Department wise CO's & PO's

Bachelor of Technology (B.Tech) Academic Year : 2020- 2021

Website Link: https://vishnu.edu.in/obe.php

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

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Approved by AICTE, Accredited by NAAC-A^{++} , NBA& Affiliated to JNTUK, Kakinada

Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor's theorem and Maclaurin's theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to ME & CE)

Course Title: Engineering Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Familiarize the concepts of theoretical acoustics for their practical utility in engineering acoustics. Explanation for the significance of ultrasound and its application in NDT application.
- Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law – Learning the structural analysis through X-ray diffraction.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index- Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser – Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric

Properties Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations with derivations for polarisabilities (Qualitative)–Lorentz (internal) field - Claussius -Mosotti equation.

orthogonal trajectories, Newton's Law of cooling, Law of natural growth and decay

UNIT-IV Acoustics and Ultrasonics

Acoustics:

Introduction **–** Reverberation - Reverberation time -Classification of Sound waves- Weber–Fechner law - Sabine's formula- derivation using growth and decay method – Absorption coefficient and its determination

–factors affecting acoustics of buildings and their remedies.

Ultrasonics:

Introduction -Production of ultrasonics by Magnetostriction and piezoelectric methods - Detection of ultrasonics - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes – applications

Unit-V Crystallography and X-ray Diffraction

Crystallography:

Introduction-Space lattice, Basis, Unit Cell and Lattice Parameters-, Bravais lattices,-Crystal Systems (3D)-coordination number-Packing fraction of SC, BCC and FCC structures.

X-ray Diffraction:

Introduction - Miller indices-Separation between successive (hkl) planes. Bragg's Law-X-ray Diffractometer-Crystal Structure determination by Laue's and Powder Mehods (Qualitative).

Text Books:

1. M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017
2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018
3. P.K. Palanisamy, Applied Physics, SciTech Publications.

Reference Books:

1. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill ,2008
2. Charles Kittel "Introduction to Solid State Physics",Wiley Publications,2011
3. S.M.Sze "Semiconductor devices-Physics and Technology"-Wiley,2008
4. Halliday, Resnick and Walker, "Fundamentals of Physics", John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers

Course Outcomes:

Upon the completion of the course the students will be able to

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Explain sound waves and its propagation/absorption of construction material used in design of buildings. Analyze acoustic parameters of typical materials used in buildings. Recognize sound level disruptors and their application in architectural acoustics. Identify the use of ultrasonics in diversified fields of NDT.

CO5: Interpret various crystal systems and Analyze the characterization of materials by XRD. Identify the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique. Analysis of structure of the crystals by Laue and Powder techniques.

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.

3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- ➢ Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words

- ➢ Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary

- ➢ Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations

- ➢ Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary

- ➢ Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

I B.Tech I Semester

ENGINEERING GRAPHICS

L	T	P	C
2	0	2	3

COURSE OBJECTIVES:

- To introduce the students to use drawing instruments and to draw polygons, Engg. Curves and use scales
- To introduce the students orthographic projections, projections of points & lines.
- The objective is to make the students draw the projections of the plane inclined to both the planes.
- The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
- The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

UNIT I

Introduction to Graphics

Curves: Ellipse, Parabola and Hyperbola by general methods, Tangent & Normal, Cycloids, Involutes, tangent & normal for the curves.

Scales: Plain scale, Diagonal scale and Vernier scale.

UNIT II

Orthographic Projections: Introduction to Projections, Horizontal plane, Vertical plane, Profile plane, importance of reference lines.

Projections of points in various quadrants.

Projections of straight lines inclined to one plane, inclined to both the planes, traces.

UNIT III

Projections of planes: inclined to one reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Projections of Prisms, Pyramids, Cones and Cylinders simple positions, the axis inclined to one of the reference planes and axis inclined to both the reference planes.

UNIT V

Conversion of isometric views to orthographic views;

Conversion of orthographic views to isometric views.

COURSE OUTCOMES:

Students will be able to:

- construct Engg. Curves and scales
- understand orthographic projections, projections of points & lines.
- draw the projections of a plane inclined to both the planes.

- draw the projections of various types of solids in different positions inclined to one or both the planes.
- visualize and convert the isometric view to orthographic view and vice versa.

TEXT BOOKS:

1. N.D. Bhatt, Engineering Drawing, Charotar Publishing House Pvt. Ltd, 1ST edition, 2012.
2. Bansal Agarwal&C.M.Agarwal, Engineering Drawing, Tata McGraw Hill, 3rd edition, 2019.

REFERENCE BOOKS:

1. K.L.Narayana& P. Kannaiah, Engineering Drawing, Scitech Publications, Revised edition, 2010.
2. K.C. John, Engineering Graphics for Degree, PHI Learning, 1st edition, 2009.
3. PI Varghese, Engineering Graphics, McGraw-Hill Publishers, 1st edition, 2017.
4. P.S. Gill, Engineering Drawing, S.K. Kataria& Sons, 1st edition, 2013.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

1. To teach problem solving through Algorithms and Flowcharts
2. To elucidate problem solving through Python programming language
3. To train in the development of solutions using modular concepts
4. To explain the role of data structures in programming
5. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer

2. Develop computational thinking and be able to use Python constructs to solve basic problems

3. Understand modularization and data structures concepts in Python

4. Apply file handling concepts in problem solving

5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners' English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner's Compass, 7th Edition

7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press
12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to ME & CE)

Course Title: Engineering Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer
8. Determination of velocity of sound – Volume resonator.
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.

14. Energy Band gap of a Semiconductor p.n junction.

15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:

- Creating a Class with variables and methods
- Class inheritance
- Constructors
- Exception handling

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to CE & ME)

Course Title:Engineering Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. Relate the need of fuels as a source of energy to industries like thermal power stations, steel, fertilizer industry etc., and hence introduced.
3. To learn the basic principles and applications of Electrochemistry.To understand the mechanism of corrosion and how it can be prevented.
4. Explain the importance and usage of water as basic material in almost all the industries; interpret drawbacks of steam boilers and also how potable water is supplied for drinking purposes.
5. To train the students on the principles and applications of Cement, Refractories and Lubricants.

UNIT -I: Polymer Chemistry

Introduction to polymers, functionality of monomers, co-polymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosettings, Preparation, Properties and Applications of – Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N– Preparation, Properties and Applications.

Conducting polymers – polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and Applications.

UNIT-II: Fuel Technology

Fuel - Introduction – Calorific value - HCV and LCV – Bomb calorimeter – Numerical problems – Coal – – Proximate and Ultimate analysis –Significance of the analysis.

Liquid fuels – Petroleum- Refining – Cracking – Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents.

Gaseous fuels – Natural gas, LPG and CNG.

Bio-fuels- Bio-diesel and Power alcohol.

UNIT- III: Electrochemistry and Corrosion

Part-A: Electrochemistry and Its Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations).Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries- working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

Part-B: Chemistry of Corrosion

Corrosion: Introduction to corrosion, Chemical and Electrochemical theory of corrosion, Pilling-Bedworth ratio rule, Differential aeration corrosion, Waterline corrosion and Galvanic corrosion.

Environmental factors (pH, temperature, Dissolved Oxygen) affecting the rate of corrosion.

Protection – Galvanizing, Tinning, Electroplating and Electro less plating (Nickel and Copper). Organic coatings - Paints (constituents and functions).

UNIT -IV: Water Technology

Introduction –Soft Water and Hardness of water, Estimation of hardness by EDTA Method - Boiler troubles - scale and sludge, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Zeolite and Ion-exchange processes. Municipal water treatment –Break point of chlorination. Deflouridation technique.

Desalination of Brackish water- Reverse Osmosis (RO) and Electrodialysis.

UNIT -V: Chemistry of Materials

Cement: Introduction to Building materials – Portland cement, constituents, manufacturing process- raw materials for manufacturing process, reactions below 1300^{o}C and reactions between 1300 and 1450^{o}C, reactions during cooling, grinding or storage, chemical equations, Chemistry of setting and hardening of cement (hydration, hydrolysis, equations).

Lubricants: Definition, Properties and Applications.

Refractories: - Definition, Classification, Properties and Applications.

Text Books :

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.
3. A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course,Students will be able to,

1. Recall the information related to polymers and their application. (Remembering)
2. Classify the different types of fuels and its applications.(Understanding)
3. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing) Solve the corrosion related problems. (Applying)
4. Use the information related to water treatment methods. (Applying)
5. Design manufacturing process of cement. (Creating)

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I Year II Semester CE	BUILDING MATERIALS AND CONCRETE TECHNOLOGY	L	T	P	C
		3	0	0	3

Course Objectives

1. To introduce various building construction materials
2. To describe various properties of ingredients of concrete
3. To explain various properties and tests of fresh and Hardened Concrete

Syllabus

Unit - I (Stones, Bricks, Tiles, Wood and Paints)

Stones: Classification of Stones–Properties of stones in structural requirements

Bricks: Composition of good brick earth, Various methods of manufacturing of bricks

Tiles: Characteristics of good tile–Manufacturing methods, Types of tiles

Wood: Structure–Properties–Seasoning of timber–Classification of various types of woods usedin buildings – Defects in timber

Paints: White washing and distempering, Constituents of paint–Types of paints–Painting of newand old wood – Varnish

Unit – II (Aggregates, Cement and Admixtures)

Aggregates: Classification of aggregate, Bond, Strength and other mechanical properties ofaggregate, Physical properties of aggregate, bulking of sand, Deleterious substance in aggregate, Soundness of aggregate, Alkali-Aggregate reaction – Thermal properties, Sieve analysis – Fineness modulus – Grading curves – Grading of fine and coarse aggregates as per relevant IS code, Maximum aggregate size

Portland Cement: Chemical composition, Hydration, Structure of hydrated cement–Setting ofcement, Fineness of cement, Tests for physical properties – Different grades of cements **Supplementary cementitious materials:** Fly ash, GGBS, Silica fume, Rice husk ash, Calcinated ash(Basic properties and their contribution to concrete strength) **Admixtures:** Mineral and Chemical admixtures

Unit - III (Fresh Concrete)

Manufacture of concrete – Mixing and vibration of concrete, Workability – Segregation and bleeding– Factors affecting workability, Measurement of workability by different tests, Effect of time and temperature on workability – Quality of mixing water, Ready mix concrete, Shotcrete

Unit - IV (Hardened Concrete)

Water / Cement ratio – Abram's law, Gel space ratio, Nature of strength of concrete – Maturity concept, Strength in tension and compression – Properties of Hardened Concrete (Elasticity, Creep, Shrinkage, Poisson's ratio, Water absorption, Permeability, etc.), Relating between compression and tensile strength, Curing

Unit - V (Testing of Hardened Concrete)

Factors affecting properties of Hardened concrete, Compression tests, Tension tests, Flexure tests, Non-destructive testing methods – Codal provisions for NDT – Rebound hammer and UPV method

Course Outcomes (COs)

1.Know various engineering properties of building construction materials and suggest their suitability

2.Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design

3.Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete

TEXT BOOKS

1. "Concrete Technology" by M. S. Shetty - S. Chand & Co., 2004
2. "Engineering Materials" by Rangwala S C, (36th edition), Anand Charotar Publishing House
3. "Concrete Technology" by Shantha Kumar – Oxford Publications

REFERENCE BOOKS

1. "Building Materials" by S. K. Duggal, New Age International Publications
2. "Building Materials" by P. C. Verghese, PHI learning (P) Ltd., 2009
3. "Properties of Concrete" by A. M. Neville – Pearson.

Year/Semester	I.B.Tech-II Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Engineering Mechanics**				
Branch	CIVIL Engineering				

COURSE OBJECTIVES:

1. Understand particle, body, rigid body, concept of force, analysis of forces acting on a rigid body
2. Understand moment and the principle of moments
3. Understand the laws of friction and its applications
4. Analyzing trusses for its member forces.
5. Understand the concept of centre of gravity and area moment of inertia
6. Understanding principles of kinematics and kinetics applied to rigid bodies.

UNIT I

STATICS OF PARTICLES AND RIGID BODIES

Introduction: Fundamental concepts and principles of engineering mechanics – Forces on particles – Concurrent forces in a plane – Resolution of forces – Resultant of several concurrent forces.

Equilibrium of Particles: Free body diagram – Equilibrium of rigid bodies in two dimensions- Equilibrium of a two, three force body.

Moment of a force – Varignon's theorem – Equivalent system of forces – Reduction of system of forces into single force and couple.

UNIT II

FRICTION AND TRUSSES

Friction: Introduction-Types of friction – laws of Friction – Limiting friction – Cone of friction-static and Dynamic Frictions. Applications of Friction: Wedges – Ladder friction.

Analysis of trusses – statically determinate and indeterminate structures – Method of Joints.

UNIT III

PROPERTIES OF SURFACES AND VOLUMES

Centre of Gravity: Centroids of lines, areas, and volumes – Determination of centroids by integration – Theorem of Pappu's.

Area Moment of Inertia: Second moment or Moment of inertia of an area – Determination of moment of inertia of area by integration – Radius of gyration – Parallel and perpendicular axis theorems

UNIT IV

KINEMATICS

Rectilinear motion: **U**niform velocity and uniformly accelerated motion – Rectangular components of velocity and acceleration, Variable acceleration

Curvilinear motion: Normal and tangential components – Radial and transverse components – Motion of Projectile

UNIT V

KINETICS

Newton second law – D. Alembert's principle, Principle of work and energy for a rigid body – connected bodies – Principle of impulse and momentum – connected bodies.

COURSE OUTCOMES:

The students will be able to:

1. Simplify the system of forces and moments to equivalent systems and construct free body diagrams and develop appropriate equilibrium equations
2. Analyze systems with friction and for member forces
3. Determine centroids of simple and composite areas and moment of inertia.
4. Apply the fundamental concepts of kinematics of particles and rigid bodies along with equilibrium condition in solving engineering problems
5. Analyze the problems of simple systems and connected bodies for displacement, velocity and acceleration.

TEXT BOOKS:

1. Timoshenko and Young, Engineering Mechanics, 3rdEd, McGraw HillPublishers,2006.
2. Engineering Mechanics - Statics and Dynamics/ Ferdin L. Singer/Harper International Edition.

REFERENCE BOOKS:

1. Engineering Mechanics: Statics and Dynamics/James L. Meriam, L. Glenn Kraige/7th/John Wiley & Sons/2012.
2. Engineering Mechanics: Statics and Dynamics/R. C. Hibbeler/13th/ Prentice Hall/2012.
3. Vector Mechanics for Engineers: Statics and Dynamics/ Ferdinand. P. Beer. E, Russell Johnston Jr., David Mazurek, Philip J Cornwell/6th/ McGraw-Hill/2012.
4. Theory and problems of Engineering Mechanics -Statics and Dynamics/ Mclean, and Nelson/ Schaum Series/2010.
5. Engineering Mechanics -Statics and Dynamics A K Tayal /Umesh Publications/2008.
6. Engineering Mechanics/ Rajasekaran.S, &Sankarasubramanian.G/3rd/Vikas Publishing House/2004.
7. A Text book of Engineering Mechanics/ Dr.Bansal.R.K, & Sanjay Bansal /8th/Lakshmi publications/2014.
8. A Text book of Engineering Mechanics/ R. S. Kurmi /20th/S. Chand
9. A Text book of Engineering Mechanics/ S. S. Bhavakatti /2nd/New age international/2014.

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Year/Semester	I B. Tech/IISem	L	T	P	C
Regulation Year	2020-21	1	0	4	3
Subject	ComputerProgramming				
Branches	ME & CE				

Course Objectives:

- To design & develop C programs using selection and repetition control statements
- To design & develop C programs using arrays and strings
- To design & develop C programs using structures, unions, pointers
- To design & develop modular programs using functions
- To design & develop C programs using the concepts – user defined datatypes, preprocessor directives, storage classes

Course Outcomes:

By the end of the course, the students should be able to:

- Use the appropriate control statements to write programs for the given task
- Write programs using arrays and strings
- Use structures, unions and pointers in programming
- Write programs using modular programming
- Write programs using user defined datatypes, preprocessor directives, storage classes

Unit-1

Introduction to the C Language: C Programming Basics: Identifiers, Types, Variable, Constants, Input/output, Operators, Expression Evaluation, Control Statements - Decision Control, Repetition Control, break, continue, Exercise programs covering these concepts

Unit-2

Derived Datatypes: Arrays, Two Dimensional Arrays, Multidimensional Arrays, Programming Examples, Strings: String Concepts, C String, String Input / Output Functions, Predefined string handling functions, Exercise programs covering these concepts

Unit-3

Structures: Definition, Variable declaration and initialization, Programming Examples, Nested Structures, Unions, Difference between Structure and Union, Pointers - Declaration & initialization, Operations on pointers, Exercise programs covering these concepts

Unit-4

Functions: Definition, Declaration, Function call, Predefined vs. User defined Functions, return statement, Types of functions, Parameter passing techniques – Call by value and Call by reference, Recursion, Tail recursion, Exercise programs covering these concepts

Unit-5

User defined datatypes: typedef, enum, Preprocessor directives: #include, #define, Conditional compilation directives, Global vs. Local variables, Storage classes, Scope and lifetime of a variable, Exercise programs covering these concepts

Text Books:

1) Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE.
2) The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson
3) Programming in ANSI C, E Balagurusamy, Mcgraw Hill

DEPARTMENTOFCIVIL ENGINEERING

IYear-II Semester		L	T	P	C
		0	0	3	1.5
BUILDINGPLANNINGANDCOMPUTER AIDEDBUILDINGDRAWING (ESC1205)					

Aim andObjectiveof this course

Tohelpthestudenttoattaincompetencyinpreparationofengineeringdrawingsasperprinciplesofplanningusing asuitableCADsoftwarethroughvarious teaching learningexperiences:

CourseOutcomes(COs)

1. Performbasic commands ofany suitableCADsoftwareto draw2Ddrawings
2. Interpretthe conventions,signsandsymbolsfromagivendrawing.
3. Preparelineplansof residentialandpublic buildingsusing principlesofplanning.
4. Prepare submission and working drawing from the given requirement for Load BearingandFramed structures

MajorEquipment/Instruments/Systemrequired

1. Computer with specification suitable for relevant CAD software with any suitableCADSoftware
2. LaserPrinterpreferablyfortheoutputofA3size.

Week1and 2

Conceptsto bestudied
IntroductiontoCADsoftware*:Basic commandsofCADtodraw, modify2Ddrawings*

Building Byelaws: Introduction – Terminology – Objectives of building byelaws – Principles underlayingbuilding byelaws – Types of Buildings.

Regulations: Introduction–DevelopmentControlRulesofbuildings–GeneralBuildingRequirements as per NBC – Open space, Lighting and ventilation requirements – Floor area ratio &Floorspaceindex.

Conventions, signs and symbols: Conventions as per IS 962-1989, signs and symbols for earthwork,brickwork,stonework, concrete, woodwork andglass used in civilengineering.

Construction, Graphical symbols for door and window, Abbreviations, symbols for sanitary andelectricalinstallations.

Typesoflinesandscales: Typesoflines-visiblelines,centreline,hiddenline,sectionline,dimensionline,extensionline,pointers,arrowheadordots.AppropriatesizeofletteringandnumeralsforTitles, sub titles, notes and dimensions.

Types of scale- Monumental, Intimate, criteria for Proper Selection of scale for various types ofdrawing.

Sizesofvariousstandardpapers/sheets.

Exercise0
Prepareagiven linedrawing inminimumthreelayersusing CADsoftware.

Exercise1
ReadingandinterpretingreadymadeArchitecturalbuildingdrawing(TobeprocuredfromArchitect,PlanningConsultants, Planning Engineer)

Week3and 4

Conceptstobestudied
Principlesofbuildingplanning: Introductiontobuildings,ClassificationofBuildings,BuildingComponents,Orientation ofbuilding, Principles ofarchitecture composition

PrinciplesofplanningofResidentialandPublicbuilding,OrientationofbuildingandPrinciplesofarchitecturecomposition :Aspect,ProspectOrientation,Grouping,Privacy,Elegance,Flexibility.Roominess, Circulation, Furniture requirements, Sanitation, Ventilation, Illumination and Economy.**Spacerequirementsandbye-laws:**Spacerequirementandnormsforminimumdimensionofdifferentunitsintheresidentialandpublicbuildingsasper IS962-1989.Rulesandbye-lawsofsanctioningauthoritiesforconstructionwork.Plotarea,builtuparea,superbuilt-uparea,plintharea,carpetarea, floorareaand FAR (FloorAreaRatio) / FSI.

Exercise2
Lineplansforresidentialbuildingofminimumthreeroomsincludingw/c,bathandstaircaseasperprinciplesof planning.

Exercise3
Lineplansforpublicbuilding-schoolbuilding,primaryhealthcentre,restaurant,bank,postoffice,hostel,Function Hall andLibrary.

Week5, 6and 7

Conceptsto bestudied
Drawing of Load Bearing Structure: *Developed plan, elevation, section, site plan, schedule ofopeningsconstruction notes with specifications, area statement.Planning and designofstaircaseRise and Tread for residential and public building (2 BHK Load bearing structure). Component partsofthegiven load bearing structure*

Exercise4
Drawdevelopedplan,elevation,section,siteplanfromthegivenlineplanforaloadbearingresidentialbuilding (2BHK) with stair case.

Exercise5
Prepare submission drawing (including foundation plan) of the given load bearing residential buildingwithstair case.

Week8, 9,and10

Conceptsto bestudied

DrawingofFramedStructure:*Developedplan,elevation,section,siteplan,scheduleofopeningsconstructionnoteswithspecifications,areastatement.Planninganddesignofstaircase*Riseand

Treadforresidentialandpublicbuilding(G+1,2BHKframedstructure).Componentpartsofthegivenframed structure

Exercise7

Drawdevelopedplan,elevation,section,siteplanfromthegivenlineplanforframedstructureresidentialbuilding including stair case(2BHK, G+1).

Exercise8

Preparesubmissiondrawing(includingfoundationplan)ofthegivenframedstructureresidentialbuildingwith stair case.

Note: Itismandatorythatstudentperformsall9Exercises(from0to8).

SUGGESTEDSTUDENTACTIVITIES

1. Preparereporton Provisionsgivenin NationalBuilding Code2005.
2. CollectandstudybuildingByelaws,rulesandregulationforplanningasperlocalcompetentauthority.
3. Preparelistofthedocumentsrequiredforobtainingpermissionforconstructionofresidentialbuilding/apartmentfrom competent authority andwritereport.
4. Preparelistofthedocumentsrequiredforobtainingpermissionforconstructionofcommercialbuildingfrom competent authority and writereport.
5. Prepareamodelofasimplebuildingusingcardboardshowingdifferentcomponentswithsuitablecolour.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common toCE &ME)

Course Title: Engineering Chemistry lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuri (2012) Laboratory Manual of Engineering chemistry-II, VGS, Techno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

CE	ENGINEERING WORKSHOP LAB	L	T	P	C
		0	0	3	1.5

Course Objectives:

- To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
- To identify the hand tools and instruments used in the fitting, carpentry, black smithy and tin smithy trades.
- To acquire skills in basic engineering practices like fitting, carpentry, black smithy and tin smithy etc.
- To gain measuring and marking skills.
- To gain basic knowledge in electrical wiring and assembly and disassembly of computer.

Note: At least two exercises to be done from first five trades & experiment from last trade is compulsory.

TRADES:

Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring

3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel

System Assembly

1. Assembly & Disassembly of computer

OUT COMES:

The student will be able to

- Identify the basic tools and equipments used in carpentry, fitting, black smithy, house wiring and tin smithy.
- Produce different joints in carpentry trade such as lap and dove tail joint
- Produce various fittings in the trade of fitting such as sqaure fit and V fit.
- Make various objects in tinsmithy trade such as open scoop and square box.
- Perform various basic house-wiring connections
- Produce various shapes in black smithy trade such as round rod to square rod and S hook
- Assemble & Disassemble of computer

TEXT BOOKS:

1.Workshop Technology Vol I & II/ S K Hajra Choudhury, A K Hajra Choudhury, N. Roy/ Media Promoters & Publishers Pvt. Ltd.

2. Workshop Practice/H S Bawa/ McGraw Hill Education; 2nd edition

REFERENCE BOOKS:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.

2. Engineering Practices Lab Manual/Jeyapoovan, Saravana Pandian, 4/e Vikas

3. Dictionary of Mechanical Engineering/GHF Nayler/Jaico Publishing House

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to ECE, CE, ME,AI&DS, CS&BS)

Course Title: Environmental Science

Objectives:

To make the student to get awareness on environment, to understand the important of protecting natural recourses, ecosystems for futures generations and pollution causes due to the day to day activates of human life to save Earth from the inventions by the engineers.

UNIT – I: Multidisciplinary nature of Environmental Science and Ecosystems

Definition, Scope and Importance – Sustainability: Need for public awareness-Human population and Environment.

Ecosystems:Concept of an ecosystem. - Structure and function of an ecosystem. -Types of Ecosystem-Forest, Grassland, Desert and Aquatic Ecosystems– Food chains, food webs and ecological pyramids.

UNIT – II: Natural Resources

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources: Conflicts over water, Dams – benefits and problems

Mineral resources: Use and exploitation, Environmental effects of extracting and using mineral resources.

Energy resources: Growing energy needs, renewable and non-renewable energy sources

Food resources: World food problems.

Land resources: Wasteland reclamation.

Role of an individual in conservation of natural resources.

UNIT – III: Biodiversity and its conservation

Definition, Genetic, species and ecosystem diversity- classification - Value of biodiversity: Consumptive use, Productive use, Social use, Biodiversity at national and local levels. Hot-spots of biodiversity - Threats to biodiversity - Endangered and Endemic species of India – Conservation of biodiversity

UNIT – IV: Environmental Pollution

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. Pollution case studies.

Solid Waste Management: Sources, effects and control measures of urban and industrial solid wastes. Bio medical and e-waste management.

Global Environmental Challenges: Global warming and climate change-Acid rains, Ozone layer depletion.

UNIT – V: Social Issues and Environmental Management

Urban problems related to energy -Water conservation, Rain water harvesting-Resettlement and rehabilitation of people. Environmental Protection Act –Air Act –Water Act - Wildlife Protection Act - Forest Conservation Act-Public awareness.

International protocols: Stockholm and Rio Summit, Kyoto protocol and Montreal Protocol.

Impact Assessment and its significance various stages of EIA, Environmental audit, Ecotourism. The student should Visit an Industry / Ecosystem.

Text Books

1. A Textbook of Environmental Studies, Shashi Chawla, TMH, NewDelhi.
2. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford UniversityPress

References

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers,Vijayawada.
2. Text Book of Environmental Studies, DeekshitaDave& P. Udaya Bhaskar, Cengage Learning.
3. Textbook of Environmental Science and Technology – Dr. Anji Reddy, BS Publications.
4. Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers,2014.
5. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education,Chennai.
6. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, NewDelhi.

Course Outcomes: Students will be able to

1. Articulate the basic structure, functions, and processes of key social systems affecting the Environment.
2. Explain how Natural Recourses should be used.
3. Identify the threats to biodiversity.
4. Understand causes, effects and control measures of Environmental pollution.
5. Gain knowledge about Watershed management and Environmental ethics.Gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

Subject	BUILDING MATERIALS AND CONSTRUCTION				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. Initiating the student with the knowledge of basic building materials and theirproperties.
2. Imparting the knowledge of course pattern in masonry construction and flat roofsand techniques of forming foundation, columns, beams, walls, sloped and flatroofs.
3. The student is to be exposed to the various patterns of floors, walls, different typesof paints and varnishes.
4. Imparting the students with the techniques of formwork and scaffolding.
5. The students should be exposed to classification of aggregates, moisture contentof the aggregate.

UNIT – I

STONES, BRICKS AND TILES

Properties of Building Stones – Relation to Their Structural Requirements. Classification of Stones – Stone Quarrying – Precautions in Blasting, Dressing of Stone, Composition of Good Brick Earth, Various Methods of Manufacturing of Bricks. Characteristics of Good Tile – Manufacturing Methods, Types of Tiles. Use of Materials like Aluminum, Gypsum, Glass and Bituminous Materials – Their Quality.

UNIT-II

MASONARY

Types of Masonry, English and Flemish Bonds, Rubble and Ashlar Masonry, Cavity and Partition Walls.

WOOD: Structure – Properties – Seasoning of Timber. Classification of Various Types of Woods Used In Buildings – Defects in Timber. Alternative Materials for Wood, Galvanized Iron, Fiber-Reinforced Plastics, Steel, Aluminum.

UNIT – III

LIME AND CEMENT

Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime.

Cement: Portland cement – Chemical Composition - hydration, Setting and Fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of Cement concrete and their importance – various tests for concrete.

UNIT-IV

BUILDING COMPONENTS

Lintels, Arches, Vaults - stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazzo floors, pitched, flat Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace and pre-fabricated roofs.

UNIT-V

FINISHINGS:

DampProofing and water proofing materials and uses- Plastering, pointing, white washing and distempering

Paints: Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish

Form works and scaffoldings.

UNIT – VI

AGGREGATES

Classification of aggregate – Coarse and fine aggregates – Particle shape and Texture – Bond and strength of Aggregate – Specific gravity – Bulk density, porosity and Absorption – Moisture content of Aggregate – Bulking of sand- Sieve analysis.-Various tests for aggregates

TEXT BOOKS:

TB1: Building Materials, S. S. Bhavikatti, Vices publications House private ltd.

TB2: Building Materials, B. C. Punmia, Laxmi Publications private ltd.

REFERENCES:

R1: Building Materials, S. K. Duggal, New Age International Publications.

R2: Building Materials, P. C. Verghese, PHI learning (P) ltd.

R3: Building Materials, M. L. Gambhir, Tata McGraw Hill Publishing Co. Ltd. NewDelhi..

R4: Building Materials, Construction and Planning, S. MahaboobBasha, Anuradha Publications, Chennai.

Subject	ENGINEERING GEOLOGY				
Year /semester	II B.Tech/I Sem	L	T	P	C
Regulation year	2020-21	3	0	0	3

Prerequisite: Physics and Chemistry

COURSE OBJECTIVES:

1. To introduce the Engineering Geology as a subject in Civil Engineering.
2. To enable the student to use subject in civil engineering applications.
3. To know the Geological history of India.

SYLLABUS:

UNIT I:

INTRODUCTION: Branches of Geology, Importance of Geology in Civil Engineering with case studies.

Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

UNIT II:

MINERALOGY AND PETROLOGY: Definitions of mineral and rock, Different methods of study of mineral and rock, The study of physical properties of minerals and rocks for megascopic study for the following minerals and rocks, Common rock forming minerals are Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and other ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite And Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT III:

STRUCTURAL GEOLOGY: Strike , Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

UNIT IV:

GROUND WATER: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earthquakes And Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

UNIT V:

GEOPHYSICS: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric

method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT VI:

GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunneling, effects, Lining of Tunnels. Influence of Geology for successful Tunneling.

COURSE OUTCOMES:

1. Identify and classify the geological minerals.
2. Judge the strength & suitability of various rocks for civil engineering use.
3. Identify earthquake prone areas to make necessary hazard mitigation.
4. Prepare, analyze and interpret the Engineering Geologic maps for the ground conditions.
5. Test the geological materials and ground to check the suitability of civil engineering project construction.
6. Do site selection for mega engineering projects like Dams, Tunnels, disposal sites

TEXT BOOKS:

1. 'Engineering Geology' by Subinoy Gangopadhay, Oxford University press.
2. 'Engineering Geology' by D. Venkat Reddy, Vikas Publishing House pvt. Ltd, 2013.
3. 'Engineering Geology' by N. Chenn Kesavulu, Trinity Press (Laxmi Publications), 2nd Edition, 2014.
4. 'Engineering Geology' by Vasudev Kanithi, University Press.

REFERENCES:

1. Engineering Geology for Civil Engineers' by P.C. Varghese,PHI learning pvt. Ltd.
2. 'Geology for Engineers and Environmental Society' by Alan E Kehew, person publications, 3rd edition
3. 'Fundamentals of Engineering Geology' by P.G. Bell, B.S.P. Publications, 2012.
4. 'Engineering Geology' by V.Parthesarathi et al., Wiley Publications
5. 'Environmental Geology' by K.S. Valdiya, McGraw Hill Publications, 2nd ed.

SUBJECT	**SURVEYING AND GEOMATICS**				
YEAR/ SEMESTER	**II B.Tech/ I Sem**	**L**	**T**	**P**	**C**
REGULATION YEAR	**2020-21**	**3**	**-**	**-**	**3**

COURSE LEARNING OBJECTIVES:

To introduce the students to basic principles of surveying, various methods of linear and angles measuring instruments and enable the students to use surveying equipments.

COURSE OBJECTIVES:

Upon successful completion of the course, the student will be able:

1. To demonstrate the basic surveying skills
2. To use various surveying instruments.
3. To perform different methods of surveying
4. To compute various data required for various methods of surveying.
5.To integrate the knowledge and produce topographical map.

SYLLABUS:

UNIT-I :

INTRODUCTION TO SURVEYING: definition-Uses of surveying- overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications – Errors in survey measurements

UNIT-II :

LEVELLING & CONTOURING: Concept and Terminology, Levelling Instruments and their Temporary and permanent adjustments- method of levelling. Characteristics and Uses of contours- methods of conducting contour surveys.

UNIT-III :

THEODOLITE: Description, principles-uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite – Introduction to Trigonometrical leveling.

TACHOMETRIC SURVEYING: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT-IV :

CURVES: Types of curves, design and setting out – simple and compound curvesIntroduction to geodetic surveying, Total Station and Global positioning system

COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits

UNIT-V :

MODERN FIELD SURVEY SYSTEMS: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Total Station – Parts of a Total Station – Accessories , Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey, Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS.

UNIT-VI :

PHOTOGRAMMETRY SURVEYING: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements , terrestrial photogrammetry, flight planning, Stereoscopy, ground control extension for photographic mapping, aerial

triangulation, radial triangulation, methods; photographic mapping.

TEXT BOOKS:

1. Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.
2. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. B.C.Punimia, Surveying, Vol-I, II and III, Laxmi Publications.
4. Advance Surveying, Satish Gopi, R. Sathi Kumar and N. Madhu, Pearson Publications.
5. Text book of Surveying, C. Venkataramaiah, University press, India Limited.
6. Surveying and levelling, R. Subramanian, Oxford University press.

REFERENCES:

1. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010
2. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.
3. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011
4. Text book of Surveying, S.K. Duggal (Vol No. 1&2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.
5. Text book of Surveying, Arora (Vol No. 1&2), Standard Book House, Delhi

COURSE OUTCOMES

1. An ability to apply knowledge of mathematics, science, and applied sciences
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to formulate or design a system, process or program to meet desired needs
4. An ability to function on multi-disciplinary teams
5. An ability to identify and solve applied science problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of solutions in a global and societal context

Subject	**ENGINEERING MECHANICS**				
Year /semester	**II B.Tech/I Sem**	**L**	**T**	**P**	**C**
Regulation year	**2020-21**	**3**	**0**	**0**	**3**

Prerequisites:
The student should have knowledge in Mathematics and Physics for solving problems.

COURSE OBJECTIVES:
The students completing this course are expected to

1. Understand the concepts of forces and its resolution in different planes, resultant of force system.
2. Know about forces acting on a body, their free body diagrams using graphical methods.
3. Understand the concepts of centre of gravity and moments of inertia and their application.
4. Have knowledge about different types of motion, friction and application of work - energy method.

SYLLABUS:

UNIT-I :

INTRODUCTION TO ENGINEERING MECHANICS & FORCE SYSTEMS: Introduction to Engineering Mechanics covering, Force Systems Basic concepts, System of Forces, Coplanar Concurrent Forces, Resultant Force, Moment of Forces and its Application, Couples. Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT-II

FRICTION: Friction covering, Types of friction, Limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction, Laws of Friction, Static and Dynamic Friction, Motion of Bodies, ladder friction, wedge friction, screw jack & differential screw jack.

UNIT-III

CENTRIOD: Centroid and Centre of Gravity covering, Centroids of simple figures from first principle Centroid of composite sections Centre of gravity of simple solid bodies from first principle, Centre of gravity of simple body centre of gravity of composite bodies, Pappus theorems.

UNIT-IV

MOMENT OF INERTIA: Area moment of inertia- Definition , Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass moment Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies inertia of thin solid rod circular plate M.I of Circular ring M.I of Cylinder, Cone, and Sphere

UNIT-V

KINEMATICS & KINETICS: Review of particle Kinematics, Rectilinear motion and Plane curvilinear motion- Velocity and Acceleration –Motion of Rigid Body. **Kinetics** of Rigid Bodies covering Basic terms, general principles in dynamics Types of motion Instantaneous centre of rotation in plane motion and simple problems, Impulse-momentum Kinetics of rigid body rotation.

UNIT-VI

WORK, ENERGY, POWER: Work energy principle, Application in plane motion of connected bodies, Plane motion, impulse momentum method.

COURSE OUTCOMES:

Uponthe successful completion ofthis course, the studentswill be able to:

1. Understand the concepts of force and friction, direction and its application.
2. Know the application of free body diagrams and make solution to problems using graphical methods and law of triangle of forces.
3. Calculate the centroid and centre of gravity.
4. Exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.
5. Exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
6. Exposed to concepts of work, energy and particle motion

TEXT BOOKS:

1. Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall
2. F. P. Beer and E. R. Johnston (2011), Vector Mechanics for Engineers, Vol I - Statics, Vol II, – Dynamics, 9th Ed, Tata McGraw Hill
3. Timoshenko solutions Manual 5^{th} edition – Engineering Mechanics by Timoshenko.
4. R. C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.
5. Andy Ruina and Rudra Pratap (2011), Introduction to Statics and Dynamics, Oxford University Press

REFERENCES:

1. Shanes and Rao (2006), Engineering Mechanics, Pearson Education
2. Hibler and Gupta (2010),Engineering Mechanics (Statics, Dynamics) by Pearson Education
3. Reddy Vijaykumar K. and K. Suresh Kumar(2010), Singer's Engineering Mechanics
4. Bansal R.K.(2010), A Text Book of Engineering Mechanics, Laxmi Publications
5. Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.
6. Tayal A.K. (2010), Engineering Mechanics, Umesh Publications

Subject	ENGINEERING GEOLOGY LAB				
Year /semester	II B.Tech/I Sem	L	T	P	C
Regulation year	2020-21	0	0	3	1.5

Prerequisite: Knowledge on physics and chemistry is necessary.

LABORATORY OBJECTIVES:

1. To identify the mega-scopic types of Ore minerals & Rock forming minerals and the mega-scopic types of Igneous, Sedimentary, Metamorphic rocks.
2. To identify the topography of the site & material selection

LIST OF EXPERIMENTS:

EXP1: Physical and Engineering properties of minerals: Mega-scopic identification of Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc,

EXP2: Physical and Engineering properties of minerals: Mega-scopic identification of Rock forming minerals – Chlorite, Olivine, Kyanite, Asbestos, Tourmaline, Calcite, Gypsum.

EXP3: Physical and Engineering properties of minerals: Mega-scopic identification of Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc

EXP4: Megascopic description and identification of Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt

EXP5: Megascopic description and identification of Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglomerate

EXP6: Megascopic description and identification of Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite &Biotiteschist, Marble, Khondalite.

EXP7: Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities.

EXP8: Simple Structural Geology Problems.

EXP9: Field work – To identify Minerals, Rocks, and Geomorphology & Structural Geology.

EXP10: To identify the minerals and rocks Augite, Hornblende, Bauxite, Galena, Soapstone

LABORATORY OUTCOMES:

CO1: Understand the physical properties of Rocks & Minerals

CO2: Know the occurrence of materials using the strike & Dip problems.

CO3: Capable to draw the sections for geological maps showing faults & unconformities.
CO4: Investigate the site for civil engineering projects

TEXT BOOKS:

1. 'Engineering Geology' by SubinoyGangopadhay, Oxford University press.
2. 'Engineering Geology' by D. Venkat Reddy, Vikas Publishing House pvt. Ltd, 2013.
3. 'Engineering Geology' by N. ChennKesavulu, Trinity Press (Laxmi Publications), 2nd Edition, 2014.
4. 'Engineering Geology' by Vasudev Kanithi, University Press.

REFERENCES:

1. Engineering Geology for Civil Engineers' by P.C. Varghese,PHI learning pvt. Ltd.
2. 'Geology for Engineers and Environmental Society' by Alan E Kehew, person publications, 3rd edition
3. 'Fundamentals of Engineering Geology' by P.G. Bell, B.S.P. Publications, 2012.
4. 'Engineering Geology' by V.Parthesarathi et al., Wiley Publications
5. 'Environmental Geology' by K.S. Valdiya, McGraw Hill Publications, 2nd ed

NAME OF THE LAB	**SURVEYING LABORATORY**				
YEAR/ SEMESTER	**II B.Tech/ I Sem**	**L**	**T**	**P**	**C**
REGULATION YEAR	**2020-21**	**-**	**-**	**3**	**1.5**

COURSE OBJECTIVES:

1. Aimed at acquiring practical knowledge of various components of chain Surveying.
2. To understand compass surveying, plane table surveying & levelling.
3. To understand surveying with theodolite.
4. Understand the usage and functions of Total Station & DGPS

LIST OF EXPERIMENTS:

1. Chaining across obstacles and determine its area.
2. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
3. Radiation method or intersection methods by plane Table survey
4. Two point or three point problems in plane table survey
5. Levelling H.I & Rise & fall
6. Two exercises on contouring.
7. Measurement of horizontal angles by method of Repetition and Reiteration.
8. Trigonometric Levelling - Heights and distance problem.
9. Heights and distance using Principles of tachometric surveying.

10. Curve setting – different methods.
11. Total Station Surveying - Measurements of Distances and Angles, Slope distances, Height, Traversing,
12. DGPS Surveying – Coordinate Measurements.

TEXT BOOKS:

1. Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.
2. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. B.C.Punimia, Surveying, Vol-I, II and III, Laxmi Publications.

REFERENCES:

1. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010
2. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001
3. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros,2011

COURSE OUTCOMES:

1. Able to Use handle Linear and angular measurements.
2. Able to draw contour maps.
3. Knowledge on calculating elevations of ground.
4. Familiar in using modern tool.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

Subject	STRENGTH OF MATERIALS – 1 (19CE4T01)				
Year / Semester	II B.tech/IISem	L	T	P	C
Regulation Year	2020-21	3	0	0	3

Course Learning Objectives:

- To impart preliminary concepts of Strength of Material and Principles of Elasticity and Plasticity Stress strain behavior of materials and their governing laws. Introduce student the moduli of Elasticity and their relations
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.
- To give concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections
- The concepts above will be utilized in measuring deflections in beams under various loading and support conditions
- To classify cylinders based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

Course Outcomes:

- The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
- The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
- The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
- The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.

SYLLABUS:

UNIT – I

Simple Stresses And Strains And Strain Energy: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force And Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R, Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

UNIT –IV

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections, built up beams, shear centre.

UNIT – V

Deflection Of Beams: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L. Uniformly varying load. Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – VI

Thin And Thick Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in diameter, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

1. Strength of Materials by Strength of materials, R. K. Rajput, S. Chand & Co, New Delhi

2. Strength of Materials by S. Ramamrutham,

REFERENCES:

1. Strength of Materials by R.K Bansal, Lakshmi Publication

2. Strength of Materials by R. . Subramanian, Oxford University Press, New Delhi

3. Mechanics of Materials by B.C Punmia, Jain and Jain.

Subject	**CONCRETE TECHNOLOGY (19CE4T02)**				
Year / Semester	**II B.tech/IISem**	**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**3**	**0**	**0**	**3**

Prerequisite: Knowledge on Building materials is necessary.

COURSE OBJECTIVES:

1. To learn the concepts of Concrete production and its behavior in various environments.
2. To learn the test procedures for the determination of properties of concrete.
3. To understand durability properties of concrete in various environments.
4. Knowledge on mix design of concrete
5. Students Will be having Knowledge in emerging technologies of concrete.

UNIT I

CEMENTS &ADMIXTURES: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Tests for physical properties – Different grades of cements - Admixtures in Cements.

UNIT II

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density,

porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size

UNIT III

FRESH CONCRETE: Workability – Factors affecting– Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability –Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete–Quality of mixing water, Ready mixed concrete.

UNIT IV

HARDENED CONCRETE: Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests –Splitting tests – Non-destructive testing methods – Codal provisions for NDT.

UNIT V

ELASTICITY, CREEP &SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity– Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

UNIT VI

MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by BIS method of mix design. Self Compact Concrete and Fiber Reinforced Concrete.

UNIT VI:

SPECIAL CONCRETE : Ready mixed concrete, Shotcrete, Light weight aggregate concrete, Cellular concrete, No-fines concrete, High density concrete, Fibre reinforced concrete, Different types of fibres, Factors affecting properties of F.R.C, Polymer concrete,Types of Polymer concrete, Properties of polymer concrete, High performance concrete –Self consolidating concrete, SIFCON, self healing concrete.

TEXT BOOKS:

1. Concrete Technology by M. S. Shetty. – S. Chand & Co.; 2004
2. Properties of Concrete by A. M. Neville – PEARSON – 4th edition

3. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi
4. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi

REFERENCES:

1. Text Book of Concrete Technology, Mahaboob Bhasha, Anuradha publications,
2. Advanced Concrete Technology – by Zongjin Li (Author)
3. Advanced Concrete Technology - Author: John Newman, B S Choo

COURSE OUTCOMES:

1 .Identify and classify the properties of Cement, Aggregate and Concrete.
2 . Understand the behaviour of concrete in various environments.
3 . Illustrate the importance of quality of concrete.
4 . Know how to test the fresh and hardened concrete.
5 . Differentiate the concepts and effects of the Elasticity, Creep & Shrinkage.
6 . Design the concrete mix by IS method.
7 . Understand the behavior of different types of concrete in various loading And environmental conditions.

SUBJECT	**FLUID MECHANICS**				
YEAR/SEMESTER	**II B.Tech/II SEM**	**L**	**T**	**P**	**C**
REGULATION YEAR	**2020-21**	**3**	**-**	**-**	**3**

Course Learning Objectives:

• To understand the properties of fluids and fluid statics

• To derive the equation of conservation of mass and its application

• To solve kinematic problems such as finding particle paths and stream lines

• To use important concepts of continuity equation, Bernoulli's equation and turbulence, and apply the same to problems

• To analyze laminar and turbulent flows

• To understand the various flow measuring devices

• To study in detail about boundary layers theory

Syllabus:

UNIT I

Introduction : Dimensions and units – Physical properties of fluids – specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion,

pressure at a point, Pascal's law, Hydrostatic law -atmospheric, gauge and vacuum pressuresmeasurementof pressure. Pressure gauges, Manometers: Differential and Micro Manometers.

UNTI – II

Hydrostatics: Hydrostatic forces on submerged plane, Horizontal, Vertical,

inclined and curved surfaces – Center of pressure.

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak line and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flow net analysis.

UNIT – III

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line - Momentum equation and its application – forces on pipe bend.

UNIT – IV

Laminar Flow And Turbulent Flows: Reynold's experiment – Characteristics of Laminar & Turbulent flows, Shear and velocity distributions, Laws of Fluid friction, Hagen-Poiseulle Formula, Flow between parallel plates, Flow through long tubes, hydro dynamically smooth and rough flows.

Closed Conduit Flow: Darcy-Weisbach equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, variation of friction factor with

Reynold's number – Moody's Chart, Pipe network problems, Hazen-Williams formula, Hard-Cross Method,

UNIT – V

Measurement of Flow: Pitot tube, Venturi meter and Orifice meter –classification of orifices, small orifice and large orifice, flow over rectangular, triangular,

trapezoidal and Stepped notches - –Broad crested weirs

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UNIT – VI

Boundary Layer Theory: Boundary layer (BL) – concepts, Prandtl contribution ,Characteristics of boundary layer along a thin flat plate, Vonkarman momentum integralequation, laminar and turbulent Boundary layers(no deviations)- BL in transition, separationof BL, Control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

Text Books:

1. Fluid Mechanics, P. N. Modi and S. M. Seth, Standard book house, New Delhi

2. A text of Fluid mechanics and hydraulic machines, R. K. Bansal - Laxmi Publications (P)ltd., New Delhi

References:

1. Mechanics of Fluids, Merle C. Potter, David C. Wiggert and Bassem H. Ramadan,

CENGAGE Learning

2. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P.N. Chandramouli,

Oxford Higher Education.

Course Outcomes:

Upon successful completion of this course the students will be able to:

1.Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics.

2.Calculate the forces that act on submerged planes and curves.

3.Identify and analyse various types of fluid flows.

4.Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.

5.Draw simple hydraulic and energy gradient lines.

6.Measure the quantities of fluid flowing in pipes, tanks and channels.

Subject	**STRUCTURAL ANALYSIS (19CE4T04)**				
Year / Semester	**II B.tech/IISem**	**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**3**	**0**	**0**	**3**

Course Learning Objectives:

- To give preliminary concepts of assessment of bending moment and shear force in Propped cantilevers
- To give preliminary concepts of assessment of bending moment and shear force in fixed beams and continuous beams due to various loading conditions.
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions

- The procedure for development of slope deflection equations and moment distribution method to solve application to continuous beams with and without settlement of supports.
- Equip student with concepts of Arches
- The concepts of moving loads and influence lines are imparted for assessment of maximum SF and BM at a given section when loads of varying spans rolling loads of Pratt and Warren trusses. Familiarize Students with Different types of Structures .

Course Outcomes:

Upon successful completion of this course the student will be able to,

- Distinguish between the determinate and indeterminate structures.
- Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure.
- Estimate the bending moment and shear forces in beams for different fixity conditions.
- Analyze the continuous beams using various methods -, three moment method, slope deflection method, energy theorems.
- Draw the influence line diagrams for various types of moving loads on beams/bridges.
- Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.
- Analyze structures using Moment Distribution

Syllabus:

UNIT – I

Propped Cantilever: Analysis of propped cantilevers-shear force and Bending moment diagram-Deflection of propped cantilevers.

UNIT - II

Fixed Beams: Introduction to statically indeterminate beams with U. D. load, central point load,eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

UNIT - III

Continuous Beams: Introduction-Clapeyron's theorem of three moments-Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT - IV

Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

Moment Distribution Method: Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – Portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT – V

Three Hinged Arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Hinges with supports at different levels.

UNIT – VI

Moving Loads And Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load, U. D load longer than the span, U. D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a sections, single point load, U.D. load longer than the span, U.D. load shorter than the span-Influence lines for forces in members of Pratt and Warren trusses.

Text Books:

1. Basic Structural Analysis, C. S. Reddy Tata Mc.Graw-Hill, New Delhi.

2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi

3. Analysis of Structures- Vol. I and II, V. N. Vazirani and M. M. Ratwani, Khanna Publishers, New Delhi

4. Structural Analysis, R.C. Hibbeler, Pearson Education, India

5. Theory of Structures – II, B. C. Punmia, Jain & Jain, Laxmi Publications, India.

References:

1. Theory of Structures, B. C Punmia, A. K Jain & Arun K. Jain, Lakshmi Publications

2. Theory of Structures, R.S. Khurmi, S. Chand Publishers.

3. Structural Analysis-I, Hemanth Patel, Yogesh Patel, Synergy Knowledgeware, Mumbai

4. Structural Analysis I Analysis of Statically Determinate Structures, P. N. Chandramouli, Yesdee Publishing Pvt Limited, Chennai

5. Theory of structures, Ramamuratam, Dhanpatrai Publications.

6. Comprehensive Structural Analysis-Vol. I & 2, R. Vaidyanathan & P. Perumal- Laxmi Publications Pvt. Ltd., New Delhi.

Subject	**SOLID MECHANICS LAB (19CE4P01)**				
Year / Semester	**II B.tech/IISem**	**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**0**	**0**	**3**	**1.5**

COURSE OBJECTIVES:

1. To determine the tension & bending of beam
2. To Conduct the Torsion, Hardness & Spring Test
3. To Conduct Compression test on Concrete
4. To verify Maxwell's Reciprocal theorem on beams

List of Experiments

1. Tension test on Steel bar
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of Electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Setup for spring tests
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauge.

Subject	**CONCRETE TECHNOLOGY LABOURATORY (19CE4P02)**				
Year/Semester	**IIBtech/ISem**	**L**	**T**	**P**	**C**
Regulation Year	**2020-21**	**-**	**-**	**3**	**1.5**

Prerequisite: Concrete Technology

LABORATORY OBJECTIVES:

1. To test the basic properties ingredients of concrete, fresh and hardened concrete properties.

LIST OF EXPERIMENTS

EXP1: Determination of normal Consistency and fineness of cement.
EXP2: Determination of initial setting time and final setting time of cement.
EXP3:.Determination of specific gravity and soundness of cement.
EXP4: Determination of compressive o strength of cement.
EXP5: Determination of grading and fineness modulus of coarse aggregate by Sieve analysis.
EXP6: Determination of specific gravity of coarse aggregate
EXP7: Determination of grading and fineness modulus of fine aggregate (sand) By sieve analysis.
EXP8: Determination of bulking of sand.
EXP9: Determination of workability of concrete by compaction factor method.
EXP10: Determination of workability of concrete by slump test
EXP11: Determination of compressive strength of cement concrete.
EXP12: Determination of split tensile strength of concrete.
EXP13: Non-Destructive testing on concrete (for demonstration)

Note: Minimum of 10 Experiments to be done.

LABORATORY OUTCOMES:

1. Capable to Conduct test on Cement determine the basic properties of cement.
2. Able to determine the basic properties of Coarse aggregates and fine aggregates
3. Understand the properties of concrete.
4. Able to determine the Compressive strength of concrete.

REFERENCES:

List of IS Codes for Cement and Concrete

1. IS 269:1989 – Specification for ordinary Portland cement, 33 grade
2. IS 383:1970 – Specification for coarse and fine aggregates from natural sources for concrete
3. IS 455:1989 Specification for Portland slag cement
4. IS 516:1959 Method of test for strength of concrete
5. IS 650:1991 Specification for standard sand for testing of cement

6. IS 1199:1959 Methods of sampling and analysis of concrete
7. IS 1727:1967 Methods of test for pozzolanic materials
8. IS 2386(Part 1):1963 Methods of test for aggregates for concrete: Part 1 Particle size and shape
9. IS 2386(Part 2):1963 Methods of test for aggreegates for concrete: Part 2 Estimation of deleterious materials and organic impurities
10. IS 2386(Part 5):1963 Methods of test for aggregates for concrete : Part 5 Soundness
11. IS 2386(Part 6):1963 Methods of test for aggregates for concrete : Part 6 Measuring mortar making properties of fine aggregates
12. IS 3085:1965 Method of test for permeability of cement mortar and concrete
13. IS 3466:1988 Specification for masonry cement
14. IS 3535:1986 Methods of sampling hydraulic cement
15. IS 3812(Part 2):2003 Specification for pulverized fuel ash Part 2 For use as admixture in cement mortar and concrete
16. IS 5513:1996 Specification for vicat apparatus
17. IS 5514:1996 Specification for apparatus used in Le-Chatelier test
18. IS 5515:1983 Specification for compaction factor apparatus
19. IS 5816:1999 Method of test for splitting tensile strength of concrete.
20. IS 8142:1976 Method of test for determining setting time of concrete by penetration.
21. IS 9284:1979 Method of test for abrasion resistance of concrete

NAME OF THE LAB	**FLUID MECHANICS LAB**				
YEAR/SEMESTER	**II B.Tech/II SEM**	**L**	**T**	**P**	**C**
REGULATION YEAR	**2020-21**	**-**	**-**	**3**	**1.5**

COURSE OBJECTIVES:

1. To calibrate the various discharge measuring instruments for flow through pipes.
2. To determine the coefficient of discharge through small orifice and mouth piece
3. To calibrate the notches for discharge measurement for flow through open channels.
4. To determine the friction factor and losses for flow through pipes
5. To verify the Bernoulli's theorem.

List of Experiments

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump

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List of Equipment:

1. Venturimeter setup.
2. Orifice meter setup.
3. Small orifice setup.
4. External mouthpiece setup.
5. Rectangular and Triangular notch setups.

6. Friction factor test setup.

7. Bernoulli's theorem setup.

8. Impact of jets.

9. Hydraulic jump test setup.

10. Pelton wheel and Francis turbines.

11. Centrifugal and Reciprocating pumps.

References:

1. Mechanics of Fluids, Merle C. Potter, David C. Wiggert and Bassem H. Ramadan, CENGAGE Learning

2. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P.N. Chandramouli, Oxford Higher Education.

COURSE OUTCOMES: At the end of the course the student will be able to

1. Apply the theoretical principles in calibrating the flow measuring devices used in pipes, channels and tanks.
2. Understand the concept of friction factor and losses through pipes.

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The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

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SYLLABUS

DESIGN OF REINFORCED CONCRETE STRUCTURES

UNIT –I

Introduction: Working stress method Design codes and handbooks, loadingstandards – Dead, live, wind and earthquake loads, elastic theory, designconstants, modular ratio, neutral axis depth and moment of resistance,balanced, under-reinforced and over-reinforced sections, working stressmethod of design of singly and doubly reinforced beams.

Limit State Design: Concepts of limit state design – Basic statisticalprinciples – Characteristic loads –Characteristic strength – Partial load andsafety factors – representative stress-strain curves for cold worked deformedbars and mild steel bars. Assumptions in limit state design – stress – blockparameters – limiting moment of ResistanceIntroduction Materials, Constituents of concrete, recommendation of IS 456 – 2000, grades of concrete, elastic theory, design constants; singly reinforced beam.

UNIT –II

Design for Flexure: Limit state analysis and design of singly reinforcedsections- effective depth- Moment of Resistance- Doubly reinforced andflanged (T and L) beam sections- Minimum depth for a given capacity-Limiting Percentage of Steel- Minimum Tension Reinforcement- MaximumFlexural Steel- Design of Flanged Sections (T&L)- Effective width of flange– Behavior- Analysis and Design.

UNIT – III

Design for Shear, Torsion and Bond: Limit state analysis and design ofsection for shear and torsion – concept of bond, anchorage and developmentlength, I.S. code provisions. Design examples in simply supported andcontinuous beams, detailing.

Limit state design for serviceability:

Deflection, cracking and code provision, Design of formwork for beams andslabs.

UNIT – IV

Design of Compression members: Effective length of a column, Design ofshort and long columns – under axial loads, uniaxial bending and biaxialbending – Braced and un-braced columns – I S Code provisions.

UNIT –V

Footings: Different types of footings – Design of isolated and combinedfootings - rectangular and circular footings subjected to axial loads, uni-axialand bi-axial bending moments.

UNIT – VI

Slabs: Classification of slabs, design of one - way slabs, two - way slabs, andcontinuous slabs using IS Coefficients (conventional), design of waist-slabstaircase

NOTE : All the designs to taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.

2. Reinforcement detailing of continuous beams.

3. Reinforcement particulars of columns and footings.

4. Detailing of One way, Two way and continuous slabs

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part Aconsists of two questions in Design and Drawing out of which one question isto be answered. Part B should consist of five questions and design out ofwhich three are to be answered. Weightage for Part – A is 40% and Part- B is60%.

TEXT BOOKS:

1) Reinforced concrete design by S.Unnikrishna Pillai &Devdas Menon, Tata Mc.Graw Hill, New Delhi.
2) Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi
3) Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES :

1) Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
2) Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3) Design of concrete structures – ArthusH.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill,
4) 3rd Edition, 2005.
5) Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
6) Reinforced concrete structures – I.C. Syal&A.K.Goel, S.Chand Publishers
7) Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi.

Course Outcomes

- Student can able to understand action of external loads acting on the structures.
- Student can able to know the structural behaviour of elements
- Student can able to design the structural elements with drawings

Course Objectives:

- To introduce the Engineering Geology as a subject in civil engineering.

To enable the student to use subject in civil engineering applications

ENGINEERING GEOLOGY

SYLLABUS

UNIT I

Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies.

Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

UNIT-II

Mineralogy And Petrology: Definitions of mineral and rock, Differentmethods of study of and rock, The study of physical properties ofminerals and rocks for megascopic study for the following minerals androcks, Common rock forming minerals are Feldspar, Quartz Group, Olivine,Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet,Calcite and other ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite And Bauxite. Classification, structures,textures and forms of Igneous rocks, Sedimentaryrocks, metamorphic rocks, and their megascopic study of granite varieties,(pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, LimeStone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT-III

Structural Geology: Strike , Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in CivilEngineering.

UNIT-IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earthquakes And Land Slides: Terminology, Classification, causes andeffects, Shield areas and Seismic bells, Richter scale intensity, Precautions ofbuilding constructions in seismic areas. Classification of Landslides, Causesand Effects, measures to be taken prevent their occurrence at Landslides.

UNIT-V

Geophysics: Importance of Geophysical methods, Classification, Principlesof Geophysical study by Gravity method, Magnetic method, Electricalmethods, Seismic methods, Radiometric method and Electrical resistivity,Seismic refraction methods and Engineering properties of rocks.

UNIT-VI

Geology Of Dams, Reservoirs And Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of ReservoirsPurpose of Tunneling, effects, of Tunnels. Influence of Geology forsuccessful Tunneling.

TEXT BOOKS:

1. 'Engineering Geology' by SubinoyGangopadhay, OxfordUniversity press.

2. 'Engineering Geology' by D. Venkat Reddy, Vikas PublishingHouse pvt.Ltd, 2013.

3. 'Engineering Geology' by N. ChennaKesavulu, Trinity Press(Laxmi Publications), 2nd Edition, 2014.

4. ‘Engineering Geology’ by VasudevKanithi, University Press.

REFERENCE BOOKS:

1. ‘Engineering Geology for Civil Engineers’ by P.C. Varghese, PHIlearning pvt.Ltd.

2. ‘Geology for Engineers and Environmental Society’ by Alan EKehew, person publications, 3rd edition

3. ‘Fundamentals of Engineering Geology’ by P.G. Bell, B.S.P.Publications, 2012.

4. ‘Engineering Geology’ by V.Parthesarathi et al., Wiley Publications

5. ‘Environmental Geology’ by K.S. Valdiya, McGraw HillPublications, 2nd Ed.

COURSE OUTCOMES

By the end of course

1. Identify and classify the geological minerals
2. Measure and rock strengths of various rocks
3. Classify and measure the earthquake prone areas to practice the hazard zonation
4. Classify ,monitor and measure the landslides and subsidence
5. Prepares, analyses and interpret the engineering geologic maps
6. Analyses the ground conditions through geophysical surveys
7. Test the geologic material and ground to check the suitability of civil engineering project construction
8. Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like dams, tunnels, disposal sites etc..

MANAGEMENT SCIENCE

Course Objectives:

- To familiarize with the process of management and to provide basic insights into select contemporary management practices.
- Use different inventory control models, critical path, forecasting techniques and queuing models in business.
- Appreciate the effect of multiple criteria on decision-making and decision tree

SYLLABUS

UNIT I

Introduction to Management: Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Types of organization structure.

UNIT II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and Cchart). Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating – Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

UNIT IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).

UNIT V

Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

UNIT VI

Contemporary Management Practice: Basic concepts of MIS, MRP, Justin- Time (JIT) system, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levies, Supply Chain Management,Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Text Books

- Dr. P. Vijaya Kumar &Dr. N. Appa Rao, 'Management Science' Cengage, Delhi, 2012.
- Dr. A. R. Aryasri, Management Science' TMH 2011.

References

- Koontz &Weihrich: 'Essentials of management' TMH 2011.
- Seth &Rastogi: Global Management Systems, Cengage learning, Delhi, 2011.
- Robbins: Organizational Behaviour, Pearson publications, 2011.
- KanishkaBedi: Production & Operations Management, Oxford Publications, 2011.
- Philip Kotler & Armstrong: Principles of Marketing, Pearson publications.
- Biswajit Patnaik: Human Resource Management, PHI, 2011.
- Hitt and Vijaya Kumar: Starategic Management, Cengage learning.

COURSE OUTCOMES

By the end of the course:

1. Knowledge on Principles of Management, operation management and materials management.
2. Knowledge on various contemporary management practices.
3. Knowledge about professional ethics in various functional departments of the organization.
4. Knowledge on Strategic Management and techniques of business

STRUCTURAL ANALYSIS-II

COURSE OBJECTIVES:

- Familiarize students with different types of structures.
- Equip student with concepts of arches.
- Understand concepts of lateral load analysis.
- Familiarize cables and suspension bridges.
- Understand analysis methods moment distribution, kani's method and matrix methods

UNIT I

THREE HINGED ARCHES: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

TWO HINGED ARCHES: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT-II

LATERAL LOAD ANALYSIS USING APPROXIMATE METHODS: application to building frames. (i) Portal method (ii) Cantilever method.

UNIT – III

CABLE STRUCTURES AND SUSPENSION BRIDGES: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

UNIT – IV

MOMENT DISTRIBUTION METHOD – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT – V

KANI'S METHOD - Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

UNIT– VI

INTRODUCTION TO MATRIX METHODS:
FLEXIBILITY METHODS: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.
STIFFNESS METHOD: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

TEXT BOOKS:

1. Structural Analysis by T.S.Thandavamoorthy, Oxford university press, India.
2. Structural Analysis by R.C. Hibbeler, Pearson Education, India
3. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.

REFERENCES:

1. Intermediate Structural Analysis by C. K. Wang, Tata McGraw Hill, India
2. Theory of structures by Ramamuratam
3. Structural Analysis by C.S. Reddy, Tata Mc-graw hill, New Delhi.
4. Analysis of structures by Vazrani & Ratwani – Khanna Publications.

COURSE OUTCOMES

At the end of this course the student will be able to

- Differentiate determine and in terminate structures.
- Carryout lateral load analysis of structures.
- Analyze cable and suspension bridge structures
- Analyze structures using moment distribution, kani's method and matrix methods

TRANSPORTATION ENGG-II

RAILWAY ENGINEERING:-

UNIT I:-

INTRODUCTION TO RAILWAY ENGINEERING

Permanent way components - Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast -Rail Fastenings - Creep of Rails- Theories related to creep - Adzing of Sleepers- Sleeper density - Rail joints.

UNIT II:-

GEOMETRIC DESIGN OF RAILWAY TRACK

Alignment - Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency Degree of Curve – safe speed on curves -Transition curve - Compound curves Reverse curves Extra clearance on curves - widening of gauge on curves vertical curves - check rails on curves.

UNIT -III

POINTS&CROSSINGS

Track layouts - Switches - Design of Tongue Rails - Crossings – Turnouts Layout of Turnout - Double Turnout - Diamond crossing - Scissors crossing.

UNIT – IV

SIGNAL AND INTERLOCKING

Objectives - Classification - Fixed signals - Stop signals - Signaling systems - Mechanical signaling system - Electrical signaling system - System for Controlling Train Movement - Interlocking - Modern signaling Installations.

AIRPORT ENGINEERING

UNIT- V

AIRPORT PLANNING&DESIGN:

Airport Master plan - Airport site selection - Air craft characteristics-Zoning laws - Airport classification - Runway orientation - Wind rose diagram - Runway length Taxiway design -- Terminal area and Airport layout - Visual aids and Air traffic control.

RUNWAY DESIGN:

Various Design factors - Design methods for Flexible pavements Design methods for Rigid

pavements - LCN system of Pavement Design -- Airfield , Pavement Failures Maintenance and Rehabilitation of Airfield pavements Evaluation & Strengthening of Airfield pavements •- Airport Drainage - Design of surface and subsurface drainage.

DOCKS AND HARBOURS

UNIT- VI

PLANNING AND LAYOUT OF DOCKS&HARBOURS

Classification of ports Requirement of a good port - classification of Harbours - Docks - Dry & wet docks Transition sheds and workhouses , layouts.

CONSTRUCTION AND MAINTENAANCE OF DOCKS & HARBOURS:

Quays - construction of Quay walls - Wharves - Jetties - Tides • Tidal : data and Analysis - Break waters - Dredging -- Maintenance of Ports and , Harbours - Navigational aids.

TEXT BOOKS:

1. Saxena & Mora - Railway Engineering - Dhanpat Rai, New Delhi.
2. Bindra 5.1'. - Docks and Harbour Engineering - Dhanpathi Rai & Sons. New Delhi.
3. Virendra Kumar, Airport Engineering. Dhanpat Rai Publishers, New Delhi.
4. Principles and pratical of highway engineering,dr.l.r.kadyali,dr.n.b.lal,khanna dehli

1. agrawal m.M.. Indian Railways Tracks. Prabhakar & Co
2. Wright P.H. & Asfort N.J. - Transportation Engineering Planning Design - John Wiley & Sons.
3. Khanna & Arora - Airport Engineering - Nemchand Bros, New Delhi.

CONCRETE TECHNOLOGY LAB

LIST OF EXPERIMENTS

Normal Consistency of cement and Fineness of cement
Setting times of cement
Specific gravity of cement a)Pycnometer b) lechatlier apparatus
Grading & Fineness modulus of coarse aggregate by sieve analysis
Grading & Fineness modulus of fine aggregate by sieve analysis
Specific gravity of coarse aggregate
Specific gravity of coarse aggregate
Bulking of sand
Compressive strength of cement concrete
Compressive strength of cement
workability of concrete by Slump cone apparatus
workability of concrete by Compaction factor test
workability of concrete by vee- bee test
Split tensile strength of concrete
Non destructive testing on concrete(for Demonistration)

ENGINEERING GEOLOGY LAB

LIST OF EXPERIMENTS

Study of Physical properties of minerals
Identification of rocks forming silicate and ore minerals
Recognition of rocks
. Geological cross sections and study of geological maps.
Faults and folds

TRANSPORTATION ENGINEERING LAB MANUAL

Sl.No	Title of the Experiment			
I. Road Aggregate tests:-				
1	Aggregate Crushing value			
2	Aggregate impact test			
3	Water absorption test and specific gravity test			
4	Attrition Test			
5	Abrasion Test			
6	Shape Tests			
II. Bituminous Materials Test:-				
6	Penetration test			
7	Ductility test			
8	Softening point test			
9	Flash and fire point test			
10	Stripping Test			
11	Viscosity Test			
III. Bituminous Mix:-				
12	Marshall Stability Test			
IV. Traffic Surveys				
13	Traffic volume study at mid blocks			
14	Traffic volume studies(turning movements)			

	at intersection			
15	Spot speed studies			
16	Parking study			
V. Design & Drawing				
17	Earth work calculations for road works			
18	Drawing of Road cross sections			
19	Rotors intersection design			

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DESIGN AND DRAWING OF STEEL STRUCTURES

UNIT-I

CONNECTIONS:

Riveted connections-definition,rivet strength and capacity ,welded connections :Introduction, Advantages & disadvantages of weldsStrength of welds – Butt and fillet weldsPermissible stresses – IS code requirements. Design of welds fillet welds subjected to moment acting in the plane. Design of welds-Fillet weld subjected to moment acting in the right angles to the plane of jointsDesign of beam to beam connections.Design of beam to column connections.

UNIT – II

BEAMS:

Introduction and allowable stresses in beams.Design requirements as per IS codeDesign of simple and compound beams.Curtailment of flange plates, Beam to Beam connection, Check for deflection, shear, buckling, check for bearing,Design of laterally unsupported beams.

UNIT – III

TENSION MEMBERS AND COMPRESSION MEMBERS:

General design of members subjected to direct tensionand bending -effective length of columns. Slenderness ratio – permissible stresses.

Roof Trusses

Different types of trusses -Design loads – load combinations Is code recommendations, structural details. Design of simple roof trusses involving the design of purlins, members and joints-tubular trusses

UNIT-IV: DESIGN OF COLUMN

Design of compression members, struts etc.Designof lacings and batten.Design principles of eccentrically loaded columns and splicing of columns.

UNIT-V: DESIGN OF COLUMN FOUNDATIONS

Design of slab base and gusseted bases. Column bases subjected to moment

UNIT-VI

PLATE GIRDER

Design consideration-IS code recommendations design of plate girder -welded Curtailment of flange platesstiffeners-splicing and connections.

GANTRY GIRDER:

Impact factors - longitudinal forces, Design of gantry girders.

NOTE: The students should prepare the following plates.

Plate1: Detailing of simple beams

Plate2: Detailing of compound beams including curtailment of flange plates.

Plate3: Detailing of column including lacing and battens.

Plate4: Detailing of column bases – slab base and gusseted base.

Plate5: Detailing of steel roof trusses including particulars at joints.

Plate6: Detailing of plate girder including curtailment, splicing and stiffeners

FINAL EXAMINATION PATTERN:

The end examination paper should consist of part A and part B. Part A consist of 2 questions in design and drawing out of which one question is to be answered. Part B should consist of 5 questions and design out of which 3 are to be answered. Weightagefor Part A is 40% and Part B is 60%.

TEXT BOOKS:

1. Steel structures Design and practice, N.Subramanian,Oxford university press
2. Design of steel structures SS.Bhavikatti I.K International publishing house Pvt.ltd
3. Design of steel structures by S.K.Duggal, Tata Mcgraw Hill, New Delhi

REFERENCES:

1. Comprehensive design of steel structures, by B.C.Punmia, Ashok Kumar Jain and Arunkumarjain, Lakshmi publications, New Delhi **(R1)**
2. Sructural designing steel by Sarwaralamraz, New age international publishers,Newdelhi
3. Design of steel structures M.Ragupathi Tata MC-Graw hill

ENIRONMENTAL ENGINEERING - I

UNIT – I

INTRODUCTION:—Importance and necessity of protected water supply systems –Water borne diseases- Flow chart of public water supply, Role of Environmental Engineer ,Agency activities.

Water Demand And Quantity Estimation: Estimation of water demand for a town or a city, Per capita demand and factors influencing it – types of water demands and its variations –factors affecting water demand, design period, factors affecting design period, population forecast

UNIT – II

SOURCES OF WATER : Lakes ,Rivers , Impounding Reservoirs ,Comparison of Source With reference to Quality ,Quantity and other considerations – Capacity of Storage Reservoirs, Mass curve analysis. Groundwater sources of water, Types of Water bearing formations, springs Wells and Infiltration galleries, Yields from infiltration galleries

Collection And Conveyance Of Water: Factors governing the selection of the intake structure, Types of Intakes, Conveyance of Water: Gravity and Pressure conduits, Types of pipes. Conveyance of water :gravity and pressure conduits, types of pipes ,pipe materials, pipe joints ,design aspects of pipe line ,laying of pipe lines

UNIT –III

QUANTITY and ANALYSIS of WATER: Characteristics of water - physical ,chemical and biological –Analysis of water – physical, chemical ,biological characteristics . Comparison of sources with reference to quality- IS drinking water quality standards and WHO guidelines for drinking water

UNIT –IV

TREATMENT OF WATER : Flowchart of water treatment plant – Treatment Methods: Theory and Design of sedimentation – coagulation – sedimentation with coagulation ,Filtration

UNIT – V

DISINFECTION: Theory of disinfection, chlorination and other disinfecting methods ,softening of water, removal of color and odours - iron and manganese removal –Adsorption –fluoridation and deflouridation –Aeration –Reverse osmosis –Iron exchange- Ultra filtration

UNIT – VI

DISTRIBUTION OF WATER :requirements- method s of distribution system ,layouts of distribution networks , pressures in the distribution , layouts , analysis of distribution networks: hardy cross and equivalent pipe methods-components distribution system : valve such as sluice

valves, air valves ,scour valves and check valves ,high drains ,and water meters ,laying and testing of pipe line s- selection of pipe materials ,pipe joints .

TEXT BOOKS:

1. Environmental engineering by peavey ,rowe and tchobanoglous
2.Enironmental engineering by duggal,s.chand

REFERENCES:

1.Water supply engineering by P.N.Modi

2.Water and waste water technology by Steel

3.Water supply engineering by,B.C.Punmia,.

GEOTECHNICAL ENGINEERING – I

COURSE OBJECTIVES:

1. To enable the student to determine the index properties of the soil and classify it.
2. To impart the concept of seepage of the water through soils and determine the discharge of water through soils.
3. To impart the principles to understand the concept of shear strength of soils.
4. Determine the shear parameters of sands and clays and the areas of their application.
5. To impart the principles of compaction, consolidation of soils and determine the magnitude and the rate of consolidation settlement.

COURSE OUTCOMES

At the end of this course the student will be able to

1. The students must know the definition of the various quantities related to soil mechanics and establish their inter-relationships.
2. The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
3. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.

The student should be able to apply the above concepts in day-to-day civil engineering practice.

UNIT I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass-volume relationship –Relative density – Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

UNIT – II

Index Properties of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT – III

Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace's equation - Seepage through soils –Flow nets: characteristics and Uses.

UNIT – IV

Stress Distribution In Soils: Stresses induced by applied loads -Boussinesq's and westergaard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.

UNIT – V

Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of Consolidation – Determination of coefficient of consolidation (cv) – Over consolidated and normally consolidated clays.

UNIT – VI

Shear Strength of Soils: Basic mechanism of shear strength - Mohr –Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination various drainage conditions.

TEXT BOOKS:

1. 'Basic and Applied Soil Mechanics' by Gopal Ranjan and A.S.R.Rao, New Age International

Publishers.

2. 'Soil Mechanics and Foundation Engineering' by V.N.S.Murthy ,CBS publishers.

3. 'Soil Mechanics' by M.Palani Kumar, PHI Learning.

REFERENCES:

1. ‘Fundamentals of Soil Mechanics’ by D.W.Taylor., Wiley.

2. ‘An introduction to Geotechnical Engineering’ by Holtz and Kovacs; Prentice Hall.

WASTE WATER MANAGEMENT

Course objectives:

1. Outline planning and the design of waste water collection, conveyance and treatment systems for a community/town/city.
2. Provide knowledge of characterization of wastewater generated in a community.
3. Impart understanding of treatment of sewage and the need for its treatment.
4. Summarize the appurtenance in sewerage system and their necessity.
5. Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.
6. Effluent disposal method and realize the importance of regulation in the disposal of effluents in river

UNIT-I

INTRODUCTION TO SANITATION: System of sanitation and relative merits and demerits, Collection and conveyance of waste water, Sewage and their classification, Estimation of sewage flow and storm, Water drainage, flucation and types of sewers, Hydraulics of sewers and storm drains, Design of sewers, Appurtenances in sewerage, Cleaning and venations of sewers.

UNIT-II

PUMPING OF WASTE WATER: Pumping stations and Locations, Components and types of pumps, Suitability of pumps regarding waste water.
HOUSE PLUMBING: System of plumbing, sanitary fitting and other accessories, One and two pipe system, Design of building drainage.

UNIT-III

SEWAGE CHARACTEISTICS: Sampling and analysis of waste water,Physical, Chemical and Biological Examination,Measurement of BOD and COD and BOD equations.
TREATMENT OF SEWAGE:Primary treatment Screens,Grit chambers and Grease traps, Floatation and Sedimentation,Design of preliminary treatment units,Design of primary treatment units.

UNIT-IV

SECONDARY TREATMENT:Aerobic and anaerobic treatment process and comparison.
SUSPENDED GROWTH PROCESS:Activated sludge process and Principle,Design and Operational problems,Modification of activated sludge process,Oxidation ponds and Aerated lagoons.
ATTACHED GROWTH PROCESS:Trickling filters and Classification,Mechanism of impurities removal,Design, Operation and Maintenance,RBCs, Fluidized bed reactors.

UNIT-V

MISCELLANEOUS TREATMENT METHODS:Nitrification and DE Nitrification,Removal of Phosphates,UASB and Membrane reactors,integrated fixed film reactors,Anaerobic Process: Septic and Imhoff tanks,Working, Principles and Design,Disposal of septic tank effluent.

UNIT-IV

BIO - SOLID MANAGEMENT: Characteristics,Handling and treatment of sludge,anaerobic digestion of sludge.
DISPOSAL OF SEWAGE:Methods of disposal,Disposal into water bodies,Oxygen sag curve,Disposal on land and Sewage sickness.

Text Books:

T1. Waste water Engineering Treatment and Reuse by Metcalf & Eddy, Tata McGraw- Hill edition.

T2. Elements of Environmental Engineering by K.N. Duggal, S.Chand & Company Ltd. New Delhi, 2012.

T3. Environmental Engineering by Howard S.Peavy , Donald R. Rowe, Teorge George Tchobanoglus- Mc-Graw-Hill Book Company, New Delhi, 1985

T4. Wastewater Treatment for pollution control and Reuuse, by soli.J Areivala, sham R Asolekar, Mc-GrawHill, New Delhi; 3rd Edition

T5. Industrial water & wastewater management by KVSG Murali Krishna

References:

R1. Environmental Engineering-II: Sewage disposal and Air pollution Engineering , by Garg, S.K.,: Khanna publishers

R2. Sewage treatment and disposal by Dr.P.N.Modi & Sethi.

R3. Environmental Engineering, by Ruth F. Weiner and Robin Matthews- 4th Edition Elsevier, 2003

R4. Environmental Engineering by D. Srinivasan, PHI Learning private Limited , New Delhi,2011.

COURSE OUTCOMES

At the end of this course the student will be able to

1. Plan and design the sewerage system.
2. Characterization of sewage.
3. Select the appropriate appurtenances in the sewerage system.
4. Selection of suitable treatment flow for sewage treatment.
5. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river.

WATER RESOURCES ENGINEERING-I

SYLLABUS:

UNIT I

Introduction: Engineering hydrology and its applications, Hydrologic cycle,hydrological data-sources of data.

Precipitation:Types and forms, measurement, rain gaugenetwork,presentation of rainfall data, average rainfall, continuity and consistency ofrainfall data, frequency of rainfall, Intensity Duration-Frequency (IDF)curves, Depth-Area-Duration (DAD) curves, Probable MaximumPrecipitation (PMP), design storm.

UNIT-II

Abstractions from Precipitation: Initial abstractions.

Evaporation: factors affecting, measurement, reduction

Evapotranspiration: factors affecting, measurement, control

Infiltration: factors affecting, Infiltration capacity curve, measurement, Infiltration indices.

UNIT-III

Runoff: Catchment characteristics**,** Factors affecting runoff, components,computation-empirical formulae, tables and curves, stream gauging, ratingcurve, flow mass curve and flow duration curve.

Hydrograph analysis: Components of hydrograph, separation of base flow,effective rainfall hydrograph and direct runoff hydrograph, unit hydrograph,assumptions, derivation of unit hydrograph, unit hydrographs of differentdurations, principle of superposition and S-hydrograph methods, limitationsand applications of unit hydrograph, synthetic unit hydrograph.

UNIT-IV

Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearsontype III distribution methods, Standard Project Flood (SPF) and ProbableMaximum Flood (MPF), flood control methods and management.

Flood Routing: Hydrologic routing, channel and reservoir routing-Muskingum and Puls methods of routing.

UNIT-V

Groundwater: Occurrence, types of aquifers, aquifer parameters, porosity,Specific yield, permeability, transmissivity and storage coefficient, types ofWells, Darcy's law, Dupuit's equation- steady radial flow to wells in confinedAnd unconfined aquifers, yield of a open well recuperation test.Civil Engineering

UNIT VI

Advanced Topics in Hydrology: Rainfall-runoff Modelling, instantaneousunit hydrograph (IUH) - conceptual models - Clark and Nash models, generalhydrological models- Chow - Kulandaiswamy model.

TEXT BOOKS:

1. 'Engineering Hydrology' by Subramanya, K, Tata Mc Graw-HillEducation Pvt. Ltd, (2013), New Delhi.

2. 'Engineering Hydrology' by Jayarami Reddy, P, Laxmi PublicationsPvt. Ltd., (2013), New Delhi

3. 'Applied hydrology 'by Chow V.T., D.R Maidment and L.W. Mays,Tata McGraw Hill Education Pvt. Ltd., (2011), New Delhi.

4. 'Engineering Hydrology 'byOjha C.S.P, R. Berndtsson and P.Bhunya, Oxford University Press, (2010).

REFERENCES:

1. 'Water Resources Engineering', Mays L.W, Wiley India Pvt. Ltd,(2013).

2. 'Hydrology'by Raghunath. H.M., New Age International Publishers,(2010).

3. 'Engineering Hydrology –Principles and Practice'by Ponce V.M.,Prentice Hall International, (1994).

4. 'Hydrology and Water Resources Engineering' by Patra K.C.,Narosa Publications, (2011).

COMPUTER AIDED ENGINEERING DRAWING PRACTICE

Prerequisites:

Familiarity with concepts of engineering drawing and usage of computer.

Course Objectives:

The course is designed to give undergraduate engineering student ability to read and write the language of Engineering Graphics. At the end of the course, students should understand, be able to putdown, use and develop further the key elements of CAED to draught their engineering knowledge.

Course Outcomes:

Upon completion of this course, students should:

- Understand advanced engineering drawing as per the latest BIS standards SP: 46-2003.
- Produce engineering design drawings using a Computer Aided Design (CAD) system.
- Be able to read and interpret drawings.
- Be able to draw & dimension 2D diagrams in standard 2D blueprint form.

Demonstrate the ability to draft a component using different CAD packages

PART A

UNIT –I

PROJECTIONS OF PLANES & SOLIDS : Projections of Regular Solids inclined to both planes – Auxiliary Views. Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT – II

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their parts.

Interpenetration of Right Regular Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – III

ISOMETRIC PROJECTIONS : Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Transformation of Projections: Conversion of Isometric Views to Orthographic Views – Conventions.

PERSPECTIVE PROJECTIONS: Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

PART B

In Part B, Computer Aided Drafting is introduced

UNIT – IV

Introduction to Computer aided Drafting: Generation of points, lines, curves, polygons, dimensioning. Types of modeling: object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling.

UNIT – V

View points and view ports: view point coordinates and view(s) displayed, examples to exercise different options like save, restore, delete, joint , single option.

UNIT-VI

Computer aided Solid Modeling: Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling of Machines & Machine Parts.

TEXT BOOKS :

1. Engineering Graphics, K.C. John, PHI Publications.
2. Engineering drawing by N.D Bhatt , Charotar publications

REFERENCES:

1. Mastering Auto CAD 2013 and Auto CAD LT 2013 – George Omura, Sybex.
2. Auto CAD 2013 Fundamentals – Elisemoss, SDC Publications.
3. Engineering Drawing and Graphics using Auto CAD – T. Jeyapoovan, Vikas.
4. Engineering Drawing + Auto CAD – K. Venugopal, V. Prabhu Raja, New Age Publications.
5. Engineering Drawing – RK Dhawan, S Chand Publications.
6. Engineering Drawing – MB Shaw, BC Rama, Pearson.
7. Engineering Drawing – KL Narayana, P Kannaiah, Scitech.
8. Engineering Drawing – Agarwal and Agarwal, Mc Graw Hill.
9. Engineering Graphics – PI Varghese, Mc Graw Hill.
10. Text book of Engineering Drawing with auto-CAD, K.Venkata Reddy/ B.S. publications.

WASTE WATER ENGINEERING LAB

LIST OF EXPERIMENTS

S.No	Name of the Experiment
1.	Determine of PH and Electrical Conductivity (Salinity) of Water and Soil
2.	Determination of Alkalinity/Acidity.
3.	Determination of Chlorides in water and soil.
4.	Determination and estimation of Total solids, organic. Solids, Inorganic Solids and settleable solids by Imhoff cone.
5.	Determination of Iron
6.	Determination of dissolved oxygen with D.O Meter and wrinklers method and BOD.
7.	Determination of Total Phosphorous
8.	Determination of C.O.D.
9.	Determination of total hardness
10.	Determination of Optimum coagulant dose
11.	Determination of Chlorine Demand.
12.	Determination of nitrogen
13.	PhysicalParameters– Temperature,Colour,Turbidity,Taste
14.	Presumptive Coliform Test

Geotechnical Engineering Lab

SR. NO.	NAME OF EXPERIMENT
1	Determination of the moisture content of soil
2	Determination of the specific gravity of the soil using pycnometer
3	Grain size distribution of the soils by Sieve analysis
4	Determination of liquid limit, plastic limit of the soil
5	Determination of Shrinkage limit of soil
6	Determination of coefficient of permeability of the soil by a) Constant head method b) Falling head method
7	Determination of field density of soils by a) Core cutter method b) Sand replacement method
8	Determination of optimum moisture content and maximum dry density of the soil by proctor test

9	Determination of unconfined compressive strength of the cohesive Soil
10	Determination of shear strength parameters of the soil by Direct Shear Test
11	Study of Triaxial Shear Test Apparatus
12	California Bearing Ratio Test

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

AIR POLLUTION AND CONTROL

Course Objectives:

The course will address the following

1. To know the analysis of air pollutants
2. To know the threshold limit values of various air pollutants
3. To acquire the design principles of particulate and gaseous control
4. To learn plume behavior in different environmental conditions
5. To learn carbon credits for various day to day activities

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SYLLABUS

UNIT-I

Air pollution: Sampling and analysis of air pollutants, conversion of ppm into $\mu g/m^3$. Definition of terms related to air pollution and control-secondary pollutants-indoor air pollution – climate change and its impact- carbon trade

UNIT-II

Thermo dynamics and kinetics of Air-pollution: Applications in the removal of gases like SO_X, NOX, CO and HC – Air- fuel ratio-Computation and control of products of combustion, Automobile pollution. Odour pollution control, Flares.

UNIT-III

Meteorology and Air pollution: Properties of atmosphere: Heat, pressure, wind forces, Moisture and relative humidity, Lapse rates – Influence of terrain and Meteorological phenomena on plume behaviour and air quality – Wind rose diagrams, plume rise models.

UNIT-IV

Ambient Air quality management: Monitoring of SPM, SO2; NO_X and CO –Stack monitoring for flue gases –Micro – meteorological monitoring –weather station. Emission standards – Gaussian model for plume Dispersion.

UNIT-V

Air pollution control : control of particulates – control at sources, process changes, equipment modifications, Design and operation of control equipments –Settling chambers ,Cyclone separators –Fabric filters, scrubbers ,Electrostatic precipitators .

UNIT-VI

Air pollution control methods: Control of NO_X and SO_X emissions –Environmental friendly fuels – In-plant Control Measures, Process changes, Methods of removal and recycling. Environmental criteria for setting industries and Green belts.

TEXT BOOKS:

1. Air pollution by M.N.RAO and H.V.N RAO- Tata McGraw Hill company.
2. Air Pollution and control by KVSG Murali Krishna.

REFERENCE BOOKS:

1. An introduction to Air Pollution by R.K Trivedy and P.K Goel, B.S Publications.
2. Air Pollution by Wark and Warner- Harper & Row. Newyork .

COURSE OUTCOMES

By the end of course the students will be able to

- Decide the ambient air quality based on the analysis of air pollutants
- The design principles of particulate and gaseous control measures for an industry
- Judge the plume behavior in a prevailing environmental conditions
- Estimate carbon credits for various day to day activities

Irrigation Design & Drawing

SYLLABUS

DESIGN DRAWING OF

Unit: I SURPLUS WEIR

Unit: II TANK SLUICE WITH A TOWER HEAD

Unit: III CANAL DROP – NOTCH TYPE

Unit: IV CANAL REGULATOR

Unit: V UNDER TUNNEL

Unit:VI SYPHON AQUEDUCT TYPE –III

Final Examination pattern:

Out of two questions out of the above design may be asked out of which the candidate has to answer one question with in the stipulated time three hours .

COURSE OUTCOMES

The students will be able to

i. Perform the stability analysis of gravity dams

ii. Explain the causes of failure of different types of dams and their design criteria

iii. Design minor irrigation structures such as regulators, cross drainage works and canal falls.

iv. At the end of the course, the student will be able to provide design & drawing of irrigation structures.

ENVIRONMENTAL ENGINEERING-II

Course objectives:

1. Outline planning and the design of waste water collection, conveyance and treatment systems for a community/town/city.
2. Provide knowledge of characterization of wastewater generated in a community.
3. Impart understanding of treatment of sewage and the need for its treatment.
4. Summarize the appurtenance in sewerage system and their necessity.
5. Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.

UNIT-I

INTRODUCTION TO SANITATION: System of sanitation and relative merits and demerits, Collection and conveyance of waste water, Sewage and their classification, Estimation of sewage flow and storm, Water drainage, flucation and types of sewers, Hydraulics of sewers and storm drains, Design of sewers, Appurtenances in sewerage, Cleaning and venations of sewers.

UNIT-II

PUMPING OF WASTE WATER: Pumping stations and Locations, Components and types of pumps, Suitability of pumps regarding waste water.
HOUSE PLUMBING: System of plumbing, sanitary fitting and other accessories, One and two pipe system, Design of building drainage.

UNIT-III

SEWAGE CHARACTEISTICS: Sampling and analysis of waste water, Physical, Chemical and Biological Examination, Measurement of BOD and COD and BOD equations.
TREATMENT OF SEWAGE: Primary treatment Screens, Grit chambers and Grease traps, Floatation and Sedimentation, Design of preliminary treatment units, Design of primary treatment units.

UNIT-IV

SECONDARY TREATMENT: Aerobic and anaerobic treatment process and comparison.
SUSPENDED GROWTH PROCESS: Activated sludge process and Principle, Design and Operational problems, Modification of activated sludge process, Oxidation ponds and Aerated lagoons.
ATTACHED GROWTH PROCESS: Trickling filters and Classification, Mechanism of impurities removal, Design, Operation and Maintenance, RBCs, Fluidized bed reactors.

UNIT-V

MISCELLANEOUS TREATMENT METHODS: Nitrification and DE Nitrification, Removal of Phosphates, UASB and Membrane reactors, integrated fixed film reactors, Anaerobic Process: Septic and Imhoff tanks, Working, Principles and Design, Disposal of septic tank effluent.

UNIT-IV

BIO - SOLID MANAGEMENT: Characteristics, Handling and treatment of sludge, anaerobic digestion of sludge.
DISPOSAL OF SEWAGE: Methods of disposal, Disposal into water bodies, Oxygen sag curve, Disposal on land and Sewage sickness.

Text Books:

T1. Environmental engineering-II by K.V.S.G.MURALI KRISHNA

T2. Environmental engineering-II by P.VENUGOPALA RAO

References:

R1. Water supply engineering-II by P.N.Modi

R2. . Environmental engineering-II by B.C.Punmia.

COURSE OUTCOMES

At the end of this course the student will be able to

1. Plan and design the sewerage system.
2. Characterization of sewage.
3. Select the appropriate appurtenances in the sewerage system.
4. Selection of suitable treatment flow for sewage treatment.
5. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river.

GEO TECHNICAL ENGINEERING-II

Course Objective:

1. To provide a coherent development to the students for the courses in sector of Geotechnical Engineering & Soil Improvement Techniques etc.
2. To present the foundations of many basic Engineering tools and concepts related Geotechnical Engineering.
3. To give an experience in the implementation of Engineering concepts which are applied in field of Geotechnical Engineering
4. To involve the application of scientific and technical principles of planning, analysis, design of foundation along with soil improvement techniques.

UNIT – I

Stability of Slopes: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Taylor's Stability Number-Stability of slopes of dams and embankments - different conditions.

UNIT-II

Earth Retaining Structures:

Rankine's& Coulomb's theory of earth pressure – Culmann's graphical method - earth pressures in layered soils.

UNIT-III

Shallow Foundations – Bearing Capacity Criteria: Types of foundationsand factors to be considered in their location - Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi's theory - IS Methods.

Settlement Criteria: Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

UNIT -IV

Pile Foundation: Types of piles – Load carrying capacity of piles based onstatic pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

UNIT-V

Well Foundations: Types – Different shapes of well – Components of well– Functions –

forces acting on well foundations - Design Criteria – Determination of steining thickness and plug - construction and Sinking of wells – Tilt and shift.

UNIT – VI

Soil Exploration: Need – Methods of soil exploration – Boring andSampling methods – Field tests – Penetration Tests – Pressure meter – planning of Programme and preparation of soil investigation report.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by GopalRanjan& ASR Rao, New Age International Pvt. Ltd, (2004).
2. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
3. Soil Mechanics and Foundations by - by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition)
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati& Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jersy Soil Mechanics and Foundation Engineering, by K R Arora, McGraw-Hill Publishing company, Newyork

COURSE OUTCOMES :

1. The students will gain an experience in the implementation of Geotechnical Engineering on engineering concepts which are applied in field Geotechnical Engineering.
2. The students will get a diverse knowledge of geotechnical engineering practices applied to real life problems of designing of structures.

The students will learn to understand the theoretical and practical aspects of geotechnical engineering along with the design and management applications

Remote Sensing & GIS Applications

SYLLABUS

UNIT – I

Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT.

UNIT – II

Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT – IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

UNIT – V

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT – VI

Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

TEXT BOOKS:

1. Bhatta B (2008), "Remote Sensing and GIS", Oxford University Press.
2. Lillesand, T. M, R.W. Kiefer and J. W. Chipman (2013) "Remote Sensing and Image Interpetation", Wiley India Pvt. Ltd., New Delhi.
3. Schowenger, R.A (2006) 'Remote Sensing" Elsevier Publishers.
4. "Fundamentals of Remote Sensing" by Georg Joseph, Universities Press, 2013.
5. "Fundamentals of Geographic information System" by Demers, M. N, Wiley India Pvt. Ltd, 2013.

REFERENCES:

1. "Remote Sensing and its Applications" by Narayana LRA, Universities Press, 2012.
2. "Concepts and techniques of Geopraphical Information System" by Chor Pand Lo and A. k. W. Yeung, Prentice Hall (India), 2006.
3. "Introduction to Geographic Information Systems" by Kand Tsung Chang, McGraw Hill Higher Education, 2009.
4. "Basics of remote Sensing & GIS" by Kumar S, Laxmi Publications, New Delhi, 2005.
5. "Principles of Geographical Information System" by Burrough P. A and R.A, McDonnell, Oxford University Press, 1998.

COURSE OUTCOMES

At the end of the course the student will be able to

a) Be familiar with ground, air and satellite based sensor platforms.
b) Interpret the aerial photographs and satellite imageries.
c) Create and input spatial data for GIS application.
d) Apply RS and GIS concepts in water resources engineering.

WRE-II

Course Objectives:

The course will address the following

1. Introduce the types of irrigation systems
2. Introduce the concepts of planning and design of irrigation systems
3. Discuss the relationships between soil, water and plant and their significance in planning an irrigation system
4. Understand design methods of erodible and non-erodible canals
5. Know the principles of design of hydraulic structures on permeable foundations
6. Know the concepts for analysis and design principles of storage and diversion head works

.

SYLLABUS

UNIT – I

Irrigation : Necessity and importance , principal crops and crop seasons, types, methods of application, soil –water-plant relationship, soil moisture constants , consumptive use, estimation of consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, irrigation efficiencies ,water logging and drainage, standards of quality for irrigation water, crop rotation.

UNIT – II

Canals : Classification ,designof non erodible canals- Methods of economic section and maximum permissible velocity, economics of canal lining , Design of erodible canals- Kennedy's silt theory and Lacey's regime theory balancing depth of cutting.

UNIT – III

Canal structures

Falls: Types andlocation, Design principles of sarda type of fall and straight glacis fall .

Regulators: Head and cross regulators, Design principles.

Cross drainage works: Types, selection, Design principles of aqueduct, Siphon aqueduct and super passage.

Outlets: Types, proportionality, sensitivity and flexibility

River training: Objectives and approaches.

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operation on a Binary tree, Binary Tree Traversals (recursive), Creation of binary tree from in, pre and post order traversals.

UNIT –IV

Diversion head works : Types of diversion head works ,weirs and barrages, lay out of diversion head works, components. Causes and failures of weirs on permeable foundations, Bligh's creep theory, khosla's theory, Design of impervious floors for sub surface flow, Exit gradient

UNIT – V

Reservoir planning: Investigation, site selection, Zones of storage, yield and storage capacity of reservoir, reservoir sedimentation.

Dams: Types of dams**,** Selectionof type of dam, selection of site for a dam.

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a dam, Stability analysis, drainage galleries, grouting.

UNIT – VI

Earth dams: Types , causes of failure , criteria for safe design, seepage measures for control of seepage – filters, Stability analysis – Stability of downstream slope during steady seepage and u/s slope during sudden draw down conditions.

Spillways: Types and design principles of Ogee spillways, Types of spillway crest gates. Energy dissipation below spillways- stilling basin and its appurtenances

TEXT BOOKS :

1. Irrigation and water power engineering by Punmia B C,P.B.B Lal,A.K.Jain and A.K.Jain .
2. Irrigation water resources and water power engineering by Modi P N .

REFERENCE BOOKS :

1. Water Resources Engineering by Mays L.W, Wiley India Pvt.Ltd, New Delhi.
2. Irrigation Engineering by Sharma R.K. and Sharma T.K.
3. Water Resources Engineering by Satyanarayana Murthy Challa

COURSE OUTCOMES

.By the end of course the students will be able to

1. Estimate irrigation water requirements

2. Design irrigation canals and canal networks

3. Plan an irrigation system

4. Design irrigation canal structures

5. Plan and design diversion head works

Prerequisites: Basics of Copyrights and patents

SYLLABUS

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Unit I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics - Types of Intellectual Property - Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Regulatory – Over use or Misuse of Intellectual Property Rights -Compliance and Liability Issues.

Unit II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership –Transfer and Duration – Right to prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration– Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.

Unit III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation –International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention

Developers and Promoters.

Unit IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Interparty Proceedings – Infringement – Dilution of Ownership of Trade Mark –Likelihood of confusion – Trade Mark claims – Trade Marks Litigation –International Trade Mark Law

Unit V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security– Employee Access Limitation – Employee Confidentiality Agreement –Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Unit VI

Introduction to Cyber Law – Information Technology Act - Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

REFERENCE BOOKS:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections
4. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw –Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

COURSE OUTCOMES

Upon the successful completion of this course, the students will be able to:

CO1: To understand about the basics of the intellectual property law.

CO2: To enlighten the students regarding the subject matter of copy-right law

CO3. To explain the patent process and the rights which come with a patent holders

CO4. To enable the students regarding the registration, maintaining and protection of trademark.

CO5. To make aware about the employee confidentiality agreements, non-disclosure agreements, and liability issues.

CO 6: To equip the students with the knowledge regarding cyber crime and e-commerce.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of CIVIL ENGINEERING Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of CIVIL ENGINEERING Department

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

Program Educational Objectives (PEOs)

PEO:1

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

PEO:2

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

PEO:3

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

PEO:4

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

Program Outcomes (POs) of CIVIL ENGINEERING Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department

PSO 1:

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

PSO 2:

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

PSO 3 :

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

ESTIMATING, SPECIFICATION AND CONTRACTS

Course Objective:

1. Impart the knowledge of Estimating, Costing and Valuation for Civil Engineering Structures.

2. Prepare and evaluate contract documents.

PART-A

UNIT – I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates –Approximate method of Estimating.

UNIT – II

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT-III

Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.

UNIT – IV

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings.
Standard specifications for different items of building construction.

PART - B

UNIT – V

Detailed Estimation of Building using individual wall method

UNIT – VI

Detailed Estimation of Buildings using centre line method

FINAL EXAMINATION PATTERN:

The end examination paper should consist of part A and Part B. Part-A should consist of five questions and design out of which three are to be answered. Part -B consists of two questions and out of which one question is to be answered. Weightage for part –A is 60% and part –B is 40%

Course Outcomes :

1. Prepare quantity estimates for Buildings, roads & rails and canal structures as per specifications.
2. Draft detailed specifications and work out Rate Analysis for all works related to civil engineering projects.
3. Ascertain the quantity of materials required for Civil engineering works as per specifications.
4. Prepare cost estimate and valuation of civil engineering works.
5. Prepare tenders & contract documents. Evaluate contracts and tenders in construction practice.

SOLID WASTE MANAGEMENT

1. Evaluate the subject from the technical, legal and economical points by learning of all terms related to general solid waste management.
2. Explain the hierarchical structure in solid waste management and a requirement for an integrated solution.
3. Examine the technical points that are required to set up a solid waste management system.
4. Apply the legal legislation related to solid waste management.
5. Make an economical analysis of the solid waste management system.

UNIT- I

INTRODUCTION OF SOLID WASTE MANAGEMENT:

Goals and Objectives Of SolidWaste Management, Classification Of Solid Waste - Factors Influencing Generation Of Solid Waste - Sampling And Characterization –Future Changes In Waste Composition, Major Legislation, Monitoring Responsibilities.

UNIT- II

BASIC ELEMENTS IN SOLID WASTE MANAGEMENT:

Elements and Their InterRelationship – Principles of Solid Waste Management- Onsite Handling, Storage and Processing Of Solid Waste

COLLECTION OF SOLID WASTE:

Type and Methods of Waste Collection Systems,Analysis of Collection System - Optimization of Collection Routes– Alternative Techniques for Collection System.

UNIT-III

TRASFER AND TRANSPORT:

Need For Transfer Operation, Compaction of SolidWaste - Transport Means and Methods, Transfer Station Types and Design Requirements

UNIT-IV

SEPARATION AND TRANSFROMATION OF SOLID WASTE:

Unit operations used forseparation and transformation: shredding - materials separation and recovery, source reduction and waste minimization.

UNIT – V

PROCESSING AND TREATMENT

Processing Of Solid Waste - WasteTransformation through Combustion and Composting, Anaerobic Methods for Materials Recovery and Treatment – Energy Recovery – Biogas Generation and Cleaning– Incinerators.

UNIT-VI

DISPOSAL OF SOLID WASTE

Methods of Disposal, Landfills: Site Selection,Design and Operation, Drainage and Leachate Collection Systems –Designated Waste Landfill Remediation

TEXT BOOKS:

1. George Techobanoglous “Integrated Solid Waste Management”, McGraw Hill Publication, 1993

REFERENCES:

1. Vesilind, P.A., Worrell, W., Reinhart, D. “Solid Waste Engineering”, Cenage learning, New Delhi, 2004
2. Charles A. Wentz; “Hazardous Waste Management”, McGraw Hill Publication, 1995.

COURSE OUTCOMES:

Upon successful completion of this course, the students will be able to:

a. Design the collection systems of solid waste of a town.
b. Design treatment of municipal solid waste and landfill.
c. To know the criteria for selection of landfill.
d. To characterize the solid waste and design a composting facility.

COUIRSE OBJECTIVES

The objective of this course is:

- Familiarize students with deterioration of concrete in structures
- Equip student with concepts of NDT and evaluation
- Understand failures and causes for failures in structures
- Familiarize different materials and technique for repairs

REPAIR AND REHABILITATION OF STRUCTURES

(ELECTIVE –II)

UNIT – I

Deterioration of concrete in structures: Physical processes of deterioration like freezing and thawing, wetting and drying, Abrasion, Erosion, pitting, chemical processes like carbonation, chloride ingress, corrosion, alkali aggregate reaction, Sulphate attack acid attack, temperature and their causes, mechanism, effect, preventive measures, Cracks: cracks in concrete type, pattern, quantification, measurement & preventive measures.

UNIT – II

Non destructive testing: Non destructive testing methods for concrete including rebound hammer, ultrasonic pulse velocity, Rebar locator, corrosion meter, penetration resistance and pull out test, core cutting corrosion: methods for corrosion measurement and assessment including half cell potential and resistivity, mapping of date.

UNIT – III

Failure of buildings: Definition of building failure-types of failures-causes of failures-faulty design, accidental overloading, poor quality of material and poor construction practises- fire damage-methodology for investigation of failures, diagnostic testing methods and equipments-repairs of cracks in concrete.

UNIT-IV

Materials for repair and rehabilitation-admixtures-types of admixtures-purposes of using admixtures-chemical composition-natural admixtures-fibres-wraps-glass and carbon fibre wraps-steel plates-concrete behaviour under corrosion, disintegrated mechanism-moisture effects and thermal effects-visual investigation-acoustical emission methods-corrosion activity measurement-chloride content- depth of carbonation impact echo methods-ultrasound pulse velocity tests-pull out tests.

UNIT – V

Repair techniques: Grouting, jacketing, Shotcreting, externally bonded plates, nailing, underpinning and under water repair, materials, equipments, precautions and processes.

UNIT – VI

.**Investigation of structures:** Distress, observation and preliminary test methods, case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion, damaged structures.

.

TEXT BOOKS:

1. ‘Maintenance & repair of civil structures’ by B.L.Gupta& Amit Gupta
2. ‘Rehabilitation of concrete structures’ by B.vidivelli, standard publishers.
3. ‘concrete bridge practice construction, maintenance & rehabilitation’ by V.K Raina.

REFERENCE BOOKS:

1. Concrete structures protection repair and rehabilitation by R.Doodgewoodson, BH publishers.

COURSE OUTCOMES

At the end of this course the students will be able to

- Explain deterioration of concrete in structure

- Carryout analysis using NDT and evaluate structures
- Assess failures and causes of failures in structures
- Carryout physical evaluation and submit report on condition of the structure

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT (ELECTIVE –II)

COURSE OBJECTIVES:

1. To study the importance of EIA
2. To know the role of public in EIA studies
3. Understand phenomena of impacts in the environment
4. Know the impact quantification of various projects on the environment

UNIT – I

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters - role of stake holders in the EIA preparation stages in EIA

UNIT – II

EIA Methodologies: introduction, Criteria for the selection of EIA Methodology, EIA methods, Ad-hoc methods, matrix methods, Network method, Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.- EIS and EMP

UNIT – III

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives, application of remote sensing and GIS in EIA

UNIT-IV

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - E I A with reference surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources,Generalized approach for assessment of Air pollution Impact.

UNIT – V

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of Deforestation.
Environmental risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty key stages in performing an Environmental Risk Assessment, advantages of Environmental risk Assessment.

UNIT – VI

EIA notification by Ministry of Environment and Forest (Govt. Of India):

Provisions of EIA notification, Procedure for environmental clearance, procedure for conducting in the EIA notification, procedure for environmental clearence, procedure for conducting environmental impact assessment report, evaluation of EIA report, environmental legislation objectives, evaluation of audit data and audit report preparation.

Post Audit activities, Concept of ISO and ISO 14000.

Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazaar, KAKINADA.
2. Environmental Impact Assessment Methodologies, by Y.Anjaneyulu, B.S. Publication, Sultan
   Bazaar, Hyderabad.

REFERENCE BOOKS:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K. Katania & Sons Publication. New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi.
3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

COURSE OUTCOMES :

1. To critically examine assumptions inherent in impact assessment.
2. To develop skills in identifying and solving problems.
3. To provide students with an understanding of the historical evolution of impact assessment in selected parts of the world.
4. To provide students with the knowledge and professional skills necessary to enable them to undertake environmental impact assessment.
5. To examine a range of environmental impact assessments.
6. To identify and explore impact assessment fields and approaches

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA& Affiliated to JNTUK, Kakinada

Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

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Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor’s theorem and Maclaurin’s

theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

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Approved by AICTE, Accredited by NAAC-A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common toCSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. To learn the basic principles and applications of Electrochemistry.
3. Advanced Analytical instrumental techniques are introduced for material characterization.With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.
4. Understanding of crystal structures and preparation of semiconductors and insulators.
5. A wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.

UNIT- I: Polymer Chemistry

Introduction to polymers, functionality of monomers, co-polymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosettings, Preparation, Properties and Applications of – Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting polymers - polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and Applications.

UNIT -II: Electrochemistry and Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations), Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries- working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

UNIT - III: Instrumental Methods and Non-Conventional Energy Sources

Part-A: **Instrumental Methods**

Electromagnetic Spectrum. Absorption of radiation: Beer-Lambert's law - Principles of UV-Visible, Infrared (IR) and Nuclear Magnetic Resonance (NMR) spectroscopy.

Basic concepts of Thin Layer Chromatography (TLC), Gas Chromatography (GC) and High-Performance Liquid Chromatography (HPLC), Separation and purification of mixture of compounds.

Part-B: **Non-Conventional Energy Sources**

Introduction – Renewable and Non –Renewable energy sources - Solar Energy- Introduction, Applications of Solar energy – Photovoltaic cell: design, working and its importance. Hydropower includes setup a Hydropower plant (schematic diagram), Geo-Thermal energy: Introduction-schematic diagram of a Geothermal power plant, Tidal power - Introduction- Design and working, Biomass energy.

UNIT- IV: Solid State Chemistry

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel.

Hall Effect and Applications.

Semiconductors:Preparation of pure semiconductors by Zone refining, Distillation and Czochralskicrystal pulling technique, Doping- Epitaxy, Diffusion and Ion-implantation technique- Intrinsic and Extrinsic semiconductors - Applications.

Insulators*:* Electrical Insulators and their Applications.

UNIT -V: Material Chemistry

Nano materials –Introduction- Top-down and Bottom- up approaches, Sol-gel method. Characterization by BET and TEM methods. Carbon nano tubes and fullerenes - Types, Preparation (Arc discharge Laser ablation and ChemicalVapour Deposition methods) Properties and Applications.

Liquid crystals - Introduction – Types – Applications.

Superconductors - Type-I & Type-II, Properties &Applications.

Green chemistry- Principles and Applications.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course,students will be able to

1. Recall the information related to polymers and their application.(Remembering)
2. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing)

3. Understand about the different analytical techniques and its applications.(Understanding)
   Design the technologies related to renewable energy sources. (Creating)
4. Understand the conductivity phenomenon and applications of solids. (Understanding)
5. Choose the materials like nano materials, liquid crystals, superconductors, and green synthetic methods to solve the Engineering problems. (Applying)

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.

3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words

- ➢ Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary
- ➢ Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations
- ➢ Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary
- ➢ Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

I B.Tech I Semester

ENGINEERING GRAPHICS

ECE & EEE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To introduce the students to use drawing instruments and to draw polygons, engineering curves and use scales
- To introduce the students orthographic projections, projections of points & lines.
- The objective is to make the students draw the projections of the plane inclined to both the planes.
- The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
- The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

UNIT I

Introduction to Graphics
Curves: Ellipse, Parabola and Hyperbola by general methods, Tangent & Normal
Scales: Plain scale, Diagonal scale and Vernier scale.

UNIT II

Orthographic Projections: Introduction to Projections, Horizontal plane, Vertical plane, Profile plane, importance of reference lines.
Projections of points in various quadrants.
Projections of straight lines inclined to one plane, inclined to both the planes, traces.

UNIT III

Projections of planes: Inclined to one reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Projections of Prisms, Pyramids, Cones and Cylinders simple positions, the axis inclined to one of the reference planes.

UNIT V

Conversion of isometric views to orthographic views;
Conversion of orthographic views to isometric views.

COURSE OUTCOMES:

Students will be able to:

1. Construct Engineering Curves and scales
2. Understand orthographic projections, projections of points & lines.
3. Draw the projections of a plane inclined to both the planes.
4. Draw the projections of various types of solids in different positions inclined to one of the planes.
5. Visualize and convert the isometric view to orthographic view and vice versa.

TEXT BOOKS:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publications
2. Engineering Graphics for Degree by K.C. John, PHI Learning
3. Engineering Graphics by PI Varghese, McGrawHill Publishers.
4. Engineering Drawing + AutoCAD by K. Venugopal, V. Prabhu Raja, New Age

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

1. To teach problem solving through Algorithms and Flowcharts
2. To elucidate problem solving through Python programming language
3. To train in the development of solutions using modular concepts
4. To explain the role of data structures in programming
5. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer

2. Develop computational thinking and be able to use Python constructs to solve basic problems

3. Understand modularization and data structures concepts in Python

4. Apply file handling concepts in problem solving

5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners‘ English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner‘s Compass, 7th Edition
7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press
12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to CSE, IT, EEE, AI & DS)

Course Title: Applied Chemistry Lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. JyotsnaCherukuri (2012) Laboratory Manual of Engineering chemistry-II, VGSTechno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:
  - Creating a Class with variables and methods
  - Class inheritance

- Constructors
- Exception handling

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application and to know the importance of free electron theory for metals.
- Enlightenment of the importance of band theory for crystalline solids and metals. To understand the physics of Semiconductors and their working mechanism.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index-Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser –Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric Properties

Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations - Electronic and Ionic polarizations with mathematical derivations – Orientational polarization (Qualitative)–Internal field in solids -Claussius -Mosotti equation.

UNIT – IV: Quantum Mechanics and Free Electron Theory of Metals

Quantum Mechanics:

Introduction- Dual nature of matter-Matter waves, de-Broglie wavelength, Properties of wave function- time independent and time dependent Schrödinger's wave equation-Particle in a one dimensional infinite potential well.

Free Electron Theory of Meals:

Classical free electron theory (Qualitative with discussion of merits and demerits)-Quantum free electron theory-Equation for electrical conductivity based on quantum free electron theory-Fermi-Dirac Distribution-density of states (3D) - Fermi Energy.

UNIT –V: Band Theory of Solids and Semiconductors

Band Theory of Solids:

Bloch Theorem - Kronig-Penny Model (Qualitative)-E vs K and v vs K diagram- Origin of energy bands - Classification of solids based on energy bands – Effective Mass of an Electron-Concept of a Hole

Semiconductors:

Introduction– Intrinsic semiconductors - density of charge carriers-Fermi level – extrinsic semiconductors - P-type & N-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature - Drift and Diffusion currents – Einstein's equation - Hall effect- Hall coefficient - Applications of Hall effect.

Text Books:

1.M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017

2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018

3. P.K. Palanisamy, Applied Physics, SciTech Publications.

References:

1. Gerd Keiser “Optical Fiber Communications”- 4/e, Tata Mc GrawHill.
2. Charles Kittel “Introduction to Solid State Physics”,Wiley Publications.
3. S.M.Sze “Semiconductor devices-Physics and Technology”-Wiley.
4. Halliday, Resnick and Walker, “Fundamentals of Physics”, John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers.
6. Ajoy Ghatak “Optics” Tata Mc GrawHill.

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger’s time independent wave equation in studying particle in one-dimensional infinite potential well. Identify the role of classical free electron theory in the study of electrical conductivity.

CO5**:** Explain the concept of quantum free electron theory in the study of electrical conductivity. Classify the energy bands of solids. Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices.

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Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Programming for Problem Solving				
Branch	CSE,IT, AI&DS,EEE				

Course Objectives:

- Formulating algorithmic solutions to problems and implementing algorithms in C.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding arrays, pointers and dynamic memory allocation.
- Understanding Strings and Structures

UNIT-I:

Introduction to C Programming- Identifiers, The main () Function, The printf () Function **Programming Style** - Indentation, Comments, Data Types**,** Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization.

Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT-II:

Control Flow-Relational Expressions - Logical Operators:

Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement.

UNIT-III:

Arrays & Pointers:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

Pointers: Concept of a Pointer, Initialisation of pointer variables, passing by address, Dangling memory, address arithmetic, Dynamic memory management functions, command line arguments.

UNIT-IV:

Modular Programming: Function and Parameter Declarations, Returning a Value, Classifications of Functions, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Array as a Function arguments.

Case Study: Recursion - Mathematical Recursion, Recursion versus Iteration

UNIT-V:

Strings & Structures:

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.

TEXT BOOKS:

1. ANSI C Programming, Gary J. Bronson, Cengage Learning.
2. Let us C Authentic Guide to C Programming Language by yashavant kanetkar.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

REFERENCE BOOKS:

1. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, Bichkar, Universities Press.
3. Programming in C, ReemaThareja, OXFORD.
4. C by Example, Noel Kalicharan, Cambridge.

Course Outcomes:

1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops and functions.
4. Explain the difference between call by value and call by reference
5. Understand the dynamics of memory by the use of pointers
6. Understand the sorting and searching algorithms.

Branch: EEE **I Year – II Semester** **Regulation: R20**

Sub. Title: ELECTRICAL CIRCUIT ANALYSIS-I

L	T	P	C
3	0	0	3

Sub.Code:

Learning Objectives:

- To study the basic concepts of DC circuits and various network reduction techniques.
- To study the concept of magnetic coupled circuit.
- To study the basic concepts of single phase AC circuits.
- To understand the behavior of RLC networks for Sinusoidal excitations and learn the concept of resonance.
- To understand the applications of network theorems for analysis of electrical networks.

UNIT-I

Introduction to Electrical Circuits-I: Basic definitions - electric charge, current, voltage, power and energy. Classification of Network elements, Passive components and their V-I relations. Sources - Dependent and Independent sources, Kirchhoff's laws, Network reduction techniques - Series, Parallel, voltage division rule and current division rule. Star to Delta and Delta to Star transformation, Source transformation technique, Nodal analysis and Mesh analysis, Concept of Super node and Super mesh.

UNIT-II

Analysis of Coupled Circuits: Basic definitions - MMF, Flux and Reluctance, Analogy between Electrical and Magnetic circuits. Concept of Self, Mutual Inductance, Dot convention, Coefficient of coupling, Series and Parallel aiding and opposing, Analysis of Coupled circuits using Mesh analysis

UNIT-III

Single Phase AC Systems: Periodic waveforms, determination of RMS, Average value, Concept of Phase angle and Phase difference, Waveforms and Phasor diagrams for lagging, leading networks, Power Factor and its significance, Real, Reactive power and Apparent power.

UNIT-IV

Analysis of AC Networks: Steady state analysis of R, L and C circuits, Extension of node and mesh analysis to AC networks, Series and parallel Resonance, Variation of Impedance with frequency, Bandwidth, Q factor and Selectivity.

UNIT-V

Network theorems (DC & AC Excitation): Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem.

Course Outcomes:

Students should be able to

- Solve dc circuits using various network reduction techniques.

- Analyse the coupled circuits.
- Determine various ac quantities for different periodic waveforms.
- Analyse the behavior of RLC networks for Sinusoidal excitations and understand the concept of resonance.
- Solve electrical networks by using principles of Network Theorems.

Text Books:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,McGraw Hill Company, 6th edition
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

Reference Books:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India).
2. Electric Circuits– (Schaum's outlines) by MahmoodNahvi& Joseph Edminister, Adapted by KumaRao, 5th Edition – McGraw Hill.
3. Electric Circuits by David A. Bell, Oxford publications
4. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications
5. Circuit Theory(Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.

I B.Tech II Semester

ELEMENTS OF CIVIL AND MECHANICAL ENGINEERING

EEE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To provide basic fundamental knowledge on buildings, building materials and surveying
- To provide basic fundamentals on foundation, environmental engineering and dams
- To provide basic fundamental knowledge on transportation engineering and understand mechanical engineering materials, various manufacturing process like casting and joining processes.
- Understand the various engineering energy transformation systems used in society
- To get familiarize with the advanced manufacturing technologies used in modern industries.

Part – A

CIVIL ENGINEERING

UNIT – I

Civil Engineering Materials (Properties and uses): Bricks – stones – sand – cement – concrete – steel sections.
Introduction to Buildings: Types of buildings, selection of site for buildings, components of a residential building and their functions
Surveying: Objectives – Types – Classification – Principles

UNIT – II

Foundations: Definition of bearing capacity of soil, functions of foundations, types – shallow and deep. Concept of load bearing and framed structure.
Environmental Engineering: Protected water supply, water treatment methods- sewage treatment
Irrigation Engineering: Dams and its Types, Purpose of reservoir.

UNIT- III

Transportation Engineering: Roads- Benefits- Classifications - Traffic signs, Bridges-components of Bridges

Part - B

MECHANICAL ENGINEERING

UNIT-III

Engineering Materials for manufacturing process: Classification, Properties of Materials. Introduction to Composites, Smart materials-classification and applications
Casting: Introduction to Casting, advantages and disadvantages
Joining processes: soldering and brazing.

UNIT-IV

Basics: Introduction to thermodynamics, working principle of internal combustion engines.
heat transfer: Modes of heat transfer,
Electric Vehicles: Introduction to electric vehicles, working principle, transmission system, social and environmental importance of electric vehicles.

Power Generation: Layout and working principle of thermal and hydroelectric power plants.

UNIT-V

Additive Manufacturing: Introduction to additive manufacturing and its applications, advantages and disadvantages, comparison between additive manufacturing and conventional manufacturing.
Robotics &Automation: Introduction to Robotics, classification of robots and applications.
Concept of Automation, comparison between NC and CNC machines.

COURSE OUTCOMES:

1. To explore the knowledge on basic surveying and building construction
2. Fundamentals of foundation and environmental engineering.
3. Learn basic knowledge on roads and bridges
4. Various conventional and modern manufacturing processes
5. Fundamentals of I.C. Engine, power generation and working of Electric Vehicles

TEXT BOOKS:

1. Basic Civil Engineering by Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, Laxmi Pulications.
2. Text Book of surveying Kindle edition by P.Venugopala rao , Vijayalakshmi Akella, PHI learning private ltd. Publisher.
3. Elements of Mechanical Engineering, M.L. Mathur, F.S.Metha & R.P.Tiwari Jain Brothers Publs, 2009.
4. Production Technology by P. N. Rao by I & II McGraw-Hill publications.
5. Rapid Prototyping-Principles and Applications 3rd Edition by Chua Chee Kai, Leong Kah Fai, Lim Chu-Sing, 2003
6. Hybrid Electric Vehicle Technology 1st Edition by Automotive Research and Design, ISBN-13: 978-0826900661

REFERENCE BOOKS:

1. Basics of civil Engineering by Er.Srikrishna A Dhale, S.Chand publications
2. Basic civil Engineering by SS Bhavikatti, New Age International publishers
3. Basic civil and Mechanical Engineering by S Shanmugam, Ms Palanichamy Mc Graw Hill publications
4. Mechanical Engineering Science by K R Gopala Krishna, Subhas publications
5. Thermal Engineering by Ballaney, P L., Khanna Publishers, 2003.
6. Electric and Hybrid Vehicles 1st Edition, (Kindle Edition) by Tom Denton, ISBN-13: 978-113884237

I B.Tech – II Sem **L T P C**

0 0 0 1.5

Programming for Problem Solving Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers Structures.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of functions involving the idea of Modularity.

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math
a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow – I
a)Write a C Program to Find Whether the Given Year is a Leap Year or not.
b)Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow – II
a)Write a C Program to Find Whether the Given Number is
    i) Prime Number
    ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle

Exercise – 5 Functions
a) Write a C Program demonstrating parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise – 6 Control Flow – III
a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions – Continued

Write a C Program to compute the values of sinx and cos x and e^x values using Series expansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a)Write a C Program to Store Information of a Movie Using Structure

b)Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a)Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find the sum of n elements entered by the user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find the sum of n elements entered by the user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations with library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

b) Implementation of string manipulation operations without library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

Course Outcomes:

1. Apply and practice logical ability to solve the problem.
2. Understand C programming development environment, compiling, debugging and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs.
4. Understand and apply the inbuilt functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques.

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume Resonator
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

Branch: EEE **I Year – II Semester** **Regulation: R20**

Sub. Title: WORKSHOP (ELECTRICAL & IT)

Sub.Code:

L	T	P	C
0	0	3	1.5

PART-A

ELECTRICAL WORKSHOP

Learning Objectives:

1. To know about different tools, abbreviations and symbols in Electrical Engineering
2. To learn about different types of electrical components and measuring instruments.
3. To learn how to perform residential wiring and fluorescent lamp wiring.

Syllabus:

1. Study on Introduction to Electrical tools, symbols and abbreviations
2. Study of types of sizes of wires and making "T" joint and straight joint for wires
3. Identification of color code of resistors, Transistors, capacitors, diodes and Introduction to Multi meter & Power supply
4. Study and performance of residential wiring (using Energy meter, Fuses, Switches, Indicator, Lamps, etc.)
5. Study of Fluorescent lamp wiring
6. Measurement of wire gauges using gauge meter

References:

1. Lab manual of Electrical Engineering by TTTI, Chennai.

Course Outcomes:

1. Able to demonstrate knowledge on different tools, abbreviations and symbols used in Electrical Engineering
2. Able to measure different electrical quantities using measuring instruments
3. Able to perform wiring for residential houses.

PART-B

IT Workshop

Task 1: Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage and Practicing disassembling and assembling components of a PC.

Task 2: Demonstration and Practice of various features of Microsoft Word Assignment: 1. Create a project certificate. 2. Creating a news letter Features to be covered:-Formatting Fonts, Paragraphs, Text effects, Spacing, Borders and Colors, Header and Footer, Date and Time option, tables, Images, Bullets and Numbering, Table of Content, Newspaper columns, Drawing toolbar and Word Art and Mail Merge in word etc.,

Task 3: Demonstration and Practice of various features Microsoft Excel Assignment: 1. Creating a scheduler 2. Calculating GPA 3. Calculating Total, average of marks in various subjects and ranks of students based on marks Features to be covered:- Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel, Charts, Renaming and Inserting worksheets, etc.,

Task 4: Demonstration and Practice of various features Microsoft Power Point Features to be covered:- Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks Tables and Charts, Master Layouts, Types of views, Inserting – Background, textures, Design Templates, etc.,

Task 5: Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices.

Task 6: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage, Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list. Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to CSE, IT & EEE Branches)

Course Title: Constitution of India

L	T	P	C
2	0	0	0

Course Objectives:

- To train students in understanding the basic structure of Indian Constitution
- To prepare students to live better and happily with other fellow beings through the application of Fundamental Rights in their lives.

UNIT-I: Introduction to Indian Constitution

Meaning of the term Indian Constitution –Preamble- Constituent Assembly- Salient Features of Indian Constitution

UNIT-II: Fundamental Rights

Fundamental Rights -Fundamental Duties -The Directive Principles of State Policy

UNIT-III: Union Government

Union Government -Union Legislature (Parliament) -Lok Sabha and Rajya Sabha (with Powers and Functions) -Union Excecutive -President of India (with Powers and Functions) -Prime Minister of India (with Powers and Functions) -Union Judiciary (Supreme Court) -Jurisdiction of the Supreme Court

UNIT-IV State Government

State Government -State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council / Vidhan Parishad) -Powers and Functions of the State Legislature -State Executive-Governor of the State (with Powers and Functions) -The Chief Minister of the State (with Powers and Functions) -State Judiciary (High Courts)

UNIT-V: Local Self Governance and Sovereign Bodies

Powers and functions of Municipalities, Panchyats, ZP's and Co – Operative Societies

Election Commission of India (with Powers and Functions) -The Union Public Service Commission (with Powers and Functions)

Text Books:

1. Introduction to constitution of India, Durga Das Basu, Lexis Nexis Publications
2. Constitution of India by PRFESSIONAL BOOK PUBLISHERS
3. The Constitution of India by Arun K Tiru vengadam, Blooms bury publishers.
4. The constitution of India by PM Bakshi, Universal law publishing co
5. The Constitution of India by S.R. Bhansali, Universal law publishing co

Course Outcomes:

Upon the completion of the course, the student will be able to

1. Examine salient features of Indian Constitution and live accordingly in society.

2. Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.

3. Discover various aspects of Union Government legislation and live up to the expectations of the rules.

4. Critically examine State Government legislation and improve your living standards by following the rules strictly

5. Examine powers and functions of local bodies such as Muncipalities and Panchayats and, ake advantage of available resources for better living, and analyze the powers and functions of Election Commission and The Union Public Service Commission and decide upon it for safe and secured life.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	Power Systems-I				
Branch	EEE				

Learning objectives:

- To study the purpose and principle of operation of different components of a thermal power station.
- To study the purpose and principle of operation of different components of a Nuclear power station.
- To study the concepts of DC and AC distribution systems and voltage drop calculations.
- To study the constructional details and operation of different components of an Air and Gas insulated substations.
- To study the constructional details of different types of cables.
- To study different types of load curves and tariffs applicable to consumers.

UNIT-I Thermal Power Stations

Selection of site, general layout of a thermal power plant showing paths of coal, steam, water, air, ash and flue gasses, ash handling system, Brief description of components: Boilers, Super heaters, Economizers, electrostatic precipitators steam Turbines : Impulse and reaction turbines, Condensers, feed water circuit, Cooling towers and Chimney.

UNIT-II Nuclear Power Stations

Location of nuclear power plant, Working principle, Nuclear fission, Nuclear fuels, Nuclear chain reaction, nuclear reactor Components: Moderators, Control rods, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR. Radiation: Radiation hazards and Shielding, nuclear waste disposal.

UNIT-III Distribution Systems

Classification of distribution systems, design features of distribution systems, radial distribution, ring main distribution, voltage drop calculations: DC distributors for following cases - radial DC distributor fed at one end and at ends (equal / unequal voltages), ring main distributor, stepped distributor and AC distribution, comparison of DC and AC distribution.

UNIT-IV Substations

Classification of substations:

Air Insulated Substations - Indoor & Outdoor substations, Substations layouts of 33/11 kV showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, double bus bar with one and two circuit breakers, main and transfer bus bar system with relevant diagrams.

Gas Insulated Substations (GIS) – Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, constructional aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

UNIT-V Underground Cables

Types of Cables, Construction, Types of insulating materials, Calculation of insulation resistance, stress in insulation and power factor of cable. Capacitance of single and 3-Core belted Cables: Grading of Cables-Capacitance grading and Inter sheath grading.

UNIT-VI Economic Aspects of Power Generation & Tariff

Economic Aspects - Load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, power capacity factor and plant use factor, Base and peak load plants.

Tariff Methods- Costs of Generation and their division into Fixed, Semi-fixed and Running Costs, Desirable Characteristics of a Tariff Method, Tariff Methods: Simple rate, Flat Rate, Block-Rate, two-part, three-part, and power factor tariff methods.

Learning Outcomes:

- Students are able to identify the different components of thermal power plants.
- Students are able to identify the different components of nuclear Power plants.
- Students are able to distinguish between AC & DC distribution systems and also estimate voltage drops of distribution systems.
- Students are able to locate the different components of air and gas insulated substations.
- Students are able to identify single core and multi core cables with different insulating materials.
- Students are able to analyze the effect of load factor, demand factor and diversity factor on the cost of generation of electrical power and also able to identify the types of tariff applicable to consumers based on their load demand.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co. Pvt. Ltd, 2013.
2. Generation, Distribution and Utilization of Electric Energy by C.L. Wadhwa New age International (P) Limited, Revised third edition.

REFERENCE BOOKS:

1. Electrical Power Distribution Systems by - V. Kamaraju, Tata Mc Graw Hill, New Delhi.
2. Elements of Electrical Power Station Design by – M V Deshpande, PHI, New Delhi.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	ELECTRICAL CIRCUIT ANALYSIS – I				
Branch	EEE				

Learning Objectives:

- To study the concepts of passive elements, types of sources and various network reduction techniques.
- To study the concept of magnetic coupled circuit.
- To understand the behavior of RLC networks for sinusoidal excitations.
- To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
- To understand the applications of network theorems for analysis of electrical networks.

UNIT-I

Introduction to Electrical Circuits-I: Basic definitions of electric charge, current, voltage, power and energy, Network elements classification, Passive components and their V-I relations, Sources (dependent and independent), Kirchoff's laws, Network reduction techniques(series, parallel, voltage division rule and current division rule).

UNIT-II

Introduction to Electrical Circuits-II: Network reduction techniques (star to delta and delta to star transformation), source transformation technique, nodal analysis and mesh analysis. Concepts of super node and super mesh.

UNIT-III

Analysis of Coupled Circuits: Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits. Concept of Self, mutual Inductance, Dot convention, coefficient of coupling, Series and parallel aiding and opposing. Analysis of Coupled circuits using mesh analysis

UNIT-IV

Single Phase A.C Systems: Periodic waveforms (determination of rms, average value), Concept of phase angle and phase difference , Waveforms and phasor diagrams for lagging, leading networks, Power Factor and its significance, real, reactive power and apparent power.

UNIT-V

Analysis of AC Networks: Steady state analysis of R, L and C circuits, Extension of node and mesh analysis to AC networks, Series and parallel resonance, Variation of impedance with frequency, Bandwidth, Q factor, Selectivity.

UNIT-VI

Network theorems (DC Excitation): Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem.

Learning Outcomes: Students are able to solve

- Various electrical networks in presence of active and passive elements.
- Any magnetic circuit with various dot conventions.
- Any R, L, C network with sinusoidal excitation.
- Electrical networks by using principles of network theorems.

Text Books:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,McGraw Hill Company,6^{th} edition.
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

Reference Books:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
2. Electric Circuits– (Schaum's outlines) by Mahmood Nahvi & Joseph Edminister, Adapted by KumarRao, 5th Edition – McGraw Hill.
3. Electric Circuits by David A. Bell, Oxford publications
4. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications
5. Circuit Theory(Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	ELECTROMAGNETIC FIELDS				
Branch	EEE				

Learning Objectives:

- To study the three dimensional coordinate system & vector calculus
- To study the production of electric field and potentials due to different configurations of static charges and To study dielectrics, calculate the capacitance
- To study the magnetic fields produced by currents in different configurations, application of ampere's law and the Maxwell's second and third equations.
- To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops.
- To develop the concept of self and mutual inductances and the energy stored.
- To study time varying and Maxwell's equations in different forms and Maxwell's fourth equation for the induced e.m.f..

UNIT-I Introduction to Vectors:

Three dimensional coordinate system:
Review of vectors-Co-ordinate systems-Cartesian coordinates-Circular cylindrical coordinates-Spherical coordinates & their transformation-Differential length, area and volume in different coordinate systems-Problems.

Vector calculus:
DEL operator-Gradient of a scalar-Divergence of a vector & Divergence theorem-Curl of a Vector & Stokes theorem-Laplacian of scalar-problems

UNIT – II Electrostatics:
Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Gauss's law – Application of Gauss's Law – Maxwell's first law, div(D)=ρv.

Work done in moving a point charge in an electrostatic field–Electric Potential – Potential gradient – Electric dipole – Dipole moment-potential and EFI due to an electric dipole- Dielectric-Capacitance of parallel plate with composite dielectrics - Energy stored in a static electric field.

UNIT – III Magneto Statics and Ampere's circuital law:
Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0.
Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Field due to a circular loop, rectangular and square loops, Maxwell's third equation, Curl (H)=Jc,

UNIT – IV Force in Magnetic fields:
Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors –Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field

UNIT – V Self and Mutual inductance:
Self and Mutual inductance – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT – VI Time Varying Fields:
Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Statically and dynamically induced EMFs – Simple problems - Modification of Maxwell's equations for time varying fields – Significance of Displacement current- problems – Poynting Theorem and Poynting vector.

Learning Outcomes:
A student who has met the objective of the course will be able to:

- To determine the location of a point in three dimensional space.
- To determine electric fields and potentials using gauss's law for various electric charge distributions and to Calculate capacitance, energy stored in dielectrics.
- To Calculate the magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations.
- To determine the magnetic forces and torque produced by currents in magnetic field
- To determine self and mutual inductances and the energy stored in the magnetic field.
- To calculate induced e.m.f., understand the concepts of displacement current and time varying fields

TEXT BOOKS:
1. "Engineering Electromagnetics" by William H. Hayt& John. A. Buck Mc. Graw-Hill Companies, 8thEdition, 2014.
2. . "Principles of Electro Magnetics" by Sadiku, Oxford Publications, 6th Edition, 2015.

REFERENCE BOOKS:
1. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd edition.
2. "Electromagnetic Field Theory" by Yaduvir Singh, Pearson.
3. Electromagnetics J. A. Edminister McGraw Hill 3rd Edition, 2010.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	ELECTRONIC DEVICES AND CIRCUITS				
Branch	EEE				

Learning Objectives:
The main objectives of this course are:

- The basic concepts of semiconductor physics are to be reviewed.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- The application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- The principal of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics are explained.
- The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers in different configuration is explained.

UNIT-I: Semi Conductor Physics : Classification of solids using energy band diagrams, Generation of charge carriers in intrinsic semi conductors and extrinsic semi conductors, mobility and conductivity ,drift and diffusion, charge densities in semiconductors, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semi conductors, continuity equation Hall effect.

UNIT- II: Junction Diode Characteristics : Open circuited p-n junction, law of junction, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, LED, Photodiode, Tunnel Diode, UJT. Construction, operation and characteristics of all the diodes are required to be considered.

UNIT- III: Rectifiers and Filters: Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors.

UNIT- IV: Transistor Characteristics:

BJT: Introduction to transistor, Operating modes of transistor, transistor current components, transistor configurations, transistor asan amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET

UNIT- V: Transistor Biasing and Thermal Stabilization : Need for biasing and operating point, load line analysis, Stability factors, (S, S', S''), BJT biasing methods, fixed bias, collector to base bias, self bias, Stabilization against variations in V_{BE}, Ic, and β, Thermal runaway avoid condition.
FET Biasing- methods and stabilization.

UNIT- VI: Small Signal Low Frequency Transistor Amplifier Models:

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers.

FET: Generalized analysis of small signal model, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition.
2. Integrated Electronics- Jacob Millman, C. Halkies, C.D.Parikh, Tata Mc-Graw Hill, 2009.

References:

1. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition.
2. Electronic Devices and Circuits – A.P.Godse, U.A.Bakshi, Technical publications.

Learning Outcomes:

At the end of this course the student can able to:

- Understand the basic concepts of semiconductor physics.
- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
- Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
- Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	INTERNET OF THINGS (IOT)				
Branch	EEE				

Learning Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web-based services on IoT devices.

UNIT – I INTRODUCTION

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, Networking basics, Machine-to-Machine Communications

IOT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols,

UNIT – II IoT SYSTEM MANAGEMENT

Software defined networks (SDN), network function virtualization, difference between SDN and NFV for IoT. Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

M2M to IoT, Definition and differing characteristics, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT.

UNIT III IOT Architectural and Wireless Technologies for IoT

Building architecture, design principles and needed capabilities, IoT architecture outline, standards considerations. Reference Architecture and Reference Model, Wireless Technologies for IoT: Protocol Standardization for IOT, M2M, RFID & NFC protocols.

UNIT IV IOT Physical Devices

Introduction to different IoT tools, IoT Physical Devices and Endpoints, Introduction to Raspberry PI, Interfaces (serial, SPI, I2C)

Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT – V DOMAIN SPECIFIC APPLICTION

Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle, Embedded Systems, IoT Levels and Templates

UNIT – VI Cloud Analytics

Introduction to cloud computing, Role of Cloud Computing in IoT,Cloud-to-Device Connectivity. IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs. Webserver – Web server for IoT, Cloud for IoT, Python web application framework. Designing a RESTful web API.

Learning Outcomes:

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS

1. 1.Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
3. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493- 9357-1.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	Artificial Intelligence Tools, Techniques and Applications				
Branch	EEE				

Course Objectives: To enable the students

- Define AI and ML and understand their relationship with data
- Understand different data wrangling techniques in Python and their significance.
- Understand different types of supervised learning techniques with their implementation in Python.
- Intuitively understand basic math fundamental behind each technique
- Understand performance metrics and tuning performance.
- Explain the mechanism of unsupervised learning and practice various clustering techniques, Dimensionality reduction and their importance
- Comprehend text mining and its applications
- Understand basic working of recommender system
- Know probabilistic learning models and their applications
- Understand basics of Artificial and Deep Neural Networks.

Unit I: Intro and basic tools in Python

Introduction to AI and Machine Learning. Emergence of AI. Relationship between AI, ML and Data Science. Types of Machine Learning with definitions and application areas. Types of Data. Data wrangling and manipulation using Numpy and Pandas in Python. Types of data. Data visualization using matplotlib and seaborn. Basic Statistic measures of central tendency and variability. Introduction to probability distributions like uniform, normal and skewed distributions, Covariance, Correlation Coefficient, Hypothesis.

Unit II: Supervised learning - Regression

Introduction, KNN, Train-Test-Split. k-fold Cross Validation, Linear Regression, Least Squares, Mean Square Error. Plotting regression line and predicting with Scikit Learn. Gradient Descent. Stochastic Gradient Descent. Learning rate. Polynomial Regression in Scikit Learn. Overfitting, Underfitting. Regularization. Measures of accuracy. Bias Vs. Variance trade-off. Hyperparameter tuning.

Unit III: Supervised Learning - Classification

Definition of classification, use cases and algorithms using Scikit Learn, KNN, Logistic Regression, Decision Tree classifier, Support Vector Machines, Naïve Bayes, Performance measures for classification.

Unit IV: Unsupervised Learning

Introduction, K-Means, Hierarchical clustering techniques. Dimensionality reduction using PCA. Feature Selection and Feature Engineering.

Unit V: Natural Language Processing / Text mining

Introduction. Applications NLP. Components of Natural Language. Steps to get text data into workable format. Term Frequency, Inverse Document Frequency, Bag of Words, ngram, One hot encoding. Notion of corpus. Introduction to NLTK.

Unit VI: Introduction to other common learning methods and applications

Introduction to ANN and deep learning with applications, introduction to ensemble learning with bagging and boosting, random forest and AdaBoost, Recommender Systems-Content and collaborative filtering, Association Rule Mining- Apriori algorithm.

Course Outcomes:

- Understand the necessary packages needed for various machine learning algorithms
- Understand the importance and applications of AI
- Understand concepts of Machine Learning algorithms and their limitations
- Understand how to showcase the machine learning outcomes
- Understand smart solutions for various domains

Text Books:

1.Python Machine Learning Cookbook- Practical Solutions from Preprocessing to Deep learning- Chris Albon-O'Reilly publication-First Edition.
2. Introduction to Machine Learning with Python A Guide for Data Scientists, Andreas C. Müller and Sarah Guido, O'Reilly

Reference books:

1. Python for Data Analysis Data Wrangling with Pandas, NumPy, and IPython, Wes McKinney, O'Reilly
2. Python Data Science Handbook, Essential Tools for Working with Data, Jake VanderPlas, O'Reilly
3. Machine Learning Algorithms, Giuseppe Bonaccorso, Packt Publishing

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	0	0	3	1.5
Subject	ELECTRONIC DEVICES AND CIRCUITS LAB				
Branch	EEE				

Electronic Workshop Practice:

1. **Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.**
2. **Identification, Specifications and Testing of active devices, Diodes, BJTs, JEETs, LEDs, LCDs, SCR, UST.**
3. **Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.**

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. P-N Junction Diode Characteristics Part A: Germanium Diode (Forward bias& Reverse bias) Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics Part A: V-I Characteristics Part B: Zener Diode as Voltage Regulator
3. Half-wave Rectifier(without and with c-filter)
4. Full-wave Rectifier(without and with c-filter)
5. BJT Characteristics(CB Configuration) Part A: Input Characteristics Part B: Output Characteristics
6. BJT Characteristics(CE Configuration) Part A: Input Characteristics Part B: Output Characteristics
7. FET Characteristics(CS Configuration) Part A: Drain Characteristics Part B: Transfer Characteristics
8. UJT Characteristics
9. Transistor Biasing
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier

Equipment Required:

Regulated Power supplies

Analog/Digital Storage Oscilloscopes

Year/Semester	II B.Tech. / I Sem.	L	T	P	C	Subject Code
Regulation Year	2019-20	-	-	2	1	
Name of the Subject	**Business Communication Lab**					
Branch	EEE					

COURSE OBJECTIVES:

- To expose student to different situations for better communication
- To inculcate the habit of learning vocabulary for effective communication
- To enable students to acquire Business English communication

UNIT – I: (2 sessions)

Listening: Listening to short conversations or monologues
Speaking: Giving information about oneself and their opinions and Giving a short talk on business related topics
Reading: Reading short and simple texts to understand the central idea/theme.
Writing: Writing a piece of internal business communication of 30-40 words (Email)

UNIT – II: (2 sessions)

Listening : Listening to a conversation/ monologue and taking notes
Speaking : Giving short talk on business related topics.
Reading: Matching descriptions of people to short texts. Matching statements to information given in a graph or graphs.
Writing : Writing a piece of internal business communication of 30-40 words (Message)

UNIT – III (2 sessions)

Listening: Listening to longer conversations/interviews.
Speaking: Debates & Extempore
Reading : Reading a longer text and deciding whether the statements about the text are right or wrong or if the information is not given.
Writing : Write a business letter 60-80 words, based on an input text and some notes.

UNIT – IV (2 sessions)

Listening: Listening to TV news channels and taking notes.
Listening to songs and writing down the lyrics.
Speaking: Interview sessions
Reading: Read a longer text and answering questions. .
Writing: Writing a Business Report

UNIT – V: (2 sessions)

Listening: Watching short documentaries and making notes.(General)
Speaking: Short plays, Presentations.
Reading : Read short texts and fill in a form using information from the texts.
Writing : Write a skit and enact.

UNIT – VI: (2 sessions)

Listening: Watching documentaries and making notes.(Business specific)
Speaking: Nail your point.
Reading : Critical Reading to know author's perspective.
Writing : Write a skit and enact.

REFERENCE BOOKS:

1. Cambridge English – Business English Certificate Preliminary
2. Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
3. Cambridge University Press India Pvt. Ltd, New Delhi.
4. Mandal S. K (2006),Effective Communication & Public Speaking , Jaico Publishing House, New Delhi.
5. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
6. Balasubramanian .T (2000), A text book of English Phonetics for Indian Student, MacMillan Publishers, India.
7. Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1& 2, New Delhi, Orient Longman Pvt. Ltd

WEB REFERENCES:

1. www.cambridgeenglish.org.
2. www.esl-lab.com

ADDITIONAL SOURCES:

1.A Planning Checklist for Business Messages
https://open.lib.umn.edu/businesscommunication/chapter/5-2-a-planning-checklist-for-business-messages/
2. How to Improve Business Wrtiting https://www.writing-skills.com/how-to-improve-your-business-writing
3. Self Compassion (Source - YouTube)
Bailey Finishes Marathon (Source - YouTube)
How to Conquer Public Speaking Fear (Source - Wordpress)
I am Sorry, I am so Nervous- Rakesh Godhwani (Source - LinedIn)
Interpersonal Communication in the Future World (Source: YouTube)
The Power of Introverts (Source: YouTube)
Boost Power Through Body Language (Source: YouTube)
Take Control of your Non-Verbal Communication (Source: YouTube)
How to have a Good Conversation (Source: YouTube)

COURSE OUTCOMES:

Upon the completion of the course, the student will be able to:

CO1: Understand and interpret conversations in informal and formal contexts.

CO2: Exhibit one's vocabulary, body language, pronunciation and intonation with proper etiquette

CO3: Critique various written texts.

CO4: Construct appropriate Business English writing skills.

CO5: Develop skit exhibiting all LSRW skills.

CO6: Develop the skill of note making.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	0	0	2	1
Subject	INTERNET OF THINGS (IOT) LAB				
Branch	EEE				

Course Objectives:

- To learn about IoT tools and different types of sensors
- To learn the Usage microcontroller based embedded platforms in IoT
- Use wireless peripherals for exchange of data.
- Use of Devices and Data Management in IoT.

Following are some of the programs that a student should be able to write and test on an Raspberry Pi, but not limited to this only.

Part A: All are compulsory

1. Start Raspberry Pi and try various Linix commands in command terminal window: *ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.*
2. Study of Digital IO configuration
3. Study of different type of Sensors (IR Sensor, LDR, Ultrasonic sensors, Temperature, Humidity, Light Intensity).
4. Demonstration of peer to peer communication between coordinator and end device through Router.

Part B – 06 Experiments need to be conducted

1. Get input from two switches and switch on the corresponding LEDs.
2. Flash an LED at a given on time and off time cycle, where the two times are taken from a file.
3. Flash an LED based on cron output (acts as an alarm) with and without using Rasberry Pi.
4. Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.
5. Get the status of a bulb at a remote place (on the LAN) through web.
6. Controlling LEDs blinking pattern through UART.
7. Timer based LED Toggle.
8. Designing of power supply circuit in simulation.
9. Reading Temperature and Relative Humidity value from the sensor.
10. Reading Light intensity value from light sensor.
11. Echo each character typed on serial terminal.

Course Outcomes:

- Able to understand the fundamental concepts of IoT
- Able to design a arduino based embedded platforms in IoT
- Apply the concept of IoT for a particular sensor based network
- Able to design raspberry pi based IOT platform with the access of IoT technology
- Analyze and design networks to support the development of intelligent services with given

performance requirements in a variety of application domains.

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	0	0	3	1.5
Subject	Artificial Intelligence Tools, Techniques and Applications Lab				
Branch	EEE				

Learning objectives: To enable students
1) Apply various NumPy and pandas' concepts to preprocess the data.
2) Understand visualization techniques and create reports for machine learning outcomes
3) Understand the importance of statistics in machine learning and apply them on datasets.
4) Understand how to apply machine learning models on data get inference from them.

1) NumPy
   i) Different ways to create NumPy arrays
   ii) Add, remove, modify elements in an array.
   iii) Arithmetic operations on NumPy array
   iv) Slicing and iterating of NumPy arrays
   V) Matrix operations onNumPy arrays
2) Pandas
   i) Create a data Frame manually
   ii) Different ways of importing a data frame
   iii) Adding, Deleting, Modifying the rows/columns in a dataframe.
   iv) Apply functions on dataframe.
   V) Iterations on dataframe
   vi) Accessing the elements from a dataframe
   Vii) Different ways to deal with NA's in dataframe
   viii) Groupby operations on dataframe
   ix) Merging dataframes
3) Data Visualizations:
   i) Line Graphs
   ii) Scatter Plots
   iii) Histograms
   iv) Subplots
   v) Joinplots
   vi) Heatmaps
4) Basic statistics for machine learning:

Consider a dataset. Apply the following statistical operations on it.
   i) Central Tendency- Mean, Median, Mode
   ii) Distribution of Data- Range, Interquartile range, Variance, Standard deviation, Correlation.
   iii) Draw a box plot to demonstrate Range, Interquartile range.
   iv) Show correlation between 2 variables using scatter plot.
   V) Draw histogram to show how data is distributed for a given data.
   Vi) For the given data, show which attributes as a) continuous b) Ordered c) Binary

5) Prediction

a. Consider a data set and perform univariate linear regression and find the coefficients. Show the relation between independent variable and dependent variable using scatter plot.Show the performance of the model using R-Square error, mean absolute error and Mean Square error

b. Consider a data set and perform multivariate linear regression and find the coefficients. Which attributes are mostly influencing the target variable? Show the performance of the model using R-Square error, mean absolute error and Mean Square error

6) Classification

Consider a datasetand apply following classifiers on it

i) KNN- Classifier
ii) Decision Tree
iii) SVM
iv) Logistic regression

Show the confusion matrix for every model.

Find the accuracy, sensitivity, specificity, F1 score of every model.

Compare the performance of all models

7) Clustering and feature reduction

Consider a dataset and apply the following

i) Apply K-means clustering on the data. Use Elbow method and find the optimal value of K.
ii) Apply Agglomerative clustering on the data. Use dendrograms.
iii) Apply PCA to reduce the number of features in a dataset.

8) Natural Language processing

a. Use NLTK package and perform the following

i) Tokenization
ii) Stemming
iii)Lemmatization
iv) Bag of words
v)TF/IDF

b. Given set of documents, use NLTK to classify them.

9) Ensemble methods.

Consider a dataset

i) Use ensemble method to combine predictive power of decision tree, Logistic regression using bagging technique

ii) Apply ADABOOST on the given data set and draw the confusion matrix for the strong classifier. Apply simple decision tree on the same dataset and compare the performance

iii)) Apply Random Forest on the given data set and draw the confusion matrix for the strong classifier. Apply simple decision tree on the same dataset and compare the performance

10) Association analysis

For a given sales dataset, apply apriori algorithm to generate association rules which is able certain support and confidence.

11) Recommender system.

Use collaborative filtering technique and find similar movies based on the movies watched and rated by a user.

Course outcomes:

By the end of the lab, the students will be able to.

1) Preprocess the raw data
2) Apply various statistical methods to understand the data
3) Apply various visualization techniques to understand the data and building reports.
4) Apply Machine learning models on real time data and check the quality of model.

Datasets url's

1) Kaggle.com
2) https://archive.ics.uci.edu/ml/index.php
3) https://data.gov.in/
4) https://vincentarelbundock.github.io/Rdatasets/datasets.html

Text books

1) Python Machine Learning Cookbook- Practical solutions from Preprocessing to Deep learning- Chris Albon-O'Reilly publication-First Edition.
2) Machine Learning Algorithms- Reference Guide for popular algorithms for Data Science and Machine Learning-Packt publications
3) Introduction to machine learning with python-Andreas C. Müller & Sarah Guido, O'Reilly publication-First Edition.

Reference Books

1) Machine Learning, Tom Mitchell, Mc Graw Hill, 1st edition

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2019-2020	2	0	0	0
Subject	Quantitative Aptitude-I				
Branch	EEE				

Learning Objectives:

Enable the students to

- Understand different number systems, factorization, divisibility and concept of LCM and HCF.
- Find averages, relation between ratio and proportion, average price of mixture of different quantities and relation between fraction and percentage.
- Know the concepts of CP,SP, MRP, profit or loss incurred in a transaction.
- Know the concepts of principal, interest, difference between SI and CI, EMIs.
- Understand the relation between speed, distance and time for trains and boats in a river.
- Understand the relation between time and efficiency, combined work and wages paid for the work.

UNIT –I:Number Systems

Basic number systems –Face and Place Value, Digital sum-Applications, Factors, Multipliers, Prime & Composite Numbers, Divisibility Rules, LCM and HCF-Remainder Rules.

UNIT- II: Averages, Ratio& Proportion

Average-Weighted average, Ratio-Concept and properties, Proportions-Mean ,Third and Fourth proportions, Mixtures & Allegations-Definition-Allegation Rule, Percentages-Conversion of Percentages to Fractions and Vice-Versa.

UNIT –III: Profit& Loss

Cost Price- Selling Price- Marked Price, Discount- Successive Discounts, Profit or Loss Percentage, False Weights- Dishonest Dealer.

UNIT –IV: Simple & Compound Interest

Principal-Interest Rate-Tenure , Simple Interest-Formula-Sum, Compound Interest-Formula-Relation Between Simple & Compound Interest, loan-EMI, Investments-Shares.

UNIT – V:Time & Distance

Time-Distance-Speed-Relation, Conversion of Speed , Average Speed, Trains-Relative Speed-Same and Opposite –Platform, Races, Boats-Streams-Upstream and Downstream.

UNIT –VI:Time & Work

Work-Time-Efficiency, Combined Work-Partnership-Division of Wages, Chain Rule, Pipes and Cisterns-Inlet-Outlet.

Text Books:

1. Dr. R.S. Aggarwal , Quantitative Aptitude for competitive Examinations, Sultan Chand Publications, 2017.

References:

1. Arun Sharma, How to Prepare for Quantitative Aptitude for the CAT, Tata McGraw Hill Publishing Company, 2016.
2. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Pearson India, 2016

Learning Outcomes:

After completing this course, the students will be able to

- Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
- Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
- Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.
- Calculate the simple and compound interests ,difference between them and the EMI repayment for a loan.
- Evaluate the time taken by a train/car for crossing a static object or a moving object and time taken by a person to a row a boat in a river.

Calculate the time required for individual or combined work, shares of amount for their work and time taken for a tank/cistern to get filled by inlets and outlet.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

II YEAR II SEMESTER

ELECTRICAL & ELECTRONICS ENGINEERING

R19 SYLLABUS

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	Power Systems-II				
Branch	EEE				

Learning Objectives:

- To compute inductance/capacitance of transmission lines and to understand the concepts of GMD/GMR.
- To study the short and medium length transmission lines, their models and performance.
- To study the performance of long transmission lines and travelling waves of transmission lines.
- To study the factors affecting the performance of transmission lines and power factor improvement methods.
- To discuss sag and tension computation of transmission lines as well as to study the performance of overhead insulators.

UNIT–I

Transmission Line Parameters-I

Types of over head transmission line conductors – Calculation of resistance for solid conductors – Calculation of inductance for single phase and three phase– Single and double circuit lines– Concept of GMR and GMD–Symmetrical and asymmetrical conductor configuration with and without transposition-Numerical problems

UNIT–II

Transmission Line Parameters-II

Bundled conductors-Calculation of capacitance for 2 wire and 3 wire systems – Effect of ground on capacitance – Capacitance calculations for symmetrical and asymmetrical single and three phase–Single and double circuit transmission lines-Numerical Problems.

UNIT–III

Performance of Short and Medium Length Transmission Lines

Classification of Transmission Lines-Short transmission line model representation–Medium transmission line model representation by End condenser, Nominal "T" and Nominal "π" methods -A, B, C, D Constants of short and medium transmission lines-Mathematical Solutions to estimate regulation and efficiency – Numerical Problems.

UNIT–IV

Performance of Long Transmission Lines and Travelling Waves

Representation of Long Transmission Line–Rigorous mathematical Solution – Evaluation of A, B, C, D Constants-Numerical Problems– Types of Power System Transients-Concept of travelling waves or propagation surges-Incident, Reflected and Refracted Waves-Wave Length and Velocity of Propagation of Waves –Surge Impedance and SIL of Long Lines

UNIT–V

Various Factors governing the Performance of Transmission line

Skin and Proximity effects – Description and effect on Resistance of Solid Conductors – Ferranti effect – Charging Current –Shunt Compensation –Corona – Description of the phenomenon– Factors affecting corona–Critical voltages and power loss – numerical problems – Basic concept of Radio Interference.

UNIT–VI

Sag and Tension Calculations and Overhead Line Insulators

Sag and Tension calculations with equal and unequal heights of towers–Effect of Wind and Ice on weight of Conductor–Numerical Problems – Stringing chart and sag template and its applications–Types of Insulators – String efficiency and Methods for improvement– Numerical Problems – Voltage distribution–Calculation of string efficiency–Capacitance grading and Static Shielding.

Learning Outcomes:

Students are able to:

- Evaluate the parameters of different types of transmission lines.
- Apply Nominal "T" and Nominal "π" concepts to evaluate the performance of short and medium transmission lines
- Understand the long transmission lines performance calculations and travelling waves of transmission lines.
- Analyze the various factors governing the performance of transmission lines.
- Understand the sag and tension calculations of transmission lines and performance of over head line insulators.

Text Books:

1. Electrical power systems – by C.L.Wadhwa, New Age International (P) Limited, Publishers, 7th edition 2017.
2. Modern Power System Analysis by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill, 4th Edition,2011
3. A course in Power Systems by J.B Gupta, SK Publications, 11th edition 2013

Reference Books:

1. Power system Analysis–by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar A.Chakrabarthy, DhanpatRai& Co Pvt. Ltd.
3. Electrical Power Systems by P.S.R. Murthy, B.S.Publications.

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	ELECTRICAL CIRCUIT ANALYSIS – II				
Branch	EEE				

Learning Objectives:

- To understand the applications of network theorems for analysis of AC electrical networks.
- To study the concepts of balancedand unbalanced three-phase circuits.
- To study the transient behavior of electrical networks with DC and AC excitations.
- To study the performance of a network based on input and output excitation/response.
- To understand the realization of electrical network function into electrical equivalent passive elements. .

UNIT-I Network theorems (AC Excitation): Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem.

UNIT-II Balanced Three phase circuits

Introduction to three phase, phase sequence, star and delta connection ,relation between line and phase voltages and currents ,analysis of balanced three phase circuits, measurement of active and reactive power.

UNIT-III Unbalanced Three phase circuits

Analysis of three phase unbalanced circuits: Loop method – Star-Delta transformation technique, Two wattmeter methods for measurement of three phase power, Single wattmeter method of measuring reactive power.

UNIT-IV Transient Analysis in DC and AC circuits

Transient response of R-L, R-C, R-L-C circuits for DC and AC excitations, Solution using differential equations and Laplace transforms.

UNIT-V Two Port Networks

Two port network parameters – Z, Y, ABCD and Hybrid parameters and their relations, Interconnections of two port networks, Poles and zeros of network functions.

UNIT-VI Network synthesis

Positive real function - basic synthesis procedure - LC immittance functions - RC impedance functions and RL admittance function - RL impedance function and RC admittance function - Foster and Cauer methods.

Learning Outcomes:

- Students are able to solve AC electrical networks by using principles of network theorems.
- Students are able to solve three- phase circuits under balanced and unbalanced condition
- Students are able find the transient response of electrical networks for different types of excitations.
- Students are able to find parameters for different types of network.
- Students are able to realize electrical equivalent network for a given network transfer function.

Text Books:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,McGraw Hill Company,6 th edition
2. Network synthesis: Van Valkenburg; Prentice-Hall of India Private Ltd

Reference Books:

1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,Dhanpat Rai &Co.
2. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
3. Introduction to circuit analysis and design by TildonGlisson. Jr, Springer Publications.
4. Circuits by A.BruceCarlson ,Cengage Learning Publications
5. Networks and Systems by D. Roy Choudhury, New Age International publishers
6. Electric Circuits by David A. Bell, Oxford publications.

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	ELECTRICAL MACHINES– I				
Branch	EEE				

Learning objectives:

i. Understand the principles of electromagnetic energy conversion and learn the Principle and construction details of DC Generator.
ii. Learn the characteristics of DC generators.
iii. Understand the concept of armature reaction and commutation Process.
iv. Learn the characteristics and performance of DC motors.
v. Learn the speed control and testing methods of DC motors.
vi. Learn the basics Of PMDC motor & Stepper Motor.

UNIT–I:

Introduction to D.C. Machines

Energy balance- singly excited machine- magnetic force - co-energy – multi excited magnetic field system.

Principle of operation of D.C.Generators – construction - E.M.F equation- armature windings – lap and wave windings- Methods of excitation - types of generators.

UNIT–II:

Characteristics of DC Generators:

Build- up of emf - open circuit characteristics-critical field resistance-critical speed-causes for failure to self excitation- remedial measures – Internal and external characteristics of separately excited, shunt, series, compound generators.

UNIT-III

Armature Reaction & Commutation:

Armature reaction – cross magnetizing and de-magnetizing AT/pole – Commutation process – methods of improving commutation – compensating windings – Interpoles - applications, losses and efficiency.

UNIT–IV:

D.C. Motors

Principle of operation – back E.M.F - torque equation –characteristics of shunt, series and compound motors – armature reaction and commutation - losses and efficiency- applications of dc motors- Starting by 3 point and 4 point starters .

UNIT-V:

Speed Control and Testing of D.C. Machines

Speed control by armature voltage and field flux control – testing of DC machines - brake test, Swinburne's method – Hopkinson's method - separation of losses – methods of electrical braking: plugging, dynamic and regenerative.

UNIT–VI:

Permanent Magnet DC Motors

Construction – Principle of working – Torque equation and equivalent circuits – Performance characteristics.

Stepper Motors

Construction – Principle of operation – Theory of torque production – Hybrid stepping motor – Variable reluctance stepping motor.

Learning outcomes:

i. Able to explain the concepts of electromagnetic energy conversion and Principle and Construction of DC Generator.
ii. Able to analyze the characteristics of dc generator,
iii. Able to explain the armature reaction and commutation in DC generator.
iv. Able to explain the Operation, Characteristics and performance of dc motors.
v. Able to analyze the speed control and testing methods of dc motors.
vi. Able to understand the operation of PMDC motor and Stepper motor.

TEXT BOOKS:

1. Electrical Machines – P.S. Bimbra., Khanna Publishers.
2. Electric Machinery – A. E. Fritzgerald, C. Kingsley and S. Umans, TMC, 7th edition
3. Theory & Performance of Electrical Machines by J.B.Gupta. S.K.Kataria& Sons.
4. Special electrical Machines, K.Venkata Ratnam, University press, 2019, New Delhi.

REFERENCE BOOKS:

1. Performance and Design of D.C Machines – by Clayton & Hancock, BPB Publishers
2. Electrical Machines -S.K. Bhattacharya,
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata McGraw – Hill Publishers, 5th edition 2004.
4. Brushless Permanent magnet and reluctance motor drives, Clarenden press, T.J.E. Miller, 2017, Oxford..

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	CONTROL SYSTEMS				
Branch	EEE				

Learning Objectives:

- To learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function.
- To analyze the time response of first and second order systems and study of controllers.
- To investigate the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
- To present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots.
- To discuss basic aspects of design and compensation of linear control systems using Bode plots.
- Ability to formulate state models and analyze the systems. To present the concepts of Controllability and Observability.

UNIT – I Mathematical Modelling of Control Systems

Classification of control systems-Open Loop and closed loop control systems and their differences with examples. Feed-Back principle and characteristics. Definition of Transfer function, determination of transfer function of translational, rotational mechanical systems and electrical networks. Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and receiver with block diagrams.

Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT-II Transient and Steady-State Analysis of Linear Time Invariant Systems.

Standard test signals - Time response of first order systems – Time response of second order systems - Time domain specifications – Steady state response -dominant closed loop poles- Steady state errors and error constants.

Definition of Controller -Proportional (P) controller , Proportional Integral (PI) controller, proportional controller(PD) and Proportional Integral Derivative controller (PID).

UNIT – III Stability Analysis.

The concept of stability – Routh Hurwitz criterion – The root locus concept - construction of root loci(Simple Problems)-Effect of open loop & Closed loop Poles on Root Locus.

UNIT – IV Frequency Response Analysis.

Introduction, Frequency domain specifications-Bode diagrams- Transfer function from the Bode Diagram-.Polar Plots- Nyquist stability criterion-Relative Stability- Phase margin and Gain margin-Stability analysis from Bode Plots.

UNIT – V Classical Control Design Techniques.

Lag, Lead, Lead-Lag Compensators. Design of Lag, Lead, Lead-Lag Compensators-using Bode plots.

UNIT – VI State Space Analysis

Concepts of state, state variables and state model, State space representation of transfer function, Diagonalization- Solving the time invariant state equations- State TransitionMatrix and its Properties – Concepts of Controllability and Observability.

Learning Outcomes:

- Ability to determine the transfer function of physical systems and overall transfer function using block diagram algebra and signal flow graphs.
- Capability to determine time response specifications of second order systems and to determine error constants.
- Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
- Capable to analyze the stability of LTI systems using frequency response methods.
- Able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.
- Able to understand the State Space Analysis of Continuous systems.

Text Books:

1. Control Systems principles and design, M.Gopal, Tata McGraw-Hill Publications, 4th Edition.
2. Automatic control systems, Benjamin C.Kuo and Farid Golnaraghi, Wiley- India,8th Edition.

Reference Books:

1. Modern Control Engineering, Katsuhiko Ogata, Prentice Hall of India.
2. Control Systems, Dhanesh NManik, Thomson Press (India) Limited.
3. Control Systems Engineering, I.J.Nagarath and M.Gopal, Newage InternationalPublications.
4. Control Systems Engineering, S.Palani,TataMcGraw-Hill Publications, 2nd Edition.

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	2	1	0	3
Subject	DIGITAL LOGIC DESIGN				
Branch	EEE				

The main objectives of this course are given below:

- To learn basic tools for the design of digital circuits and fundamental concepts used in the design of digital systems
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip flops.

UNIT- I: Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction

UNIT -II: Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms,

UNIT- III: Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT- IV: Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers.

UNIT- V: Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines

UNIT -VI: Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, Ripple Counter

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.
2. Digital Logic Design, Leach, Malvino, Saha, TMH. 3. Modern Digital Electronics, R.P. Jain, TMH.

LEARNING OUTCOMES:

At the end of this course the student will able to:

- Able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, gray, and BCD.
- Able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.

Able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

II Year II sem EEE 2019-2020	ELEMENTS OF CIVIL AND MECHANICAL ENGINEERING	L	T	P	C
		2	1	0	3

Part - A

CIVIL ENGINEERING

Course Objectives:

- To know the different fields of Civil Engineering, Building Materials and structural Elements
- To impart knowledge on basic concepts in surveying and building construction
- To Provide basic fundamental knowledge on Transportation Engineering, Environmental engineering

UNIT – I

Civil Engineering Materials (Types, Properties and uses): Bricks – stones – sand – cement – concrete – steel sections.

Introduction to Buildings: Types of buildings, selection of site for buildings, components of a residential building and their functions

UNIT – II

Surveying: Objectives – Types – Classification – Principles - Determination of area (Mid ordinate rule, Average ordinate rule, Trapezoidal rule, & Simpson's rule)

Foundations: Definition of Bearing capacity of soil, functions of foundations, types – shallow and deep (brief discussion only). Concept of Load bearing & framed structure.

UNIT- III

Roads- Benefits- Classifications - Traffic signs, Bridges-components of Bridges – Dams and its Types , Purpose of reservoir.

Environmental Engineering: Protected water supply, water treatment methods-sewage treatment

COURSE OUTCOMES:

- To impart basic knowledge on civil engineering.
- To explore the knowledge on basic surveying and Foundations.
- The students will be able to analyze the material on the basis of their properties and thus assigning different weightage to their use for technical purposes. And to provide exposure on the fundamental elements of civil engineering structures.

Part - B

MECHANICAL ENGINEERING

OBJECTIVES:

- To provide the basic concepts of various mechanical systems
- To expose to a wide range of equipment and their utility in a practical situation.
- To provide the fundamentals of manufacturing methods, IC engines, heat transfer and transmission systems that usually exist in engineering.

UNIT-IV

Engineering Materials for manufacturing process: Classification, Properties of Materials. Introduction to Composites, Smart materials-classification and applications
Casting: Introduction to Casting, advantages and disadvantages
Joining processes: Brief description of arc welding, gas welding, soldering and brazing.

UNIT-V

Thermal Basics: Introduction to thermodynamics, working principle of internal combustion engines. heat transfer: Modes of heat transfer,
Electric Vehicles: Introduction to electric vehicles, working principle, transmission system, social and environmental importance of electric vehicles.
Power Generation: Layout and working principle of thermal and hydro electric power plants.

UNIT-VI

Additive Manufacturing: Introduction to additive manufacturing and its applications, advantages and disadvantages, comparison between additive manufacturing and conventional manufacturing.
Robotics &Automation: Introduction to Robotics, classification of robots and applications.
Concept of Automation, comparison between NC and CNC machines.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- Identify engineering materials, their properties, manufacturing methods encountered in engineering practice.
- Understand the basics of internal combustion engines, heat transfer and power generation.
- Understand the working of hybrid electric vehicles, basics of robotics and automation.

TEXT BOOKS:

1. Basic Civil Engineering/Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, /Laxmi Pulications.
2. Text Book of surveying Kinle edition by P.Venugopala rao , Vijayalakshmi Akella
3. Basic Mechanical Engineering, Pravin Kumar, published by Pearson
4. Production Technology, Volume - I by P. N. Rao, McGraw-Hill publications.

REFERENCE BOOKS:

1. Basics of civil Engineering, S. Chand publications Er. Srikrishna A Dhale
2. Basic civil Engineering – SS Bhavikatti. New Age International publishers
3. Electric and Hybrid Vehicles 1st Edition, Kindle Edition by Tom Denton, ISBN-13: 978-1138842373
4. Manufacturing Engineering and Technology, Serope Kalpakjian and Steven R. Schmid published by Pearson, Fourth edition

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	2	0	0	0
Subject	Logical Reasoning				
Branch	EEE				

Course Objectives:

Enable the students to

1. Be familiar with different relations in a family, concepts of clocks and calendars.
2. Find position and order of a person /object , routes between points.
3. Understand the techniques of coding and decoding .
4. Understand the validity of statements and inferences from them.
5. Draw valid conclusions from given statements.
6. Understand the concept of analogy and properties of dice.

UNIT –I:Blood Relations, Directions, Clocks & Calendars.
Blood relations -family tree, types of problems on blood relations- first person narrating type-coded relation-puzzle relation, direction-distance-direction and distance problems, angle between hands -correct or incorrect time, day of a date-repeated calendars.
UNIT- II: Ranks & Position, Puzzles.
Ranks-based on positions ,counting ,comparisons , puzzles-table based, selection based, seating based, graph and network Based .
UNIT –III: Coding & Decoding, Series.
Coding and decoding-letter coding, number coding, symbol coding, substitution and mixed type, Symbols and notations, series-number, letter and word type , missing term.
UNIT –IV: Critical Reasoning-I.
Syllogisms, logical consistency, inference & degree of truth, assertion & reason.
UNIT – V: Critical Reasoning-II
Statement & assumption, statement &conclusion, cause & effect, decision making.
UNIT –VI: Non Verbal Reasoning
Series, odd-man out, analogies, mirror & water images, paper cutting & folding, figure formation, cubes & dice .

Text Books:

1. Dr. R.S. Aggarwal , A Modern Approach to Verbal & Non-Verbal Reasoning Sultan Chand Publications, 2018.

References:

1. B.S.Sijwali and Indu Sijwali, A New Approach to Reasoning Verbal & Non-Verbal, Arihant Publishers, 2016.

2. M.K. Pandey, Analytical Reasoning , Bsc Publishing Co. Pvt. Ltd 2009.

Course Outcomes:

After completing this course, the students will be able to

1. Identify the relation between given persons, find the direction and distance from starting point, find angle between hands at given time and vice-versa, find day of given date and vice-versa.
2. Find the position and rank of a person/object in an arrangement, arranging in order using given data.
3. Decode the given code pattern and code given word in terms of alphabet, numbers, symbols and mixed, identify missing term in the pattern/series.
4. Draw a valid conclusion from the statements, consistency of inference drawn, valid reason from given assertions.
5. Identify the cause for the assumed effect, take decision logically from the given data.
6. Identify the odd one in the given series/group, number opposite any face of dice, figure completion from a folded figure.

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2019-2020	0	0	2	1
Subject	ELECTRICAL CIRCUIT ANALYSIS LAB				
Branch	EEE				

Learning objectives:
To verify and demonstrate various theorems, two port networks.
To determine self and mutual inductance of a magnetic circuit, parameters of a given coil and measurement of 3- phase power.

Any 10 of the following experiments are to be conducted:

1) Verification of Thevenin's and Norton's Theorems
2) Verification of Superposition theorem and Maximum Power Transfer Theorem
3) Verification of Compensation Theorem
4) Verification of Reciprocity , Millmann's Theorems
5) Series and Parallel Resonance
6) Determination of Self, Mutual Inductances and Coefficient of coupling
7) Z and Y Parameters
8) Transmission and hybrid parameters
9) Parameters of a choke coil.
10) Determination of cold and hot resistance of an electric lamp.
11) Measurement of 3-phase Power by two Wattmeter Method for balanced loads.

Learning outcomes:
Able to apply various theorems, determination of self and mutual inductances, two port parameters of a given electric circuit. Waveforms and phasor diagram for lagging and leading networks.

II year II sem EEE 2019- 2020	CIVIL AND MECHANICAL ENGINEERING LAB	L	T	P	C
		0	0	2	1

.

Note: At least 5 experiments to be done from each Part

PART - A

CIVIL ENGINEERING

COURSE OBJECTIVES:

- To test basic properties of construction materials like cement, fine aggregates, coarse aggregates, bricks and concrete
- To familiarize the students with advanced survey instruments (Total Station)
- To determine Dissolved Oxygen (DO) levels in given water sample

List of Experiments:

1. Determination of the fineness of cement
2. Determination of particle size distribution of coarse and fine aggregates
3. Determination of specific gravity of fine and coarse aggregates
4. Determination of water absorption of Bricks
5. Determination of efflorescence of Bricks
6. Determination of Compressive strength of concrete
7. Determination of elevation of various points by using Total Station
8. Determination of Dissolved Oxygen (DO) present in given water sample

COURSE OUTCOMES:

- By the end of the course Students will be able to do the Quality Analysis for Building Materials.
- By the end of the course students will be able do the land surveying by Using Total Station Equipment.
- By the end of the course students will be able check the Dissolved oxygen levels in raw water sample.

PART - B

MECHANICAL ENGINEERING

COURSE OBJECTIVES:

- To study and observe various stages of casting through demonstration of Sand Casting Process.
- To prepare a simple joint like lap joint, butt joint are prepared using arc welding.
- Interpret the basic concepts in the area of IC engines.

- Develop a program to operate automated systems.

List of Experiments:

1. Mold making & Casting.
2. Preparation of i) Butt joint and ii) Lap joint by Arc Welding.
3. Perform Turning and facing for a given work piece using CNC lathe machine.
4. Thermal conductivity of a metal rod.
5. Draw the valve and port timing diagrams for IC engine.
6. Robot programming and simulation for Pick and place operation.
7. Joining printed circuite board using soldering process.
8. Perform milling operation for a given work piece using CNC milling machine.

Course Outcomes:

At the end of course the students are able to:

- Students must be able to prepare mould cavity and fabrication of welded structures.
- Students are able to understand the actual working of an IC engine.
- Students are able to generate a program to operate an automated systems.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

III Year – I SEMESTER

L	T	P	C
4	0	0	3

POWER SYSTEMS–II

Preamble:

This course is an extension of power systems–I course. It deals with basic theory of transmission lines modeling and their performance analysis. Transient in power system, improvement of power factor and voltage control are discussed in detail. It is important for the student to understand the mechanical design aspects of transmission lines, cables, insulators. These aspects are also covered in detail in this course.

Learning Objectives:

- To compute inductance/capacitance of transmission lines and to understand the concepts of GMD/GMR.
- To study the short and medium length transmission lines, their models and performance.
- To study the performance and modeling of long transmission lines.
- To study the effect of travelling waves on transmission lines.
- To study the factors affecting the performance of transmission lines and power factor improvement methods.
- To discuss sag and tension computation of transmission lines as well as to study the performance of overhead insulators.

UNIT–I:
Transmission Line Parameters
Conductor materials - Types of conductors – Calculation of resistance for solid conductors – Calculation of inductance for single phase and three phase– Single and double circuit lines– Concept of GMR and GMD–Symmetrical and asymmetrical conductor configuration with and without transposition–Bundled conductors-Numerical Problems–Calculation of capacitance for 2 wire and 3 wire systems – Effect of ground on capacitance – Capacitance calculations for symmetrical and asymmetrical single and three phase–Single and double circuit lines- Bundled conductors–Numerical Problems.

UNIT–II:
Performance of Short and Medium Length Transmission Lines
Classification of Transmission Lines – Short, medium, long line and their model representations –Nominal-T–Nominal-Pie and A, B, C, D Constants for symmetrical and Asymmetrical Networks– Numerical Problems– Mathematical Solutions to estimate regulation and efficiency of all types of lines – Numerical Problems.

UNIT–III:
Performance of Long Transmission Lines
Long Transmission Line–Rigorous Solution – Evaluation of A,B,C,D Constants– Interpretation of the Long Line Equations, regulation and efficiency– Incident, Reflected and Refracted Waves –Surge Impedance and SIL of Long Lines–Wave Length and Velocity of Propagation of Waves – Representation of Long Lines – Equivalent-T and Equivalent Pie network models (Numerical Problems).

UNIT – IV:

Power System Transients

Types of System Transients – Travelling or Propagation of Surges – Attenuation–Distortion– Reflection and Refraction Coefficients – Termination of lines with different types of conditions – Open Circuited Line–Short Circuited Line – T-Junction– Lumped Reactive Junctions.

UNIT–V:

Various Factors governing the Performance of Transmission line

Skin and Proximity effects – Description and effect on Resistance of Solid Conductors – Ferranti effect – Charging Current –Shunt Compensation –Corona – Description of the phenomenon–Factors affecting corona–Critical voltages and power loss – Radio Interference.

UNIT–VI:

Sag and Tension Calculations and Overhead Line Insulators

Sag and Tension calculations with equal and unequal heights of towers–Effect of Wind and Ice on weight of Conductor–Numerical Problems – Stringing chart and sag template and its applications–Types of Insulators – String efficiency and Methods for improvement– Numerical Problems – Voltage distribution–Calculation of string efficiency–Capacitance grading and Static Shielding.

Learning Outcomes:

- Able to understand parameters of various types of transmission lines during different operating conditions.
- Able to understand the performance of short and medium transmission lines.
- Student will be able to understand travelling waves on transmission lines.
- Will be able to understand various factors related to charged transmission lines.
- Will be able to understand sag/tension of transmission lines and performance of line insulators.

Text Books:

1. Electrical power systems – by C.L.Wadhwa, New Age International (P) Limited, Publishers, 1998.
2. Modern Power System Analysis by I.J.Nagarath and D.P.Kothari, Tata McGraw Hill, 2nd Edition

Reference Books:

1. Power system Analysis–by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Power System Analysis and Design by B.R.Gupta, Wheeler Publishing.
3. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.BhatnagarA.Chakrabarthy, DhanpatRai& Co Pvt. Ltd.
4. Electrical Power Systems by P.S.R. Murthy, B.S.Publications.

III Year – I SEMESTER

L	T	P	C
4	0	0	3

RENEWABLE ENERGY SOURCES

Preamble:

This course gives a flavor of renewable sources and systems to the students. It introduces solar energy its radiation, collection, storage and its applications. This covers generation, design, efficiency and characteristics of various renewable energy sources including solar, wind, hydro, biomass, fuel cells and geothermal systems.

Learning Objectives:

- To study the solar radiation data, extraterrestrial radiation, radiation on earth's surface.
- To study solar thermal collections.
- To study solar photo voltaic systems.
- To study maximum power point techniques in solar pv and wind energy.
- To study wind energy conversion systems, Betz coefficient, tip speed ratio.
- To study basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.

UNIT–I:

Fundamentals of Energy Systems and Solar energy

Energy conservation principle – Energy scenario (world and India) – various forms of renewable energy - Solar radiation**:** Outside earth's atmosphere – Earth surface – Analysis of solar radiation data – Geometry – Radiation on tilted surfaces – Numerical problems.

UNIT–II:

Solar Thermal Systems

Liquid flat plate collectors**:** Performance analysis –Transmissivity– Absorptivity product collector efficiency factor – Collector heat removal factor – Numerical problems. Introduction to solar air heaters – Concentrating collectors, solar pond and solar still – solar thermal plants.

UNIT–III:

Solar Photovoltaic Systems

Solar photovoltaic cell, module, array – construction – Efficiency of solar cells – Developing technologies – Cell I-V characteristics – Equivalent circuit of solar cell – Series resistance – Shunt resistance – Applications and systems – Balance of system components - System design**:** storage sizing – PV system sizing – Maximum power point techniques**:** Perturb and observe (P&O) technique – Hill climbing technique.

UNIT–IV:

Wind Energy

Sources of wind energy - Wind patterns – Types of turbines –Horizontal axis and vertical axis machines - Kinetic energy of wind – Betz coefficient – Tip–speed ratio – Efficiency – Power output of wind turbine – Selection of generator(synchronous, induction) – Maximum power point tracking – wind farms – Power generation for utility grids.

UNIT–V:

Hydro and Tidal power systems

Basic working principle – Classification of hydro systems**:** Large, small, micro – measurement of head and flow – Energy equation – Types of turbines – Numerical problems. Tidal power – Basics – Kinetic energy equation – Turbines for tidal power - Numerical problems – Wave power – Basics – Kinetic energy equation – Wave power devices – Linear generators.

UNIT–VI:

Biomass, fuel cells and geothermal systems

Biomass Energy**:** Fuel classification – Pyrolysis – Direct combustion of heat – Different digesters and sizing.

Fuel cell**:** Classification of fuel for fuel cells – Fuel cell voltage– Efficiency – V-I characteristics.

Geothermal**:** Classification – Dry rock and hot acquifer – Energy analysis – Geothermal based electric power generation

Learning Outcomes:

Student should be able to

- Analyze solar radiation data, extraterrestrial radiation, and radiation on earth's surface.
- Design solar thermal collectors, solar thermal plants.
- Design solar photo voltaic systems.
- Develop maximum power point techniques in solar PV and wind energy systems.
- Explain wind energy conversion systems, wind generators, power generation.
- Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.

Text Books:

1. Solar Energy**:** Principles of Thermal Collection and Storage, S. P. Sukhatme and J. K. Nayak, TMH, New Delhi, 3rd Edition.
2. Renewable Energy Resources, John Twidell and Tony Weir, Taylor and Francis - second edition,2013.

Reference Books:

1. Energy Science**:** Principles, Technologies and Impacts, John Andrews and Nick Jelly, Oxford University Press.
2. Renewable Energy- Edited by Godfrey Boyle-oxford university.press,3rd edition,2013.
3. Handbook of renewable technology Ahmed and Zobaa, Ramesh C Bansal, World scientific, Singapore.
4. Renewable Energy Technologies /Ramesh & Kumar /Narosa.
5. Renewable energy technologies – A practical guide for beginners – Chetong Singh Solanki, PHI.
6. Non conventional energy source –B.H.khan- TMH-2nd edition.

III Year – I SEMESTER

L	T	P	C
4	0	0	3

SIGNALS & SYSTEMS

OBJECTIVES:

The main objectives of this course are given below:

- To introduce the terminology of signals and systems.
- To introduce Fourier tools through the analogy between vectors and signals.
- To introduce the concept of sampling and reconstruction of signals.
- To analyze the linear systems in time and frequency domains.
- To study z-transform as mathematical tool to analyze discrete-time signals and systems.

UNIT- I: INTRODUCTION: Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions.

UNIT –II: FOURIER SERIES AND FOURIER TRANSFORM:
Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

UNIT –III: SAMPLING THEOREM – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT-IV: ANALYSIS OF LINEAR SYSTEMS: Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

Cross-correlation and auto-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT –V: LAPLACE TRANSFORMS : Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation

between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT –VI: Z–TRANSFORMS : Fundamental difference between continuous-time and discrete-time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in
Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Signals & Systems- Narayan Iyer and K Satya Prasad, Cenage Pub.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Principles of Linear Systems and Signals – BP Lathi, Oxford University Press, 2015
3. Signals and Systems – K Raja Rajeswari, B VisweswaraRao, PHI, 2009
4. Fundamentals of Signals and Systems- Michel J. Robert, MGH International Edition, 2008.
5. Signals and Systems – T K Rawat , Oxford University press, 2011

OUTCOMES:

At the end of this course the student will able to:

- Characterize the signals and systems and principles of vector spaces, Concept of orthgonality.
- Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
- Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- Understand the relationships among the various representations of LTI systems
- Understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships.
- Apply z-transform to analyze discrete-time signals and systems.

III Year – I SEMESTER

L	T	P	C
4	0	0	3

PULSE AND DIGITAL CIRCUITS OBJECTIVES

The student will be made

- To understand the concept of wave shaping circuits, Switching Characteristics of diode and transistor.
- To study the design and analysis of various Multivibrators.
- To understand the functioning of different types of time-base Generators.
- To learn the working of logic families & Sampling Gates.

UNIT I

LINEAR WAVESHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and exponential inputs. RC network as differentiator and integrator; Attenuators , its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT II

NON-LINEAR WAVE SHAPING : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper; Clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT III

SWITCHING CHARACTERISTICS OF DEVICES : Diode as a switch, piecewise linear diode characteristics, Design and analysis of Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

Bistable Multivibrator: Analysis And Design of Fixed Bias, Self Bias Bistable Multi Vibrator, Collector Catching Diodes, Commutating Capacitors, Triggering of Binary Circuits, Emitter Coupled Bistable Multivibrator (Schmitt Trigger).

UNIT IV

Monostable Multivibrator: Analysis and Design of Collector Coupled Monostable Multi vibrator, Triggering of Monostable Multivibrator, Applications of Monostable Multivibrator.

Astable Multivibrator: Analysis and Design of Collector Coupled Astable Multivibrator, Application of Astable Multivibrator as a Voltage to Frequency Converter.

UNIT V

VOLTAGE TIME BASE GENERATORS:

General features of a time base signal, Methods of generating time base waveform Exponential Sweep Circuits, Negative Resistance Switches, basic principles in Miller and Bootstrap time base generators, Transistor Miller time base generator, Transistor Bootstrap time base generator.

UNIT VI

LOGIC FAMILIES & SAMPLING GATES:

LOGIC FAMILIES: Diode Logic, Transistor Logic, Diode-Transistor Logic, Transistor-Transistor Logic, Emitter Coupled Logic, AOI Logic, Comparison of Logic Families.

SAMPLING GATES: Basic Operating Principles of Sampling Gates, Diode Unidirectional Sampling Gate and Two-Diode Bi-Directional Sampling Gate, Four-Diode gates, Six-Diode Gates, Reduction of Pedestal in Sampling Gates, Applications of Sampling Gates.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill
2. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005

REFERENCES :

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill, Second Edition, 2007.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002
3. Pulse & Digital Circuits by Venkata Rao,K,Ramasudha K, Manmadha Rao,G., Pearson,2010

OUTCOMES

After going through this course the student will be able to

- Design linear and non-linear wave shaping circuits.
- Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
- Design different multivibrators and time base generators.
- Utilize the non sinusoidal signals in many experimental research areas.

III Year – I SEMESTER

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POWER ELECTRONICS

Preamble:

The usage of power electronics in day to day life has increased in recent years. It is important for student to understand the fundamental principles behind all these converters. This course covers characteristics of semiconductor devices, ac/dc, dc/dc, ac/ac and dc/ac converters. The importance of using pulse width modulated techniques to obtain high quality power supply (dc/ac converter) is also discussed in detail in this course.

Learning Objectives:

- To study the characteristics of various power semiconductor devices and to design firing circuits for SCR.
- To understand the operation of single phase full–wave converters and analyze harmonics in the input current.
- To study the operation of three phase full–wave converters.
- To understand the operation of different types of DC-DC converters.
- To understand the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
- To analyze the operation of AC-AC regulators.

UNIT–I:
Power Semi-Conductor Devices
Thyristors–Silicon controlled rectifiers (SCR's) –Characteristics of power MOSFET and power IGBT– Basic theory of operation of SCR–Static characteristics– Turn on and turn off methods–Dynamic characteristics of SCR– Snubber circuit design– Basic requirements of gating circuits for SCR, IGBT and MOSFET.

UNIT–II:
AC-DCSingle-Phase Converters
1-phase half wave controlled rectifiers – R load and RL load with and without freewheeling diode – 1-phase full wave controlled rectifiers – center tapped configuration and bridge configuration- R load and RL load with and without freewheeling diode – continuous and discontinuous conduction – Effect of source inductance in 1-phase fully controlled bridge rectifier with continuous conduction.

UNIT–III:
AC-DC3-Phase Converters
3-phase half wave and Full wave uncontrolled rectifier – 3-phase half wave controlled rectifier with R and RL load – 3-phase fully controlled rectifier with R and RL load – 3-phase semi controlled rectifier with R and RL load.

UNIT–IV:
DC–DC Converters
Analysis of Buck, boost and buck, buck-boost converters in ContinuousConduction Mode (CCM) and Discontinuous Conduction Modes (DCM) – Output voltage equations using volt-sec balance in CCM & DCM output voltage ripple & inductor current, ripple for CCM only – Principle operation of forward and fly back converters in CCM.

UNIT – V:

DC–AC Converters

1- phase halfbridge and full bridge inverters with R and RL loads – 3-phase square wave inverters – 120^0 conduction and 180^0 conduction modes of operation – PWM inverters – Quasi-square wave pulse width modulation – Sinusoidal pulse width modulation – Prevention of shoot through fault in Voltage Source Inverter (VSI) – Current Source Inverter (CSI) – Introduction to Auto Sequential Commutated Current Source Inverter (ASCCSI) .

UNIT – VI:

AC – AC Regulators.

Static V-I characteristics of TRIAC and modes of operation – 1-phase AC-AC regulator phase angle control and integrated cycle control with R and RL load – For continuous and discontinuous conduction- 3-Phase AC-AC regulators with R load only – Transformer tap changing using antiparallel Thyristors.

Learning Outcomes:

Student should be able to

- Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's.
- Design firing circuits for SCR.
- Explain the operation of single phase full–wave converters and analyze harmonics in the input current.
- Explain the operation of three phase full–wave converters.
- Analyze the operation of different types of DC-DC converters.
- Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
- Analyze the operation of AC-AC regulators.

Text Books:

1. Power Electronics: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998
2. Power Electronics: Essentials & Applications by L.Umanand, Wiley, Pvt. Limited, India, 2009

Reference Books:

1. Elements of Power Electronics–Philip T.Krein.oxford.
2. Power Electronics – by P.S.Bhimbra, Khanna Publishers.
3. Thyristorised Power Controllers – by G. K. Dubey, S. R. Doradla, A. Joshi and R. M. K.Sinha, New Age International (P) Limited Publishers, 1996.
4. Power Electronics handbook by Muhammad H.Rashid, Elsevier.
5. Power Electronics: converters, applications & design -by Nedmohan, Tore M. Undeland, Robbins by Wiley India Pvt. Ltd.
6. Power Converter Circuits -by William Shepherd, Li zhang, CRC Taylor & Francis Group.

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III Year – I SEMESTER	**0**	**0**	**3**	**2**

ELECTRICAL MACHINES – II LABORATORY

Learning objectives:

- To control the speed of three phase induction motors.
- To determine /predetermine the performance three phase and single phase induction motors.
- To improve the power factor of single phase induction motor .
- To predetermine the regulation of three–phase alternator by various methods, find X_d/ $X_q$ratio of alternator and asses the performance of three–phase synchronous motor.

The following experiments are required to be conducted as compulsory experiments:

1. Brake test on three phase Induction Motor
2. No–load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance &m.m.f. Methods
4. Regulation of three–phase alternator by Potier triangle method
5. V and Inverted V curves of a three—phase synchronous motor.
6. Determination of X_d and X_q of a salient pole synchronous machine
7. Equivalent circuit of single phase induction motor
8. Speed control of induction motor by V/f method.
9. Determination of efficiency of three phase alternator by loading with three phase induction motor.
10. Power factor improvement of single phase induction motor by using capacitors and load test on single phase induction motor.

Learning outcomes:

- Able to assess the performance ofsingle phase and three phase induction motors.
- Able to control the speed of three phase induction motor.
- Able to predetermine the regulation of three–phase alternator by various methods.
- Able to find the X_d/ $X_q$ratio of alternator and asses the performance of three–phase synchronous motor.

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III Year – I SEMESTER

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CONTROL SYSTEMS LAB

Learning Objectives:

- To impart hands on experience to understand the performance of basic control system components such as magnetic amplifiers, D.C. servo motors, A.C. Servo motors, stepper motor and potentiometer.
- To understand time and frequency responses of control system with and without controllers and compensators.

Any 10 of the following experiments are to be conducted:

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – characteristics of stepper motor
4. Effect of feedback on DC servo motor
5. Effect of P, PD, PI, PID Controller on a second order systems
6. Lag and lead compensation – Magnitude and phase plot
7. DC position control system
8. Transfer function of DC motor
9. Temperature controller using PID
10. Characteristics of magnetic amplifiers
11. Characteristics of AC servo motor
12. Characteristics of DC servo motor
13. Potentiometer as an error detector

Learning Outcomes

- Able to analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchronous motors.
- Able to design P,PI,PD and PID controllers
- Able to design lag, lead and lag–lead compensators
- Able to control the temperature using PID controller
- Able to determine the transfer function of D.C.motor
- Able to control the position of D.C servo motor performance

III Year – I SEMESTER

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ELECTRICAL MEASUREMENTS LABORATORY

Learning Objectives:

- To understand the correct function of electrical parameters and calibration of voltage, current, single phase and three phase power and energy, and measurement of electrical characteristics of resistance, inductance and capacitance of a circuits through appropriate methods.
- To understand testing of transformer oil.

Any 10 of the following experiments are to be conducted

1. Calibration and Testing of single phase energy Meter
2. Calibration of dynamometer wattmeter using phantom loading
3. Calibration of PMMC ammeter and voltmeter using Crompton D.C. Potentiometer
4. Measurement of resistance and Determination of Tolerance using Kelvin's double Bridge.
5. Capacitance Measurement using Schering bridge.
6. Inductance Measurement using Anderson bridge.
7. Measurement of 3 phase reactive power with single phase wattmeter for balanced loading.
8. Calibration of LPF wattmeter by direct loading.
9. Measurement of 3 phase power with single watt meter and using two C.Ts.
10. Testing of C.T. using mutual inductance method.
11. Testing of P.T. using absolute null method.
12. Dielectric oil testing using H.T test Kit.
13. Calibration of AC voltmeter and measurement of choke parameters using AC Potentiometer in polarform.
14. Measurement of Power by 3 Voltmeter and 3 Ammeter method.

Learning Outcomes:

- To be able to measure the electrical parameters voltage, current, power, energy and electrical characteristics of resistance, inductance and capacitance.
- To be able to test transformer oil for its effectiveness.
- To be able to measure the parameters of inductive coil.

III Year – I SEMESTER

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INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Objectives:

***To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.**

***Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.**

Unit I: Introduction to Intellectual Property Rights (IPR)

Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO -Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

Unit II: Copyrights and Neighboring Rights

Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers **–** Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.

Unit III: Patents

Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer — Revocation of Patent – Patent Appellate Board - Infringement of Patent – Compulsory Licensing — Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations.

Unit IV: Trademarks

Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing Off Action.

Unit V: Trade Secrets

Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

Unit VI: Cyber Law and Cyber Crime

Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions - E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers.

- Relevant Cases Shall be dealt where ever necessary.

Outcome:

*** IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.**

***Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.**

References:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.
2. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
3. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi
4. Richard Stim: Intellectual Property, Cengage Learning, New Delhi.
5. Kompal Bansal &Parishit Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press).
6. Cyber Law - Texts & Cases, South-Western's Special Topics Collections.
7. R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.
8. M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

III Year – II SEMESTER

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POWER ELECTRONIC CONTROLLERS & DRIVES

Preamble:

This course is an extension of power electronics applications to electric drives. This course covers in detail the basic and advanced speed control techniques using power electronic converters that are used in industry. It is equally important to understand the four quadrant operation of electric drives and slip power recovery schemes in induction motors.

Learning Objectives:

- To learn the fundamentals of electric drive and different electric braking methods.
- To analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters.
- To discuss the converter control of dc motors in various quadrants.
- To understand the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
- To learn the principles of static rotor resistance control and various slip power recovery schemes.
- To understand the speed control mechanism of synchronous motors

UNIT–I:

Fundamentals of Electric Drives

Electric drive – Fundamental torque equation – Load torque components – Nature and classification of load torques – Steady state stability – Load equalization– Four quadrant operation of drive (hoist control) – Braking methods**:** Dynamic – Plugging – Regenerative methods.

UNIT–II:

Controlled Converter Fed DC Motor Drives

1-phase half and fully controlled converter fed separately and self-excited DC motor drive – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics — Principle of operation of dual converters and dual converter fed DC motor drives -Numerical problems.

UNIT–III:

DC–DC Converters Fed DC Motor Drives

Single quadrant – Two quadrant and four quadrant DC-DC converter fed separately excited and self-excitedDC motors – Continuous current operation– Output voltage and current waveforms – Speed–torque expressions – Speed–torque characteristics –Four quadrant operation – Closed loop operation (qualitative treatment only).

UNIT–IV:

Stator side control of 3-phase Induction motor Drive

Stator voltage control using 3-phase AC voltage regulators – Waveforms –Speed torque characteristics– Variable Voltage Variable Frequency control of induction motor byPWMvoltage source inverter – Closed loop v/f control of induction motor drives (qualitative treatment only).

UNIT–V:

Rotor side control of 3-phase Induction motor Drive

Static rotor resistance control – Slip power recovery schemes – Static Scherbius drive – Static Kramer drive – Performance and speed torque characteristics – Advantages –Applications.

UNIT–VI:

Control of Synchronous Motor Drives

Separate control & self-control of synchronous motors – Operation of self-controlled synchronous motors by VSI– Closed Loop control operation of synchronous motor drives (qualitative treatment only).–Variable frequency control–Pulse width modulation.

Learning Outcomes:

After completion of the course, studentswill be able to:

- Explain the fundamentals of electric drive and different electric braking methods.
- Analyze the operation of three phase converter fed dc motors and four quadrant operations of dc motors using dual converters.
- Describe the converter control of dc motors in various quadrants of operation
- Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
- Differentiate the stator side control and rotor side control of three phase induction motor..
- Explain the speed control mechanism of synchronous motors

Text Books:

1. Fundamentals of Electric Drives – by G K DubeyNarosa Publications
2. Power Semiconductor Drives, by S.B.Dewan, G.R.Slemon, A.Straughen, Wiley-India Edition.

Reference Books:

1. Electric Motors and Drives Fundamentals, Types and Apllications, by Austin Hughes and Bill Drury, Newnes.
2. Thyristor Control of Electric drives – VedamSubramanyam Tata McGraw Hill Publications.
3. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI
4. Power Electronics handbook by Muhammad H.Rashid, Elsevier.

III Year – II SEMESTER

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POWER SYSTEM ANALYSIS

Preamble:

The course is designed to give students the required knowledge for the design and analysis of electrical power grids. Calculation of power flow in a power system network using various techniques, formation of Z_{bus} and its importance are covered in this course. It also deals with short circuit analysis and analysis of power system for steady state and transient stability.

Learning Objectives:

- To development the impedance diagram (p.u) and formation of Y_{bus}
- To study the different load flow methods.
- To study the concept of the Z_{bus}building algorithm.
- To study short circuit calculation for symmetrical faults
- To study the effect of unsymmetrical faults and their effects.
- To study the rotor angle stability of power systems.

UNIT –I:

Per Unit Representation & Topology

Per Unit Quantities–Single line diagram– Impedance diagram of a power system–Graph theory definition – Formation of element node incidence and bus incidence matrices – Primitive network representation – Formation of Y–bus matrix by singular transformation and direct inspection methods.

UNIT –II:

Power Flow Studies

Necessity of power flow studies – Derivation of static power flow equations – Power flow solution using Gauss-Seidel Method – Newton Raphson Method (Rectangular and polar coordinates form) –Decoupled and Fast Decoupled methods – Algorithmic approach – Problems on 3–bus system only.

UNIT –III:

Z–Bus formulation

Formation of Z–Bus**:** Partial network– Algorithm for the Modification of Z_{bus} Matrix for addition element for the following cases**:** Addition of element from a new bus to reference– Addition of element from a new bus to an old bus– Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).– Modification of Z–Bus for the changes in network (Problems).

UNIT – IV:

Symmetrical Fault Analysis

Transients on a Transmission line-Short circuit of synchronous machine(on no-load) - 3–Phase short circuit currents and reactances of synchronous machine–Short circuit MVA calculations -Series reactors – selection of reactors.

UNIT –V:

Symmetrical Components & Fault analysis

Definition of symmetrical components - symmetrical components of unbalanced three phase systems – Power in symmetrical components – Sequence impedances – Synchronous generator – Transmission line and transformers – Sequence networks –Various types of faults LG– LL– LLG and LLL on unloaded alternator–unsymmetrical faults on power system.

UNIT – VI:

Power System Stability Analysis

Elementary concepts of Steady state– Dynamic and Transient Stabilities– Description of Steady State Stability Power Limit–Transfer Reactance–Synchronizing Power Coefficient – Power Angle Curve and Determination of Steady State Stability –Derivation of Swing Equation–Determination of Transient Stability by Equal Area Criterion–Applications of Equal Area Criterion–Methods to improve steady state and transient stability.

`Learning Outcomes:

- Able to draw impedance diagram for a power system network and to understand per unit quantities.
- Able to form a$Y_{bus}$and $Z_{bus}$for a power system networks.
- Able to understand the load flow solution of a power system using different methods.
- Able to find the fault currents for all types faults to provide data for the design of protective devices.
- Able to findthe sequence components of currents for unbalanced power system network.
- Able to analyze the steady state, transient and dynamic stability concepts of a power system.

Text Books:

1. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
2. Modern Power system Analysis – by I.J.Nagrath&D.P.Kothari: Tata McGraw–Hill Publishing Company, 2nd edition.

Reference Books:

1. Power System Analysis – by A.R.Bergen, Prentice Hall, Inc.
2. Power System Analysis by HadiSaadat – TMH Edition.
3. Power System Analysis by B.R.Gupta, Wheeler Publications.
4. Power System Analysis and Design by J.Duncan Glover, M.S.Sarma, T.J.Overbye – CengageLearning publications.

III Year – II SEMESTER

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MICROPROCESSORS AND MICROCONTROLLERS

Preamble:

Microprocessor and microcontroller have become important building blocks in digital electronics design. It is important for student to understand the architecture of a microprocessor and its interfacing with various modules. 8086 microprocessor architecture, programming, and interfacing is dealt in detail in this course. Interfacing, PIC, architecture, programming in C.

Learning objectives:

- To understand the organization and architecture of Micro Processor
- To understand addressing modes to access memory
- To understand 8051 micro controller architecture
- To understand the programming principles for 8086 and 8051
- To understand the interfacing of MP with IO as well as other devices
- To understand how to develop cyber physical systems

UNIT–I:
Introduction to Microprocessor Architecture
Introduction and evolution of Microprocessors– Architecture of 8086–Register Organization of 8086–Memory organization of 8086– General bus operation of 8086–Introduction to 80286–80386 and 80486 and Pentium.

UNIT–II:
Minimum and Maximum Mode Operations
Instruction set, Addressing modes– Minimum and Maximum mode operations of 8086–8086 Control signal interfacing–Read and write cycle timing diagrams.

UNIT–III:
I/O Interface
8255 PPI– Architecture of 8255–Modes of operation– Interfacing I/O devices to 8086 using 8255–Interfacing A to D converters– Interfacing D to A converters– Stepper motor interfacing– Static memory interfacing with 8086–DMA controller (8257)–Architecture–Interfacing 8257 DMA controller– Programmable Interrupt Controller (8259)–Command words and operating modes of 8259– Interfacing of 8259–Keyboard/display controller (8279)–Architecture–Modes of operation–Command words of 8279– Interfacing of 8279.

UNIT–IV:
Introduction to 8051 Micro Controller
Overview of 8051 Micro Controller– Architecture– Register set–I/O ports and Memory Organization– Interrupts–Timers and Counters–Serial Communication.

UNIT– V:
PIC Architecture
Block diagram of basic PIC 18 micro controller, registers I/O ports.

UNIT– VI:
Programming in C for PIC
Data types, I/O programming, logical operations, data conversion

Learning Outcomes:

- To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors.
- To be able to understand the addressing modes of microprocessors
- To be able to understand the micro controller capability
- To be able to program mp and mc
- To be able to interface mp and mc with other electronic devices
- To be able to develop cyber physical systems

Text Books:

1. Kenneth J Ayala, "The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.
2. PIC Microcontroller and Embedded Systems using Assembly and C for PIC 18, - Muhammad Ali Mazidi, RolindD.Mckinay , Danny causey -Pearson Publisher 21st Impression.

Reference Books:

1. R.S. Kaler, " A Text book of Microprocessors and Micro Controllers", I.K. International Publishing House Pvt. Ltd.
2. Ajay V. Deshmukh, "Microcontrollers – Theory and Applications", Tata McGraw–Hill Companies –2005.
3. Ajit Pal, "Microcontrollers – Principles and Applications", PHI Learning Pvt Ltd, 2011.
4. Microprocessors and Interfacing, Douglas V Hall, Mc–Graw Hill, 2nd Edition.
5. Ray and Burchandi, "Advanced Micro Processors and Interfacing", Tata McGraw–Hill.

III Year – II SEMESTER

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DATA STRUCTURES THROUGH C++

OBJECTIVES:

- To be familiar with basic techniques of object oriented principles and exception handling using C++
- To be familiar with the concepts like Inheritance, Polymorphism
- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVLTrees, and B Trees.

UNIT-I: ARRAYS

Abstract Data Types and the C++ Class, An Introduction to C++ Class- Data Abstraction and Encapsulation in C++- Declaring Class Objects and Invoking Member Functions- Special Class Operations- Miscellaneous Topics- ADTs and C++Classes, The Array as an Abstract Data Type, The Polynomial Abstract Data type- Polynomial Representation- Polynomial Addition. Spares Matrices,Introduction- Sparse Matrix Representation- Transposing a Matrix- Matrix Multiplication, Representation of Arrays.

UNIT-II: STACKS AND QUEUES

Templates in C++, Template Functions- Using Templates to Represent Container Classes, The Stack Abstract Data Type, The Queue Abstract Data Type, Subtyping and Inheritance in C++, Evaluation of Expressions, Expression- Postfix Notation- Infix to Postfix.

UNIT-III: LINKED LISTS

Single Linked List and Chains, Representing Chains in C++, Defining a Node in C++- Designing a Chain Class in C++- Pointer manipulation in C++- Chain Manipulation Operations, The Template Class Chain, Implementing Chains with Templates- Chain Iterators- Chain Operations- Reusing a Class, Circular Lists, Available Space Lists, Linked Stacks and Queues, Polynomials, Polynomial Representation- Adding Polynomials- Circular List Representation of Polynomials, Equivalence Classes, Sparse Matrices, Sparse Matrix Representation- Sparse Matrix Input- Deleting a Sparse Matrix, Doubly Linked Lists, Generalized Lists, Representation of Generalized Lists- Recursive Algorithms for Lists- Reference Counts, Shared and Recursive Lists

UNIT-IV: TREES

Introduction, Terminology, Representation of Trees, Binary Trees, The Abstract Data Type, Properties of Binary Tress, Binary Tree Representations, Binary Tree Traversal and Tree Iterators, Introduction, Inorder Traversal Preorder Traversal, Postorder Traversal, Thread Binary Trees, Threads, Inorder Traversal of a Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree, Heaps, Priority Queues, Definition of a Max Heap, Insertion into a Max Heap, Deletion from a Max Heap, Binary Search Trees, Definition, Searching a Binary Search Tree, Insertion into a Binary Search Tree, Deletion from a Binary Search Tree, Height of Binary Search Tree.

UNIT-V: GRAPHS

The Graph Abstract Data Type, Introduction, Definition, Graph Representation, Elementary Graph Operation, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Biconnected Components, Minimum Cost Spanning Trees, Kruskal S Algorithm, Prim s Algorithm Sollin' s Algorithm, Shortest Paths and Transitive Closure, Single Source/All Destination: Nonnegative Edge Cost, Single Source/All Destination: General Weights, All-Pairs Shortest Path, Transitive Closure.

UNIT-VI: SORTING

Insertion Sort, Quick Sort, Merge Sort Merging, Iterative Merge Sort, Recursive Merge Sort, Heap Sort.

OUTCOMES:

- Distinguish between procedures and object oriented programming.
- Apply advanced data structure strategies for exploring complex data structures.
- Compare and contrast various data structures and design techniques in the area of Performance.
- Implement data structure algorithms through C++. • Incorporate data structures into the applications such as binary search trees, AVL and B Trees
- Implement all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs

TEXT BOOKS:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press, Pvt. Ltd.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd.Second, Edition.
3. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

REFERENCE BOOKS:

1.Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
2.Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

III Year – II SEMESTER

L	T	P	C
4	0	0	3

UNIX AND SHELL PROGRAMMIN
OPEN ELECTIVE

OBJECTIVES:

- Written technical communication and effective use of concepts and terminology.
- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Individual capability in problem solving using the tools presented within the class. Students will demonstrate a mastery of the course materials and concepts within in class discussions.

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

UNIT-VI

The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-Process Creation-The Trap Command-The Stty Command-The Kill Command-Job Control.

OUTCOMES:

- Documentation will demonstrate good organization and readability.
- File processing projects will require data organization, problem solving and research.
- Scripts and programs will demonstrate simple effective user interfaces.
- Scripts and programs will demonstrate effective use of structured programming.
- Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.
- Testing will demonstrate both black and glass box testing strategies.
- Project work will involve group participation.

TEXT BOOKS:

1. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Parson.
2. Unix programming environment by Brain W. Kernighan & Rob Pike, Pearson.

REFERENCE BOOKS:

1. Unix and shell programmingby B.M. Harwani, OXFORD university press.

OOPs through Java

OBJECTIVE:

- To strengthen their problem solving ability by applying the characteristics of an object- oriented approach.
- To introduce object oriented concepts in C++ and Java.

Programming:

1. Write a Programme that computes the simple interest and compound interest payable on principal amount (in Rs.) of loan borrowed by the customer from a bank for a giver period of time (in years) at specific rate of interest. Further determine whether the b bank will benefit by charging simple interest or compound interest

2. Write a Programme to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger (as an approximate integer), the conductor mentions the fare to the passenger according to following criteria.
3. Write a C++ Program to illustrate Enumeration and Function Overloading

4. Write a C++ Program to illustrate Scope and Storage class

5. Implementation of ADT such as Stack and Queues

6. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading

7. Write a Program to illustrate Static member and methods

8. Write a Program to illustrate Bit fields

9. Write a Program to overload as binary operator, friend and member function

10. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function

11. Write a C++ Program to illustrate Iterators and Containers

12. Write a C++ Program to illustrate function templates

13. Write a C++ Program to illustrate template class

14. Write C++ Programs and incorporating various forms of Inheritance

15. Write a C++ Program to illustrate Virtual functions

16. To write a C++ program to find the sum for the given variables using function with default arguments.

17. To write a C++ program to find the value of a number raised to its power that demonstrates a function using call by value.

18. To write a C++ program and to implement the concept of Call by Address

19. To write a program in C++ to prepare a student Record using class and object

20. To implement the concept of unary operator overloading by creating a C++ program.

21. Write a C++ program for swapping two values using function templates

22. Write a C++ program to implement a file handling concept using sequential access.

OUTCOMES:

- Explain what constitutes an object-oriented approach to programming and identify potentialbenefits of object-oriented programming over other approaches.
- Apply an object-oriented approach to developing applications of varying complexities

VLSI DESIGN

Objectives:

The main objectives of this course are:

- Basic characteristics of MOS transistor and examines various possibilities for configuring inverter circuits and aspects of latch-up are considered.
- Design processes are aided by simple concepts such as stick and symbolic diagrams but the key element is a set of design rules, which are explained clearly.
- Basic circuit concepts are introduced for MOS processes we can set out approximate circuit parameters which greatly ease the design process.

Outcomes:

At the end of this course the student can able to:

- Understand the properties of MOS active devices and simple circuits configured when using them and the reason for such encumbrances as ratio rules by which circuits can be interconnected in silicon.
- Know three sets of design rules with which nMOS and CMOS designs may be fabricated.
- Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.

Syllabus:

Unit-I:

Introduction and Basic Electrical Properties of MOS Circuits: Introduction to IC technology, Fabrication process: nMOS, pMOS and CMOS. I_{ds} versus V_{ds} Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans, Output Conductance and Figure of Merit. nMOS Inverter, Pull-up to Pull-down Ratio for nMOS inverter driven by another nMOS inverter, and through one or more pass transistors. Alternative forms of pull-up, The CMOS Inverter, Latch-up in CMOS circuits, Bi-CMOS Inverter, Comparison between CMOS and BiCMOS technology. **(Text Book-1)**

Unit-II:

MOS and Bi-CMOS Circuit Design Processes: MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µm Double Metal, Double Poly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOS inverter, Symbolic Diagrams-Translation to Mask Form.

(Text Book-1)

Unit-III:

Basic Circuit Concepts: Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, Some area Capacitance Calculations, The Delay Unit, Inverter Delays, Driving large capacitive loads, Propagation Delays, Wiring Capacitances, Choice of layers.

Scaling of MOS Circuits: Scaling models and scaling factors, Scaling factors for device parameters, Limitations of scaling, Limits due to sub threshold currents, Limits on logic levels and supply voltage due to noise and current density. Switch logic, Gate logic.

(Text Book-1)

Unit-IV:

Chip Input and Output circuits: ESD Protection, Input Circuits, Output Circuits and L(di/dt) Noise, On-Chip clock Generation and Distribution.

Design for Testability: Fault types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based Techniques and Built-In Self Test techniques.

(Text Book-2)

Unit-V:

FPGA Design: FPGA design flow, Basic FPGA architecture, FPGA Technologies, FPGA families- Altera Flex 8000FPGA, Altera Flex 10FPGA, Xilinx XC4000 series FPGA, Xilinx Spartan XL FPGA, Xilinx Spartan II FPGAs, Xilinx Vertex FPGA. Case studies: FPGA Implementation of Half adder and full adder.

Introduction to synthesis: Logic synthesis, RTL synthesis, High level Synthesis.

(Reference Text Book-1)

Unit-VI:

Introduction to Low Power VLSI Design: Introduction to Deep submicron digital IC design**,** Low Power CMOS Logic Circuits: Over view of power consumption, Low –power design through voltage scaling, Estimation and optimisation of switching activity, Reduction of switching capacitance. Interconnect Design, Power Grid and Clock Design.

(Text Book-2)

Text Books:

1. Essentials of VLSI Circuits and Systems - Kamran Eshraghian, Douglas and A. Pucknell and Sholeh Eshraghian, Prentice-Hall of India Private Limited, 2005 Edition.
2. CMOS Digital Integrated Circuits Analysis and Design- Sung-Mo Kang, Yusuf Leblebici, Tata McGraw-Hill Education, 2003.

References:

1. Advanced Digital Design with the Verilog HDL, Michael D.Ciletti, Xilinx Design Series, Pearson Education
2. Analysis and Design of Digital Integrated Circuits in Deep submicron Technology, 3’rd edition, David Hodges.

ROBOTICS
(Open Elective)

OBJECTIVES:

- To introduce the basic concepts, parts of robots and types of robots.
- To make the student familiar with the various drive systems for robot, sensors and their
  applications in robots and programming of robots.
- To discuss about the various applications of robots, justification and implementation of robot.

UNIT- I:

Introduction

Specifications of Robots- Classifications of robots – Work envelope - Flexible automation versus Robotic technology – Applications of Robots ROBOT KINEMATICS AND DYNAMICS Positions,

UNIT-II:

Orientations and frames, Mappings

Changing descriptions from frame to frame, Operators: Translations, Rotations and Transformations - Transformation Arithmetic - D-H Representation - Forward and inverse Kinematics Of Six Degree of Freedom Robot Arm – Robot Arm dynamics

UNIT- III:

Robot Drives and Power Transmission Systems

Robot drive mechanisms, hydraulic – electric – servomotor- stepper motor - pneumatic drives, Mechanical transmission method - Gear transmission, Belt drives, cables, Roller chains, Link - Rod systems - Rotary-to-Rotary motion conversion, Rotary-to-Linear motion conversion, Rack and Pinion drives, Lead screws, Ball Bearing screws,

UNIT -IV:

Manipulators

Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators

UNIT- V:

Robot End Effectors

Classification of End effectors – Tools as end effectors. Drive system for grippers-Mechanical adhesive-vacuum-magnetic-grippers. Hooks&scoops. Gripper force analysis and gripper design. Active and passive grippers.

UNIT -VI:

Path planning & Programming

Trajectory planning and avoidance of obstacles, path planning, skew motion, joint integrated motion – straight line motion-Robot languages-computer control and Robot software.

OUTCOMES:

- The Student must be able to design automatic manufacturing cells with robotic control using
- The principle behind robotic drive system, end effectors, sensor, machine vision robot Kinematics and programming.

TEXT BOOKS:

1. Deb S. R. and Deb S., “Robotics Technology and Flexible Automation”, Tata McGraw HillEducation Pvt. Ltd, 2010.
2. John J.Craig, “Introduction to Robotics”, Pearson, 2009.
3. Mikell P. Grooveret. al., "Industrial Robots - Technology, Programming and Applications", McGraw Hill, New York, 2008.

REFERENCE BOOKS:

1. Richard D Klafter, Thomas A Chmielewski, Michael Negin, "Robotics Engineering – An Integrated Approach", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd., 2006.
2. Fu K S, Gonzalez R C, Lee C.S.G, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, 1987

NEURAL NETWORKS AND FUZZY LOGIC
(Open Elective)

Preamble:
This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associate Memories and introducesFuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

Learning Objectives:
- To understand artificial neuron models.
- To understand learning methods of ANN.
- To utilize different algorithms of ANN.
- To distinguish between classical and fuzzy sets.
- To understand different modules of fuzzy controller.
- To understand applications of neural networks and fuzzy logic.

Unit – I: Introduction to Neural Networks
Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential, Applications of ANN.

Unit- II: Essentials of Artificial Neural Networks
Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANNArchitectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

Unit–III:
Multilayer feed forward Neural Networks
Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements, Radial Basis Function (RBF) Neural Network – Kohonen Self Organising feature Map (KSOM).
Associative Memories
Bidirectional Associative Memories (BAM)-Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network, Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

Unit – IV: Classical & Fuzzy Sets
Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT V: Fuzzy Logic Modules
Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT VI: Applications
Neural network applications: Process identification, control, fault diagnosis and load forecasting.
Fuzzy logic applications: Load frequency control and Fuzzy classification.

Learning Outcomes:
Students should able to:

- Know different models of artificial neuron.
- Use learning methods of ANN.
- Use different paradigms of ANN.
- Classify between classical and fuzzy sets.
- Use different modules of Fuzzy logic controller.
- Apply Neural Networks and fuzzy logic for real-time applications.

Text Book:
1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by RajasekharanandRai – PHI Publication.
2. Introduction to Neural Networks using MATLAB 6.0 - S.N.Sivanandam, S.Sumathi, S.N.Deepa, TMH,2006

Reference Book:
1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks – Simon Hakins , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
4. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.

ENERGY AUDIT, CONSERVATION & MANAGEMENT
(Open Elective)

Preamble:

This is an open elective course developed to cater the current needs of the industry. This course covers topics such as energy conservation act and energy conservation. It also covers energy efficient lighting design. The student will learn power factor improvement techniques, energy efficiency in HVAC systems. In addition The economic aspects such as payback period calculations, life cycle costing analysis is covered in this course.

Learning Objectives:

- To understand energy efficiency, scope, conservation and technologies.
- To design energy efficient lighting systems.
- To estimate/calculate power factor of systems and propose suitable compensation techniques.
- To understand energy conservation in HVAC systems.
- To calculate life cycle costing analysis and return on investment on energy efficient technologies.

Unit–I:
Basic Principles of Energy Audit and management

Energy audit – Definitions – Concept – Types of audit – Energy index – Cost index – Pie charts –Sankey diagrams – Load profiles – Energy conservation schemes and energy saving potential – Numerical problems – Principles of energy management – Initiating, planning, controlling, promoting, monitoring, reporting – Energy manager – Qualities and functions – Language – Questionnaire – Check list for top management.

Unit–II:
Lighting

Modification of existing systems – Replacement of existing systems – Priorities**:** Definition of terms and units – Luminous efficiency – Polar curve – Calculation of illumination level – Illumination of inclined surface to beam – Luminance or brightness – Types of lamps – Types of lighting – Electric lighting fittings (luminaries) – Flood lighting – White light LED and conducting Polymers – Energy conservation measures.

Unit–III:
Power Factor and energy instruments

Power factor – Methods of improvement – Location of capacitors – Power factor with non linear loads – Effect of harmonics on Power factor – Numerical problems. Energy Instruments – Watt–hour meter – Data loggers – Thermocouples – Pyrometers – Lux meters – Tong testers – Power analyzer.

Unit–IV:
Space Heating and Ventilation

Ventilation – Air–Conditioning (HVAC) and Water Heating**:** Introduction – Heating of buildings – Transfer of Heat–Space heating methods – Ventilation and air–conditioning – Insulation–Cooling load – Electric water heating systems – Energy conservation methods.

Unit–V
Economic Aspects and Financial Analysis

Understanding energy cost - Economics Analysis – Depreciation Methods – Time value of money – Rate of return – Present worth method – Replacement analysis – Life cycle costing analysis – Energy efficient motors (basic concepts) – Economics of energy efficient motors and systems.

Unit–VI:

Computation of Economic Aspects

Need of investment, appraisal and criteria - Calculation of simple payback period–Return on investment – Net present value – Internal rate of return – numerical examples – Power factor correction – Lighting – Applications of life cycle costing analysis – Return on investment – Numerical examples.

Learning Outcomes:

Student will be able to

- Explain energy efficiency, conservation and various technologies.
- Design energy efficient lighting systems.
- Calculate power factor of systems and propose suitable compensation techniques.
- Explain energy conservation in HVAC systems.
- Calculate life cycle costing analysis and return on investment on energy efficient technologies.

Text Books:

1. Hand Book of Energy Audit by Sonal Desai- Tata McGraw hill
2. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd–2nd edition, 1995

Reference Books:

1. Energy management by W.R. Murphy & G. Mckay Butter worth, Elsevier publications. 2012
2. Electric Energy Utilization and Conservation by S C Tripathy, Tata McGraw hill publishing company Ltd. New Delhi.
3. Energy management by Paul o' Callaghan, Mc–Graw Hill Book company–1st edition, 1998.
4. Energy management hand book by W.C.Turner, John wiley and sons.
5. Energy management and conservation –k v Sharma and pvenkataseshaiah-I K International Publishing House pvt.ltd,2011.
6. http://www.energymanagertraining.com/download/Gazette_of_IndiaPartIISecI-37_25-08-2010.pdf

III Year – II SEMESTER

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POWER ELECTRONICS LAB

Learning objectives:

- To study the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.
- To analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
- To understand the operation of AC voltage regulator with resistive and inductive loads.
- To understand the working of Buck converter, Boost converter and inverters.

Any 10 of the Following Experiments are to be conducted

1. Study of Characteristics of Thyristor, MOSFET & IGBT.
2. Design and development of a firing circuit for Thyristor.
3. Design and development of gate drive circuits for IGBT.
4. Single -Phase Half controlled converter with R and RL load
5. Single -Phase fully controlled bridge converter with R and RL loads
6. Single -Phase AC Voltage Regulator with R and RL Loads
7. Single -Phase square wave bridge inverter with R and RL Loads
8. Three- Phase fully controlled converter with RL–load.
9. Design and verification of voltages gain of Boost converter in Continuous Conduction Mode(CCM) and Discontinuous Conduction Mode(DCM).
10. Design and verification of voltages ripple in buck converter in CCM operation.
11. Single -phase PWM inverter with sine triangle PWM technique.
12. 3-phase AC-AC voltage regulator with R-load.

Learning outcomes:

- Able to study the characteristics of various power electronic devices and analyze gate drive circuits of IGBT.
- Able to analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
- Able to understand the operation of single phase AC voltage regulator with resistive and inductive loads.
- Able to understand the working of Buck converter, Boost converter, single–phase square wave inverter and PWM inverter.

III Year – II SEMESTER

L	T	P	C
0	0	3	2

MICRO MPROCESSORS AND MICRO CONTROLLERS LAB

Learning Objectives:

- To study programming based on 8086 microprocessor and 8051 microcontroller.
- To study 8086 microprocessor based ALP using arithmetic, logical and shift operations.
- To study to interface 8086 with I/O and other devices.
- To study parallel and serial communication using 8051& PIC 18 micro controllers.

Any 10 of the following experiments are to be conducted:

I. Microprocessor 8086&Microcontroller 8051

Introduction to MASM/TASM.

1. Arithmetic operation – Multi byte addition and subtraction, multiplication and division – Signed and unsigned arithmetic operation, ASCII – Arithmetic operation.
2. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
3. By using string operation and Instruction prefix**:** Move block, Reverse string Sorting, Inserting, Deleting, Length of the string, String comparison.
4. Interfacing 8255–PPI
5. Interfacing 8259 – Interrupt Controller.
6. Interfacing 8279 – Keyboard Display.
7. Stepper motor control using 8253/8255.
8. Reading and Writing on a parallel port using 8051
9. Timer in different modes using 8051
10. Serial communication implementation using 8051
11. Understanding three memory areas of 00 – FF Using 8051 external interrupts.
12. Interface PIC 18 with an optoisolator
13. Interface PIC 18 with a DC motor

Learning Outcomes:

- Will be able to write assembly language program using 8086 micro based on arithmetic, logical, and shift operations.
- Will be able to interface 8086 with I/O and other devices.
- Will be able to do parallel and serial communication using 8051 & PIC 18 micro controllers.

III Year–II SEMESTER

L	T	P	C
0	0	3	2

DATASTRUCTURES THROUGH C LAB

OBJECTIVES:

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures

List of Experiments:

1. Implementation of Singly linked list.
2. Implementation of Doubly linked list.
3. Implementation of Multistack in a Single Array.
4. Implementation of Circular Queue
5. Implementation of Binary Search trees.
6. Implementation of Hash table.
7. Implementation of Heaps.
8. Implementation of Breadth First Search Techniques.
9. Implementation of Depth First Search Techniques.
10. Implementation of Prim's Algorithm.
11. Implementation of Dijkstra's Algorithm.
12. Implementation of Kruskal's Algorithm
13. Implementation of MergeSort
14. Implementation of Quick Sort
15. Implementation of Data Searching using divides and conquers technique

OUTCOMES:

At the end of this lab session, the student will

- Be able to design and analyze the time and space efficiency of the data structure
- Be capable to identity the appropriate data structure for given problem
- Have practical knowledge on the application of data structures

III Year - II Semester

L	T	P	C
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PROFESSIONAL ETHICSAND HUMAN VALUES

Course Objectives:

***To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.**
***Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.**

UNIT I: Human Values:
Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty – Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT: II: Principles for Harmony:
Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:
History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism —Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument –Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past –Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:
Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights – Confidential and Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes-Industrial Espionage- Price Fixing-Whistle Blowing.

UNIT VI: Global Issues:

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

- Related Cases Shall be dealt where ever necessary.

Outcome:

***It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.**

***It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.**

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M. Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013
9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

IV Year – I SEMESTER

L	T	P	C
4	0	0	3

UTILIZATION OF ELECTRICAL ENERGY

Preamble:

This course primarily deals with utilization of electrical energy generated from various sources. It is important to understand the technical reasons behind selection of motors for electric drives based on the characteristics of loads. Electric heating, welding and illumination are some important loads in the industry in addition to motor/drives. Another major share of loads is taken by Electric Traction. Utilization of electrical energy in all the above loads is discussed in detail in this course. Demand side management concepts are also introduced as a part of this course.

Learning objectives:

- To understand the operating principles and characteristics of traction motors with respect to speed, temperature,loading conditions.
- To acquaint with the different types of heating and welding techniques.
- To study the basic principles of illumination and its measurement.
- To understand different types of lightning system including design.
- To understand the basic principle of electric traction including speed–time curves of different traction services.
- To understand the method of calculation of various traction system for braking, acceleration and other related parameters, including demand side management of energy.

UNIT – I:

Selection of Motors

Choice of motor, type of electric drives, starting and running characteristics–Speed control–Temperature rise–Applications of electric drives–Types of industrial loads–continuous–Intermittent and variable loads–Load equalization.

UNIT – II:

Electric Heating

Advantages and methods of electric heating–Resistance heating induction heating and dielectric heating – Arc furnaces – Direct and indirect arc furnaces

Electric Welding

Electric welding–Resistance and arc welding–Electric welding equipment–Comparison between AC and DC Welding

UNIT – III:

Illumination fundamentals

Introduction, terms used in illumination–Laws of illumination–Polar curves–Integrating sphere–Lux meter–Discharge lamps, MV and SV lamps – Lumen or flux method of calculation - Sources of light.

UNIT – IV:

Various Illumination Methods

Comparison between tungsten filament lamps and fluorescent tubes–Basic principles of light control– Types and design of lighting and flood lighting–LED lighting, principle of operation, street lighting and domestic lighting – Conservation of energy.

UNIT – V:

Electric Traction – I

System of electric traction and track electrification– Review of existing electric traction systems in India– Special features of traction motor– Mechanics of train movement–Speed–time curves for different services – Trapezoidal and quadrilateral speed time curves-High speed transportation trains.

UNIT – VI:

Electric Traction – II

Calculations of tractive effort– power –Specific energy consumption for given run–Effect of varying acceleration and braking retardation–Adhesive weight and braking, retardation adhesive weight and coefficient of adhesion–Principles of energy efficient motors-Modern traction motors.

Learning Outcomes:

- Able to identify a suitable motor for electric drives and industrial applications
- Able to identify most appropriate heating or welding techniques for suitable applications.
- Able to understand various level of illuminosity produced by different illuminating sources.
- Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.
- Able to determine the speed/time characteristics of different types of traction motors.
- Able to estimate energy consumption levels at various modes of operation.

Text Books:

1. Utilization of Electric Energy – by E. Openshaw Taylor, Orient Longman.
2. Art & Science of Utilization of electrical Energy – by Partab, DhanpatRai& Sons.

Reference Books:

1. Utilization of Electrical Power including Electric drives and Electric traction – by N.V.Suryanarayana, New Age International (P) Limited, Publishers, 1996.
2. Generation, Distribution and Utilization of electrical Energy – by C.L. Wadhwa, New Age International (P) Limited, Publishers, 1997.

IV Year – I SEMESTER

L	T	P	C
4	0	0	3

LINEAR IC APPLICATIONS

OBJECTIVES

- To understand the basic operation &performance parameters of differential amplifiers.
- To understand & learn the measuring techniques of performance parameters of OP-AMP
- To learn the linear and non-linear applications of operational amplifiers.
- To understand the analysis & design of different types of active filters using opamps
- To learn the internal structure, operation and applications of different analog ICs
- To Acquire skills required for designing and testing integrated circuits

UNIT I

INTEGRATED CIRCUITS: Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II

Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and Temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp Specifications, DC and AC characteristics, 741 op-amp & its features, Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rate, CMRR, PSRR, drift, Frequency Compensation techniques.

UNIT III

LINEAR and NON-LINEAR APPLICATIONS OF OP-AMPS: Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log Amplifiers, Precision rectifiers.

UNIT IV

ACTIVE FILTERS, ANALOG MULTIPLIERS AND MODULATORS: Design & Analysis of Butterworth active filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and all pass filters.
Four Quadrant Multiplier, IC 1496, Sample & Hold circuits.

UNIT V

TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger; PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators. Applications of VCO (566).

UNIT VI

DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs – parallel Comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC.DAC and ADC Specifications, Specifications AD 574 (12 bit ADC).

TEXT BOOKS:

1. Linear Integrated Circuits – D. Roy Choudhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.
3.Operational Amplifiers–C.G. Clayton, Butterworth & Company Publ. Ltd./Elsevier, 1971

REFERENCES :

1. Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria &Sons;2nd Edition,2010
2. Design with Operational Amplifiers & Analog Integrated Circuits – Sergio Franco, McGraw Hill, 1988.
3. OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd.
4. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition.
5. Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition

OUTCOMES

□ Design circuits using operational amplifiers for various applications.
□ Analyze and design amplifiers and active filters using Op-amp.
□ Diagnose and trouble-shoot linear electronic circuits.
□ Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
□ Understand thoroughly the operational amplifiers with linear integrated circuits.

	L	T	P	C
IV Year – I SEMESTER	**4**	**0**	**0**	**3**

POWER SYSTEM OPERATION AND CONTROL

Preamble:

This subject deals with Economic operation of Power Systems, Hydrothermal scheduling and modeling of turbines, generators and automatic controllers. It emphasizes on single area and two area load frequency control and reactive power control.

Learning Objectives:

- To understand optimal dispatch of generation with and without losses.
- To study the optimal scheduling of hydro thermal systems.
- To study the optimal unit commitment problem.
- To study the load frequency control for single area system with and without controllers
- .To study the load frequency control for two area system with and without controllers
- To understand the reactive power control and compensation of transmission lines.

UNIT–I:

Economic Operation of Power Systems

Optimal operation of Generators in Thermal power stations, – Heat rate curve – Cost Curve – Incremental fuel and Production costs – Input–output characteristics – Optimum generation allocation with line losses neglected – Optimum generation allocation including the effect of transmission line losses – Loss Coefficients – General transmission line loss formula.

UNIT–II:

Hydrothermal Scheduling

Optimal scheduling of Hydrothermal System**:** Hydroelectric power plant models – Scheduling problems – Short term hydrothermal scheduling problem.

UNIT–III:

Unit Commitment

Optimal unit commitment problem – Need for unit commitment – Constraints in unit commitment – Cost function formulation – Solution methods – Priority ordering – Dynamic programming.

UNIT–IV:

Load Frequency Control-I

Modeling of steam turbine – Generator – Mathematical modeling of speed governing system – Transfer function – Modeling of Hydro turbine –Necessity of keeping frequency constant – Definitions of Control area – Single area control system – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case. Proportional plus Integral control of single area and its block diagram representation – Steady state response.

UNIT–V:

Load Frequency Control-II

Block diagram development of Load Frequency Control of two area system uncontrolled case and controlled case. Tie-line bias control. Load Frequency Control and Economic dispatch control.

UNIT–VI:

Reactive Power Control

Overview of Reactive Power control – Reactive Power compensation in transmission systems – Advantages and disadvantages of different types of compensating equipment for transmission systems – Load compensation – Specifications of load compensator – Uncompensated and compensated transmission lines**:** Shunt and series compensation – Need for FACTS controllers.

Learning Outcomes:

- Able to compute optimal scheduling of Generators.
- Able to understand hydrothermal scheduling.
- Understand the unit commitment problem.
- Able to understand importance of the frequency.
- Understand importance of PID controllers in single area and two area systems.
- Will understand reactive power control and compensation for transmission line.

Text Books:

1. Electric Energy systems Theory – by O.I.Elgerd, Tata McGraw–hill Publishing Company Ltd., Second edition.
2. Modern Power System Analysis – by I.J.Nagrath&D.P.Kothari Tata McGraw Hill Publishing Company Ltd, 2nd edition.

Reference Books:

1. Power System Analysis and Design by J.Duncan Glover and M.S.Sarma., Thompson, 3rd Edition.
2. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
3. Power System Analysis by HadiSaadat – TMH Edition.
4. Power System stability & control, PrabhaKundur,TMH

IV Year – I SEMESTER

L	T	P	C
4	0	0	3

SWITCHGEAR AND PROTECTION

Preamble:

In order to supply power from generating end to receiving end several equipments are connected in to the system. In order to protect the equipments and components against various operating conditions and over voltages protective devices are required to be installed in the system. Topics specified in this subject deal with various types of protective equipments and their working principle including limitations etc.

Learning objectives:

- To provide the basic principles and operation of various types of circuit breakers.
- To study the classification, operation and application of different types of electromagnetic protective relays.
- To explain protective schemes, for generator and transformers.
- To impart knowledge of various protective schemes used for feeders and bus bars.
- To explain the principle and operation of different types of static relays.
- To study different types of over voltages in a power system and principles of different protective schemes for insulation co–ordination.

UNIT–I:

Circuit Breakers

Miniature Circuit Breaker(MCB)– Elementary principles of arc interruption– Restriking Voltage and Recovery voltages– Restriking phenomenon - RRRV– Average and Max. RRRV– Current chopping and Resistance switching– Introduction to oil circuit breakers– Description and operation of Air Blast– Vacuum and SF6 circuit breakers– CB ratings and specifications– Concept of Auto reclosing.

UNIT–II:

Electromagnetic Protection

Relay connection – Balanced beam type attracted armature relay - induction disc and induction cup relays–Torque equation - Relays classification–Instantaneous– DMT and IDMT types– Applications of relays**:** Over current and under voltage relays– Directional relays– Differential relays and percentage differential relays– Universal torque equation– Distance relays**:** Impedance– Reactance– Mho and offset mho relays– Characteristics of distance relays and comparison.

UNIT–III:

Generator Protection

Protection of generators against stator faults– Rotor faults and abnormal conditions– restricted earth fault and inter turn fault protection– Numerical examples.

Transformer Protection

Protection of transformers**:** Percentage differential protection– Design of CT's ratio– Buchholz relay protection–Numerical examples.

UNIT–IV:

Feeder and Bus bar Protection

Protection of lines**:** Over currentProtection schemes – PSM,TMS - Numerical examples - Carrier current and three zone distance relay using impedance relays–Protection of bus bars by using Differential protection.

UNIT–V:

Static and Digital Relays

Static relays**:** Static relay components– Static over current relays– Static distance relay– Micro processor based digital relays

UNIT–VI:

Protection against over voltage and grounding

Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc oxide lighting arresters– Insulation coordination– BIL– impulse ratio– Standard impulse test wave– volt-time characteristics– Grounded and ungrounded neutral systems–Effects of ungrounded neutral on system performance– Methods of neutral grounding**:** Solid–resistance–Reactance–Arcing grounds and grounding Practices.

Learning Outcomes:

- Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF_6 gas type.
- Ability to understand the working principle and operation of different types of electromagnetic protective relays.
- Students acquire knowledge of faults and protective schemes for high power generator and transformers.
- Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.
- Able to understand different types of static relays and their applications.
- Able to understand different types of over voltages and protective schemes required for insulation co–ordination.

Text Books:

1. Power System Protection and Switchgear by Badari Ram and D.N Viswakarma, TMH Publications
2. Power system protection- Static Relays with microprocessor applications.by T.S.MadhavaRao,TMH

Reference Books:

1. Fundamentals of Power System Protection by Paithankar and S.R.Bhide.,PHI, 2003.
2. Art & Science of Protective Relaying – by C R Mason, Wiley Eastern Ltd.
3. Protection and SwitchGear by BhaveshBhalja, R.P. Maheshwari, NileshG.Chothani, Oxford University Press, 2013

IV Year – I SEMESTER

L	T	P	C
4	0	0	3

ELECTRICAL MACHINE MODELING & ANALYSIS
(Elective-I)

Preamble:
Electrical Motor is one of the main components of electrical drive. So, in order to develop control strategies for electrical motor drives, it is very essential to have complete knowledge on modeling of electrical machines.

Learning Objectives

- Establish unified theory of rotating machines.
- To understand the concept of phase transformation.
- Analyze different electrical machines for improved performance through modification of their characteristics.
- Develop concepts on mathematical modeling of electrical machines.

UNIT – I
Basic concepts of Modeling
Basic Two-pole Machine representationof Commutator machines, 3-phase synchronous machine with andwithout damper bars and 3-phase induction machine, Kron's primitiveMachine-voltage, current and Torque equations.

UNIT – II
DC Machine Modeling
Mathematical model of separately excited D.Cmotor – Steady State analysis-Transient State analysis-Suddenapplication of Inertia Load-Transfer function of Separately excited D.C Motor- Mathematical model of D.C Series motor, Shunt motor-Linearization Techniques for small perturbations.

UNIT- III
Reference frame theory & Modeling of single phase InductionMachines
Linear transformation-Phase transformation - three phase totwo phase transformation (abc to dq0) and two phase to three phasetransformation dq0 to abc -Power equivalence-Mathematical modelingof single phase induction machines.

UNIT – IV
Modeling of three phase Induction Machine
Generalized model inarbitrary reference frame-Electromagnetic torque-Derivation ofcommonly used Induction machine models- Stator reference framemodel-Rotor reference frame model-Synchronously rotating referenceframe model-state space model with flux linkages as variables.

UNIT –V
Modeling of Synchronous Machine
Synchronous machine inductances–voltage equations in the rotor's dq0 reference frame-electromagnetictorque-current in terms of flux linkages-three synchronous machinemodel.

UNIT –IV

Modeling of Special Machines

Modeling of PM Synchronous motor, modeling of BLDC motor,modeling of Switched Reluctance motor.

Learning Outcomes:

After completion of this course, students will be able to

- Develop modeling of dc machine
- Apply mathematical modeling concepts to 3-phase Induction machines
- Design control strategies based on dynamic modeling of 3-ph Induction machines and 3-phase synchronous machine.
- Analyze BLDC Machine and switched reluctance machine based on mathematical modeling of BLDCM and SRM.

Text Books:

1. Generalized theory of Electrical Machinery –P.S.Bimbra- Khanna Publishers.
2. Electric Motor Drives - Modeling, Analysis& control -R.Krishnan- Pearson Publications- 1st edition -2002.

Reference Books:

1. Analysis of Electrical Machinery and Drive systems – P.C.Krause, OlegWasynczuk, Scott D.Sudhoff – Second Edition-IEEE Press.
2. Dynamic simulation of Electric machinery using Matlab / Simulink –CheeMunOng-PHl.
3. Modern Power Electronics and AC Drives-B.K. Bose - PHI

ADVANCED CONTROL SYSTEMS

Preamble:

This subject aims to study state space, describing function, phase plane and stability analysis including controllability and observability. It also deals with modern control and optimal control systems.

Learning Objectives:

- Review of the state space representation of a control system**:** Formulation of different models from the signal flow graph, diagonalization.
- To introduce the concept of controllability and observability. Design by pole placement technique.
- Analysis of a nonlinear system using Describing function approach and Phase plane analysis.
- The Lypanov's method of stability analysis of a system.
- Formulation of Euler Laugrange equation for the optimization of typical functionals and solutions.
- Formulation of linear quadratic optimal regulator (LQR) problem by parameter adjustment and solving riccatti equation.

UNIT – I:
State space analysis
State Space Representation – Solution of state equation – State transition matrix, –Canonical forms – Controllable canonical form – Observable canonical form, Jordan Canonical Form.

UNIT – II:
Controllability, observability and design of pole placement
Tests for controllability and observability for continuous time systems – Time varying case – Minimum energy control – Time invariant case – Principle of duality – Controllability and observability form Jordan canonical form and other canonical forms – Effect of state feedback on controllability and observability – Design of state feedback control through pole placement.

UNIT – III:
Describing function analysis
Introduction to nonlinear systems, Types of nonlinearities, describing functions, Introduction to phase–plane analysis.

UNIT–IV:
Stability analysis
Stability in the sense of Lyapunov – Lyapunov's stability and Lypanov's instability theorems – Direct method of Lyapunov for the linear and nonlinear continuous time autonomous systems.

UNIT–V:
Calculus of variations
Minimization of functional of single function – Constrained minimization – Minimum principle – Control variable inequality constraints – Control and state variable inequality constraints – Euler lagrangine equation.

UNIT –VI:

Optimal control

Linear Quadratic Optimal Regulator (LQR) problem formulation – Optimal regulator design by parameter adjustment (Lyapunov method) – Optimal regulator design by Continuous Time Algebraic Riccatti equation (CARE) - Optimal controller design using LQG framework.

Learning Outcomes:

- State space representation of control system and formulation of different state models are reviewed.
- Able to design of control system using the pole placement technique is given after introducing the concept of controllability and observability.
- Able to analyse of nonlinear system using the describing function technique and phase plane analysis.
- Able to analysethe stability analysis using lypnov method.
- Minimization of functionals using calculus of variation studied.
- Able to formulate andsolve the LQR problem and riccatti equation.

Text Books:

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998
2. Automatic Control Systems by B.C. Kuo, Prentice Hall Publication

Reference Books:

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition,1996
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Digital Control and State Variable Methods – by M. Gopal, Tata McGraw–Hill Companies, 1997.
4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.
5. Optimal control theory: an Introduction by Donald E.Kirk by Dover publications.

PROGAMMABLE LOGIC CONTROLLERS & APPLICATIONS

Preamble:IN most of the industry applications, computer control is gaining importance, PLC is a industry computer, hence this course PLC makes the students to acquire knowledge required for industry.

Learning Objectives:

- To have knowledge on PLC.
- To acquire the knowledge on programming of PLC.
- To understand different PLC registers and their description.
- To have knowledge on data handling functions of PLC.
- To know how to handle analog signal and converting of A/D in PLC.

Unit I:
Introduction
PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming equipment, programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

Unit II:
PLC Programming
PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Digital logic gates, programming in the Boolean algebra system, conversion examples. Ladder diagrams and sequence listings, ladder diagram construction.

Unit III:
Programmable Timers and Counters
Timer instructions – On delay time instruction – Off delay timer instruction – Retentive timer – Counter instructions – Up counter – Down counter - Cascading counters - Incremental encoder – Counter applications – Combining counter and timer functions.

Unit IV:
Program Control Instructions
Master control reset instruction – Jump instructions and sub routines – Immediate input and output instructions.

Unit V:
Other Instructions
Data manipulation – Data transfer operation – Data compare instruction – Data manipulation programs – Numerical data I/O interfaces – Math instructions – Addition, subtraction, multiplication & division instruction – Sequential instructions – Sequence programs – Shift registers – Word shift registers.

Unit VI:
Applications
Control of water level indicator – Alarm monitor - Conveyor motor control – Parking garage – Ladder diagram for process control – PID controller.

LearningOutcomes: After completion of the course, students are able to:

- Understand the PLCs and their I/O modules.
- Develop control algorithms to PLC using ladder logic.
- Manage PLC registers for effective utilization in different applications.
- Design PID controller with PLC.

Text Books:

1. Programmable logic controllers by Frank D.Petruzella- McGraw Hill – 3rd Edition.
2. Programmable Logic Controllers – Principle and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI

Reference Books:

1. Programmable Logic Controllers – Programming Method and Applications by JR. Hackworth and F.D Hackworth Jr. – Pearson, 2004.
2. Introduction to Programmable Logic Controllers- Gary Dunning-Cengage Learning.
3. Programmable Logic Controllers –W.Bolton-Elsevier publisher

INSTRUMENTATION
(Elective – I)

Preamble:

Electrical and Electronic Instrumentation plays a key role in the industry. With the advancement of technology day to day manual maintenance is replaced by simply monitoring using various instruments. Thus this course plays very important role in overall maintenance of the industry.

Learning Objectives:

- To study various types of signals and their representation.
- To study various types of transducers: Electrical, Mechanical, Electromechanical, Optical etc.
- To study and measure the various types of Non–electrical quantities.
- To study various types of digital voltmeters
- To study the working principles of various types of oscilloscopes and their applications.
- To study various types of signal analyzers.

UNIT–I:

Signals and their representation

Measuring Systems, Performance Characteristics, – Static characteristics – Dynamic Characteristics – Errors in Measurement – Gross Errors – Systematic Errors – Statistical analysis of random errors – Signal and their representation – Standard test, periodic, aperiodic, modulated signal – Sampled data pulse modulation and pulse code modulation.

UNIT–II:

Transducers

Definition of transducers – Classification of transducers – Advantages of Electrical transducers – Characteristics and choice of transducers – Principle operation of resistor, inductor, LVDT and capacitor transducers – LVDT Applications – Strain gauge and its principle of operation – Guage factor – Thermistors – Thermocouples – Synchros – Piezo electric transducers – Photo diodes.

UNIT–III:

Measurement of Non–Electrical Quantities

Measurement of strain – Gauge Sensitivity – Displacement – Velocity – Angular Velocity – Acceleration – Force – Torque – Measurement of Temperature, Pressure, Vacuum, Flow, Liquid level.

UNIT–IV:

Digital Voltmeters

Digital voltmeters – Successive approximation, ramp, dual–Slope integration continuous balance type – Microprocessor based ramp type – DVM digital frequency meter – Digital phase angle meter.

UNIT–V:

Oscilloscope

Cathode ray oscilloscope – Time base generator – Horizantal and vertical amplifiers – Measurement of phase and frequency – Lissajous patterns – Sampling oscilloscope – Analog and digital type data logger – Transient recorder.

UNIT–VI:

Signal Analyzers

Wave Analyzers – Frequency selective analyzers – Heterodyne – Application of Wave analyzers – Harmonic Analyzers – Total Harmonic distortion – Spectrum analyzers – Basic spectrum analyzers – Spectral displays – Vector impedance meter – Q meter – Peak reading and RMS voltmeters.

Learning Outcomes:

- Able to represent various types of signals .
- Acquire proper knowledge to use various types of Transducers.
- Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc.
- Acquire proper knowledge and working principle of various types of digital voltmeters.
- Able to measure various parameter like phase and frequency of a signal with the help of CRO.
- Acquire proper knowledge and able to handle various types of signal analyzers.

Text Books:

1. Electronic Instrumentation–by H.S.Kalsi Tata MCGraw–Hill Edition, 1995.
2. A course in Electrical and Electronic Measurements and Instrumentation, A.K. Sawhney, Dhanpatrai& Co.

Reference Books:

1. Measurement and Instrumentation theory and application, Alan S.Morris and Reza Langari, Elsevier
2. Measurements Systems, Applications and Design – by D O Doeblin
3. Principles of Measurement and Instrumentation – by A.S Morris, Pearson/ Prentice Hall ofIndia
4. Modern Electronic Instrumentation and Measurement techniques – by A.D HelfrickandW.D.Cooper, Pearson/Prentice Hall of India.

4. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India.

IV Year – I SEMESTER

L	T	P	C
4	0	0	3

OPTIMIZATION TECHNIQUES
(Elective – II)

Preamble:

Optimization techniques have gained importance to solve many engineering design problems by developing linear and nonlinear mathematical models. The aim of this course is to educate the student to develop a mathematical model by defining an objective function and constraints in terms of design variables and then apply a particular mathematical programming technique. This course covers classical optimization techniques, linear programming, nonlinear programming and Genetic & Partial Swarm Optimization algorithms.

Learning Objectives:

- To define an objective function and constraint functions in terms of design variables, and then state the optimization problem.
- To state single variable and multi variable optimization problems, without and with constraints.
- To explain linear programming technique to an optimization problem, define slack and surplus variables, by using Simplex method.
- To study and explain nonlinear programming techniques, unconstrained or constrained, and define exterior and interior penalty functions for optimization problems.
- To introduce evolutionary programming techniques.
- To introduce basic principles of Genetic Algorithms and Partial Swarm Optimization methods.

UNIT – I:

Introduction and Classical Optimization Techniques:

Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

UNIT – II:

Classical Optimization Techniques

Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints.Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

UNIT – III:

Linear Programming

Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm - Duality in Linear Programming – Dual Simplex method.

UNIT – IV:

Nonlinear Programming:

Unconstrained cases - One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method - Univariate method, Powell's method and steepest descent method.

Constrained cases - Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods.Introduction to convex Programming Problem.

UNIT – V:

Introduction to Evolutionary Methods:

Evolutionary programming methods - Introduction to Genetic Algorithms (GA)– Control parameters –Number of generation, population size, selection, reproduction, crossover and mutation – Operator selection criteria – Simple mapping of objective function to fitness function – constraints – Genetic algorithm steps – Stopping criteria –Simple examples.

UNIT – VI:

Introduction to Swarm Intelligence Systems:

Swarm intelligence programming methods - Basic Partial Swarm Optimization – Method – Characteristic features of PSO procedure of the global version – Parameters of PSO (Simple PSO algorithm – Operators selection criteria – Fitness function constraints) – Comparison with other evolutionary techniques – Engineering applications of PSO.

Learning Outcomes:

The student should be able to:

- State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
- Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.
- Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.
- Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions.
- Able to apply Genetic algorithms for simple electrical problems.
- Able to solve practical problems using PSO.

Text Books

1. "Engineering optimization: Theory and practice"-by S. S.Rao, New Age International (P) Limited, 3rd edition, 1998.
2. Soft Computing with Matlab Programming by N.P.Padhy&S.P.Simson, Oxford University Press – 2015

Reference Books:

1. **"**Optimization methods in operations Research and Systems Analysis" by K.V.Mital and C.Mohan, New Age International (P) Limited, Publishers, 3rd edition, 1996.
2. Genetic Algorithms in search, optimization, and Machine Learning by David E.Goldberg,ISBN:978-81-7758-829-3, Pearsonby Dorling Kindersley (India) Pvt. Ltd.
3. "Operations Research: An Introduction" by H.A.Taha, PHI pvt. Ltd., 6th edition.
4. Linear Programming by G.Hadley.

ELECTRIC POWER QUALITY

Preamble:

Power quality is a major problem for utilities and customers. Customers using sensitive critical loads need quality power for proper operation of the electrical equipment. It is important for the student to learn the power quality issues and improvement measures provided by the utility companies. This course covers the topics on voltage and current imperfections, harmonics, voltage regulation, power factor improvement, distributed generation, power quality monitoring and measurement equipment.

Learning Objectives:

- To learn different types of power quality phenomena.
- To identify sources for voltage sag, voltage swell, interruptions, transients, long duration over voltages and harmonics in a power system.
- To describe power quality terms and study power quality standards.
- To learn the principle of voltage regulation and power factor improvement methods.
- To explain the relationship between distributed generation and power quality.
- To understand the power quality monitoring concepts and the usage of measuring instruments.

Unit–I:Introduction

Overview of power quality – Concern about the power quality – General classes of power quality and voltage quality problems – Transients – Long–duration voltage variations – Short–duration voltage variations – Voltage unbalance – Waveform distortion – Voltage fluctuation – Power frequency variations.

Unit–II:Voltage imperfections in power systems

Power quality terms – Voltage sags – Voltage swells and interruptions – Sources of voltage sag, swell and interruptions – Nonlinear loads – IEEE and IEC standards. Source of transient over voltages – Principles of over voltage protection – Devices for over voltage protection – Utility capacitor switching transients.

Unit–III: Voltage Regulation and power factor improvement:

Principles of regulating the voltage – Device for voltage regulation – Utility voltage regulator application – Capacitor for voltage regulation – End–user capacitor application – Regulating utility voltage with distributed resources – Flicker – Power factor penalty – Static VAR compensations for power factor improvement.

Unit– IV: Harmonic distortion and solutions

Voltagedistortion vs. Current distortion – Harmonics vs. Transients – Harmonic indices – Sources of harmonics – Effect of harmonic distortion – Impact of capacitors, transformers, motors and meters – Point of common coupling – Passive and active filtering – Numerical problems.

Unit–V: Distributed Generation and Power Quality

Resurgence of distributed generation – DG technologies – Interface to the utility system – Power quality issues and operating conflicts – DG on low voltage distribution networks.

Unit–VI :Monitoring and Instrumentation

Power quality monitoring and considerations – Historical perspective of PQ measuring instruments – PQ measurement equipment – Assessment of PQ measuring data – Application of intelligent systems – PQ monitoring standards.

Learning Outcomes:

At the end of this course the student should be able to

- Differentiate between different types of power quality problems.
- Explain the sources of voltage sag, voltage swell, interruptions, transients, long duration over voltages and harmonics in a power system.
- Analyze power quality terms and power quality standards.
- Explain the principle of voltage regulation and power factor improvement methods.
- Demonstrate the relationship between distributed generation and power quality.
- Explain the power quality monitoring concepts and the usage of measuring instruments.

Textbooks:

1. Electrical Power Systems Quality, Dugan R C, McGranaghan M F, Santoso S, and Beaty H W, Second Edition, McGraw–Hill, 2012, 3rd edition.
2.Electric power quality problems –M.H.J.Bollen IEEE series-Wiley India publications,2011.

Reference Books:

1. Power Quality Primer, Kennedy B W, First Edition, McGraw–Hill, 2000.
2. Understanding Power Quality Problems: Voltage Sags and Interruptions, Bollen M HJ, First Edition, IEEE Press; 2000.
3. Power System Harmonics, Arrillaga J and Watson N R, Second Edition, John Wiley & Sons, 2003.
4. Electric Power Quality control Techniques, W. E. Kazibwe and M. H. Sendaula, Van Nostrad Reinhold, New York.
5. Power Quality c.shankaran, CRC Press, 2001
6. Harmonics and Power Systems –Franciso C.DE LA Rosa–CRC Press (Taylor & Francis)
7. Power Quality in Power systems and Electrical Machines–EwaldF.fuchs, Mohammad A.S. Masoum–Elsevier.

SPECIAL ELECTRICAL MACHINES

Preamble:

This is an advanced course on electrical machines. Students will be exposed to various special machines which are gaining importance in industry. This course covers topics related to principles, performance and applications of these special machines including switched reluctance motors, stepper motors, permanent magnet dc motors and linear motors.

Learning Objective:

- To explain theory of operation and control of switched reluctance motor.
- To explain the performance and control of stepper motors, and their applications.
- To describe the operation and characteristics of permanent magnet dc motor.
- To distinguish between brush dc motor and brush less dc motor**.**
- To explain the theory of travelling magnetic field and applications of linear motors.

Unit I:

Permanent magnet materials and PMDC motors

Introduction-classification of permanent magnet materials used in electrical machines-minor hysteresis loop and recoil line-Stator frames of conventional dc machines-Development of electronically commutated dc motor from conventional dc motor-Permanent-magnet materials and characteristics-B-H loop and demagnetization characteristics-Temperature effects: reversible and irreversible losses-high temperature effects-reversible losses-Irreversible losses recoverable by magnetization-Mechanical properties, handling and magnetization-Application of permanent magnets in motors-power density-operating temperature range-severity of operation duty.

Unit II:

Stepper Motors

Classification of stepper motors – Hybrid and Variable Reluctance Motor (VRM) - Construction and principle of hybid type synchronous stepper motor – Different configuration for switching the phase windings control circuits for stepper motors – Open loop and closed loop control of 2-phase hybrid stepping motor.

Construction and principle of operation of Variable Reluctance Motor (VRM) – Single stack and multiple stack – Open loop control of 3- phase VR Stepper Motor- Applications.

Unit III:

Switched Reluctance Motors

Construction – Comparison of conventional and switched reluctance motors – Design of stator and rotor pole arcs – Torque producing principle and torque expression – Different converter configurations for SRM – Drive and power circuits for SRM – Position sensing of rotor – Applications of SRM.

Unit IV:

Square Wave Permanent Magnet Brushless DC Motor

Types of constructions – Surface mounted and interior type permanent magnet – Principle of operation of BLDC motor. Torque and EMF equations – Torque speed characteristics – Performance and efficiency- Square wave brushless motors with 120^0 and 180^0 magnetic areas commutation.

Unit V:

Sine wave Permanent Magnet Brushless Motor

Torque and EMF equations – Phasor Diagram – Circle diagram – Torque/speed characteristics – Comparison between square wave and sine wave permanent magnet motors - Applications.

Unit VI:

Linear Induction Motors (LIM)

Construction– principle of operation–Double sided LIM from rotating type Induction Motor – Schematic of LIM drive for traction – Development of one sided LIM with back iron-equivalent circuit of LIM.

Learning Outcomes:

The student should be able to

- Distinguish between brush dc motor and brush less dc motor**.**
- Explain the performance and control of stepper motors, and their applications.
- Explain theory of operation and control of switched reluctance motor.
- Explain the theory of travelling magnetic field and applications of linear motors.
- Understand the significance of electrical motors for traction drives.

Text Books:

1. Brushless Permanent magnet and reluctance motor drives, Clarenden press, T.J.E. Miller, 1989, Oxford.
2. Special electrical Machines, K.VenkataRatnam, University press, 2009, New Delhi.

IV Year – I SEMESTER

L	T	P	C
0	0	2	2

ELECTRICAL SIMULATION LAB

Learning objectives:

- To simulate integrator circuit, differentiator circuit, Boost converter, Buck converter, full convertor and PWM inverter.
- To simulate transmission line by incorporating line, load and transformer models.
- To perform transient analysis of RLC circuit and single machine connected to infinite bus(SMIB).

Following experiments are to be conducted:

1. Simulation of transient response of RLC circuits
   a. Response to pulse input
   b. Response to step input
   c. Response to sinusoidal input
2. Analysis of three phase circuit representing the generator transmission line and load. Plot three phase currents & neutral current .
3. Simulation of single–phase full converter using RLE loads and single phase AC voltage controller using RL loads
4. Plotting of Bode plots, root locus and nyquist plots for the transfer functions of systems up to 5^{th} order
5. Simulation of Boost and Buck converters.
6. Integrator & Differentiator circuits using op–amp.
7. Simulation of D.C separately excited motor using transfer function approach.

Any 2 of the following experiments are to be conducted:

1. Modeling of transformer and simulation of lossy transmission line.
2. Simulation of single phase inverter with PWM control.
3. Simulation of three phase full converter using MOSFET and IGBTs.
4. Transient analysis of single machine connected to infinite bus(SMIB).

Learning outcomes:

- Able to simulate integrator circuit, differentiator circuit, Boost converter, Buck converter, full convertor and PWM inverter.
- Able to simulate transmission line by incorporating line, load and transformer models.
- Able to perform transient analysis of RLC circuit and single machine connected to infinite bus(SMIB).

Reference Books:

1. "Simulation of Power Electronic Circuit",byM.B.patil, V.Ramanarayan, V.T.Ranganathan.Narosha,2009.
2. Pspice for circuits and electronics using PSPICE – by M.H.Rashid, M/s PHI Publications
3. Pspice A/D user`s manual – Microsim, USA
4. Pspice reference guide – Microsim, USA
5. MATLAB user`s manual – Mathworks, USA
6. MATLAB – control system tool box – Mathworks, USA
7. SIMULINK user`s manual – Mathworks, USA
8. EMTP User`s Manual.
9. SEQUEL– A public domain circuit simulator available at www.ee.iitb.ac.in/~sequel

IV Year – I SEMESTER

L	T	P	C
0	0	3	2

POWER SYSTEMS LAB

Learning Objectives:

To impart the practical knowledge of functioning of various power system components and determination of various parameters and simulation of load flows, transient stability, LFC and Economic dispatch.

Any 10 of the Following experiments are to be conducted:

1. Sequence impedances of 3 phase Transformer.
2. Sequence impedances of 3 phase Alternator by Fault Analysis.
3. Sequence impedances of 3 phase Alternator by Direct method.
4. ABCD parameters of Transmission line.
5. Power Angle Characteristics of 3phase Alternator with infinite bus bars.
6. Dielectric strength of Transformer oil.
7. Calibration of Tong Tester.
8 Load flow studies using Gauss-seidel method
9. Load flow studies using N-R method..
10. Transient Stability Analysis
11. Load frequency control with &without control
12. Load frequency control with control
13. Economic load dispatch with & without losses
14. Economic load dispatch with losses.

Learning Outcomes:

The student is able to determine the parameters of various power system components which are frequently occur in power system studies and he can execute energy management systems functions at load dispatch center.

IV Year – II SEMESTER

L	T	P	C
4	0	0	3

DIGITAL CONTROL SYSTEMS

Preamble:

In recent years digital controllers have become popular due to their capability of accurately performing complex computations at high speeds and versatility in leading nonlinear control systems. In this context, this course focuses on the analysis and design of digital control systems.

Learning objectives:

- To understand the concepts of digital control systems and assemble various components associated with it. Advantages compared to the analog type.
- The theory of z–transformations and application for the mathematical analysis of digital control systems.
- To represent the discrete–time systems in state–space model and evaluation of state transition matrix.
- To examine the stability of the system using different tests.
- To study the conventional method of analyzing digital control systems in the w–plane.
- To study the design of state feedback control by "the pole placement method."

UNIT – I:

Introduction and signal processing

Introduction to analog and digital control systems – Advantages of digital systems – Typical examples – Signals and processing – Sample and hold devices – Sampling theorem and data reconstruction – Frequency domain characteristics of zero order hold.

UNIT–II:

z–transformations

z–Transforms – Theorems – Finding inverse z–transforms – Formulation of difference equations and solving – Block diagram representation – Pulse transfer functions and finding open loop and closed loop responses.

UNIT–III:

State space analysis and the concepts of Controllability and observability

State space representation of discrete time systems – State transition matrix and methods of evaluation – Discretization of continuous – Time state equations – Concepts of controllability and observability – Tests(without proof).

UNIT – IV:

Stability analysis

Mapping between the s–Plane and the z–Plane – Primary strips and Complementary strips – Stability criterion – Modified Routh's stability criterion and Jury's stability test.

UNIT – V:

Design of discrete–time control systems by conventional methods

Transient and steady state specifications – Design using frequency response in the w–plane for lag and lead compensators – Root locus technique in the z–plane.

UNIT – VI:

State feedback controllers:

Design of state feedback controller through pole placement – Necessary and sufficient conditions – Ackerman's formula.

Learning outcomes:

- The students learn the advantages of discrete time control systems and the "know how" of various associated accessories.
- The learner understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems).
- The stability criterion for digital systems and methods adopted for testing the same are explained.
- Finally, the conventional and state space methods of design are also introduced.

Text Book:

1. Discrete–Time Control systems – K. Ogata, Pearson Education/PHI, 2nd Edition.
2. Digital Control and State Variable Methods by M.Gopal, TMH, 4^{th} Edition.

Reference Books:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

IV Year – II SEMESTER

L	T	P	C
4	0	0	3

H.V.D.C. TRANSMISSION

Preamble:
This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Faults and protections, Harmonics and Filters. It also deals with Reactive power control and Power factor improvements of the system.

Learning Objectives:

- To Understand basic concepts of HVDC Transmission.
- To analyze the converter configuration.
- To Know the control of converter and HVDC Transmission.
- To Understand the significance of reactive power control and AC/Dc load flow.
- To Know different converter faults, protection and effect of harmonics.
- To leave low pass and high pass filters.

UNIT – I
Basic Concepts
Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

UNIT – II
Analysis of HVDC Converters
Choice of converter configuration – analysis of Graetz – characteristics of 6 pulse & 12 pulse converters –Cases of two 3 phase converters in star –star mode – their performance.

UNIT – III
Converter & HVDC System Control
Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system - Starting and stopping of DC link - Power Control.

UNIT-IV
Reactive Power Control in HVDC
Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategiessources of reactive power-AC Filters – shunt capacitors-synchronous condensers.
Power Flow Analysis In AC/DC Systems
Modelling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC loadflow –solution of AC-DC Power flow-Simultaneous method-Sequential method.

UNIT-V
Converter Fault & Protection
Converter faults – protection against over current and over voltage in converter station – surge arresters –smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference.

Harmonics
Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non-Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics.

UNIT-VI

Filters

Types of AC filters,Design of Single tuned filters –Design of High pass filters.

Learning Outcomes:

The Student shall be able to

- Learn different types of HVDC levels and basic concepts
- Know the operation of converters
- Acquire control concept of reactive power control and AC/DC load flow.
- Understand converter faults, protection and harmonic effects
- Design low pass and high pass filters

Text Books:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar,New Age International (P) Limited, and Publishers.
2. HVDC Transmission by S.Kamakshaiah andV.Kamaraju-Tata McGraw–Hill

Reference Books:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.

IV Year – II SEMESTER

L	T	P	C
4	0	0	3

ELECTRICAL DISTRIBUTION SYSTEMS

Preamble:

This subject deals with the general concept of distribution system, substations and feeders as well as discusses distribution system analysis, protection and coordination, voltage control and power factor improvement.

Learning Objectives

- To study different factors of Distribution system.
- To study and design the substations and distribution systems.
- To study the concepts of voltage drop and power loss.
- To study the distribution system protection and its coordination.
- To study the effect of compensation for power factor improvement.
- To study the effect of voltage control on distribution system.

UNIT – I:

General Concepts

Introduction to distribution systems, Load modeling and characteristics – Coincidence factor – Contribution factor loss factor – Relationship between the load factor and loss factor – Classification of loads (Residential, commercial, Agricultural and Industrial).

UNIT – II:

Substations

Location of substations**:** Rating of distribution substation – Service area with'n'primary feeders – Benefits and methods of optimal location of substations..

Distribution Feeders

Design Considerations of distribution feeders**:** Radial and loop types of primary feeders – Voltage levels – Feeder loading – Basic design practice of the secondary distribution system.

UNIT – III:

System Analysis

Voltage drop and power–loss calculations**:** Derivation for voltage drop and power loss in lines – Uniformly distributed loads and non-uniformly distributed loads – Numerical problems - Three phase balanced primary lines.

UNIT – IV:

Protection

Objectives of distribution system protection – Types of common faults and procedure for fault calculations for distribution system – Protective devices**:** Principle of operation of fuses – Circuit reclosures – Line sectionalizes and circuit breakers.

Coordination

Coordination of protective devices**:** General coordination procedure –Various types of co-ordinated operation of protective devices - Residual Current Circuit Breaker

UNIT – V:

Compensation for Power Factor Improvement

Capacitive compensation for powerfactor control – Different types of power capacitors – shunt and series capacitors – Effect of shunt capacitors (Fixed and switched) – Power factor correction – Capacitor allocation – Economic justification – Procedure to determine the best capacitor location – Numerical problems.

UNIT – VI:

Voltage Control

Voltage Control**:** Equipment for voltage control – Effect of series capacitors – Effect of AVB/AVR – Line drop compensation – Numerical problems.

Learning Outcomes:

- Able to understand various factors of distribution system.
- Able to design the substation and feeders.
- Able to determine the voltage drop and power loss
- Able to understand the protection and its coordination.
- Able to understand the effect of compensation forp.f improvement.
- Able to understand the effect of voltage control.

Text Book:

1. "Electric Power Distribution system, Engineering" – by TuranGonen, McGraw–hill Book Company.

Reference Books:

1. Electrical Distribution Systems by Dale R.Patrick and Stephen W.Fardo, CRC press
2. Electric Power Distribution – by A.S. Pabla, Tata McGraw–hill Publishing company, 4^{th} edition, 1997.
3. Electrical Power Distribution Systems by V.Kamaraju, Right Publishers.

IV Year – II SEMESTER

L	T	P	C
4	0	0	3

HIGH VOLTAGE ENGINEERING
(ELECTIVE – III)

Preamble:

With the growth of power, HV power transmission has become an important subject. The performance of generating equipment requires knowledge of different phenomena occurring at higher voltage. Thus evaluations of various insulating materials are required for protection of HV equipments. Keeping this in view the course is designed to understand various phenomena related to breakdown study and withstand characteristics of insulating materials. The course also describes the generation and measurement of DC, AC and Impulse voltages as well various testing techniques.

Learning Objectives:

- To understand electric field distribution and computation in different configuration of electrode systems.
- To understand HV breakdown phenomena in gases, liquids and solids dielectrics.
- To acquaint with the generating principle of operation and design of HVDC, AC and Impulse voltages and currents.
- To understand various techniques of AC, DC and Impulse measurement of high voltages and currents.
- To understand the insulating characteristics of dielectric materials.
- To understand the various testing techniques of HV equipments.

UNIT–I:
Introduction to High Voltage Technology
Electric Field Stresses – Uniform and non–uniform field configuration of electrodes – Estimation and control of electric Stress – Numerical methods for electric field computation.

UNIT–II:
Break down phenomenon in gaseous, liquid and solid insulation
Gases as insulating media – Collision process – Ionization process – Townsend's criteria of breakdown in gases – Paschen's law – Liquid as Insulator – Pure and commercial liquids – Breakdown in pure and commercial liquid – Intrinsic breakdown – Electromechanical breakdown – Thermal breakdown –Breakdown of solid dielectrics, composite dielectrics used in practice.

UNIT–III:
Generation of High voltages and High currents
Generation of high DC voltages – Generation of high alternating voltages – Generation of impulse voltages and currents – Tripping and control of impulse generators.

UNIT–IV:
Measurement of high voltages and High currents
Measurement of high AC, DC and Impulse voltages – Voltages and measurement of high currents – Direct, alternating and Impulse.

UNIT–V:

Non–destructive testing of material and electrical apparatus

Measurement of DC resistivity – Measurement of dielectric constant and loss factor – Partial discharge measurements.

UNIT–VI:

High voltage testing of electrical apparatus

Testing of insulators and bushings – Testing of isolators and circuit breakers – Testing of cables – Testing of transformers – Testing of surge arresters – Radio interference measurements.

Learning Outcomes:

- To be acquainted with the performance of high voltages with regard to different configurations of electrode systems.
- To be able to understand theory of breakdown and withstand phenomena of all types of dielectric materials.
- To acquaint with the techniques of generation of AC,DC and Impulse voltages.
- To be able to apply knowledge for measurement of high voltage and high current AC,DC and Impulse.
- To be in a position to measure dielectric property of material used for HV equipment.
- To know the techniques of testing various equipment's used in HV engineering.

Text Books:

1. High Voltage Engineering: Fundamentals by E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier, 2nd Edition.
2. High Voltage Engineering and Technology by Ryan, IET Publishers.

Reference Books:

1. High Voltage Engineering by M.S.Naidu and V. Kamaraju – TMH Publications, 3rd Edition
2. High Voltage Engineering by C.L.Wadhwa, New Age Internationals (P) Limited, 1997.
3. High Voltage Insulation Engineering by RavindraArora, Wolfgang Mosch, New Age International (P)Limited,1995.

FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

Preamble:

Flexible Alternating Current Transmission System controllers have become a part of modern power system. It is important for the student to understand the principle of operation of series and shunt compensators by using power electronics. As the heart of many power electronic controllers is a voltage source converter (VSC), the student should be acquainted with the operation and control of VSC. Two modern power electronic controllers are also introduced.

Learning Objectives:

- To learn the basics of power flow control in transmission lines using FACTS controllers
- To explain operation and control of voltage source converter.
- To understand compensation methods to improve stability and reduce power oscillations of a power system.
- To learn the method of shunt compensation using static VAR compensators.
- To learn the methods of compensation using series compensators
- To explain operation of Unified Power Flow Controller (UPFC).

Unit–I:

Introduction to FACTS

Power flow in an AC System – Loading capability limits – Dynamic stability considerations – Importance of controllable parameters – Basic types of FACTS controllers – Benefits from FACTS controllers – Requirements and characteristics of high power devices – Voltage and current rating – Losses and speed of switching – Parameter trade–off devices.

Unit–II:

Voltage source and Current source converters

Concept of voltage source converter(VSC) – Single phase bridge converter – Square–wave voltage harmonics for a single–phase bridge converter – Three–phase full wave bridge converter– Three–phase current source converter – Comparison of current source converter with voltage source converter.

Unit–III:

Shunt Compensators–1

Objectives of shunt compensation – Mid–point voltage regulation for line segmentation – End of line voltage support to prevent voltage instability – Improvement of transient stability – Power oscillation damping.

Unit–IV:

Shunt Compensators–2

Thyristor Switched Capacitor(TSC)–Thyristor Switched Capacitor – Thyristor Switched Reactor (TSC–TCR). Static VAR compensator(SVC) and Static Compensator(STATCOM)**:** The regulation and slope transfer function and dynamic performance – Transient stability enhancement and power oscillation damping– Operating point control and summary of compensation control.

Unit V:

Series Compensators

Static series compensators**:** Concept of series capacitive compensation – Improvement of transient stability – Power oscillation damping – Functional requirements. GTO thyristor controlled Series Capacitor (GSC) – Thyristor Switched Series Capacitor (TSSC) and Thyristor Controlled Series Capacitor (TCSC).

Unit–VI:

Combined Controllers

Schematic and basic operating principles of Unified Power Flow Controller (UPFC).– Application on transmission lines.

Learning Outcomes:

The student should be able to

- Understandpower flow control in transmission lines using FACTS controllers.
- Explain operation and control of voltage source converter.
- Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines.
- Explain the method of shunt compensation using static VAR compensators.
- Understand the methods of compensations using series compensators.
- Explain operation of Unified Power Flow Controller (UPFC).

Text Books:

1. "Understanding FACTS" N.G.Hingorani and L.Guygi, IEEE Press.Indian Edition is available:—Standard Publications, 2001.

Reference Books:

1. "Flexible ac transmission system (FACTS)" Edited by Yong Hue Song and Allan T Johns, Institution of Electrical Engineers, London.
2. Thyristor-based FACTS Controllers for Electrical Transmission Systems, by R.MohanMathur and Rajiv k.Varma, Wiley

POWER SYSTEM REFORMS
(Elective III)

Preamble:

This course introduces the concepts and issues of power system reforms and aims at computation of Available Transfer Capability (ATC), Congestion Management, Electricity Pricing, Ancillary services Management and Power system operation in competitive environment

Learning Objectives:

- To study fundamentals of power system deregulation and restructuring.
- To study available transfer capability.
- To study congestion management
- To study various electricity pricing methods.
- To study operation of power system in deregulated environment.
- To study importance of Ancillary services management.

UNIT–I
Over view of key issues in electric utilities
Introduction – Restructuring models – Independent system operator (ISO) – Power Exchange – Market operations – Market Power – Standard cost – Transmission Pricing – Congestion Pricing – Management of Inter zonal/Intra zonal Congestion.

UNIT–II
Available Transfer Capability (ATC)
Structure of OASIS – Processing of Information – Transfer capability on OASIS – Definitions Transfer Capability Issues – ATC – TTC – TRM – CBM calculations – Methodologies to calculate ATC.

UNIT–III
Congestion Management
Introduction to congestion management – Methods to relieve congestion

UNIT–IV
Electricity Pricing:
Introduction – Electricity price volatility electricity price indexes – Challenges to electricity pricing – Construction of forward price curves – Short–time price forecasting.

UNIT–V
Power system operation in competitive environment:
Introduction – Operational planning activities of ISO – The ISO in pool markets – The ISO in bilateral markets – Operational planning activities of a GENCO.

UNIT–VI
Ancillary Services Management:
Introduction – Reactive power as an ancillary service – A review – Synchronous generators as ancillary service providers.

Learning Outcomes:

- Will understand importance of power system deregulation and restructuring.
- Able to compute Available Transfer Capability**.**
- Will understand transmission congestion management.
- Able to compute electricity pricing in deregulated environment.
- Will be able to understand power system operation in deregulated environment.
- Will understand importance of ancillary services.

Text Books:

1. Kankar Bhattacharya, Math H.J. Boller, JaapE.Daalder, 'Operation of Restructured Power System' Kluver Academic Publisher – 2001.
2. Mohammad Shahidehpour, and Muwaffaqalomoush, – "Restructured electrical Power systems" Marcel Dekker, Inc. 2001

Reference Books:

1. Loi Lei Lai; "Power system Restructuring and Deregulation", Jhon Wiley & Sons Ltd., England.
2. Electrical Power Distribution Case studies from Distribution reform, upgrades and Management (DRUM) Program, by USAID/India, TMH

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA& Affiliated to JNTUK, Kakinada

Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor's theorem and Maclaurin's theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to ME & CE)

Course Title: Engineering Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Familiarize the concepts of theoretical acoustics for their practical utility in engineering acoustics. Explanation for the significance of ultrasound and its application in NDT application.
- Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law – Learning the structural analysis through X-ray diffraction.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index- Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser – Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric

Properties Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations with derivations for polarisabilities (Qualitative)–Lorentz (internal) field - Claussius -Mosotti equation.

orthogonal trajectories, Newton's Law of cooling, Law of natural growth and decay

UNIT-IV Acoustics and Ultrasonics

Acoustics:

Introduction **–** Reverberation - Reverberation time -Classification of Sound waves- Weber–Fechner law - Sabine's formula- derivation using growth and decay method – Absorption coefficient and its determination

–factors affecting acoustics of buildings and their remedies.

Ultrasonics:

Introduction -Production of ultrasonics by Magnetostriction and piezoelectric methods - Detection of ultrasonics - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes – applications

Unit-V Crystallography and X-ray Diffraction

Crystallography:

Introduction-Space lattice, Basis, Unit Cell and Lattice Parameters-, Bravais lattices,-Crystal Systems (3D)-coordination number-Packing fraction of SC, BCC and FCC structures.

X-ray Diffraction:

Introduction - Miller indices-Separation between successive (hkl) planes. Bragg's Law-X-ray Diffractometer-Crystal Structure determination by Laue's and Powder Mehods (Qualitative).

Text Books:

1. M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017
2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018
3. P.K. Palanisamy, Applied Physics, SciTech Publications.

Reference Books:

1. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill ,2008
2. Charles Kittel "Introduction to Solid State Physics",Wiley Publications,2011
3. S.M.Sze "Semiconductor devices-Physics and Technology"-Wiley,2008
4. Halliday, Resnick and Walker, "Fundamentals of Physics", John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers

Course Outcomes:

Upon the completion of the course the students will be able to

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Explain sound waves and its propagation/absorption of construction material used in design of buildings. Analyze acoustic parameters of typical materials used in buildings. Recognize sound level disruptors and their application in architectural acoustics. Identify the use of ultrasonics in diversified fields of NDT.

CO5: Interpret various crystal systems and Analyze the characterization of materials by XRD. Identify the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique. Analysis of structure of the crystals by Laue and Powder techniques.

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.

3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- ➢ Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words

- ➢ Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary

- ➢ Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations

- ➢ Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary

- ➢ Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

I B.Tech I Semester

ENGINEERING GRAPHICS

L	T	P	C
2	0	2	3

COURSE OBJECTIVES:

- To introduce the students to use drawing instruments and to draw polygons, Engg. Curves and use scales
- To introduce the students orthographic projections, projections of points & lines.
- The objective is to make the students draw the projections of the plane inclined to both the planes.
- The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
- The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

UNIT I

Introduction to Graphics

Curves: Ellipse, Parabola and Hyperbola by general methods, Tangent & Normal, Cycloids, Involutes, tangent & normal for the curves.

Scales: Plain scale, Diagonal scale and Vernier scale.

UNIT II

Orthographic Projections: Introduction to Projections, Horizontal plane, Vertical plane, Profile plane, importance of reference lines.

Projections of points in various quadrants.

Projections of straight lines inclined to one plane, inclined to both the planes, traces.

UNIT III

Projections of planes: inclined to one reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Projections of Prisms, Pyramids, Cones and Cylinders simple positions, the axis inclined to one of the reference planes and axis inclined to both the reference planes.

UNIT V

Conversion of isometric views to orthographic views;

Conversion of orthographic views to isometric views.

COURSE OUTCOMES:

Students will be able to:

- construct Engg. Curves and scales
- understand orthographic projections, projections of points & lines.
- draw the projections of a plane inclined to both the planes.

- draw the projections of various types of solids in different positions inclined to one or both the planes.
- visualize and convert the isometric view to orthographic view and vice versa.

TEXT BOOKS:

1. N.D. Bhatt, Engineering Drawing, Charotar Publishing House Pvt. Ltd, 1ST edition, 2012.
2. Bansal Agarwal&C.M.Agarwal, Engineering Drawing, Tata McGraw Hill, 3rd edition, 2019.

REFERENCE BOOKS:

1. K.L.Narayana& P. Kannaiah, Engineering Drawing, Scitech Publications, Revised edition, 2010.
2. K.C. John, Engineering Graphics for Degree, PHI Learning, 1st edition, 2009.
3. PI Varghese, Engineering Graphics, McGraw-Hill Publishers, 1st edition, 2017.
4. P.S. Gill, Engineering Drawing, S.K. Kataria& Sons, 1st edition, 2013.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

1. To teach problem solving through Algorithms and Flowcharts
2. To elucidate problem solving through Python programming language
3. To train in the development of solutions using modular concepts
4. To explain the role of data structures in programming
5. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer

2. Develop computational thinking and be able to use Python constructs to solve basic problems

3. Understand modularization and data structures concepts in Python

4. Apply file handling concepts in problem solving

5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners' English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner's Compass, 7th Edition

7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press
12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to ME & CE)

Course Title: Engineering Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer
8. Determination of velocity of sound – Volume resonator.
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.

14. Energy Band gap of a Semiconductor p.n junction.

15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:

- Creating a Class with variables and methods
- Class inheritance
- Constructors
- Exception handling

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to CE & ME)

Course Title:Engineering Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. Relate the need of fuels as a source of energy to industries like thermal power stations, steel, fertilizer industry etc., and hence introduced.
3. To learn the basic principles and applications of Electrochemistry.To understand the mechanism of corrosion and how it can be prevented.
4. Explain the importance and usage of water as basic material in almost all the industries; interpret drawbacks of steam boilers and also how potable water is supplied for drinking purposes.
5. To train the students on the principles and applications of Cement, Refractories and Lubricants.

UNIT -I: Polymer Chemistry

Introduction to polymers, functionality of monomers, co-polymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosettings, Preparation, Properties and Applications of – Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N– Preparation, Properties and Applications.

Conducting polymers – polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and Applications.

UNIT-II: Fuel Technology

Fuel - Introduction – Calorific value - HCV and LCV – Bomb calorimeter – Numerical problems – Coal — Proximate and Ultimate analysis –Significance of the analysis.

Liquid fuels – Petroleum- Refining – Cracking – Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents.

Gaseous fuels – Natural gas, LPG and CNG.

Bio-fuels- Bio-diesel and Power alcohol.

UNIT- III: Electrochemistry and Corrosion

Part-A: Electrochemistry and Its Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations).Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries- working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

Part-B: Chemistry of Corrosion

Corrosion: Introduction to corrosion, Chemical and Electrochemical theory of corrosion, Pilling- Bedworth ratio rule, Differential aeration corrosion, Waterline corrosion and Galvanic corrosion.

Environmental factors (pH, temperature, Dissolved Oxygen) affecting the rate of corrosion.

Protection – Galvanizing, Tinning, Electroplating and Electro less plating (Nickel and Copper). Organic coatings - Paints (constituents and functions).

UNIT -IV: Water Technology

Introduction –Soft Water and Hardness of water, Estimation of hardness by EDTA Method - Boiler troubles - scale and sludge, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Zeolite and Ion-exchange processes. Municipal water treatment –Break point of chlorination. Deflouridation technique.

Desalination of Brackish water- Reverse Osmosis (RO) and Electrodialysis.

UNIT -V: Chemistry of Materials

Cement: Introduction to Building materials – Portland cement, constituents, manufacturing process- raw materials for manufacturing process, reactions below 1300^{o}C and reactions between 1300 and 1450^{o}C, reactions during cooling, grinding or storage, chemical equations, Chemistry of setting and hardening of cement (hydration, hydrolysis, equations).

Lubricants: Definition, Properties and Applications.

Refractories: - Definition, Classification, Properties and Applications.

Text Books :

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.
3. A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course,Students will be able to,

1. Recall the information related to polymers and their application. (Remembering)
2. Classify the different types of fuels and its applications.(Understanding)
3. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing) Solve the corrosion related problems. (Applying)
4. Use the information related to water treatment methods. (Applying)
5. Design manufacturing process of cement. (Creating)

I.B.Tech II Semester

ENGINEERING MECHANICS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- Understand particle, body, rigid body, concept of force, analysis of forces acting on a rigid body
- Understand moment and the principle of moments
- Understand the laws of friction and its applications
- Analyzing trusses for its member forces.
- Understand the concept of centre of gravity and area moment of inertia
- Understanding principles of kinematics and kinetics applied to rigid bodies.

UNIT I

STATICS OF PARTICLES AND RIGID BODIES

Introduction: Fundamental concepts and principles of engineering mechanics – Forces on particles – Concurrent forces in a plane – Resolution of forces – Resultant of several concurrent forces.

Equilibrium of Particles: Free body diagram – Equilibrium of rigid bodies in two dimensions- Equilibrium of a two, three force body.

Moment of a force – Varignon's theorem – Equivalent system of forces – Reduction of system of forces into single force and couple.

UNIT II

FRICTION AND TRUSSES

Friction: Introduction-Types of friction – laws of Friction – Limiting friction – Cone of friction-static and Dynamic Frictions. Applications of Friction: Wedges – Ladder friction.

Analysis of trusses – statically determinate and indeterminate structures – Method of Joints.

UNIT III

PROPERTIES OF SURFACES AND VOLUMES

Centre of Gravity: Centroids of lines, areas, and volumes – Determination of centroids by integration – Theorem of Pappu's.

Area Moment of Inertia: Second moment or Moment of inertia of an area – Determination of moment of inertia of area by integration – Radius of gyration – Parallel and perpendicular axis theorems

UNIT IV

KINEMATICS

Rectilinear motion: **U**niform velocity and uniformly accelerated motion – Rectangular components of velocity and acceleration, Variable acceleration

Curvilinear motion: Normal and tangential components – Radial and transverse components – Motion of Projectile

UNIT V

KINETICS

Newton second law – D. Alembert's principle, Principle of work and energy for a rigid body – connected bodies – Principle of impulse and momentum – connected bodies.

COURSE OUTCOMES:

The students will be able to:

- Simplify the system of forces and moments to equivalent systems and construct free body diagrams and develop appropriate equilibrium equations
- Analyze systems with friction and for member forces
- Determine centroids of simple and composite areas and moment of inertia.
- Apply the fundamental concepts of kinematics of particles and rigid bodies along with equilibrium condition in solving engineering problems
- Analyze the problems of simple systems and connected bodies for displacement, velocity and acceleration.

TEXT BOOKS:

1. Engineering Mechanics, Timoshenko and Young, McGraw Hill Publishers, 5th Edition by, 2017.
2. Engineering Mechanics, S. S. Bhavakatti, New age international, 7 th Edition, 2019.

REFERENCE BOOKS:

1. Engineering Mechanics: Statics and Dynamics, James L. Meriam, L. Glenn Kraige, John Wiley & Sons, 7th Edition, 2017.
2. Engineering Mechanics -Statics and Dynamics, A K Tayal, Umesh Publications, 14th Edition, 2011.
3. Engineering Mechanics, R. S. Kurmi, S. Chand, 22nd Edition, 2018.

Branch: ME **I Year – II Semester** **Regulation: R20**

Sub. Title: ELEMENTS OF ELECTRICAL & ELECTRONICS ENGINEERING

L	T	P	C
3	0	0	3

Sub.Code:

Preamble:

This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines, electronic components to perform well in their respective fields.

Learning Objectives:

- To learn the basic principles of electrical law's and analysis of DC circuits and AC circuits.
- To understand the principles of operation and characteristics of DC machines.
- To understand the principle of operation of Transformer and Induction motor.
- To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
- To learn the operation of PNP and NPN transistors and various amplifiers.

UNIT - I

DC Circuits: Basic definitions, Electrical circuit elements (R - L and C), Ohm's-Law, Kirchhoff laws, Series and parallel connection of resistances with DC excitation, Mesh Analysis and Nodal Analysis.

AC Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Introduction to three phase, phase sequence, relation between line and phase voltages and currents.

UNIT - II

DC Machines: Principle and operation of DC Generator, EMF equation, Applications. Principle and operation of DC Motor, Back EMF, Types of DC machines, Speed- Torque Characteristics of DC Motors, Speed control of DC Motors, Applications.

UNIT - III

AC Machines: Classification of AC machines, Principle and operation of 3-phase Induction Motor and 3-phase Synchronous Generator.

Transformers: Principle of operation and construction of Single Phase Transformer, OC and SC test on transformer, efficiency

UNIT IV

Rectifiers & Linear ICs: PN junction diodes, Applications -Half wave and Bridge rectifiers. Characteristics of Operation Amplifiers (OP- AMPs), Applications of OP-AMPs -Inverting, Non-Inverting, Integrator and Differentiator.

UNIT V

Transistors : PNP and NPN junction transistor, transistor as an amplifier, Transistor Configurations-CE,CB,CC configurations, CE Amplifier Characteristics, Application of Transistors.

Course Outcomes:

- Able to analyze the various DC networks and AC circuits.
- Able to understand the operation and Applications of DC Generators and DC Motor.
- Able to analyze the performance of Transformer and Induction motor and Synchronous generator.
- Able to analyze the operation of half wave, full wave rectifiers and OP- AMPs.
- Able to explain the operation of transistors and its applications.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 10th edition, PEI/PHI2006
2. Theory and performance of Electrical Machines ,J.B.Gupta,3rd edition,Kataria.S.K& Sons
3. Electrical Circuit Theory and Technology by John Bird, 6th Edition Routledge Taylor & Francis Group

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4. Industrial Electronics by G.K. Mittal, PHI.
5. Electrical Technology by Surinder Pal Bali, Pearson Publications.
6. Principles of Basic Electrical Engineering by T.N. Nagsarkar, M.S. Sukhija, Oxford University Press.

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Year/Semester	I B. Tech/IISem	L	T	P	C
Regulation Year	2020-21	1	0	4	3
Subject	ComputerProgramming				
Branches	ME & CE				

Course Objectives:

- To design & develop C programs using selection and repetition control statements
- To design & develop C programs using arrays and strings
- To design & develop C programs using structures, unions, pointers
- To design & develop modular programs using functions
- To design & develop C programs using the concepts – user defined datatypes, preprocessor directives, storage classes

Course Outcomes:

By the end of the course, the students should be able to:

- Use the appropriate control statements to write programs for the given task
- Write programs using arrays and strings
- Use structures, unions and pointers in programming
- Write programs using modular programming
- Write programs using user defined datatypes, preprocessor directives, storage classes

Unit-1

Introduction to the C Language: C Programming Basics: Identifiers, Types, Variable, Constants, Input/output, Operators, Expression Evaluation, Control Statements - Decision Control, Repetition Control, break, continue, Exercise programs covering these concepts

Unit-2

Derived Datatypes: Arrays, Two Dimensional Arrays, Multidimensional Arrays, Programming Examples, Strings: String Concepts, C String, String Input / Output Functions, Predefined string handling functions, Exercise programs covering these concepts

Unit-3

Structures: Definition, Variable declaration and initialization, Programming Examples, Nested Structures, Unions, Difference between Structure and Union, Pointers - Declaration & initialization, Operations on pointers, Exercise programs covering these concepts

Unit-4

Functions: Definition, Declaration, Function call, Predefined vs. User defined Functions, return statement, Types of functions, Parameter passing techniques – Call by value and Call by reference, Recursion, Tail recursion, Exercise programs covering these concepts

Unit-5

User defined datatypes: typedef, enum, Preprocessor directives: #include, #define, Conditional compilation directives, Global vs. Local variables, Storage classes, Scope and lifetime of a variable, Exercise programs covering these concepts

Text Books:

1) Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE.
2) The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson
3) Programming in ANSI C, E Balagurusamy, Mcgraw Hill

Branch: ME **I Year – II Semester** **Regulation: R20**

Sub. Title: ELEMENTS OF ELECTRICAL & ELECTRONICS ENGINEERING LAB

L	T	P	C
0	0	3	1.5

Sub.Code:

Learning Objectives:

- To learn the application of DC and AC circuits.
- To understand the tests of a transformer
- To understand the tests and speed control of a DC machine
- To learn the operation and characteristics of PN junction diode and Full wave rectifier
- To learn the operation and characteristics of a Transistor
- To learn the operation and applications of CE amplifier and OP-AMP

Any 10 experiments are to be conducted as compulsory experiments

Section A: Electrical Engineering

1. *Verification of Kirchoff's Laws*
2. *Analysis of series RLC circuits*
3. *Measurement of Active, Reactive and Apparent power in a single phase circuit.*
4. *OC and SC Tests on single phase transformer*
5. *Speed control of DC Shunt motor by Armature voltage control & Field flux control*
6. *Brake test on DC Shunt Motor*
7. *Brake test on three phase Induction motor*

Section B: Electronics Engineering

1. *Characteristics of PN Junction diode*
2. *Characteristics of transistor in CE configuration*
3. *Full wave rectifier with and without filters*
4. *Frequency Response of CE Amplifier*
5. *Applications of OP-AMP (any two applications)*

Course Outcomes:

The student will be

- Able to analyze DC and AC circuits.
- Able to test the performance of a transformer

- Able to test and analyze various speed control methods of a DC machine
- Able to analyze the operation and characteristics of PN junction diode and Full wave rectifier
- Able to analyze the operation and characteristics of a Transistor
- Able to analyze the operation and applications of CE amplifier and OP-AMP

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common toCE &ME)

Course Title: Engineering Chemistry lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuri (2012) Laboratory Manual of Engineering chemistry-II, VGS, Techno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

I.B.Tech II Semester

ENGINEERING WORKSHOP

ME

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
- To identify the hand tools and instruments used in the fitting, carpentry, black smithy and tin smithy trades.
- To acquire skills in basic engineering practices like fitting, carpentry, black smithy and tin smithy etc.
- To gain measuring and marking skills.
- To gain basic knowledge in electrical wiring and assembly and disassembly of computer.

Note: At least two exercises to be done from first five trades & experiment from last trade is compulsory.

TRADES:

Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop

4. Funnel

System Assembly

1. Assembly & Disassembly of computer

COURSE OUT COMES:

The student will be able to

- Identify the basic tools and equipments used in carpentry, fitting, black smithy, house wiring and tin smithy.
- Produce different joints in carpentry trade such as lap and dove tail joint
- Produce various fittings in the trade of fitting such as square fit and V fit.
- Make various objects in tinsmithy trade such as open scoop and square box.
- Perform various basic house-wiring connections
- Produce various shapes in black smithy trade such as round rod to square rod and S hook
- Assemble & Disassemble of computer

TEXT BOOKS:

1. Workshop Technology Vol I & II, S K Hajra Choudhury, A K Hajra Choudhury, N. Roy, Media Promoters & Publishers Pvt. Ltd.
2. Workshop Practice/H S Bawa/ McGraw Hill Education; 2nd edition

REFERENCE BOOKS:

1. P. Kannaya and K.L. Narayana, **Engineering Practices Laboratory**, Scitech Publications (India) Pvt Ltd, 3rd edition, 2015.
2. S Gowri T Jeyapoovan, E**ngineering Practices Lab Manual, vikas publishing house, 5th edition, 2009.**
3. PN RAO, **Manufacturing Technology – Vol,** McGraw Hill Education, 4th edition, 2017.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to ECE, CE, ME,AI&DS, CS&BS)

Course Title: Environmental Science

Objectives:

To make the student to get awareness on environment, to understand the important of protecting natural recourses, ecosystems for futures generations and pollution causes due to the day to day activates of human life to save Earth from the inventions by the engineers.

UNIT – I: Multidisciplinary nature of Environmental Science and Ecosystems

Definition, Scope and Importance – Sustainability: Need for public awareness-Human population and Environment.

Ecosystems:Concept of an ecosystem. - Structure and function of an ecosystem. -Types of Ecosystem-Forest, Grassland, Desert and Aquatic Ecosystems– Food chains, food webs and ecological pyramids.

UNIT – II: Natural Resources

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources: Conflicts over water, Dams – benefits and problems

Mineral resources: Use and exploitation, Environmental effects of extracting and using mineral resources.

Energy resources: Growing energy needs, renewable and non-renewable energy sources

Food resources: World food problems.

Land resources: Wasteland reclamation.

Role of an individual in conservation of natural resources.

UNIT – III: Biodiversity and its conservation

Definition, Genetic, species and ecosystem diversity- classification - Value of biodiversity: Consumptive use, Productive use, Social use, Biodiversity at national and local levels. Hot-spots of biodiversity - Threats to biodiversity - Endangered and Endemic species of India – Conservation of biodiversity

UNIT – IV: Environmental Pollution

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. Pollution case studies.

Solid Waste Management: Sources, effects and control measures of urban and industrial solid wastes. Bio medical and e-waste management.

Global Environmental Challenges: Global warming and climate change-Acid rains, Ozone layer depletion.

UNIT – V: Social Issues and Environmental Management

Urban problems related to energy -Water conservation, Rain water harvesting-Resettlement and rehabilitation of people. Environmental Protection Act –Air Act –Water Act - Wildlife Protection Act -Forest Conservation Act-Public awareness.

International protocols: Stockholm and Rio Summit, Kyoto protocol and Montreal Protocol.

Impact Assessment and its significance various stages of EIA, Environmental audit, Ecotourism. The student should Visit an Industry / Ecosystem.

Text Books

1. A Textbook of Environmental Studies, Shashi Chawla, TMH, NewDelhi.
2. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford UniversityPress

References

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers,Vijayawada.
2. Text Book of Environmental Studies, DeekshitaDave& P. Udaya Bhaskar, Cengage Learning.
3. Textbook of Environmental Science and Technology – Dr. Anji Reddy, BS Publications.
4. Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers,2014.
5. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education,Chennai.
6. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, NewDelhi.

Course Outcomes: Students will be able to

1. Articulate the basic structure, functions, and processes of key social systems affecting the Environment.
2. Explain how Natural Recourses should be used.
3. Identify the threats to biodiversity.
4. Understand causes, effects and control measures of Environmental pollution.
5. Gain knowledge about Watershed management and Environmental ethics.Gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

II-Year I-Semester

S. No	Course Title	L	T	P	C
1	Material Science and Metallurgy	3	-	-	3
2	Manufacturing Processes	3	-	-	3
3	Mathematics-III (Numerical Methods & Applied Statistics)	3	-	-	3
4	Engineering Mechanics	3	-	-	3
5	Thermodynamics	3	-	-	3
6	Metallurgy Lab	-	-	3	1.5
7	Manufacturing Processes Lab	-	-	3	1.5
8	Quantitative Aptitude - I	-	-	2	-
	Total	15	-	8	18

Course Name	**MATERIALS SCIENCE AND METALLURGY**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. To acquire the knowledge of different crystal structures and constitution of alloys.
2. To understand rules to form solid solution and different reactions in a phase diagram.
3. To be able to correlate the concepts of phase structures and properties of different types of steels and their heat treatment methods.
4. To understand the microstructure and properties of cast iron and few non-ferrous metal alloys.
5. To exemplify different types of ceramics, polymers and composite materials.
6. To identify various advanced materials and their importance.

UNIT I

Structure of Metals: Crystallography, Miller indices, Packing Efficiency, Density calculations-Grains and Grain Boundaries-Effect of grain size on the properties-Determination of grain size by different methods.

Constitution of alloys: Necessity of alloying, Types of solid solutions, Hume – Rothery rules, Intermediate alloy phases.

UNIT II

Phase diagrams: Construction and interpretation of phase diagrams, Phase rule- Lever rule-Binary phase diagrams, Isomorphous, Eutectic and Eutectoid transformations with examples, Study of Fe-Fe_3Cphase diagram.

UNIT III

Engineering Materials–I (Steels): Classification of Steels, Structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, Tool and Die Steels.

Engineering Materials–II (**Cast Irons):** Structure and properties of White Cast iron, Malleable Cast iron,Grey cast iron and Nodular cast iron

UNIT IV

Heat Treatment: Annealing, Normalizing, Hardening and Tempering of Steels, Construction of TTT diagrams, Hardenability, Surface-hardening methods.

Engineering Materials-III: Non-ferrous Metals and Alloys: Structure and properties of Copper and its alloys, Aluminum and its alloys, Al-Cu phase diagram, Titanium and its alloys.

UNIT V

Engineering Materials-IV: Ceramics, Polymers and Composites: Crystalline Ceramics, Glasses, Cermets - Structure, Properties and Applications; Composites - Classification, properties and applications; Polymers - Classification, Properties and applications

UNIT VI

Advanced Materials: Special Purpose Materials, Cryogenic Materials, Shape Memory Alloys, Smart Materials and Nanomaterials.

COURSE OUT COMES:

Students will be able to:

1. Know different structure of metals and the constitution of alloys
2. Construct different phase diagrams, microstructures and reactions with examples
3. Acquire the knowledge of engineering materials – steels with iron-carbon phase diagram and various heat treatment properties.
4. Analyze various cast irons and few non-ferrous metals& alloys and their properties
5. Characterize different non-metals such as ceramics, polymers and composites for engineering applications.
6. Identify the need for some advanced materials and their properties.

TEXT BOOKS:

1. V. D. Kodgire, Material Science and Metallurgy for Engineers, Everest Publishing House, 39th edition, 2017.
2. Sidney H. Avner, Introduction to Physical Metallurgy, McGraw Hill, 2nd edition, 2017.
3. Donald R. Askeland and Pradeep P Fulay, Essentials of Materials Science and Engineering, Cengage Learning, 2nd edition, 2013.

REFERENCE BOOKS:

1. William D Callister& R. Balasubramaniam, Materials Science & Engineering, Wiley Publishing, 1st edition, 2007.
2. V. Raghavan, Materials Science & Engineering, Eastern Economy Edition, 6th edition, 2015.
3. A.K. Bandyopadhyay, Nanomaterials, New Age International, 1st edition, 2009.

Course Name	**MANUFACTURING PROCESSES**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. To understand casting principles and different tools used for creating a sound casting.
2. To specify various casting processes and gating systems.
3. To demonstrate different types welding principles, welding defects - causes and remedies, testing of welds.
4. To state various metal working and rolling processes.
5. To study various metal forming processes such as forging, extrusion, drawing.
6. To get familiarize with the sheet metal working, processing of plastics by blow and injection molding.

UNIT I

Casting: Steps involved in making a casting–Advantage of casting and its applications.

Patterns and Pattern making: Types of patterns**,** Materials used for patterns, Pattern allowances and their construction, Properties of mold sand - Applications – Cores – Core making

UNIT II

Gating System: Elements of Gating System-Principles of Gating, Gating Ratio and Design of Gating Systems, Risers – Types, Function and Design

Different Casting Processes: Sand Casting; Die Casting; Centrifugal and Investment Casting, Casting Defects.

UNIT III

Welding: Classification of Welding Processes, Types of Welds and Welded Joints, Their Characteristics, Edge Preparation, Gas Welding, Arc Welding, Submerged Arc Welding, Inert Gas Welding- TIG & MIG Welding, Thermit Welding, Resistance Welding. Friction Welding, Friction Stir Welding, Explosive Welding, Laser Welding, Welding Defects – Causes and Remedies, Oxy – Acetylene Gas Cutting, Soldering & Brazing.

UNIT IV

Bulk Deformation Processes -I: **Fundamentals**: On Metal Forming Processes -Hot Working, Warm Working, Cold Working, Strain Hardening, Recovery, Recrystallization and Grain Growth, Comparison of Properties of Cold and Hot Worked Parts, Rolling Fundamentals -Theory of Rolling-.Types of Rolling Mills and Products,

UNIT V

Bulk Deformation Processes -II: Forging Processes: Principles of Forging, Tools and Dies**,** Types of Forging – Smith Forging, Drop Forging, Roll Forging – Forging Hammers: Rotary Forging, Forging Defects.

Extrusion Of Metals: Basic Extrusion Process and its Characteristics- Hot Extrusion and Cold Extrusion -Forward Extrusion and Backward Extrusion – Impact Extrusion, Hydrostatic Extrusion, Wire Drawing and Tube Drawing.

UNIT VI

Sheet Metal Working &Plastics: Blanking and Punching–Bending and Deep Drawing - Other Forming Processes - Stamping, Forming and Other Cold Working Processes– Coining – Hot and Cold Spinning – Types of Presses and Press Tools -Defects and Estimation of Blank Size.

Processing of Plastics: Blow Moulding& Injection Moulding methods.

COURSE OUT COMES:

Students will be able to:

1. Know different structure of metals and the constitution of alloys
2. Construct different phase diagrams, microstructures and reactions with examples
3. Acquire the knowledge of engineering materials – steels with iron-carbon phase diagram and various heat treatment properties.
4. Analyze various cast irons and few non-ferrous metals& alloys and their properties
5. Characterize different non-metals such as ceramics, polymers and composites for engineering applications.
6. Identify the need for some advanced materials and their properties.

TEXT BOOKS:

1. Kalpakjian Sand Steven R Schmid, Manufacturing Engineering and Technology, Pearson Publishing,7th edition,2018.
2. P.N. Rao, Manufacturing Technology –Vol. I, Tata McGraw Hill Publishers,4th edition, 2017.

REFERENCE BOOKS:

1. Philip C Rosenthal, Principles of Metal Casting, McGraw-Hill Education, 2nd edition, 2017.
2. P. L. Jain, Principles of Foundry Technology, Tata McGraw Hill Publishers, 5th edition, 2017.
3. AmitabhaGhosh&Asok Kumar Mallik, Manufacturing Science, East West Press Pvt. Ltd, 2nd edition, 2010.
4. R.S. Parmar, Welding Processes & Technology, Khanna Publishers, 1st edition, 1996.
5. E. P. De Garmo, J.T. Black and R. A. Kohser, Materials & Processes in Manufacturing, Wiley Publishing, 8th edition, 1997.

Course Name	**MATHEMATICS-III (Numerical Methods & Applied Statistics)**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- Know the standard numerical methods to find roots of functionsin practical engineering problems
- Identify the concepts of interpolation, to estimate the unknown functional values.
- Identify the methods for finding the values of derivatives and finite integrals using numerical techniques
- Make use of method of least squares to fit a best curve for the given data and apply the regression analysis to fit the curves
- Understand various statistical distribution
- Decide the null or alternative hypotheses using the suitable test statistic

UNIT-I: Solution of Algebraic and Transcendental Equations

Introduction- algebraic function and transcendental function - Bisection method, Regula –Falsi Method, Iteration Method, Newton- Raphson method.

UNIT-II: Interpolation

Introduction, Finite Differences, Forward –Backward- Central Differences – Newton's forward and backward formulae – Gauss Forward and Backward formulae – Lagrange's Interpolation Formula.

UNIT-III: Numerical Integration and Solution of Ordinary Differential Equations

Numerical Integration-Trapezoidal rule – Simpson's 1/3 rd Rule –Simpson's 3/8 th Rule. Solution by Taylor's method, Picard's method, Euler's & Modified Euler's method, Runge- Kutta Methods.

UNIT-IV: Curve Fitting &Correlation and Regression

Least Squares Method - Quadratic, Power and Exponential models.

Correlation and Regression**:** Simple Bivariate Correlation: Karl Pearson's coefficient of correlation, Spearman's Rank correlation coefficient.

Linear Regression - Regression lines, Regression coefficients, properties.

UNIT-V: Distributions

Random variables, Discrete and continuous distributions- Normal and Sampling distributions

UNIT-VI: Tests of Hypothesis

Null and Alternative Hypothesis, One tail and two tailed tests, Type I and Type II errors. Tests of hypotheses concerning single mean, difference of means using Z- distribution and Student's t-test.

COURSEOUT COMES:

After undergoing this course, students will be able to

- apply standard numerical methods to solve fundamental and practical engineering problems
- understand the concepts of interpolation, extrapolation to estimate the unknown functional values.
- find approximate values of derivatives and finite integrals using numerical techniques
- make use of method of least squares to fit a best curve for the given data and apply the regression analysis to fit the curves
- use various statistical distribution to solve engineering problems
- decide the null or alternative hypotheses using the suitable test statistic

TEXT BOOKS:

1. A text book of Engineering Mathematics - N.P. Bali and Manish Goyal – 9th Ed-Laxmi Publications, 2010.
2. Engineering Mathematics- B. V. Ramana, , 4th Ed.- Tata McGraw Hill, New Delhi – 2009.
3. Fundamentals of Mathematical Statistics a Modern Approach - S.C. Gupta, V.K. Kapoor - 11th Ed. - 2018 - Sultan Chand & Sons.

REFERENCE BOOKS:

1. Engineering Mathematics- T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad -12th Ed. - S. Chand Publishers - 2014
2. Introductory methods of Numerical Analysis - S.S.Sastry - 5th Ed. -Prentice Hall of India Pvt. Ltd. - 2012

Course Name	**ENGINEERING MECHANICS**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. Understand particle, body, rigid body, concept of force, analysis of forces acting on a rigid body
2. Understand moment and the principle of moments
3. Understand friction and its implications
4. Understand the concept of centre of gravity and moment of inertia
5. Understanding kinematics and kinetics parts of machines

UNIT I:

STATICS OF PARTICLES AND RIGID BODIES

Introduction: Fundamental concepts and principles of engineering mechanics – Forces on particles – vector addition – Concurrent forces in a plane – Resolution of forces – Resultant of several concurrent forces.

Equilibrium of Particles: Free body diagram –Equilibrium of rigid bodies.

UNIT II

Moment of a force –Varignon's theorem – Equivalent system of forces – Reduction of system of forces into single force and couple – Equilibrium of rigid bodies in two dimensions- Equilibrium of a two, three force body.

Analysis of trusses – statically determinate and indeterminate structures – Method of Joints.

UNIT III

FRICTION AND ITS APPLICATIONS

Friction: Introduction-Types of friction – laws of Friction – Limiting friction – Cone of friction-static and Dynamic Frictions. Applications of Friction: Wedges – Ladder friction.

UNIT IV

PROPERTIES OF SURFACES AND VOLUMES

Centre of Gravity: Centroids of lines, areas, and volumes – Determination of centroids by integration – Theorem of Pappu's.

Moment of Inertia: Second moment or Moment of inertia of an area – Determination of moment of inertia of area by integration – Radius of gyration – Parallel and perpendicular axis theorems – Polar moment of inertia – Mass moment of inertia

UNIT V

KINEMATICS

Rectilinear motion: **U**niform velocity and uniformly accelerated motion – Rectangular components of velocity and acceleration, Variable acceleration

Curvilinear motion: Normal and tangential components – Radial and transverse components – Motion of Projectile

UNIT VI

KINETICS

Newton second law – D.Alembert's principle, Principle of work and energy for a rigid body – connected bodies – Principle of impulse and momentum – connected bodies.

COURSE OUTCOMES:

The students will be able to:

1. Explain the free bodydiagram of a body acted upon by a system of forces
2. Understand the concepts of equilibrium and moment
3. Determine the forces on truss members by using equations of equilibrium.
4. Apply concept of friction to practical applications.
5. Determine the centroid, center of gravity and moment of inertia of various surfaces.
6. Understand kinematics and kinetics and its principles.

TEXT BOOKS:

1. Timoshenko and Young, Engineering Mechanics, McGraw Hill Publishers, 5th Ed, 2017.
2. A Text book of Engineering Mechanics, S. S. Bhavakatti, New age international, 7th Ed, 2019.

REFERENCE BOOKS:

1. James L. Merriam, L. Glenn Kraige, Engineering Mechanics: Statics and Dynamics, John Wiley & Sons, 7th Ed, 2017.
2. A K Tayal, Engineering Mechanics, Statics and Dynamics, Umesh Publications, 14th Ed, 2011.
3. R. S. Kurmi, A Text book of Engineering Mechanics, S. Chand, 22nd Ed. 2018.

Course Name	**THERMODYNAMICS**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

1. To understand the basic concepts of thermodynamics and heat and work interactions between system and its surroundings.
2. To learn the applications of first and second law of thermodynamics to thermal engineering devices.
3. To learn the significance of Carnot cycle and to understand the concept of entropy.
4. To understand the properties of pure substances.
5. To understand the basis of Ideal, real gases and mixture of perfect gases.
6. Apply the knowledge of thermodynamics to air power cycles.

UNIT-I

Fundamentals: Thermodynamic definition and scope, Macroscopic and Microscopic approaches, System, Surroundings, Boundaries, Universe, types of systems, Thermodynamic Properties; definition and units, intensive, extensive properties, Thermodynamic state, state point, state diagram, path and process, quasi-static process, cyclic and non-cyclic processes, Thermodynamic Equilibrium. Temperature, Zeroth law of Thermodynamics, Principles of Thermometry: Temperature scales, Various thermometers.

Work and Heat: Thermodynamic definitions of work, examples, sign convention. Different forms of work, Displacement work, expressions for displacement work in various processes through p-v diagrams, Heat; Definition, units, sign conversion.

UNIT-II

First law of thermodynamics: Joule's Experiment, equivalence of heat and work, Statement of first law of thermodynamics, first law applied to a system undergoing a cyclic process and a change of state, Concept of energy, energy as a property, modes of energy, Corollaries; First law applied to a flow system: general energy equation, steady flow energy equation and important applications (boiler, turbine, heat exchangers, pumps, nozzles).

Second law of thermodynamics: Limitations of the First Law of Thermodynamics, Definitions: Thermal reservoir, Heat Engine, Heat pump, refrigerator, Parameters of performance (thermal efficiency and the coefficient of performance), Kelvin-Planck statement of the second law of thermodynamics PMM 1 and PMM 2, Clausius Statements of the second law, equivalence of two statements.

UNIT-III

Carnot theorem and corollaries: reversible process, irreversible process, factors responsible for making a process irreversible, thermodynamic temperature scale, Carnot cycle and its specialties, Entropy, Clausius theorem, Clausius Inequality, Principle of Entropy Increase. Availability, Unavailability and Irreversibility; Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations –Elementary Treatment of the Third Law of Thermodynamics.

UNIT-V

Definition of Pure substance, Phase Transformations of Pure Substance, P-v-T- surfaces; Definitions of saturated states; Triple Point and critical state properties during change of

phase; Dryness Fraction; Clausius-Clapeyron Equation; Mollier's Chart; Various Thermodynamic processes and energy Transfer; Steam Calorimetry.

UNIT-V

Ideal Gas and Real Gas: Ideal gas, relation among the specific heats, internal energy, enthalpy. Analysis of isochoric, isobaric, isothermal, isentropic, isenthalpic processes, representation of the above processes on P-v, T-s planes. Determination of work, heat, entropy and enthalpy changes during the above processes, problems. Deviations from perfect Gas Model, Vander Waals Equation of State, Compressibility charts; Variable Specific Heats.

Mixtures of perfect Gases: Mole Fraction, Mass fraction, Gravimetric and volumetric Analysis, Dalton' slaw of partial pressures, Avogadro's Laws of additive volumes; Volume fraction and partial pressure; Equivalent Gas constant and Molecular weight; Internal Energy, Enthalpy, specific heats and Entropy of Mixture of perfect Gases and Vapor, Atmospheric air.

UNIT-VI

Power Cycles: Assumptions for air standard cycles, Analysis of Otto, Diesel, Dual combustion, Joule/Brayton cycles, Atkinson Cycle, Ericson Cycle, Lenoir Cycle and Miller Cycle.

COURSE OUTCOMES:

Students will be able to

1. Apply energy balance to systems and control volumes, in situations involving heat and work interactions.
2. Apply first and second law of thermodynamics to energy conversion devices.
3. Analyze the entropy on thermal energy devices.
4. Evaluate the properties of pure substance.
5. Evaluate the properties of mixture of perfect gases.
6. Analyze the performance of gas and air power cycles.

TEXT BOOKS:

1. PK Nag, Engineering Thermodynamics, Tata Mcgraw Hill,6th Edition, 2017.
2. YunusCengel and Boles, Thermodynamics-An Engineering Approach, Tata Mcgraw Hill, 18thEdition, 2017.

REFERENCE BOOKS:

1. R.K Rajput, A Text book of Engineering Thermodynamics, Laxmi Publications, 5th Edition, 2016.
2. J. P .Holman, Thermodynamics, McGraw-Hill, 4th Edition, 1987.
3. Moran, M. J. Shapiro, Daisie D. Boettner and Margaret B. Bailey, Fundamentals of Engineering Thermodynamics, Wiley and sons, 7th Edition, 2010.

Course Name	**METALLURGY LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- To apply the knowledge of Engineering Metallurgy and Mechanics of Solids for a given material.
- To understand the microstructures of various ferrous and non-ferrous alloys.
- To plan a heat treatment process for an alloy and test for its improved properties.

LIST OF EXPERIMENTS:

Any 10 experiments are to be conducted

1. Preparation and Study of Microstructure of pure Copper.
2. Preparation and Study of Microstructure of Cu alloy – Brass.
3. Preparation and Study of Microstructure of Cu alloy – Bronze.
4. Preparation and Study of Microstructure of Aluminum alloy.
5. Preparation and Study of Microstructure of plain carbon steel – Low Carbon Steel.
6. Preparation and Study of Microstructure of plain carbon steel – High Carbon Steel.
7. Preparation and Study of Microstructure of alloy steels – HSS.
8. Preparation and Study of Microstructure of cast iron – Grey Cast Iron.
9. Preparation and Study of Microstructure of metal after annealing process.
10. Preparation and Study of Microstructure of metal after normalizing process.
11. Preparation and Study of Microstructure of metal after Hardening process.
12. Hardness measurement of different types of plain carbon steels.
13. Hardenability test of steels on Jominy End Quench test equipment.
14. Hardness measurement of heat treated and untreated steels.

COURSE OUTCOMES:

Students will be able to:

- Independently operate a metallurgical microscope to observe and document the microstructures.
- Identify the microstructures of various types of ferrous and non-ferrous alloys.
- Check the hardness of steels at different untreated and heat treated conditions.
- Perform the Jominy End Quench test and determine the hardenability of steel.

Course Name	**MANUFACTURING PROCESSES LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- To prepare wooden pattern using carpentry tools.
- To make a sand mold using pattern.
- To perform various operations done on press tools.
- To prepare simple welded joints like T-joint, butt joint, lap joint using arc, oxy-acetylene, MIG, TIG welding.
- To fabricate a bottle and cap using blow and injection molding machines.

STRUCTURED ENQUIRY:

1. Determining sand properties – a) Grain Size, b) Permeability c) Hardness and d) Compressive strength of moulding sand.
2. Preparation of a welded joint by TIG welding.
3. Preparation of plastic bottle using blow moulding.
4. Preparation of a wooden pattern as per the given dimensions of the casting considering all the possible allowances.
5. Joining of sheet metal joint by Spot Welding.
6. Performing blanking and piercing operations using a fly-press attachment.
7. Performing 'V' bend in a sheet metal by using a hydraulic press.
8. Performing pipe bending operation using a hydraulic press.
9. Preparation of an air tight plastic bottle cap using injection moulding.
10. Making a metal joint using brazing process.
11. Making analuminium casting for a given pattern using a moulding process.

OPEN ENDED:

1. Preparation of sand mould cavity.
2. Preparation of i) Butt joint ii) Lap joint and iii) T-joint by Arc Welding.

COURSE OUTCOMES:

At the end of the course, students will:

- Make the wooden pattern using carpentry tools.
- Use the pattern for creating mould cavity.
- Perform blanking and piercing operations on press tools.
- Fabricate welded structures for engineering applications.
- Prepare components using blow and injection molding.

Course Name	**QUANTITATIVE APTITUDE - I**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	2	0

COURSE OBJECTIVES:

Enable the students to

- Understand different number systems, factorization, divisibility and concept of LCM and HCF.
- Find averages, relation between ratio and proportion, average price of mixture of different quantities and relation between fraction and percentage.
- Know the concepts of CP, SP, MRP, profit or loss incurred in a transaction.
- Know the concepts of principal, interest, difference between SI and CI, EMIs.
- Understand the relation between speed, distance and time for trains and boats in a river.
- Understand the relation between time and efficiency, combined work and wages paid for the work.

UNIT –I: Number Systems

Basic number systems –Face and Place Value, Digital sum-Applications, Factors, Multipliers, Prime & Composite Numbers, Divisibility Rules, LCM and HCF-Remainder Rules.

UNIT- II: Averages, Ratio& Proportion

Average-Weighted average, Ratio-Concept and properties, Proportions-Mean, Third and Fourth proportions, Mixtures &Alligations-Definition-Alligation Rule, Percentages-Conversion of Percentages to Fractions and Vice-Versa.

UNIT –III: Profit& Loss

Cost Price- Selling Price- Marked Price, Discount- Successive Discounts, Profit or Loss Percentage, False Weights- Dishonest Dealer.

UNIT –IV: Simple & Compound Interest

Principal-Interest Rate-Tenure, Simple Interest-Formula-Sum, Compound Interest-Formula-Relation Between Simple & Compound Interest, loan-EMI, Investments-Shares.

UNIT – V: Time & Distance

Time-Distance-Speed-Relation, Conversion of Speed, Average Speed, Trains-Relative Speed- Same and Opposite –Platform, Races, Boats-Streams-Upstream and Downstream.

UNIT –VI: Time & Work

Work-Time-Efficiency, Combined Work-Partnership-Division of Wages, Chain Rule, Pipes and Cisterns-Inlet-Outlet.

COURSE OUTCOMES:

After completing this course, the students will be able to

- Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
- Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
- Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.

TEXT BOOKS:

1. Quantitative Aptitude for competitive Examinations- Dr. R.S. Aggarwal - Sultan Chand Publications - 2017.

REFERENCEBOOKS:

1. How to Prepare for Quantitative Aptitude for the CAT - Arun Sharma- Tata McGraw Hill Publishing Company - 2016.
2. The Pearson Guide to Quantitative Aptitude for Competitive Examinations - Dinesh Khattar - Pearson India – 2016.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

II-Year II-Semester

S.No	Course Title	L	T	P	C
1	Instrumentation and Metrology	3	-	-	3
2	Fluid Mechanics and Hydraulic Machines	3	-	-	3
3	Mechanics of Solids	3	-	-	3
4	Applied Thermodynamics	3	-	-	3
5	Kinematics of Machinery	3	-	-	3
6	Instrumentation and Metrology Lab	-	-	3	1.5
7	Fluid Mechanics and Hydraulic Machines Lab	-	-	3	1.5
8	Mechanics of Solids Lab	-	-	3	1.5
9	Applied Thermodynamics Lab	-	-	3	1.5
10	Business English Communication Lab	-	-	3	1.5
11	Innovative Idea Project	-	-	3	1.5
	Total	15	-	18	24

Course Name	**INSTRUMENTATION AND METROLOGY**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- To understand the measurement systems and its performance.
- To acquire knowledge about various measuring equipments.
- Design of part, tolerances and fits &Evaluation and inspection of surface Inspection of engineering parts and gears with various precision instruments roughness.
- Concept of interference of light and working of interferometers.
- The working of CMM and importance of X-ray computer tomography in non-destructive testing.

UNIT I

Measurement systems and performance: Measurement systems, generalized configuration and functional descriptions of measuring instruments – examples, dynamic performance characteristics –classification and elimination of errors, calibration.

Measurement of Displacement: Transducers-Piezo electric, Inductive, capacitance, resistance transducers, Photo conductive cell, optical encoder

Measurement of Speed: Tachogenerator – Stroboscope

UNIT II

Measurement of Temperature: Bimetallic strip thermometer-Thermocouple - Resistance Thermometer – Thermistor – Optical Pyrometer

Measurement of Pressure: Bourdon pressure gauge– Diaphragm gauges – McLeod pressure gauge - Pirani thermal conductivity gauge – Ionization pressure gauge

Flow Measurement: Rotameter, Magnetic flow meter, Ultrasonic flow meter

UNIT III

Measurement of Acceleration and Vibration: Seismometer – Laser Doppler Vibrometer and Accelerometer

Stress Strain Measurements: Concept of Electrical resistance strain gauge- method of usage of resistance strain gauge for bending compressive and tensile strains –Strain gauge Rosettes.

Measurement of Force, Torque and Power: Hydraulic load cell, Strain gauge load cell, Strain gauge torsion meter, Hydraulic dynamometer, Eddy current dynamometer

UNIT IV

INTRODUCTION TO MEASUREMENTS-LINEAR, ANGULAR

Introduction, nominal size, tolerance, limits, deviations, fits -Unilateral and bilateral tolerance system, hole and shaft basis systems, slip gauges, dial indicators, micrometers, sine bar, bevel protractor, spirit levels, angle dekkor, limit gauges-Taylor's principle

UNIT V

FORM MEASUREMENT, OPTICAL & INTERFEROMETRY

Form measurement – Measurement of tooth thickness – gear tooth vernier - Tools maker's

microscope- autocollimators - Interference of light, Michelson's interferometer, NPL flatness interferometer, and NPL gauge interferometer. Comparators – mechanical & pneumatic

SURFACE ROUGHNESS MEASUREMENT: Surface roughness and surface waviness– Numerical assessment of surface finish- CLA, R.M.S. Rz, R10 values, Method of measurement of surface finish ,Talysurf, ISI symbols for indication of surface finish.

UNIT VI

RECENT ADVANCEMENT AND DEVELOPMENT METROLOGY

Laser Metrology: Precision instrument based on laser – Principle – Application of Laser – Laser interferometer - Applications in linear measurement and angular measurement

Coordinate Measuring Machine (CMM) – construction- Applications of CMM - Inspection by computer aided- X-ray computed tomography (CT)–principle- Applications.

COURSE OUTCOMES:

1. Describe the working principle of strain gauges and possess knowledge about various measuring instruments.
2. Evaluate the performance of a measuring systems.
3. Understand the standards of length, angles and evaluation of surface finish with various comparators.
4. Understand the concept of interference by interferometers and Choose appropriate method for inspection of various gear elements and thread elements
5. Understand the principle and applications of laser in linear, angular measurements and dimensional metrology.

TEXT BOOKS:

1. D.S Kumar, Measurement Systems Applications & design, Metropolitan Book Co. (P) Ltd, 5th edition, 2015.
2. Mahajan, Engineering Metrology, DhanpatRai Publishers, 1st edition, 2012.
3. R.K.Jain, Engineering Metrology, Khanna Publishers, 1st edition, 2018.

REFERENCE BOOKS:

1. R.K. Jain, Mechanical and Industrial Measurements, Khanna Publishers, 1st edition, 1995.
2. I.C.Gupta, Engineering Metrology, DhanpatRai Publishers, 1st edition, 2018.
3. Connie Dotson, Dimensional Metrology, Cengage Learning, 1st edition, 2016.
4. Doeblin Earnest, Measurement systems Application and design , O. Adaptation, TMH, 6th edition, 2017.

Course Name	**FLUID MECHANICS AND HYDRAULIC MACHINES**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- To understand the concept of physical properties and their significance.
- To distinguish different types of flows for better understanding of flow regimes
- To understand the concept of boundary layer phenomenon in different conditions and to Interpret the concepts of flow measurements and flow through pipes
- To understand the basic concepts of turbo machinery and to apply the impulse momentum and angular momentum principles to different types of vanes of turbo machinery.
- To understand the fundamental concepts of hydraulic turbines and their design
- To understand the fundamental concepts of pumps and their design

UNIT-I

FLUID STATICS: Units and dimensions, Properties of fluids- density, specific volume, specific gravity, viscosity, compressibility, surface tension, vapor pressure and their influence on fluid motion, Newton's law of viscosity, measurement of pressure- Piezometer, U-tube and differential manometers, Pascal's law, Hydrostatic law, Buoyancy and flotation: Meta center, stability of floating body, Submerged bodies, Calculation of meta center height.

UNIT-II

FLUID KINEMATICS: Stream line, path line and streak lines and stream tube, Classification of flows-steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational, irrotational, compressible, incompressible, free vortex, forced vortex, Equation of continuity for one, two and three dimensional flows

FLUID DYNAMICS: Surface and body forces-Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

Measurements of flows: Pitot tube, Venturimeter, Orifice meter and Turbine flow meter.

UNIT-III

BOUNDARY LAYER CONCEPTS: Flow over a Flat Plate- Displacement Thickness, Momentum Thickness and Energy Thickness- Laminar and Turbulent boundary layers (No derivation) – boundary layer in transition - Laminar Sub-Layer- Boundary Layer Separation

CLOSED CONDUIT FLOW: Reynold's experiment- Darcy Weisbach equation, Moody's diagram, Minor losses in pipes, Pipes in series and pipes in parallel- total energy line-hydraulic gradient line-power transmission through pipelines

DIMENSIONAL ANALYSIS: Similitude, Modeling, Dimensionless numbers

UNIT-IV

BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes- jet striking centrally and at tip- velocity diagrams at inlet and outlet- work done and efficiency-Angular momentum principle-flow over radial vanes

UNIT-V

HYDRAULIC TURBINES: Classification of turbines- Pelton wheel turbine, Francis turbine and Kaplan turbine-working principle, work done, efficiencies, Draft tube theory- functions and efficiency

PERFORMANCE OF HYDRAULIC TURBINES: Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT-VI

CENTRIFUGAL PUMPS: Classification ,working - work done – manomertic head- losses and efficiencies-specific speed-pumps in series and parallel- performance characteristic curves, NPSH, cavitation.

RECIPROCATING PUMPS: Main component parts and working - discharge and slip-Indicator diagrams

COURSE OUTCOMES:

At the end of course students will be able to:

- Understand the physical properties of fluids and its units.
- Understand the types of flows and flow regimes.
- Apply the knowledge of boundary layer to different conditions of flows in the fluid streams and determine minor and major head losses for viscous flows through pipes.
- Draw velocity diagrams for stationary, moving and inclined cases of flat and curved blades of turbo machinery.
- Select type of turbine to be best suitable for the purpose.
- Use proper types of pumps according to the requirement.

TEXT BOOKS:

1. P.N. Modi and S.M.Seth, Hydraulics, fluid mechanics and Hydraulic Machinery, Standard Book Company, 21st Edition, 2018.
2. R. K. Bansal, Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 10thEd 2018.

REFERENCE BOOKS:

1. Frank White, Fluid Mechanics, McGraw-Hill, 8th Ed, 2015.
2. S.Ramamrutham, Hydraulics Fluid Mechanics and Fluid Machines, DhanpatRai, 9thEdition, 2014.

Course Name	**MECHANICS OF SOLIDS**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- To provide the basic concepts and principles of mechanics of solids.
- Understand the principles of Mechanics, Stress and Strain, principal stresses applied to solid structural members under different types of loads.
- To give an ability to calculate stresses and deformations of objects under bending, shear and torsion loadings.

UNIT I

Simple Stresses & Strains: Elasticity and plasticity–Types of stresses & strains – Hooke‘s law–stress–strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson‘s ratio & volumetric strain –Elastic module& the relationship between them – Bars of varying section – composite bars – Temperature stresses.

Strain energy –Resilience–Gradual, sudden, impact and shock loadings.

UNIT II

Shear Force and Bending Moment: Definition of beam–Types of beams–Concept ofshear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT III

Flexural Stresses : Theory of simple bending–Assumptions–Derivation of bending equation: M/I = f/y =E/R Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula–Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT IV

Principal Stresses and Strains: Introduction–Stresses on an inclined section of a bar under axial loading –compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr‘s circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Introduction to Columns and Struts: Buckling and Stability, Columns with Pinned ends, Columns with other support Conditions, Limitations of

Euler’s Formula, Rankine’s Formula.

UNIT V

Torsion of Circular Shafts: Theory of pure torsion–Derivation of Torsion equations: $T/J=\tau/r = C\Theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

UNIT VI

Thin Cylinders: Thin seamless cylindrical shells–Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter, and volume of thin cylinders– Thin spherical shells.

Thick Cylinders: Lame's equation – cylinders subjected to inside & outside pressures – compound cylinders.

COURSE OUTCOMES:

At the end of course the student will be able to:

- Student will know the basic terms like stress, strain, thermal stress, principal stresses, Strain energy, poissons ratio…etc and how these parameters varying across the uniform and varying sections, composite bars, and relation between elastic constants.
- Students can draw the SF and BM diagrams for various beams at different loading conditions.
- Students will get concept of Theory of simple bending and will able to determine flexural stresses, shear stresses and section modulus of rectangular, circular, triangular, I, T angle sections.
- Students will able calculate stresses on inclined planes, principle stresses and importance of Mohr's circle in finding principle stresses.
- Students will able to calculate shear stress induced in circular shafts subjected to torsion. Also will know how shafts behave when subjected to combined bending and torsional moment.
- Students can differentiate between Thick cylinders and Thin cylinders. And also will identify when and how a cylinder fails subjected to internal and external pressures.

TEXT BOOKS:

1. Egor P .Popov, Engineering Mechanics of Solids, PHI, 2nd Edition, 2015.
2. R. K. Bansal, Strength of Materials (Mechanics of Solids), Laxmi Publication, 6thEdition, 2015.

REFERENCE BOOKS:

1. Stephen Timoshenko, Strength of Materials, CBS, 3rd Edition, 2002.
2. S.Ramamrutham, Strength of Materials,DhanapatRai,16th Edition, 2011
3. B.C.Punmia, Mechanics of Materials, Laxmi Publications, 10th Edition, 2019.
4. R.K Rajput, Strength of Materials, S. Chand, 7th Edition, 2018.
5. Strength of Materials, S.S.Rattan, 2nd Edition, Tata McGraw Hill, 2011.

Course Name	**APPLIED THERMODYNAMICS**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- To study different types of IC engines, working &their performances.
- To learn about Alternate Fuels and Electric vehicles
- Understand the Rankine cycle, working of different boilers and their mountings & accessories.
- To learn about steam nozzles and condensers, and their performance.
- To analyze the performance of steam turbines.

UNIT I

Introduction: Introduction to IC engines, Working principles of 4-Stroke and 2-Stroke Spark Ignition and Compression Ignition Engines, Differences between 2-s and 4-s cycle engines, Differences between SI and CI engines, effect of operating variables, comparison of air standard and actual cycles, effect of time loss, heat loss and exhaust loss in Petrol and Diesel engines.

Engine Testing and Performance: Introduction, Parameters of performance-measurement of cylinder pressure, Measurement of Fuel consumption, Air intake, Brake power, Determination of Frictional power and Indicated power, Performance tests, Heat Balance sheet.

UNIT II

Combustion in SI and CI Engines: Stages of combustion in SI engines, abnormal combustion and knocking in SI engines, factors affecting knocking, effects of knocking, control of knocking, Fuels for SI and CI engine, important qualities of IC engine fuels, rating of fuelsStages of combustion in CI engines, detonation in C.I. engines, factors affecting detonation, controlling detonation, combustion chamber for SI and CI engine.

UNIT III

Alternate Fuels: Need for Alternate fuels, Desirable Characteristics of good Alternate Fuel,

Bio-diesels: Base materials used for production of Bio Diesel (Karanji oil, Neemoil, Sunflower oil, Soyabeen oil, Musturd oil, Palm oil, Jatropha seeds, Algae). Preparation of Bio-Diesel. Properties Diesel blended with vegetable oil, and difference in performance of Engine.

Alternate Vehicles: Electrical vehicles: History of EVs, EV system, components of EV-DC and AC electric machines: Introduction and basic structure-Electric vehicle drive train-advantages and limitations, Permanent magnet and switched reluctance motors.

UNIT IV

Basic Concepts: Rankine cycle -Schematic layout, Thermodynamic Analysis, Methods to improve cycle performance; Regeneration and Reheating.

Boilers: Classification–Working principle of critical boiler with sketches – Mountings and Accessories – Boiler horse power, – Draught, classification – Height of chimney for given

draught and discharge, condition for maximum discharge, efficiency of chimney.

UNIT V

Steam Nozzles : Function of nozzle, applications and types, Flow through nozzles, thermodynamic analysis –velocity of nozzle at exit-Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape- Super saturated flow and its effects, degree of super saturation and degree of under cooling - Wilson line.

UNIT VI

Steam Turbines: Classification–Impulse, reaction turbine; Mechanical details–Velocity diagram–effect of friction – power developed, axial thrust, blade efficiency – condition for maximum efficiency. De-Laval Turbine - its features. Compounding of steam turbines.combined velocity diagram for a impulse turbine.

Steam Condensers: Requirements of steam condensing plant–Classification of condensers–working principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects.

COURSE OUTCOMES:

After completing this course, the students will able to

1. Understand the types of IC engines, working and their performance.
2. Understand the combustion process in IC Engines.
3. Understand the different Alternate Fuels and the working of Electrical vehicles
4. Analyze Rankine cycle and the importance of steam boilers in power plants.
5. Understand the various types of steam nozzles and their performance.
6. Analyze the performance of steam turbines.

TEXT BOOK:

1. V Ganesan, Internal Combustion Engines, McGraw-Hill, 4th Ed, 2017.
2. R.K. Rajput, Applied Thermodynamics, Lakshmi Publications, 2nd Ed, 2016.
3. MehrdadEhsani, YaminGio, Ali Emadi, Modern Electric, Hybrid Electric, and Fuel CellVehicles, Fundamentals, Theory, and Design, Standards media, 2nd Edition, 2009.

REFERENCE BOOKS:

1. Mahesh M. Rathore, Thermal Engineering, McGraw-Hill, 1st Edition, 2010.
2. PK Nag, Engineering Thermodynamics, TMH, 6th Edition, 2017.
3. Seth Leitman and Bob Brant, Build your own electric vehicle, McGraw Hill Co., 2nd Edition, 2009.
4. R. Yadav, Thermodynamics and Heat Engines, Central Book Depot, 1stEdition, 2003.

Course Name	**KINEMATICS OF MACHINERY**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- Understand mechanisms for motion transmission.
- To analyze Steering gear mechanisms and to understand the working principles in power drives.
- Understand the principles in analyzing the assembly with respect to the displacement, velocity and acceleration at any point in a link of a mechanism.
- Able to design cams and followers and understand the relative motion between them.
- To understand the basic concepts, terminologies and kinematics of gears and gear trains.

UNIT I

Mechanisms: Elements or Links–Classification–Rigid Link, flexible and fluid link–Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully constrained and incompletely constrained .

Machines: Mechanism and machines–classification of machines–kinematic chain–inversion of mechanism– inversions of quadric cycle, chain – single and double slider crank chains.

UNIT II

StraightLline Motion Mechanisms: Exact and approximate copiers and generated types– Peaucellier, Hart and Scott Russul – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

Steering Mechanism: Conditions for correct steering– Davis Steering gear, Ackerman's steering gear –velocity ratio.

Hooke's Joint: Single and double Hooke's joint –Universal coupling–application–Problems

UNIT III

Kinematics: Velocity and acceleration–Motion of link in machine–Determination of Velocity and acceleration diagrams – Graphical method – Application of relative velocity method four bar chain.

Analysis of Mechanisms: Analysis of slider crank chain for displacement, velocity and acceleration of slider – Acceleration diagram for a given mechanism, Klein's construction, Carioles acceleration, determination of Carioles component of acceleration.

Plane Motion of Body: Instantaneous center of rotation – relative motion between two bodies – Three centre's in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT IV

Cams: Definitions of cam and followers–their uses–Types of followers and cams– Terminology–Types of follower motion – Uniform velocity – Simple harmonic motion and

uniform acceleration. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases

Analysis of Motion of Followers: Roller follower – circular cam with straight and convex flanks.

UNIT V

Gears: Higher pairs, friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion, Forms of teeth: Cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.

UNIT VI

Gear Trains: Introduction–Train value–Types–Simple and reverted wheel train–epicyclic gear train. Methods of finding train value or velocity ratio – Epicyclic gear trains.

Selection of gear box-Differential gear for an automobile

COURSE OUTCOMES:

At the end of course the students will be able to:

1. Describe the principles of kinematics, kinematic pairs, links, and their classification, degrees of freedom, simple mechanisms, and inversions.
2. Interpret different concepts of mechanisms like straight line motion mechanisms, Steering gear mechanisms and universal joint.
3. Analyze the planar mechanisms for position, velocity and acceleration.
4. Construct cam profiles for various follower motions.
5. Understand the applications of different types of toothed gears and interference between the gears.
6. Gain knowledge about various gear trains, their applications and the effect of torque on the functioning of gear trains.

TEXTBOOKS:

1. Thomas Bevan, Theory of Machines, CBS, 3rd Ed, 2009.
2. Rattan .S.S, Theory of machines, TMH, 4th edition, 2014.

REFERENCE BOOKS:

1. R.K Bansal, Theory of Machines, Lakshmi Publications, 5th edition, 2012.
2. R.S Khurmi& J.K Gupta, Theory of Machines, S Chand, 14th edition, 2005.

Course Name	**INSTRUMENTATION AND METROLOGY LAB**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- The Metrology and instrumentation Laboratory course is designed for measuring and gauging instruments for inspection of precision linear, geometric forms, angular and surface finish measurements.
- The student can learn the measurements with and calibration of instruments.
- They also understand the machine tool alignment test.
- Instrumentation lab introduces the students with the theory and methods for conducting experimental work in the laboratory and calibration of various instruments for measuring pressure, temperature, displacement, speed, vibration etc.

  Note: The students have to conduct at least 8 experiments from each lab.

INSTRUMENTATION LAB

1. Calibration of pressure gauge.
2. Study and calibration of thermistor.
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge.
5. Calibration of thermocouple.
6. Study and calibration of capacitive transducer.
7. Study and calibration of photo and magnetic speed pickups.
8. Calibration of resistance temperature detector.
9. Study and calibration of a rotameter.
10. Study and use of a seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.

METROLOGY LAB

1. Measurement of lengths, heights, diameters by vernier calipers, micrometers, vernier height guage.
2. Measurement of bores by internal micrometers and dial bore indicators.
3. Angle and taper measurements with bevel protractor, Sine bar, rollers and balls.
4. Thread inspection of pitch, depth, angle bytool maker's microscope.
5. Use of gear tooth vernier caliper for tooth thickness inspection and flange micro meter for checking the chordal thickness of spur gear
6. Use of spirit level in finding the straightness of a bed and flatness of a surface.
7. Surface roughness measurement with roughness measuring instrument
8. Machine tool alignment test on the lathe.

9. Machine tool alignment test on drilling machine.
10. Machine tool alignment test on milling machine.

COURSE OUTCOMES:

Metrology Lab:

Student will become familiar with the different instruments that are available for linear, angular, roundness and roughness measurements they will be able to select and use the appropriate measuring instrument according to a specific requirement (in terms of accuracy, etc)

Instrumentation Lab:

Students will be able to select proper measuring instrument and know requirement of calibration, errors in measurement etc. They can perform accurate measurements.

Course Name	**FLUID MECHANICS AND HYDRAULIC MACHINES LAB**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- Measure the losses in pipes and coefficient of discharge using Venturimeter and orifice meter.
- To verify Bernoulli's theorem.
- Apply the impulse momentum equation and determine the force exerted by jet on vanes.
- Study the performance of hydraulic machines viz. turbines and pumps.

EXPERIMENTS:

Minimum of 10 experiments needs to be performed

1. Calibration of Venturimeter.
2. Calibration of Orificemeter.
3. Determination of friction factor for a given pipeline.
4. Determination of loss of head due to sudden contraction in a pipeline.
5. Verification of Bernoulli's theorem
6. Impact of jet on Vanes.
7. Performance Test on Pelton Wheel Turbines.
8. Performance Test on Francis Turbine.
9. Performance Test on Kaplan Turbine.
10. Performance Test on Single Stage Centrifugal Pump.
11. Performance Test on Multi Stage Centrifugal Pump.
12. Performance Test on Reciprocating Pump.

COURSE OUTCOMES:

At the end of course the student will be able to:

1. Estimate minor and major losses in the pipelines.
2. Measure the coefficient of discharge of a flow measuring devices.
3. Evaluate the performance of centrifugal pumps, reciprocating pumps and hydraulic turbines
4. Evaluate the force exerted by a jet on different vanes.

Course Name	**MECHANICS OF SOLIDS LAB**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- Calculate the various Mechanical properties of materials
- Determine compressive and strength of material
- Determine Elastic Constants of material by basic principles
- Determine Rigidity modulus of material by basic principles
- Perform hardness test to find the hardness of given material
- Perform impact test to find the toughness of given material

LIST OF EXPERIMENTS:

Any 10 experiments from the list given below

1. Direct tension test
2. Compression test on cube
3. Punch shear test
4. Torsion test
5. Test on springs
6. Brinell‘s hardness test
7. Rockwell hardness test
8. Vickers hardness test
9. Charpy Impact test
10. Izod Impact test
11. Simply supported beam
12. Cantilever beam

COURSE OUTCOMES:

At the end of course the student will be able to:

- Perform tensile test to determine tensile strength and modulus of elasticity of a given material
- Determine the compressive and shear strength of given material.
- Perform torsion test and determine the rigidity modulus of given specimen
- Determine the stiffness and rigidity modulus of given spring.
- Determine hardness number of given material
- Find the toughness of given material
- Determine the deflection and modulus of elasticity of given beam material

Course Name	**APPLIED THERMODYNAMICS LAB**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- Interpret the basic concepts in the area of IC engines and other power input devices of thermal engineering field
- Evaluate the performance of various types of petrol, diesel engines and reciprocating air compressor
- To study the boilers used in steam turbines and locomotives

EXPERIMENTS:

Any 10 experiments from the list given below

1. Valve Timing Diagram of a four stroke Engine & Port timing diagram of a two stroke Engine
2. Preparation of Bio diesel
3. Estimation of given fuel properties, carbon content and the calorific value
4. Performance test on 4 stroke diesel engine.
5. Performance test on4 stroke CI engine with Bio-diesel.
6. Performance Test on 4 -Stroke SI engines
7. Heat Balance Sheet on 4 stroke CI engine.
8. Exhaust gas emission measurements of 4-stroke petrol engine
9. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine.
10. Determination of FP by retardation test on IC engine.
11. Determination of FP by motoring test on IC engine.
12. Performance test on variable compression ratio engines.
13. Performance test on reciprocating air compressor unit.
14. Study of Boilers
15. Dis-assembly / Assembly of Engines.

COURSE OUTCOMES:

At the end of course students will be able to:

- Evaluate performance of petrol and diesel engines at different operating conditions
- Determine the performance of air compressors
- Discuss the different types of boilers
- Draw Valve Timing and Port timing diagrams of an IC engine.
- Estimate the given fuel properties.

Course Name	**BUSINESS ENGLISH COMMUNICATION LAB**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- To expose student to different situations for better communication
- To inculcate the habit of learning vocabulary for effective communication
- To enable students to acquire Business English communication

UNIT I: (2 sessions)

Listening: Listening to short conversations or monologues

Speaking: Giving information about oneself and their opinions and Giving a short talk on business related topics

Reading: Reading short and simple texts to understand the central idea/theme.

Writing: Writing a piece of internal business communication of 30-40 words (Email)

UNIT II: (2 sessions)

Listening: Listening to a conversation/ monologue and taking notes

Speaking: Giving short talk on business related topics.

Reading: Matching descriptions of people to short texts. Matching statements toinformation given in a graph or graphs.

Writing: Writing a piece of internal business communication of 30-40 words (Message)

UNIT III (2 sessions)

Listening: Listening to longer conversations/interviews.

Speaking: Debates & Extempore

Reading: Reading a longer text and deciding whether the statements about the text are right or wrong or if the information is not given.

Writing: Write a business letter 60-80 words, based on an input text and some notes.

UNIT IV (2 sessions)

Listening: Listening to TV news channels and taking notes.

Listening to songs and writing down the lyrics.

Speaking: Interview sessions

Reading: Read a longer text andanswering questions. .

Writing: Writing a Business Report

UNIT V: (2 sessions)

Listening: Watching short documentaries and making notes.(General)

Speaking: Short plays, Presentations.

Reading: Read short texts and fill in a form using information from the texts.

Writing: Write a skit and enact.

UNIT VI:(2 sessions)

Listening: Watching documentaries and making notes.(Business specific)

Speaking: Nail your point.

Reading: Critical Reading to know author's perspective.

Writing: Write a skit and enact.

REFERENCE BOOKS:

1. Cambridge English – Business English Certificate Preliminary
2. Suresh Kumar. E. &Sreehari P.A (2007), Handbook for English Language Laboratories,Cambridge University Press India Pvt. Ltd, New Delhi.
3. MandalS.K(2006), EffectiveCommunication&PublicSpeaking,JaicoPublishingHouse,New Delhi.
4. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
5. Balasubramanian.T(2000),AtextbookofEnglishPhoneticsforIndianStudent,MacMillan Publishers, India.
6. KamaleshSadanand,SusheelaPunitha(2008),SpokenEnglish:AfoundationCourse:Parts1& 2, New Delhi, Orient Longman Pvt. Ltd

WEB REFERENCES:

1. www.cambridgeenglish.org.
2. www.esl-lab.com

ADDITIONAL SOURCES:

1. A Planning Checklist for Business Messages https://open.lib.umn.edu/businesscommunication/chapter/5-2-a-planning-checklist-for-business-messages/
2. How to Improve Business Writing https://www.writing-skills.com/how-to-improve-your-business-writing
3. Self Compassion (Source - YouTube)
4. Bailey Finishes Marathon (Source - YouTube)
5. How to Conquer Public Speaking Fear (Source - Wordpress)
6. I am Sorry, I am so Nervous- RakeshGodhwani (Source - LinedIn)
7. Interpersonal Communication in the Future World (Source: YouTube)
8. The Power of Introverts (Source: YouTube)
9. Boost Power Through Body Language (Source: YouTube)
10. Take Control of your Non-Verbal Communication (Source: YouTube)
11. How to have a Good Conversation (Source: YouTube)

Course Name	**INNOVATIVE IDEA PROJECT**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

Introduction

1. Innovative idea project is anexperientiallearningstrategythatintegratesmeaningfulcommunityservicewithinstruction,participation,learningandcommunitydevelopment
2. Innovative idea projectinvolvesstudentsincommunitydevelopmentand service activitiesandappliestheexperiencetopersonalandacademicdevelopment.
3. Innovative idea projectismeanttolinkthecommunitywiththecollegeformutual benefit.
4. The community will be benefited with the focused contribution of the college studentsforthevillage/localdevelopment.Thecollegefindsan opportunityto developsocialsensibilityandresponsibility amongstudentsandalsoemerge asasocially responsible in situation.

Objective

Innovative idea projectshouldbean integralpartofthe curriculum, thespecific objectivesare;

1. Tosensitizethe studentstothe livingconditionsofthepeoplewhoarearoundthem,
2. To helpstudentstorealizethe starkrealitiesofthesociety.
3. Tobringaboutanattitudinalchangeinthestudentsandhelpthemtodevelopsocietal consciousness,sensibility,responsibilityandaccountability
4. Tomakestudentsawareoftheirinnerstrengthandhelpthemtofindnew/outofbox solutions tothe socialproblems.
5. Tomakestudentssociallyresponsiblecitizenswhoaresensitivetotheneedsof thedisadvantagedsections.
6. Tohelpstudentstoinitiatedevelopmentalactivitiesinthecommunityin coordinationwithpublicandgovernmentauthorities.
7. Todevelopaholisticlifeperspectiveamongthestudentsbymakingthemstudyculture, traditions,habits,lifestyles,resourceutilization,wastagesanditsmanagement, socialproblems,publicadministrationsystemandtherolesandresponsibilitiesof differentpersons acrossdifferentsocialsystems.

GUIDELINES:

- The students in convenient groups of not more than 4 members have to take one small innovative idea, if necessary in terms of their own domain or subject area and that could be benefit to the society. Every innovative project work shall have a supervisor who is the member of the faculty of the institution.
- Students will be exposed to lecture modules or could conduct a real time general survey on the project. A common survey format could be designed. An Industrial problem may also be undertaken by the student and it be supervised jointly by Industry personnel and the supervisor.
- Based on comprehensive literature survey and interaction with supervisor, the student shall identify the problem statement clearly and prepare the plan of action within do course time.
- The innovative project comes with a suitable solution in the form of design &fabricated product or service and combination of both. A project report should be

submitted by each student.

- A viva shall be conducted by a review committee constituted by the Head of the department.
- The innovative project documentation in the form of a report is to be submitted at the end of semester.

Thedifferentareas,couldbelike–

Agriculture
Health
MarketingandCooperation
AnimalHus
bandry
Horticultur
e Fisheries
Sericulture
RevenueandSurvey
NaturalDisasterManagement
Irrigation
Law&Order
ExciseandProhi
bition
MinesandGeol
ogy Energy
Internet
FreeElectricity
DrinkingWater

EXPECTEDOUTCOMES

BENEFITSOFINNOVATIVE IDEA PROJECTTOSTUDENTS

LearningOutcomes

1. Positive impactonstudents'academiclearning
2. Improvesstudents' abilitytoapplywhattheyhavelearnedin "therealworld"
3. Positiveimpactonacademicoutcomessuchasdemonstratedcomplexityofunderstanding, problemanalysis,problem-solving,criticalthinking,andcognitivedevelopment
4. Improvedabilityto understandcomplexityandambiguity

Personal Outcomes

1. Greatersense ofpersonalefficacy,personal identity,spiritualgrowth,and moral development
2. Greaterinterpersonaldevelopment,particularlytheabilitytoworkwellwith others, andbuildleadershipandcommunicationskills

SocialOutcomes

1. Reducedstereotypesandgreaterinter-culturalunderstanding
2. Improvedsocialresponsibilityandcitizenshipskills
3. Greaterinvolvementincommunityserviceaftergraduation

CareerDevelopment

1. Connections withprofessionalsandcommunitymembersforlearningand Career opportunities.
2. Greateracademiclearning,leadershipskills,andpersonalefficacycanleadtoGreater

opportunity.

Relationshipwith theInstitution

1. Strongerrelationshipswithfaculty
2. Greatersatisfactionwithcollege
3. Improvedgraduationrates

SUGGESTIVE LIST OF PROGRAMMES UNDER INNOVATIVE IDEA PROJECT

The following there commended list of projects for Engineering students.The lists are not. Exhaustive an dopen for additions, deletions and modifications.College sareexpected to focus on specific local issues for this kind of projects.The students are expected to carry outtheseprojectswithinvolvement,commitment,responsibilityandaccountability.The mentorsofagroupofstudentsshouldtaketheresponsibilityofmotivating,facilitating,and guiding the students.They have to interact with local leadership and people and appraise the objectives and benefits of this kind of projects.The project report shall be placed in the college website for reference.Systematic,Factual,methodical and honestreporting shall been sured.

ForEngineeringStudents

1. Water facilities and drinking water availability
2. Health and hygiene
4. Stress levels and coping mechanisms
5. Health intervention programmes
6. Horticulture
7. Herbal plants
8. Botanical survey
9. Zoological survey
10. Marine products
11. Aqua culture
12. Inland fisheries
13. Animals and species
14. Nutrition
15. Traditional health care methods
16. Food habits
17. Air pollution
18. Water pollution
19. Plantation
20. Soil protection
21. Renewable energy
22. Plant diseases
23. Yoga awareness and practice
24. Health care awareness programmes and their impact
25. Use of chemicals on fruits and vegetables
26. Organic farming
27. Crop rotation
28. Floury culture
29. Access to safe drinking water
30. Geographical survey
31. Geological survey
32. Sericulture

33. Study of species
34. Food adulteration
35. Incidence of Diabetes and other chronic diseases
36. Human genetics
37. Blood groups and blood levels
38. Internet Usage in Villages
39. Android Phone usage by different people
40. Utilization of free electricity to farmers and related issues
41. Gender ration in schooling level- observation.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

III Year - I Semester

DESIGN OF MACHINE MEMBERS– II

L	T	P	C
4	0	0	3

Course Objectives:

- This course gives the insight of slider and roller bearings and the lifeprediction.
- Learn to design I.C engineparts
- Design the mechanical systems for power transmission elements such as gears,belts,ropes,chains, keys andlevers

UNIT – I

BEARINGS: Classification of bearings- applications, types of journal bearings – lubrication – bearing modulus – full and partial bearings – clearance ratio – heat dissipation of bearings, bearing materials – journal bearing design – ball and roller bearings – static loading of ball & roller bearings, bearinglife.

UNIT – II

ENGINE PARTS: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – cranks and crank shafts, strength and proportions of over hung and center cranks – crank pins, crank shafts.

Pistons, forces acting on piston – construction design and proportions of piston, cylinder, cylinder liners,

UNIT – III

Design of curved beams: introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and t-section, design of crane hooks, c – clamps**.**

UNIT – IV

POWER TRANSMISSIONS SYSTEMS, PULLEYS: Transmission of power by belt and rope drives , transmission efficiencies, belts – flat and v types – ropes - pulleys for belt and rope drives, materials, chain drives

DESIGN OF POWER SCREWS: Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw- possible failures.

UNIT – V

SPUR & HELICAL GEAR DRIVES: Spur gears- helical gears – load concentration factor – dynamic load factor, surface compressive strength – bending strength – design analysis of spur gears – estimation of centre distance, module and face width, check for plastic deformation, check for dynamic and wear considerations.

UNIT – VI

MACHINE TOOL ELEMENTS: Levers and brackets: design of levers – hand levers-foot lever – cranked lever

– lever of a lever loaded safety valve- rocker arm straight – angular- design of a crank pin – brackets- hangers- wall boxes.

Wire Ropes: Construction, Designation, Stresses in wire ropes, rope sheaves and drums.

Note: Design data book is permitted for examination

Course outcomes:

1. To select the suitable bearing based on the application of the loads and predict the lifeofthe bearing
2. Design of internal combustion engine parts for safe and continuous operation
3. Apply the basic principles to find position of neutral axis and stress variation across thecross section in curved beams
4. To select and/or design of belt drives, chain drives and power screws based on givenconditions
5. Design spur and helical gears based on strength and wear consideration
6. Design of levers, brackets and wire ropes for safe operation

Text Books:

1. Machine Design/V.Bandari/TMHPublishers
2. Machine Design/ NC Pandya& CS Shaw/ Charotarpublishers
3. Design databook.

References:

1. Machine Design: An integrated Approach / R.L. Norton / PearsonEducation
2. Mech. Engg. Design / JE Shigley/Tata McGraw Hilleducation
3. Design of machine elements- spots/PearsonPublications
4. Machine Design-Norton/PearsonPublications

III Year - I Semester

DYNAMICS OF MACHINERY

L	T	P	C
4	0	0	3

Course Objectives:

- To equip the student with fundamental knowledge of dynamics of machines so that student can appreciate problems of dynamic force balance, transmissibility of forces, isolation of systems, vibrations.
- Develop knowledge of analytical and graphical methods for calculating balancing of rotary and reciprocating masses.
- Develop understanding of vibrations and its significance on engineering design
- Develop understanding of dynamic balancing, flywheel analysis, gyroscopic forces and moments

UNIT – I

PRECESSION: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships, static and dynamic force analysis of planar mechanisms, (Demonstration of models in video show).

UNIT – II

FRICTION: Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear, friction circle and friction axis: lubricated surfaces, boundary friction, film lubrication.

CLUTCHES: Friction clutches- single disc or plate clutch, multiple disc clutch, cone clutch, centrifugal clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. General description and operation of dynamometers: Prony, Rope brake, Epicyclic, Bevis Gibson and belt transmission,

UNIT – III

TURNING MOMENT DIAGRAMS: Dynamic force analysis of slider crank mechanism, inertia torque, angular velocity and acceleration of connecting rod, crank effort and turning moment diagrams – fluctuation of energy – fly wheels and their design.

UNIT-IV

GOVERNERS: Watt, porter and proell governors, spring loaded governors – Hartnell and Hartung with auxiliary springs. sensitiveness, isochronism and hunting.

UNIT – V

BALANCING: Balancing of rotating masses single and multiple – single and different planes, use analytical and graphical methods. Primary, secondary, and higher balancing of reciprocating masses. analytical and graphical methods, unbalanced forces and couples – examination of “V” multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing, hammer blow, swaying couple, variation of tractive effort.

UNIT – VI

VIBRATIONS: Free Vibration of spring mass system –Natural frequency-types of damping – damped free vibration, Simple problems on forced damped vibration, vibration isolation and transmissibility transverse loads, vibrations of beams with concentrated and distributed loads. Dunkerly's methods, Raleigh's method, whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

Course Outcomes

1. Analyze stabilization of sea vehicles, aircrafts and automobile vehicles
2. Compute frictional losses, torque transmission of mechanical systems
3. Analyzedynamicforceanalysisofslidercrankmechanism,Turningmomentdiagramsfor different engines and design of flywheel
4. Analyze the different types of governors
5. Understanding of vibrations and its significance on engineering design
6. Understand balancing of reciprocating and rotary masses

Text Books :

1. Theory of Machines / S.S Rattan/ Mc. Graw Hill
2. Mechanism and machine theory /Ashok G. Ambedkar/PHI Publications.

References :

1. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
2. Theory of Machines / Shigley / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers
4. Theory of machines / Khurmi/S.Chand.

III Year - I Semester

METAL CUTTING & MACHINE TOOLS

L	T	P	C
4	0	0	3

Course objectives:

1. The course provides students with fundamental knowledge and principles in material removalprocesses.

2.In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, and drill presses, Computer Numerical Controletc

3. To demonstrate the fundamentals of machining processes and machinetools.

4. To develop knowledge and importance of metal cuttingparameters.

5. To develop fundamental knowledge on tool materials, cutting fluids and tool wearmechanisms.

6. To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.

UNIT – I

FUNDAMENTAL OF MACHINING:

Elementary treatment of metal cutting theory – element of cutting process – geometry of single point cutting tool, tool angles, chip formation and types of chips – built up edge and its effects, chip breakers, mechanics of orthogonal cutting –Merchant's force diagram, cutting forces, cutting speeds, feed, depth of cut, tool life, tool wear, machinability, economics of machining, coolants, tool materials and properties.

UNIT – II

LATHE MACHINES:

Engine lathe – principle of working, specification of lathe – types of lathe – work holders tool holders – box tools taper turning, thread turning – for lathes and attachments, constructional features of speed gear box and feed gear box. Turret and capstan lathes – collet chucks – other work holders – tool holding devices – box and tool layout. Principal features of automatic lathes – classification – single spindle and multi-spindle automatic lathes – tool layout and cam design for automats.

UNIT – III

SHAPING, SLOTTING AND PLANNING MACHINES: Principles of working – principal parts – specifications, operations performed, machining time calculations.

DRILLING & BORING MACHINES: Principles of working, specifications, types, operations performed – tool holding devices – twist drill – Boring Machines – fine Boring Machines – jig boring machine, deep hole DrillingMachine.

UNIT – IV

MILLING MACHINES: Principles of working – specifications – classification of Milling Machines – principal features of horizontal, vertical and universal Milling Machine, machining operations, types of cutters, geometry of milling cutters – methods of indexing, accessories to millingmachines.

UNIT –V

FINISHING PROCESSES: Theory of grinding – classification of grinding machines, cylindrical and surface grinding machines, tool and cutter grinding machines, different types of abrasives, bonds, specification and selection of a grinding wheel. Lapping, Honing & Broaching operations, comparison to grinding.

UNIT - VI

JIGS & FIXTURES: Principles of design of jigs and fixtures and uses, classification of jigs & fixtures, principles of location and clamping, types of clamping & work holding devices, typical examples of jigs and fixtures.

CNC MACHINE TOOLS: CNC Machines, working principle, classification, constructional features of CNC machines, CNC controller, types of motion controls in CNC machines, applications of CNC machines.

Course Outcomes:

1. Operate lathe, milling machines, drill press, grinding machines etc.
2. Select cutting tool materials and tool geometries for different metals
3. Select appropriate machining processes and conditions for different metals
4. Apply cutting mechanics to metal machining based on cutting force and power consumption
5. Learn machine tool structures and machining economics
6. Write simple CNC programs and conduct CNC machining

Text Books:

1. Manufacturing Processes / JP Kaushish/ PHI Publishers-2nd Edition

2. Manufacturing Technology Vol-II/P.N Rao/Tata McGrawHill

References:

1. Metal cutting and machine tools /Geoffrey Boothroyd, Winston A.Knight/ Taylor &Francis

2. Production Technology / H.M.T. Hand Book (Hindustan MachineTools).

3. Production Engineering/K.C Jain & A.K Chitaley/PHIPublishers

4. Technology of machine tools/S.F.Krar, A.R. Gill, Peter SMID/TMH

5. Manufacturing Processes for Engineering Materials-Kalpakjian S & Steven R Schmid/Pearson Publications 5th Edition

III Year - I Semester

OPERATIONS RESEARCH

L	T	P	C
4	0	0	3

Course Objectives:

To learn the importance of Operations Research in the design, planning, scheduling, manufacturing and business applications and to use the various techniques of Operations Research in solving such problems.

UNIT – I

Development – definition– characteristics and phases – types of operation research models – applications.

ALLOCATION: Linear programming problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle.

UNIT – II

TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem – degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem- traveling salesman problem.

SEQUENCING – Introduction – flow **–**shop sequencing – *n* jobs through two machines – *n* jobs through three machines – job shop sequencing – two jobs through 'm' machines.

UNIT – III

REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement.

UNIT – IV

THEORY OF GAMES: Introduction – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

WAITING LINES: Introduction – single channel – poison arrivals – exponential service times – with infinite population and finite population models– multichannel – poison arrivals – exponential service times with infinite population single channel poison arrivals.

UNIT – V

INVENTORY : Introduction – single item – deterministic models – purchase inventory models with one price break and multiple price breaks – shortages are not allowed – stochastic models – demand may be discrete variable or continuous variable –

instantaneous production. Instantaneous demand and continuous demand and no set up cost. ABC & VED Analysis.

UNIT – VI

DYNAMIC PROGRAMMING: Introduction – Bellman's principle of optimality – applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

SIMULATION: Definition – types of simulation models – phases of simulation– applications of simulation – inventory and queuing problems – advantages and disadvantages – simulation languages.

Course Outcomes:

1. Identify and formulate LP problems using various methods for maximization and minimization problems.
2. Apply mathematical techniques in different application areas of operations research like transportation, assignment and sequencing models.
3. Students are able to proficient to use mathematical models to solve the Replacement problems.
4. Apply the principles of Game theory and waiting lines to real world Competitive situations.
5. Formulate mathematical models for quantitative analysis of Inventory control practicein industry.
6. Apply mathematical techniques to solve decision models using LP Problems and dynamic programming method.

TEXT BOOKS:

1. Operations Research-An Introduction/Hamdy A Taha/Pearsonpublishers
2. Operations Research –Theory & publications / S.D.Sharma-Kedarnath/McMillan publishers IndiaLtd

REFERENCES:

1. Introduction to O.R/Hiller &Libermann/TMH
2. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/PearsonEducation.
3. Operations Research: Methods & Problems / Maurice Saseini, ArhurYaspan& Lawrence Friedman/Wiley
4. Operations Research / R.Pannerselvam/ PHIPublications.
5. Operations Research / Wagner/ PHIPublications.
6. Operation Research /J.K.Sharma/MacMilanPubl.
7. Operations Research/ Pai/ OxfordPublications
8. Operations Research/S Kalavathy / VikasPublishers
9. Operations Research / DS Cheema/University SciencePress
10. Operations Research / Ravindran, Philips, Solberg / Wileypublishers

III Year - I Semester

THERMAL ENGINEERING – II

L	T	P	C
4	0	0	3

(Use of steam tables and

Mollier chart is allowed)

Course objectives:

This course is intended to provide basic knowledge of components being used in steam and gas power plant cycles and to analyse the energy transfers and transformations in these components including individual performance evaluation.

UNIT – I

BASIC CONCEPTS: Rankine cycle - schematic layout, thermodynamic analysis, concept of mean temperature of heat addition, methods to improve cycle performance – regeneration & reheating. combustion: fuels and combustion, concepts of heat of reaction, adiabatic flame temperature, Stoichiometry, flue gas analysis.

UNIT II

BOILERS : Classification – working principles of L.P & H.P boilers with sketches – mountings and accessories

– working principles, boiler horse power, equivalent evaporation, efficiency and heat balance – draught, classification – height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – artificial draught, induced andforced.

UNIT – III

STEAM NOZZLES: Function of a nozzle – applications - types, flow through nozzles, thermodynamic analysis

– assumptions -velocity of fluid at nozzle exit-Ideal and actual expansion in a nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilsonline.

STEAM TURBINES: Classification – impulse turbine; mechanical details – velocity diagram – effect of friction

– power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency. De-laval turbine - methods to reduce rotor speed-velocity compounding, pressure compounding and velocity & pressure compounding, velocity and pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine, condition for maximumefficiency

UNIT IV

REACTION TURBINE: Mechanical details – principle of operation, thermodynamic analysis of a stage, degree of reaction –velocity diagram – Parson's reaction turbine – condition for maximum efficiency – calculation of blade height.

STEAM CONDENSERS: Requirements of steam condensing plant – classification of condensers – working principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, air pump- cooling water requirement.

UNIT – V

GAS TURBINES: Simple gas turbine plant – ideal cycle, essential components – parameters of performance – actual cycle – regeneration, inter cooling and reheating – closed and semi-closed cycles – merits and demerits, types of combustion chambers.

UNIT – VI

JET PROPULSION : Principle of operation –classification of jet propulsive engines – working principles with schematic diagrams and representation on t-s diagram - thrust, thrust power and propulsion efficiency – turbo jet engines – needs and demands met by turbo jet – schematic diagram, thermodynamic cycle, performance evaluation, thrust augmentation – methods.

Rockets : Application – working principle – classification – propellant type – thrust, propulsive efficiency – specific impulse – solid and liquid propellant rocket engines.

Course outcomes:

1. Student able to understand the concept of Rankinecycle ,stoichiometry ,flue gas analysis
2. Student able to understand the construction details of various boilers and boiler efficiency calculations
3. Student to acquire the design procedure for the steam nozzles and impulse steam turbine
4. Student able to understand the concept steam condensers and reaction turbine
5. Understand the design and constructional details of gas turbine
6. Student able to understand the concept of jet propulsions and rockets

Text Books:

1. Thermodynamics and Heat Engines/R.Yadav, Volume -II /Central PublishingHouse
2. Gas Turbines /V.Ganesan/TMH
3. Heat Engineering /V.P Vasandani and D.S Kumar/Metropolitan Book Company, NewDelhi

References:

1. Gas Turbines and Propulsive Systems /P.Khajuria&S.P.Dubey/Dhanpatrai
2. Gas Turbines / Cohen, Rogers and SaravanaMuttoo / Addison Wesley –Longman

3. Thermal Engineering-R.S Khurmi, &J SGupta/S.Chand.

4. Thermal Engineering-P.L.Bellaney/ Khanna publishers.

5. Thermal Engineering-M.L.Marthur& Mehta/Jain bros.Publishers

6. Thermal Engineering / RK Rajput/ LakshmiPublications

III Year - I Semester

IPR & PATENTS

L	T	P	C
0	2	0	0

Objectives:

- To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientificdisciplines.
- Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.

UNIT I: Introduction to Intellectual Property Rights (IPR)

Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO -Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

UNIT II: Copyrights and Neighbouring Rights

Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers **–** Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip ProtectionAct.

UNIT III: Patents

Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer — Revocation of Patent – Patent Appellate Board - Infringement of Patent – CompulsoryLicensing

— Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations.

UNIT IV: Trademarks

Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing Off Action.

UNIT V: Trade Secrets

Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract – Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

UNIT VI: Cyber Law and Cyber Crime

Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions - E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of NetworkProviders.

- Relevant Cases Shall be dealt where evernecessary.

Course Outcome:

- **IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.**
- ***Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.**

References:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, NewDelhi.
2. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, NewDelhi.
3. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, NewDelhi
4. Richard Stim: Intellectual Property, Cengage Learning, NewDelhi.
5. KompalBansal&ParishitBansal Fundamentals of IPR for Engineers, B. S. Publications(Press).
6. Cyber Law - Texts & Cases, South-Western's Special TopicsCollections.
7. R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. NewDelhi.
8. M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, SerialsPub.

III Year - I Semester

MACHINE TOOLS LAB

L	T	P	C
0	0	3	2

Course objectives:

The students are required to understand the parts of various machine tools and operate them. They are required to understand the different shapes of products that can be produced on these machine tools.

1. Introduction of general purpose machines -lathe, drilling machine, milling machine, shaper, planing machine, slotting machine, cylindrical grinder, surface grinder and tool and cuttergrinder.
2. Step turning and taper turning on lathemachine
3. Thread cutting and knurling on lathemachine.
4. Drilling andtapping
5. Shaping andplanning
6. Slotting
7. Milling
8. Cylindrical surface grinding
9. Grinding of toolangles.

Course outcome:

1. To impart practical exposure on various machine tools used in industry
2. Able to identify different types of cutting tools and the effect of cutting tool geometry on machining.
3. Able to perform various machining operations on lathe.
4. Capable of manufacturing components according to given drawings using various machine tools.
5. Exhibit the ability in developing sequence of machining operations required for industry.
6. Able to produce work pieces with good surface finish using machine tools

III Year - I Semester

THEORY OF MACHINES LAB

L	T	P	C
0	0	3	2

1. To determine whirling speed of shaft theoretically andexperimentally.
2. To determine the position of sleeve against controlling force and speed of a Hartnell governor and to plot the characteristic curve of radius ofrotation.
3. To analyse the motion of a motorized gyroscope when the couple is applied along its spinaxis
4. To determine the frequency of undamped free vibration of an equivalent spring masssystem.
5. To determine the frequency of damped force vibration of a spring masssystem
6. To study the static and dynamic balancing using rigidblocks.
7. To find the moment of inertia of aflywheel
8. To plot follower displacement vs cam rotation for various Cam Followersystems.
9. To plot slider displacement, velocity and acceleration against crank rotation for single slider crank mechanism/Four barmechanism
10. To find coefficient of friction between belt andpulley.
11. To study simple and compound screw jack and determine the mechanical advantage , velocity ratio andefficiency
12. To study various types of gears- Spur, Helical, Worm and BevelGears

Course outcomes:

1	Experimental study of Undamped ,damped free and forced vibrations and determine the whirling speed of the shaft
2	Determine the controlling force of Hartnell Governor
3	Identify the significance of friction in belt &pulley and study the efficiency of simple and compound screw jacks
4	Know the application of Gyroscope and understand the concept of balancing of rotating masses by experiment
5	Study of different types of Gears and Four bar mechanism with the help of functional models
6	Practical determination of moment of inertia of the flywheel and know the relative motion between the cam & follower

III Year - I Semester

THERMAL ENGINEERING LAB

L	T	P	C
0	0	3	2

Course objective: To provide hands on experience in operating various types of internal combustion engines and understand their functioning and performance.

2. I.C. Engines valve / port timingdiagrams.
3. Testing of Fuels – Viscosity, flash point/fire point, carbon residue, calorificvalue.
4. I.C. Engines performance test and Exhaust emission measurements (4 -stroke dieselengine)
5. I.C. Engines performance test and Exhaust emission measurements (2-stroke petrolengine)
6. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrolengine.
7. Determination of FP by retardation and motoring test on ICengine.
8. I.C. Engines heat balance at different loads and show the heat distributioncurve.
9. Economical speed test of an ICengine.
10. Performance test on variable compression ratioengines.
11. Performance test on reciprocating air compressorunit.
12. Dis-assembly / assembly of different parts of two wheelers. 3 wheelers & 4 wheelers. Tractor & Heavy duty engines covering 2-stroke and 4 stroke, SI and CIengines.
13. Study of boilers, mountings andaccessories.

Course outcome:

1. Student able to understand the IC engine valve, port timing mechanism.
2. To study the performance characteristics of an internal combustion engines and conduct heat balance test on I.C.Engine
3. Understand the method of finding the Indicated power and Evaluate the engine friction by conducting mores test, retardation test and motoring test on IC engine.
4. Able to identify the various fuel characterizations through experimental testing
5. Able to conduct Performance test on reciprocating air compressor and calculations of various efficiencies.
6. To Study the principle of various parameters in different types of boilers and study the different parts by dis-assembly/ assembly of IC engines.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

III Year - II Semester

HEAT TRANSFER

(Heat transfer data book allowed)

L	T	P	C
4	0	0	3

Course Objectives:

This course is intended to impart knowledge of principles of heat transfer and analyze the heat exchange process in various modes for the evaluation of rate of heat transfer and the temperature distribution in different configurations.

UNIT – I

INTRODUCTION: Modes and mechanisms of heat transfer – basic laws of heat transfer – General discussion about applications of heat transfer.

CONDUCTION HEAT TRANSFER: Fourier rate equation – general heat conduction equation in cartesian, cylindrical and Spherical coordinates. Steady, unsteady and periodic heat transfer – initial and boundary conditions.

ONE DIMENSIONAL STEADY STATE CONDUCTION HEAT TRANSFER: Homogeneous slabs, hollow

cylinders and spheres – overall heat transfer coefficient – electrical analogy – critical radius of insulation- Variable thermal conductivity – systems with heat sources or heat generation,

UNIT – II

extended surface (fins) heat Transfer – long fin, fin with insulated tip and short fin, application to error measurement of temperature.

ONE DIMENSIONAL TRANSIENT CONDUCTION HEAT TRANSFER: Systems with negligible internal resistance – significance of biot and fourier numbers - chart solutions of transient conduction systems

UNIT – III

CONVECTIVE HEAT TRANSFER: Classification of convective heat transfer – dimensional analysis as a tool for experimental investigation – Buckingham Pi Theorem for forced and free convection, application for developing semi – empirical non- dimensional correlation for convective heat transfer – Significance of non- dimensional numbers – concepts of continuity, momentum and Energy Equations.

UNIT –IV

FORCED CONVECTION

EXTERNAL FLOWS: Concepts about hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer -flat plates and cylinders.

INTERNAL FLOWS: Concepts about hydrodynamic and thermal entry lengths – division of internal flow based on this –use of empirical relations for horizontal pipe flow and annulus

flow.

FREE CONVECTION: Development of hydrodynamic and thermal boundary layer along a vertical plate – use of empirical relations for vertical plates and pipes.

UNIT V

HEAT TRANSFER WITH PHASE CHANGE

BOILING: Pool boiling – regimes- calculations on nucleate boiling, critical heat flux and film boiling.

CONDENSATION: Film wise and drop wise condensation –Nusselt's theory of condensation on a vertical plate

- film condensation on vertical and horizontal cylinders using empirical correlations.

HEAT EXCHANGERS:

Classification of heat exchangers – overall heat transfer coefficient and fouling factor – concepts of LMTD and NTU methods – Problems.

UNIT VI

RADIATION HEAT TRANSFER:

Emission characteristics and laws of black-body radiation – Irradiation – total and monochromatic quantities – laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiationnetworks.

Course outcomes:

1. Understand basic modes of heat transfer and compute temperature distribution in steady state and unsteady state heat conduction.
2. Analyze heat transfer through extended surfaces.
3. Apply correlations to compute heat loss and heat transfer co-efficient due to convection for practical applications.
4. Comprehend the phenomena of boundary layer concept and flow regimes of boiling and condensation.
5. Design the heat exchanger for engineering applications based on LMTD and NTU methods.
6. Understand the principles of radiation and estimate radiation exchange between different surfaces.

Text Books:

1. Heat Transfer /JPHOLMAN/TMH
2. Heat Transfer /P.K.Nag/ TMH
3. Principles of Heat Transfer /Frank Kreith, RM Manglik& MS Bohn/Cengage learningpublishers

References:

1. Heat and Mass Transfer /Arora and Domkundwar/Dhanpatrai&sons
2. Fundamentals of Engg. Heat and Mass Transfer / R.C.Sachdeva / New AgeInternational
3. Heat and Mass Transfer /Cengel/McGrawHill.

4. Heat and Mass Transfer /D.S.Kumar / S.K.Kataria&Sons
5. A Text book on Heat Transfer-4th Edition/ S.P Sukhatme/UniversitiesPress

III Year - II Semester

INSTRUMENTATION & CONTROL SYSTEMS

L	T	P	C
4	0	0	3

Course Objectives:

The course focuses on imparting the principles of measurement which includes the working mechanism of various sensors and devices, that are in use to measure the important physical variables of various mechatronic systems.

UNIT – I

Definition – Basic principles of measurement – measurement systems, generalized configuration and functional descriptions of measuring instruments – examples.dynamic performance characteristics – sources of error, classification and elimination of error.

Measurement of Displacement: Theory and construction of various transducers to measure displacement – piezo electric, inductive, capacitance, resistance, ionization and photo electric transducers, calibrationprocedures.

UNIT – II

MEASUREMENT OF TEMPERATURE: Classification – ranges – various principles of measurement – expansion, electrical resistance – thermister – thermocouple – pyrometers – temperature indicators.

MEASUREMENT OF PRESSURE: Units – classification – different principles used. manometers, piston, bourdon pressure gauges, bellows – diaphragm gauges. low pressure measurement – thermal conductivity gauges

– ionization pressure gauges, Mcleod pressuregauge.

UNIT – III

MEASUREMENT OF LEVEL : Direct method – indirect methods – capacitative, ultrasonic, magnetic, cryogenic fuel level indicators – bubler level indicators.

FLOW MEASUREMENT: Rotameter, magnetic, ultrasonic, turbine flow meter, hot – wire anemometer, laser Doppler anemometer (LDA).

MEASUREMENT OF SPEED : Mechanical tachometers – electrical tachometers – stroboscope, noncontact type of tachometer

Measurement of Acceleration and Vibration: Different simple instruments – principles of seismic instruments

– Vibrometer and accelerometer using thisprinciple.

UNIT – IV

STRESS STRAIN MEASUREMENTS : Various types of stress and strain measurements –

electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending compressive and tensile strains – usage for measuring torque, strain gauge rosettes.

UNIT – V

MEASUREMENT OF HUMIDITY – Moisture content of gases, sling psychrometer, absorption psychrometer, dew point meter.

MEASUREMENT OF FORCE, TORQUE AND POWER- Elastic force meters, load cells, torsion meters, dynamometers.

UNIT – VI

ELEMENTS OF CONTROL SYSTEMS: Introduction, importance – classification – open and closed systems, servomechanisms–examples with block diagrams–temperature, speed & position control systems.

Course outcome:

1. Understand the basic principles of measurement and working mechanism of displacement transducer
2. Select a suitable transducer for temperature and pressure measurements
3. Select appropriate device for the measurement of level, flow, speed an acceleration
4. Understand the concept of strain gauge and strain rosettes for strain measurement
5. Analyzetheconceptofpsychometryforhumiditymeasurementandloadcellsfortheforce measurement
6. Significance of control systems in real world applications.

Text Books:

1. Measurement Systems: Applications & design / D.SKumar/
2. Mechanical Measurements / BeckWith, Marangoni,Linehard,Pearson

References:

1. Measurement systems: Application and design/Doeblin Earnest. O. Adaptation/TMH
2. Experimental Methods for Engineers / J.P.Holman/McGrawHill
3. Mechanical and Industrial Measurements / R.K. Jain/ KhannaPublishers.
4. Instrumentation, measurement & analysis / B.C.Nakra&K.K.Choudhary/TMH

III Year - II Semester

METROLOGY

L	T	P	C
4	0	0	3

Course objectives:

The students will learn

1. Inspection of engineering parts with various precisioninstruments
2. Design of part, tolerances andfits
3. Principles of measuring instruments and gauges and theiruses
4. Evaluation and inspection of surfaceroughness
5. Inspection of spur gear and thread elements
6. Machine tool testing to evaluate machine toolquality

UNIT-I

SYSTEMS OF LIMITS AND FITS: Introduction, nominal size, tolerance, limits, deviations, fits -Unilateral and bilateral tolerance system, hole and shaft basis systems-interchangeability, determistic& statistical tolerances, selective assembly. International standard system of tolerances, selection of limits and tolerances for correctfunctioning.

UNIT-II

LINEAR MEASUREMENT: Length standards, end standards, slip gauges- calibration of the slip gauges, dial indicators, micrometers.

MEASUREMENT OF ANGLES AND TAPERS:

Different methods – bevel protractor, angle slip gauges- angle dekkor- spirit levels- sine bar-sine table, rollers and spheres used to measure angles and tapers.

LIMIT GAUGES:

Taylor's principle – design of go and no go gauges; plug, ring, snap, gap, taper, profile and position gauges.

UNIT-III

OPTICAL MEASURING INSTRUMENTS: Tools maker's microscope and uses - autocollimators, optical projector, optical flats and their uses.

INTERFEROMETRY:

Interference of light, Michelson's interferometer, NPL flatness interferometer, and NPL gauge interferometer.

UNIT-IV

SURFACE ROUGHNESS MEASUREMENT: Differences between surface roughness and

surface waviness – Numerical assessment of surface finish-CLA, Rt., R.M.S. Rz, R10 values, Method of measurement of surface finish – Profilograph, Talysurf, ISI symbols for indication of surface finish.

COMPARATORS: Types - mechanical, optical , electrical and electronic, pneumatic comparators and their uses.

UNIT – V

GEAR MEASUREMENT: Nomenclature of gear tooth, tooth thickness measurement with gear tooth vernier& flange micro meter, pitch measurement, total composite error and tooth to tooth composite errors, rolling gear tester, involute profile checking.

SCREW THREAD MEASUREMENT: Elements of measurement – errors in screw threads- concept of virtual effective diameter, measurement of effective diameter, angle of thread and thread pitch, and profile thread gauges.

UNIT – VI

FLATNESS MEASUREMENT:

Measurement of flatness of surfaces- instruments used- straight edges- surface plates – auto collimator. **MACHINE TOOL ALIGNMENT TESTS:** Principles of machine tool alignment testing on lathe, drilling and milling machines.

Course outcome:

1. Illustrate the fundamentals of Limits, Fits and Tolerances for gauge design
2. Thestudentsareabletomeasuringthevariousparameterslikelength,height,angle, displacement, flatness by using various instruments like Verniercallipers, micrometers,
3. Use linear, angular and optical instruments in various manufacturing techniques
4. Learn the methods of measuring surface roughness and use of comparators
5. Understand the fundamentals of various methods for the measurements of screw threads and gear measurement
6. Analyze theprocessalignmenttesting of machinetoolsfor manufacturing fieldand flatness surface

Text Books:

1. Dimensional Metrology/Connie Dotson/CengageLearning
2. Engineering Metrology / R.K.Jain / KhannaPublishers

References:

1. Engineering Metrology / Mahajan / DhanpatRaiPublishers
2. Engineering Metrology / I.C.Gupta / DhanpatRaiPublishers
3. Precision Engineering in Manufacturing / R.L.Murthy / NewAge
4. Engineering Metrology and Measurements / NV Raghavendra, L Krishna murthy/ Oxfordpublishers.
5. Engineering Metrology / KL Narayana/Scitechpublishers

III Year - II Semester

REFRIGERATION & AIR CONDITIONING

(Refrigeration and Psychometric tables and charts allowed)

L	T	P	C
4	0	0	3

Course objectives:

The course is to understand the basic cycles of various refrigerating systems, their performance evaluation along with details of system components and refrigerant properties. The course is also aimed at imparting knowledge of psychrometric properties, processes which are used in air-conditioning systems for comfort and industrial applications.

UNIT – I

INTRODUCTION TO REFRIGERATION: Necessity and applications – unit of refrigeration and C.O.P. – Mechanical refrigeration – types of ideal cycles of refrigeration. air refrigeration: bell coleman cycle - open and dense air systems – refrigeration systems used in air crafts and problems.

UNIT – II

VAPOUR COMPRESSION REFRIGERATION: Working principle and essential components of the plant – simple vapour compression refrigeration cycle – COP – representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – actual cycle influence of various parameters on system performance – use of p-h charts – numerical problems.

UNIT III

REFRIGERANTS – Desirable properties – classification - refrigerants used – nomenclature – ozone depletion – global warming

VCR SYSTEM COMPONENTS: Compressors – general classification – comparison – advantages and disadvantages. condensers – classification – working principles evaporators – classification – working principles expansion devices – types – working principles

UNIT IV

VAPOR ABSORPTION SYSTEM: Calculation of maximum COP – description and working of NH_3 – water system and Li Br –water (Two shell & Four shell) System, principle of operation three fluid absorption system, salient features.

STEAM JET REFRIGERATION SYSTEM: Working Principle and basic components.principle and operation of (i) thermoelectric refrigerator (ii) vortex tube.

UNIT – V

INTRODUCTION TO AIR CONDITIONING: Psychometric properties & processes – characterization of sensible and latent heat loads — need for ventilation, consideration of infiltration – load concepts of RSHF, GSHF- problems, concept of ESHF and ADP temperature.

Requirements of human comfort and concept of effective temperature- comfort chart –

comfort air conditioning – requirements of industrial air conditioning, air conditioning load calculations.

UNIT – VI

AIR CONDITIONING SYSTEMS: Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers. heat pump – heat sources – different heat pump circuits.

Course outcomes:

1. Significance of control systems in real world applications.
2. Know the types of VCR cycles and their practical application.
3. Understand the components of VCR systems and their types and properties of refrigerants
4. Analyze the VAR systems their applications
5. Understand to perform cooling load calculations, select the appropriateprocessandequipmentfortherequiredcomfortandindustrialair-conditioning
6. Classify of fans and understand their performance

Text Books:

1. A Course in Refrigeration and Air conditioning / SC Arora&Domkundwar /Dhanpatrai
2. Refrigeration and Air Conditioning / CP Arora /TMH.

References:

1. Refrigeration and Air Conditioning / Manohar Prasad / NewAge.
2. Principles of Refrigeration /Dossat / PearsonEducation.
3. Basic Refrigeration and Air-Conditioning / Ananthanarayanan /TMH

III Year II Semester

PROFESSIONAL ETHICS & HUMAN VALUES

L	T	P	C
0	3	0	0

Course Objectives:

- *To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.*
- *Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.*

UNIT I: Human Values:

Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty – Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT: II: Principles for Harmony:

Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:

History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism –

–Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument –Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past –Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature ofEngineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:

Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/s Involuntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/s Immediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:

Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty

- Consensus and Controversy - Professional and Individual Rights –Confidential and Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes- Industrial Espionage- Price Fixing-WhistleBlowing.

UNIT VI: Global Issues:

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

Related Cases Shall be dealt where evernecessary.

Outcome:

- *It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.*
- *It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.*

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, NewDelhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill –2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - MaruthiPublications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, NewDelhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd.,Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd –2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.KalilRahman and M. Jayakumaran – University SciencePress.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill -2013
9. Human Values And Professional Ethics by Jayashree Suresh and B. S. Raghavan, S.ChandPublications

III Year II Semester

COMPUTER GRAPHICS

(OPEN ELECTIVE)

L	T	P	C
4	0	0	3

Course objectives:

This course allows the students to:

1. Understand the fundamental concepts and theory of computergraphics
2. Understand modeling, and interactive control of 3D computer graphicsapplications
3. The underlying parametric surface concepts beunderstood
4. Learn multimedia authoringtools.

UNIT-I

INTRODUCTION: Application areas of computer graphics, overview of graphic system, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices.

UNIT-II

OUTPUT PRIMITIVES: Points and lines, line drawing algorithms, mid-point circle algorithm, Filled area primitives: scan-line polygon fill algorithm, boundary-fill and flood-fill algorithm.

2-D GEOMETRICAL TRANSFORMATIONS: Translation, scaling, rotation, reflection and shear transformation matrix representations and homogeneous co-ordinates, composite transformations, transformations betweencoordinates

UNIT -III

2-D VIEWING : The viewing pipe-line, viewing coordinat4 reference frame, window to view-port co-ordinate transformations, viewing function, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland- Hodgeman polygon clipping algorithm

UNIT -IV

3-D OBJECT REPRESENTATION: spline representation, Hermite curve, Bezier curve and B-spline curve, Polygon surfaces, quadric surfaces, , Solid modeling Schalars – wire frame, CSG, B-rep. Bezier and B-spline surfaces, Basic illumination models, shading algorithms

UNIT -V

3-D GEOMETRIC TRANSFORMATIONS: Translation, rotation, scaling, reflection and shear transformation and composite transformations. Visible surface detection methods: Classification, back-face detection, depth- buffer, scan-line, depth sorting

UNIT-VI

COMPUTER ANIMATION: Design of animation sequence, general computer animation functions, raster animation, computer animation language, key frame system, motion specification

Course outcomes:

Upon successful completion of the course, students will be able to:

1. Use the principles and commonly used paradigms and techniques of computergraphics
2. Write basic graphics application programs includinganimation
3. Design programs to display graphic images to givenspecifications

Text Books:

1. Computer Graphics C version/ Donald Hearn and M. PaulineBaker/Pearson/PHI
2. Computer Graphics Principles & practice-second edition in C/ Foley, VanDam, Feiner and Hughes/PearsonEducation

References:

1. Computer Graphics Second edition/ Zhigandxiang, Roy Plastock, Schaum's outlines/Tata Mc-Graw hill edition.
2. Procedural elements for Computer Graphics/David F Rogers/Tata McGraw hill, 2ndedition.
3. Principles of Interactive Computer Graphics/ Neuman andSproul/TMH.
4. Computer Graphics/ StevenHarrington/TMH

III Year II Semester

DATA BASE MANAGEMENT SYSTEM
(OPEN ELECTIVE)

L	T	P	C
4	0	0	3

OBJECTIVES

To learn the principles of systematically designing and using large scaleDatabase Management Systems for various applications.

UNIT-I: An Overview of Database Management, Introduction- What is Database System- What is Database- Why Database- Data Independence- Relation Systems and Others- Summary,

Database system architecture, Introduction- The Three Levels of Architecture-The External Level- the Conceptual Level- the Internal Level- Mapping- the Database Administrator-The Database Management Systems- Client/ServerArchitecture.

UNIT-II:

The E/R Models, The Relational Model, Relational Calculus, Introduction to Database Design, Database Design and Er Diagrams-Entities Attributes, and Entity Sets-Relationship and Relationship Sets-Conceptual Design With the Er Models, The Relational Model Integrity Constraints Over Relations- Key Constraints –Foreign Key Constraints-General Constraints, Relational Algebra and Calculus, Relational Algebra- Selection and Projection- Set Operation, Renaming – Joins- Division- More Examples of Queries, Relational Calculus, Tuple Relational Calculus- Domain Relational Calculus

UNIT-III:

Queries, Constraints, Triggers, Overview, The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.

UNIT-IV:

SCHEMA REFINEMENT (NORMALIZATION) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT-V:

Transaction Management and Concurrency Control:

Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint.

Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

UNIT-VI:

Overview of Storages and Indexing, Data on External Storage- File Organization and Indexing –Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization

Course Outcomes

- Describe a relational database and object-orienteddatabase.
- Create, maintain and manipulate a relational database usingSQL
- Describe ER model and normalization for databasedesign.
- Examine issues in data storage and query processing and can formulate appropriatesolutions.
- Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategicadvantage.
- Design and build database system for a given real worldproblem

TEXT BOOKS:

1. Introduction to Database Systems, CJ Date,Pearson
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGraw Hill 3rdEdition
3. Database Systems - The Complete Book, H G Molina, J D Ullman, J WidomPearson

REFERENCES BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel7th Edition.
2. Fundamentals of Database Systems, ElmasriNavrate PearsonEducation
3. Introduction to Database Systems, C.J.Date PearsonEducation

III Year - II Semester

ENTREPRENEURSHIP

(OPEN ELECTIVE)

L	T	P	C
4	0	0	3

COURSE OBJECTIVE:

- To develop and strengthen entrepreneurial quality and motivation in students.
- To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.

UNITI ENTREPRENEURAL COMPETENCE

Entrepreneurship concept – Entrepreneurship as a Career – Entrepreneurial Personality - Characteristics of Successful, Entrepreneur – Knowledge and Skills of Entrepreneur.

UNITII ENTREPRENEURAL ENVIRONMENT

Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support Organisational Services –

UNITIII INDUSTRIAL POLACIES

Central and State Government Industrial Policies and Regulations - International Business.

UNIT IV BUSINESS PLAN PREPARATION

Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product -

Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and EvaluationCriteria.

UNIT V LAUNCHING OF SMALL BUSINESS

Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching – Incubation, Venture capital, IT startups.

UNIT VI MANAGEMENT OF SMALL BUSINESS

Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units- Effective Management of small Business.

COURSE OUTCOME:
Students will gain knowledge and skills needed to run a business.

Text Books:

1. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi,2001.
2. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi,2001.

References

1. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms & Praxis, Biztrantra ,2nd Edition 2005
2. Prasanna Chandra, Projects – Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill, 1996.
3. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai-1997.
4. Arya Kumar. Entrepreneurship. Pearson.2012
5. Donald F Kuratko, T.V Rao. Entrepreneurship: A South Asian perspective. Cengage Learning.2012

III Year II Semester

GREEN ENGINEERING SYSTEMS

(OPEN ELECTIVE)

L	T	P	C
4	0	0	3

Course Objective:

The course aims to highlight the significance of alternative sources of energy, green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmentalfriendly.

UNIT-I INTRODUCTION:

SOLAR RADIATION: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics

SOLAR ENERGY COLLECTION:Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT – II

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betzcriteria, types of winds, wind datameasurement.

UNIT – III

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India. **OCEAN ENERGY**: OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

ENERGY EFFICIENT SYSTEMS:

(A) ELECTRICAL SYSTEMS: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand sitemanagement.

(B) MECHANICAL SYSTEMS: Fuel cells- principle, thermodynamic aspects, selection of fuels &working of various types of fuel cells, Environmental friendly and Energy efficient compressors andpumps**.**

UNIT-V

ENERGY EFFICIENT PROCESSES: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

UNIT – VI

GREEN BUILDINGS: Definition, features and benefits. Sustainable site selection and planning of buildings for maximum comfort. Environmental friendly building materials like bamboo, timber, rammed earth, hollow blocks, lime & lime pozzolana cement, agro materials and industrial waste, Ferro cement and Ferro-concrete, alternate roofing systems, paints to reduce heat gain of the buildings. Energymanagement.

Course outcome:

The student shall understand the principles and working of solar, wind, biomass, geo thermal, ocean energies and green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.

Text Books:

1. Solar Energy – Principles of Thermal Collection and Storage/Sukhatme S.P. and J.K.Nayak/TMH
2. Non-Conventional Energy Resources/ Khan B.H/ Tata McGraw Hill, New Delhi,2006
3. Green Manufacturing Processes and Systems, Edited / J. Paulo Davim/Springer2013

References:

1. Alternative Building Materials and Technologies / K.S Jagadeesh, B.V Venkata Rama Reddy and K.S NanjundaRao/New ageinternational
2. Principles of Solar Engineering / D.YogiGoswami, Frank Krieth& John F Kreider/ Taylor &Francis
3. Non-Conventional Energy / Ashok V Desai /New Age International (P)Ltd
4. Renewable Energy Technologies /Ramesh & Kumar/Narosa
5. Non conventional Energy Source/ G.D Roy/StandardPublishers
6. Renewable Energy Resources-2nd Edition/ J.Twidell and T. Weir/ BSP BooksPvt.Ltd
7. Fuel Cell Technology –Hand Book / GregorHoogers / BSP Books Pvt.Ltd.

III Year II Semester

INDUSTRIAL ROBOTICS
(OPEN ELECTIVE)

L	T	P	C
4	0	0	3

Course Objectives:

1. To give students practice in applying their knowledge of mathematics, science, and Engineering and to expand this knowledge into the vast area ofrobotics.
2. The students will be exposed to the concepts of robot kinematics, Dynamics, Trajectoryplanning.
3. Mathematical approach to explain how the robotic arm motion can bedescribed.
4. The students will understand the functioning of sensors andactuators.

UNIT-I

INTRODUCTION: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present andfuture applications – classification by coordinate system and controlsystem.

UNIT – II

COMPONENTS OF THE INDUSTRIAL ROBOTICS: Function line diagram representation of robot arms, common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – III

MOTION ANALYSIS: Homogeneous transformations as applicable to rotation and translation – problems. **MANIPULATORKINEMATICS:**Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

UNIT – IV

Differential transformation and manipulators, Jacobians– problems Dynamics: Lagrange – Euler and Newton – Euler formulations – Problems.

UNIT V

General considerations in path description and generation.Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion –straight line motion – Robot programming, languages and software packages-description of paths with a robot programminglanguage.

UNIT VI

ROBOT ACTUATORS AND FEED BACK COMPONENTS:

Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors.

Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors. **ROBOT APPLICATIONS IN MANUFACTURING:** Material Transfer - Material

handling, loading and unloading-Processing - spot and continuous arc welding & spray painting - Assemblyand Inspection.

Course outcomes:
Upon successful completion of this course you should be able to:

1. Identify various robot configuration andcomponents,
2. Select appropriate actuators and sensors for a robot based on specificapplication
3. Carry out kinematic and dynamic analysis for simple serial kinematicchains
4. Perform trajectory planning for a manipulator by avoidingobstacles.

Text Books:

1. Industrial Robotics / GrooverM P /PearsonEdu.
2. Robotics and Control / Mittal R K &NagrathI J /TMH.

References:

1. Robotics / Fu K S/ McGrawHill.
2. Robotic Engineering / Richard D. Klafter, PrenticeHall
3. Robot Analysis and Control / H. Asada and J.J.E. Slotine/ BSP BooksPvt.Ltd.
4. Introduction to Robotics / John J Craig / PearsonEdu.

III Year II Semester

WASTE WATER MANAGEMENT
(OPEN ELECTIVE)

L	T	P	C
4	0	0	3

Learning Objectives:

- Outline planning and the design of waste water collection ,conveyance and treatment systems for a community/town/city
- Provide knowledge of characterization of waste water generated in acommunity
- Impart understanding of treatment of sewage and the need for itstreatment
- Summarize the appurtenance in sewage systems and theirnecessity
- Teach planning and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatmentsystems
- Effluent disposal method and realize the importance of regulations in the disposal of effluents inrivers

UNIT-I:

Introduction to Sanitation-Systems of sanitation- relative merits and demerits - collection and conveyance of waste water - classification of sewerage systems-Estimation of sewage flow and storm water drainage- fluctuations-types of sewers- Hydraulics of sewers and storm drains-design of sewers- appurtenances in sewerage- cleaning and ventilation ofsewers

UNIT-II:

Pumping of wastewater: Pumping stations-location- components- types of pumps and their suitability with regard to wastewaters.

House Plumbing: Systems of plumbing-sanitary fittings and other accessories-one pipe and two pipe systems- Design of building drainage

UNIT-III:

Sewage characteristics-Sampling and analysis of waste water-Physical, chemical and Biological examination- measurement of BOD & COD- BOD equations

Treatment of sewage: Primary treatment- Screens-grit chambers- grease traps- floatation-sedimentation-design of preliminary and primary treatment units.

UNIT-IV:

Secondary treatment: Aerobic and anaerobic treatment process -comparison.

Suspended growth process: Activated sludge process, principles, design and operational problems, modifications of Activated sludge processes, Oxidation ponds, Aerated Lagoons.

Attached Growth process: Trickling Filters-mechanism of impurities removal-classification-design -operation and maintenance problems. RBCs. Fluidized bed reactors

UNIT-V:

Miscellaneous Treatment Methods: Nitrification and Denitrification- Removal of phosphates-UASB- Membrane reactors- Integrated fixed film reactors. Anaerobic Processes: Septic Tanks, Imhoff tanks- working principles and Design-disposal of septic tank effluent-FAB Reactors

UNIT-VI:

Bio-solids (sludge) management: Characteristics- handling and treatment of sludge-thickening-anaerobic digestion ofsludge

Disposal of sewage: Methods of disposal- disposal into water bodies- Oxygen sag Curve-Disposal into sea- disposal on land- sewage sickness

Course Outcomes:

By the end of successful completion of this course, the students will be able to:

- Plan and design the seweragesystems
- Characterization ofsewage
- Select the appropriate appurtenances in the seweragesystems
- Select the suitable treatment flow for sewagetreatment
- Identify the critical point of pollution in a river for a specific amount of pollutant disposal into theriver

TextBook:

1. Waste water Engineering Treatment and Reuse by Metcalf & Eddy, Tata McGraw-Hilledition.
2. Elements of Environmental Engineering by K.N. Duggal, S.Chand& Company Ltd. New Delhi,2012.
3. Environmental Engineering by Howard S.Peavy , Donald R. Rowe, Teorge George Tchobanoglus- Mc-Graw-Hill Book Company, New Delhi,1985
4. Wastewater Treatment for pollution control and Reuuse, by soli.J Areivala, sham R Asolekar, Mc- GrawHill, New Delhi; 3rdEdition
5. Industrial water & wastewater management by KVSGMuraliKrishna

Reference Book:

1. Environmental Engineering-II: Sewage disposal and Air pollution Engineering , by Garg, S.K.,: Khannapublishers
2. Sewage treatment and disposal by Dr.P.N.Modi&Sethi.
3. Environmental Engineering, by Ruth F. Weiner and Robin Matthews- 4th Edition Elsevier,2003
4. Environmental Engineering by D. Srinivasan, PHI Learning private Limited , NewDelhi,2011.

III Year II Semester

COMPUTATIONAL FLUID DYNAMICS LABORATORY

L	T	P	C
0	0	3	2

Course Pre-requisites:

- Basic courses of Fluid Mechanics, Heat transfer and Numerical methods are required aspre-requisites
- Knowledge of matrices, differentiation, integration and differential equations areexpected

Course Objectives:

- Solving Problems of fluid mechanics and heat transfer by writing programs in C-language andMATLAB.
- Using ANSYS-FLUENT build a geometry, mesh that geometry, Perform CFD method on the mesh, perform the calculation, and post-process theresults.
- Understanding the validation of the numerical result by comparison with known analyticalresults.
- Understanding the numerical result by invoking the physical principles of fluid mechanics and heat transfer.

PART-A

Writing Programs in C and MATLAB for the following:

1. Solution of Transcendentalequations
2. Solution of Simultaneous algebraicequations
3. Numerical differentiation andIntegration
4. Solution of Ordinary DifferentialEquation
5. Solution of a Tri-diagonal matrix using ThomasAlgorithm.
6. Solution of Partial differential equations relatedto
   i) Elliptical Partial differentialequations
   ii) Parabolic Partial differentialequations
   iii) Hyperbolic Partial differentialequations
7. Solution of 1-D and 2-D heat conduction with (Finite Differencemethod)
   i) Constant temperature boundaryconditions
   ii) Constant heat flux boundaryconditions
   iii) Convective boundaryconditions
8. Solution of Incompressible Navier-Stokes equations (Finite difference and Finite Volumemethods)
9. Solution of Inviscid incompressible fluid flows.(Finite difference and Finite

Volumemethods)

PART-B

Using ANSYS-FLUENT solve the following problems of heat transfer analysis

1. steady stateconduction
2. Lumped heattransfer
3. Convective heat transfer – Internal flow (study both velocity and thermal boundarylayers)
4. Convective heat transfer – External flow (study both velocity and thermal boundarylayers)
5. Radiation heat transfer–Emissivity

Course outcomes:

1. Know the basics of C-language and MATLAB to solve the Problems in fluid mechanics and heat transfer
2. Perform the simple differential equations and integration in MATLAB
3. Apply Navier-Stokes equations to solve fluid dynamics problems in MATLAB
4. Perform computational fluid dynamics analysis in ANSYS
5. Apply various numerical tools like finite volume and finite difference for solving the different fluid flow problems.
6. Validate the numerical result by comparison with known analytical results

III Year II Semester

HEAT TRANSFER LAB

L	T	P	C
0	0	3	2

Objectives:

The laboratory course is aimed to provide the practical exposure to the students with regard to the determination of amount of heat exchange in various modes of heat transfer including condensation & boiling for several geometries.

1. COP of VCR System with Capillary and thermal expansionvalve.
2. Determination of overall heat transfer co-efficient of a compositeslab
3. Determination of heat transfer rate through a laggedpipe.
4. Determination of heat transfer rate through a concentricsphere
5. Determination of thermal conductivity of a metalrod.
6. Determination of efficiency of apin-fin
7. Determination of heat transfer coefficient in natural and forcedconvection
8. Determination of effectiveness of parallel and counter flow heatexchangers.
9. Determination of emissivity of a givensurface.
10. Determination of Stefan Boltzman constant.
11. Determination of heat transfer rate in drop and film wisecondensation.
12. Determination of critical heat flux.
13. Determination of Thermal conductivity of liquids andgases.
14. Investigation of Lambert's cosinelaw

Course outcome:

1. Perform steady state conduction experiments to estimate thermal conductivity ofdifferent materials for plane, cylindrical and spherical geometries.
2. Obtain variation of temperature along the length of the pin-fin under forced and free convection.
3. Estimate the heat transfer coefficients in forced convection, free convection and correlate with the theoretical values.
4. Compare parallel and counter flow heat exchanger performance characteristics
5. Estimate heat transfer coefficients in condensation, boiling and effectiveness of heat pipe
6. Understand and perform Test Emissivity, Stefan Boltzmann Constant and Critical Heat flux.

III Year II Semester

METROLOGY & INSTRUMENTATION LAB

L	T	P	C
0	0	3	2

Course Objectives:

The Metrology and instrumentation Laboratory course is designed for measuring and gauging instruments for inspection of precision linear, geometric forms, angular and surface finish measurements. The student can learn the measurements with and calibration of instruments. They also understand the machine tool alignment test. Instrumentation lab introduces the students with the theory and methods for conducting experimental work in the laboratory and calibration of various instruments for measuring pressure, temperature, displacement, speed, vibration etc.

Note: The students have to conduct at least 8 experiments from each lab

METROLOGY LAB

1. Measurement of lengths, heights, diameters by vernier calipers, micrometersetc.
2. Measurement of bores by internal micrometers and dial boreindicators.
3. Use of gear tooth vernier caliper for tooth thickness inspection and flange micro meter for checking the chordal thickness of spurgear.
4. Machine tool alignment test on thelathe.
5. Machine tool alignment test on drillingmachine.
6. Machine tool alignment test on millingmachine.
7. Angle and taper measurements with bevel protractor, Sine bar, rollers andballs.
8. Use of spirit level in finding the straightness of a bed and flatness of asurface.
9. Thread inspection with two wire/ three wire method & tool makersmicroscope.
10. Surface roughness measurement with roughness measuringinstrument.

INSTRUMENTATION LAB

2. Calibration of pressuregauge.
3. Calibration of transducer for temperaturemeasurement.
4. Study and calibration of LVDT transducer for displacementmeasurement.
5. Calibration of straingauge.
6. Calibration ofthermocouple.
7. Calibration of capacitivetransducer.
8. Study and calibration of photo and magnetic speedpickups.
9. Calibration of resistance temperaturedetector.
10. Study and calibration of arotameter.

11. Study and use of a seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
12. Study and calibration of Mcleod gauge for lowpressure.

Course outcomes:

1. Students will be able to apply the procedures to measure the length, height and diameter by using different instruments.
2. Students will be able to measure effective diameter, pitch of thread profile using tool maker's microscope.
3. Students will be able to measure the flatness, surface roughness and perform machine alignments tests.
4. Selection of a proper instrument for measurement of displacement and strain
5. Analyse the requirement of calibration for temperature measuring instrument
6. Identify and use suitable instrument for pressure and flow measurements

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

IV Year - I Semester

CAD/CAM

L	T	P	C
4	0	0	3

Course Objectives:

The general objectives of the course are to enable the students to

1. Understand the basic fundamentals of computer aided design and manufacturing.

2. To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc

3. To understand the different geometric modeling techniques like solid modeling,

surfacemodeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication

4. To learn the part programming, importance of group technology, computer aided process planning, computer aided quality control

5. To learn the overall configuration and elements of computer integrated manufacturing systems.

UNIT – I

Computers in industrial manufacturing, product cycle, CAD / CAM Hardware, basic structure, CPU, memory types, input devices, display devices, hard copy devices, storage devices.

COMPUTER GRAPHICS: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping, hidden surface removal.

UNIT – II

GEOMETRIC MODELING: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

DRAFTING AND MODELING SYSTEMS: Basic geometric commands, layers, display control commands, editing, dimensioning, solid modelling.

UNIT – III

PART PROGRAMMING FOR NC MACHINES: NC, NC modes, NC elements, CNC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming: fundamentals, manual part programming methods, Computer Aided Part Programming. Direct Numerical Control, Adaptive Control.

UNIT – IV

GROUP TECHNOLOGY: Part family, coding and classification, production flow analysis, types and advantages. Computer aided processes planning – importance, types. FMS-Introduction, Equipment, Tool management systems, Layouts, FMS Control

UNIT – V

COMPUTER AIDED QUALITY CONTROL: Terminology used in quality control, use of computers in Quality control. Inspection methods- contact and noncontact types, computer aided testing, integration of CAQC with CAD/CAM.

UNIT – VI

COMPUTER INTEGRATED MANUFACTURING SYSTEMS: Types of manufacturing systems, machine tools and related equipment, material handling systems, material requirement planning, computer control systems, human labor in manufacturing systems, CIMS benefits.

Course Outcome:

1 Ability to describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid

2 Ability to describe Memory types, input/output devices, display devices and computer graphics

3 Acquire the knowledge of geometric modeling and Execute the steps required in CAD software for developing 2D and 3D models and perform transformations

4 Explain fundamental and advanced features of NC and CNC machines

5 Ability to describe the use of GT and CAPP for the product development.

6 Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.

Text Books:

1. CAD / CAM Principles and Applications/PN Rao / McGraw-Hill

2. Automation, Production systems & Computer integrated Manufacturing/ M.P. Groover/Pearson Education

References:

1. Mastering CAD / CAM / Ibrahim Zeid / McGraw-Hill
2. Principles of Computer Aided Design and Manufacturing / FaridAmirouche / Pearson
3. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson learning, Inc
4. Product manufacturing and cost estimation using CAD/CAE/ KuangHua Chang/Elsevier Publishers

IV Year - I Semester

FINITE ELEMENT METHODS

L	T	P	C
4	0	0	3

Course Objectives:

1. To learn basic principles of finite element analysisprocedure
2. To learn the theory and characteristics of finite elements that represent engineeringstructures
3. To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed byothers
4. Learn to model complex geometry problems and solutiontechniques.

UNIT-I

Introduction to finite element method, stress and equilibrium, strain – displacement relations, stress – strain relations, plane stress and plane strain conditions, variational and weighted residual methods, concept of potential energy, one

dimensional problems.

UNIT – II

Discretization of domain, element shapes, discretization procedures, assembly of stiffness matrix, band width, nodenumbering, meshgeneration, interpolation functions, local and global coordinates, convergence requirements,treatment of boundary conditions.

UNIT – III

Analysis of Trusses: Finite element modelling, coordinates and shape functions, assembly of global stiffness matrixand load vector, finite element equations, treatment of boundary conditions, stress, strain and support reaction calculations. Analysis of Beams: Element stiffness matrix for Hermite beam element, derivation of load vector for concentrated and UDL, simple problems onbeams.

UNIT – IV

Finite element modellingof two dimensional stress analysis with constant strain triangles and treatment of boundary conditions, formulation of axisymmetricproblems.

UNIT-V

Higher order and isoparametricelements: One dimensional quadratic and cubic elements in natural coordinates, two dimensional four nodedisoparametricelements and numerical integration.

UNIT – VI

Steady state heat transfer analysis : one dimensional analysis of a fin and two dimensional analysis of thin plate, analysis of a uniform shaft subjected to torsion. Dynamic Analysis: Formulation of finite element model, element consistent and lumped mass matrices, evaluation of eigen values and eigenvectors, free vibration analysis.

Course outcomes:

Upon successful completion of this course you should be able to:

1	Understand the numerical methods involved in Finite Element Methods.
2	Demonstrate the procedure to generate a finite element model and understand the role and significance of shape functions in finite element formulations.
3	Formulate and solve one dimensional structural problem involving bar, beam, and trusses.
4	Understand the formulation of two-dimensional elements. (CST and LST elements)
5	Apply the numerical integration technique to solve the quadrilateral and higher order elements in FEM.
6	Illustrate an ability to identify, formulate, and apply FEA software to solve steady heat transfer and dynamic analysis.

Text Books:

1. The Finite Element Methods in Engineering / SS Rao/Pergamon.

References:

1. Finite Element Method with applications in Engineering / YM Desai, Eldho& Shah /Pearsonpublishers
2. An introduction to Finite Element Method / JN Reddy / McGrawHill
3. The Finite Element Method for Engineers – Kenneth H. Huebner, Donald L. Dewhirst, Douglas E. Smith and Ted G. Byrom/ John Wiley & sons (ASIA) PteLtd.
4. Finite Element Analysis: Theory and Application with Ansys, SaeedMoaveniu, PearsonEducation
5. Finite Element Methods /Chen
6. Finite Element Analysis: for students & Practicing Engineers / G.LakshmiNarasaiah / BSP Books Pvt. Ltd.

IV Year - I Semester

MECHATRONICS

L	T	P	C
4	0	0	3

Course Objective

The main objective of this course is to introduce the integrative nature of Mechatronics. To describe the different components and devices of mechatronics systems.

UNIT-I

Mechatronics systems – elements & levels of mechatronics system, Mechatronics design process, system, measurement systems, control systems, microprocessor-based controllers, advantages and disadvantages of mechatronics systems. Sensors and transducers, types, displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT-II

Solid state electronic devices - PN junction diode, BJT, FET, DIAC, TRIAC and LEDs.Analog signal conditioning, operational amplifiers, noise reduction, filtering.

UNIT-III

Hydraulic and pneumatic actuating systems - Fluid systems, Hydraulic systems, and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems. Mechanical actuating systems and electrical actuating systems – basic principles and elements.

UNIT-IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT-V

System and interfacing and data acquisition – Data Acquisition Systems, Analog to Digital and Digital to Analog conversions; Digital Signal Processing – data flow in DSPs, block diagrams, typical layouts, Interfacing motor drives.

UNIT -VI

Dynamic models and analogies, System response.Process Controllers – Digital Controllers, Programmable Logic Controllers, Design of mechatronics systems & future trends.

Course outcomes:

1 To understand definition and requirement of Mechatronic systems.

2 Understand key elements of Mechatronics system, representation into block diagram

3 Acquire the knowledge on basic Electronic components and their applications in Mechatronic systems.

4 Acquire the knowledge on different actuators and their working.

5 Understand the concept of PLC system and its ladder programming, and significance of PLC systems in industrial application.

6 Understand the concept system and interfacing and data acquisition.

Text Books:

1. MECHATRONICS Integrated Mechanical Electronics Systems/KP Ramachandran, GK VijayaRaghavan& MS Balasundaram/WILEY India Edition

References:

1 Mechatronics /Smaili A, Mrad F/ Oxford Higher Education, Oxford University Press

2 Mechatronics Source Book / Newton C Braga/Thomson Publications,Chennai.

3 Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.

4 Mechatronics System Design / Devdasshetty/Richard/Thomson.

5 Mechatronics/M.D.Singh/J.G.Joshi/PHI.

6 Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg. 4th Edition / W. Bolton/ Pearson, 2012

7 Mechatronics – Principles and Application / Godfrey C. Onwubolu/Elsevier, Indian print

IV Year - I Semester

POWER PLANT ENGINEERING

L	T	P	C
4	0	0	3

Course Objectives:

The course is aimed at providing knowledge of power generation through different prime movers viz steam, ICGT, Hydro, nuclear and hybrid systems along with their economics and environmental considerations.

UNIT – I

Introduction to the sources of energy – resources and development of power in india.

STEAM POWER PLANT: Plant layout, working of different circuits, fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, ash handling systems. Combustion: properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, dust collectors, cooling towers and heat rejection. corrosion and feed watertreatment.

UNIT – II

INTERNAL COMBUSTION AND GAS TURBINE POWER PLANTS:

DIESEL POWER PLANT: Plant layout with auxiliaries – fuel supply system, air starting equipment, super charging.

GAS TURBINE PLANT: Introduction – classification - construction – layout with auxiliaries, combined cycle power plants and comparison.

UNIT – III

HYDRO ELECTRIC POWER PLANT: Water power – hydrological cycle / flow measurement – drainage area characteristics – hydrographs – storage and pondage – classification of dams and spill ways.

HYDRO PROJECTS AND PLANT: Classification – typical layouts – plant auxiliaries – plant operation pumped storage plants.

UNIT – IV

NUCLEAR POWER STATION: Nuclear fuel – breeding and fertile materials – nuclear reactor – reactor operation.

TYPES OF REACTORS: Pressurized water reactor, boiling water reactor, sodium-graphite reactor, fast breeder reactor, homogeneous reactor, gas cooled reactor, radiation hazards and shielding – radioactive waste disposal.

UNIT – V

COMBINED OPERATIONS OF DIFFERENT POWER PLANTS: Introduction, advantages of combined working, load division between power stations, storage type hydro-electric plant in combination with steam plant, run-of-river plant in combination with steam plant, pump storage plant in combination with steam or nuclear power plant, co-ordination of hydro-electric and gas turbine stations, co-ordination of hydro-electric and nuclear power stations, co-ordination of different types of power plants.

POWER PLANT INSTRUMENTATION AND CONTROL: Importance of measurement and instrumentation in power plant, measurement of water purity, gas analysis, O_2 and CO_2 measurements, measurement of smoke and dust, measurement of moisture in carbon dioxide circuit, nuclearmeasurements.

UNIT – VI

POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS: Capital cost, investment

of fixed charges, operating costs, general arrangement of power distribution, load curves, load duration curve, definitions of connected load, maximum demand, demand factor, average load, load factor, diversity factor – related exercises. effluents from power plants and Impact on environment – pollutants and pollution standards – methods of pollution control.

Course outcomes:

1 Understand the layout of coal based power plant and working of individual equipment.

2 Identify elements in a layout and their functions of diesel and gas power plants.

3 Get the knowledge on hydraulic power plant working principle & various plant layouts and understand the influence of operating parameters.

4 Describe the working principle and reactor operation of the nuclear power plant and their impact on environment.

5 Understanding the Co-ordination of Combined operations of different power plants, and get the knowledge of various instruments used in power plants.

6 Evaluate the performance characteristics of power plants based on load variations and understand the pollution standards.

Text Books:

1. A course in Power Plant Engineering /Arora and Domkundwar/Dhanpatrai&Co.
2. Power Plant Engineering /P.C.Sharma / S.K.KatariaPub

References:

1. Power Plant Engineering: P.K.Nag/ II Edition/TMH.
2. Power station Engineering – ElWakil /McGrawHill.
3. An Introduction to Power Plant Technology / G.D. Rai/KhannaPublishers

IV Year II Semester

PRODUCTION PLANNING AND CONTROL

L	T	P	C
4	0	0	3

Course objectives:

This subject provides students with

1. An understanding of the concepts of production and servicesystems;
2. The ability to apply principles and techniques in the design, planning and control of these systems to optimise/make best use of resources in achieving theirobjectives.
3. Identify different strategies employed in manufacturing and service industries to plan production and controlinventory.
4. Measure the effectiveness, identify likely areas for improvement,develop and implement improved planning and control methods for productionsystems.

UNIT – I

Introduction: Definition – objectives and functions of production planning and control – elements of production control – types of production – organization of production planning and control department – internal organization ofdepartment.

UNIT – II

Forecasting – importance of forecasting – types of forecasting, their uses – general principles of forecasting – forecasting techniques – qualitative methods and quantitive methods.

UNIT – III

Inventory management – functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P–Systems and Q-Systems Introduction to MRP I, MRP II, ERP, LOB (Line of Balance), JIT and KANBAN system.

UNIT – IV

Routing – definition – routing procedure –route sheets – bill of material – factors affecting routing procedure, schedule –definition – difference with loading

UNIT – V

Scheduling policies – techniques, standard scheduling methods.

Line Balancing, aggregate planning, chase planning, expediting, controlling aspects.

UNIT – VI

Dispatching – activities of dispatcher – dispatching procedure – follow up – definition – reason for existence of functions – types of follow up, applications of computer in production planning and control.

Course Outcomes

1	Understand the core features of the production planning and control at the operational and strategic levels, specifically the relationships between people, process, technology, productivity and quality and how it contributes to the competitiveness of firms.
2	Present and illustrate qualitative and quantitative forecasting techniques and their influence on production planning and control.
3	Demonstrate and explain the use of Manufacturing Requirements Planning (MRP2),Just - In - Time (JIT) techniques in terms of operation and their importance in Lean World Class Manufacturing
4	Solve routing and scheduling problems
5	Summarize various aggregate production planning techniques.
6	Identify the dispatching activities and various types of follow-ups

Text Books:

1. Elements of Production Planning and Control / Samuel Eilon/Universal BookCorp.
2. Manufacturing, Planning and Control/PartikJonssonStig-ArneMattsson/TataMcGrawHill

References:

1. Inventory Control Theory and Practice / Martin K. Starr and David W.Miller/Prentice-Hall
2. Production Planning andControl/Mukhopadyay/PHI.
3. Production Control A Quantitative Approach / John E.Biegel/Prentice-Hall
4. Production Control / Franklin G Moore & Ronald Jablonski/Mc-GrawHill
5. Production and Operations Management/Shailendra Kale/McGrawHill
6. Production and Operations Management/Ajay K Garg/McGrawHill

IV Year I Semester

ADDITIVE MANUFACTURING

(ELECTIVE – I)

L	T	P	C
4	0	0	3

Course Objectives:

The course aims at the importance of Additive Manufacturing, classifications, models, specifications of various Additive Manufacturing Techniques. To learn the different tools, soft-wares required and the applications of Additive Manufacturing.

UNIT – I

INTRODUCTION: Prototyping fundamentals, historical development, fundamentals of rapid prototyping, advantages and limitations of rapid prototyping, commonly used terms, classification of RP process.

LIQUID-BASED RAPID PROTOTYPING SYSTEMS: Stereo lithography Apparatus (SLA): models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies. Solid Ground Curing (SGC): models and specifications, process, working principle, applications, advantages and disadvantages, casestudies.

UNIT-II

SOLID-BASED RAPID PROTOTYPING SYSTEMS: Laminated object manufacturing (LOM) - models and specifications, process, working principle, applications, advantages and disadvantages, case studies. Fused deposition modelling (FDM) - models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT – III

POWDER BASED RAPID PROTOTYPING SYSTEMS: Selective laser sintering (SLS): models and specifications, process, working principle, applications, advantages and disadvantages, case studies. three dimensional printing (3DP): models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-IV

RAPID TOOLING: Introduction to rapid tooling (RT), conventional tooling Vs RT, Need for RT. rapid tooling classification: indirect rapid tooling methods: spray metal deposition, RTV epoxy tools, Ceramic tools, investment casting, spin casting, die casting, sand casting, 3D Keltool process. Direct rapid tooling: direct AIM, LOM Tools, DTM Rapid Tool Process, EOS Direct Tool Process and Direct Metal Tooling using3DP.

UNIT – V

RAPID PROTOTYPING DATA FORMATS: STL Format, STL File Problems, consequence of building valid and invalid tessellated models, STL file Repairs: Generic Solution, other Translators, Newly Proposed Formats.

RAPID PROTOTYPING SOFTWARE'S: Features of various RP software's like Magics, Mimics, Solid View, View Expert, 3 D View, Velocity 2, Rhino, STL View 3 Data Expert and 3 D doctor.

UNIT –VI

RP APPLICATIONS: Application in engineering, analysis and planning, aerospace industry, automotive industry, jewelry industry, coin industry, GIS application, arts and architecture. RP medical and bioengineering applications: planning and simulation of complex surgery, customized implants & prosthesis, design and production of medical devices, forensic science and anthropology, visualization of bimolecular.

Course Outcomes:

1 Understand the use of rapid prototyping and identify the rapid prototyping techniques used in different industries.

2 Describe the working of liquid based RP techniques and understand the importance of it with the help of case studies.

3 DiscussanddescribetheworkingofsolidbasedRPtechniqueswiththeuseofcasestudies.

4 Understand, compare the working of powder based RP techniques with liquid basedRP techniques and solid based RP techniques by studying the use cases.

5 Understand the importance of different techniques of rapid tooling for the preparation of molds.

6 Know the importance of slicing, tessellation, RP data format used in software and RP applications in medical, aerospace, architecture and jewelry industry.

Text Books:

1. Rapid prototyping: Principles and Applications /Chua C.K., Leong K.F. and LIM C.S/World Scientific publications

References:

1. Rapid Manufacturing / D.T. Pham and S.S.Dimov/Springer
2. Wohlers Report 2000 /Terry T Wohlers/WohlersAssociates
3. Rapid Prototyping & Manufacturing / Paul F.Jacobs/ASMEPress
4. Rapid Prototyping / Chua &Liou

IV Year I Semester

COMPUTATIONAL FLUID DYNAMICS

(Elective 1)

L	T	P	C
4	0	0	3

Course Objectives:

The course aims at providing required numerical and software techniques for solving various engineering problems involving fluid flow.

UNIT-I

ELEMENTARY DETAILS IN NUMERICAL TECHNIQUES: Number system and errors, representation of integers, fractions, floating point arithmetic, loss of significance and error propagation, condition and instability, computational methods for error estimation, convergence ofsequences.

UNIT – II

APPLIED NUMERICAL METHODS: Solution of a system of simultaneous linear algebraic equations, iterative schemes of matrix inversion, direct methods for matrix inversion, directmethods for banded matrices.

REVIEW OFEQUATIONS GOVERNING FLUID FLOW ANDHEATTRANSFER: Introduction,conservation of mass, Newton's second law of motion, expanded forms of navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

UNIT – III

Steady flow, dimensionless form of momentum and energy equations, stokes equation, conservative body force fields, stream function - vorticityformulation.

Finite difference applications in heat conduction and convention – heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT – IV

Finite differences, discretization, consistency, stability, and fundamentals of fluid flow modelling: introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT – V

Introduction to first order wave equation, stability of hyperbolic and elliptic equations, fundamentals of fluid flow modelling, conservative property, the upwind scheme.

UNIT –VI

FINITE VOLUME METHOD: Approximation of surface integrals, volume integrals,

interpolation and differentiation practices, upwind interpolation, linear interpolation and quadratic interpolation.

Text Books:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar/Butter-worthPublishers
2. Computational fluid dynamics - Basics with applications /John. D. Anderson / McGrawHill.

References:

1. Computational Fluid Flow and Heat Transfer/ Niyogi/PearsonPublications
2. Fundamentals of Computational Fluid Dynamics /Tapan K. Sengupta/ UniversitiesPress.
3. Computational fluiddynamics: An introduction, 3rd edition/John.FWendt/Springer publishers

Course Outcomes:

After undergoing the course the student shall be able to apply various numerical tools like finite volume, finite difference etc for solving the different fluid flow heat transfer problems.

IV Year I Semester

CONDITION MONITORING

(ELECTIVE – I)

L	T	P	C
4	0	0	3

Course Objectives:

- This course is designed to introduce the benefits and opportunities of health Monitoring and covers a range oftechniques
- The students will be exposed to a range of techniques from Vibration based methods, Thermography, Oil conditions, Debris and ultrasonicmonitoring
- Using overall vibration, vibration limit zones, broadband vibration bandwidth, alert levels, typical severity guidelines, recording overall vibration, using overall vibration for fault finding, trending overallvibration.
- Identifying Resonance, Hammer Test, Self Excitation, Exciter Testing. Reducing Resonance - Effects of Frequency, Stiffness, Mass, Damping,Isolation

UNIT-I

BASICS OF VIBRATION: Basic motion: amplitudes, period, frequency, basic parameters: displacement, velocity, acceleration, units (including dB scales) and conversions, Mass, spring and damper concept, Introduction to SDOF and MDOF systems, Natural frequencies and resonance, Forcedresponse.

UNIT-II

VIBRATION MEASUREMENTS AND ANALYSIS: Transducers and mounting methods, data acquisition using instrumentation recorders/data loggers, time domain signal analysis, orbit analysis, Filters, Frequency domain analysis (Narrow band FFT analysis), Nyquist criteria, Sampling, aliasing, windowing and averaging.

VIBRATION MEASUREMENT AND ANALYSIS: Use of phase; bode, polar and water fall plots, constant percentage band width analysis (1/3 and 1/1 Octave analysis), envelope detection /spike energy analysis, cepstral analysis, advances in analysis (PC based and portable instruments for vibration analysis).

UNIT-III

Fault Diagnosis, Interpreting vibration measurements for common machine faults , imbalance, misalignment, mechanical looseness, bearing and gearing faults, faults in induction motors, resonances, some case studies, static and dynamic balancing, international standards for vibration conditionmonitoring.

UNIT-IV

THERMOGRAPHY: The basics of infrared thermography, differences in equipment and specific wave length limitations, application of ir to: electrical inspection, mechanical inspection, energy conservation, how to take good thermal images, hands-on demonstrations focusing on proper camera settings and image interpretation, analysis of thermal images and report generation, study of thermo graphy applications

UNIT-V

OIL AND WEAR DEBRIS ANALYSIS: Basics of oil analysis, monitoring condition of oil, lubricant analysis, physio – chemical properties, moisture, tan tbn, wear debris analysis, particle counting, spectroscopy, uses & limitations, ferrography wear particle analysis, concept of ferrography, principle particle classification, size, shape, composition, concentration, analysis procedure, sampling & analytical ferrographyequipments, severity rating.

UNIT-VI

ULTRASONIC MONITORING AND ANALYSIS: Ultrasonic monitoring (leak, crack and thickness) basics of ultrasonic monitoring , ultrasonic theory, test taking philosophy, ultrasonic theory, mathematics of ultrasound, equipment and transducers, inspection parameters and calibration, immersion theory, equipment quality control, flaw origins and inspection methods, UT Procedure familiarization, and study recommendations, application of ultrasound to: air leaks, steam trap testing, bearing lubrication, electrical inspection, casestudies.

Course outcomes:

- Gaining invaluable insights into the benefits of ConditionMonitoring
- Understanding the reasons for selecting particular maintenancestrategies
- Understanding effective methodologies for implementing Condition MonitoringTechniques
- Identifying the optimum maintenance strategy for different types ofequipment
- Gaining practical approaches to minimize the risk of plant and machinerybreakdowns
- Awareness of International Standards covering assetmanagement

Text Books:

1. The Vibration Analysis Handbook/J I Taylor (1994)/Vibration consultants IncorporatePublishers
2. Machinery Vibration ConditionMonitoring/Lynn/Butterworth(1989)

References:

1. Machinery Vibration: Measurement and Analysis/Victor Wowk/McGrawHillProfessional
2. Mechanical fault diagnosis and condition monitoring/RA Collacott(1977) /Chapman andHall
3. The Vibration Monitoring Handbook/Charles W Reeves/Coxmoor publishingcompany

IV Year - I Semester

ADVANCED MATERIALS (ELECTIVE – II)

L	T	P	C
4	0	0	3

Course Objectives

The objective for this course is to understand the mechanics of different materials. This understanding will include concepts such as anisotropic material behaviour, constituent properties and manufacturing processes of different composites. Suitability of smart and nano materials for engineering applications.

UNIT-I

INTRODUCTION TO COMPOSITE MATERIALS: Introduction, classification: polymer matrix composites, metal matrix composites, ceramic matrix composites, carbon–carbon composites, fiber- reinforced composites and nature-made composites, and applications .

REINFORCEMENTS: Fibres- glass, silica, kevlar, carbon, boron, silicon carbide, and born carbide fibres.

UNIT-II

Polymer composites, thermoplastics, thermosetting plastics, manufacturing of PMC, MMC & CCC and their applications.

UNIT-III

MANUFACTURING METHODS: Autoclave, tape production, moulding methods, filament winding, hand layup, pultrusion, RTM.

UNIT-IV

MACROMECHANICAL ANALYSIS OF A LAMINA: Introduction, generalized Hooke's law, reduction of Hooke's law in three dimensions to two dimensions, relationship of compliance and stiffness matrix to engineering elastic constants of an orthotropic lamina, laminate-laminate code.

UNIT-V

FUNCTIONALLY GRADED MATERIALS: Types of functionally graded materials-classification- different systems-preparation-properties and applications of functionally graded materials.

SHAPE MEMORY ALLOYS: Introduction-shape memory effect-classification of shape memory alloys- composition-properties and applications of shape memory alloys.

UNIT-VI

NANO MATERIALS: Introduction-properties at nano scales-advantages & disadvantages-applications in comparison with bulk materials (nano – structure, wires, tubes, composites). state of art nano advanced- topic delivered by student.

Text Books:

1. Nano material /A.K. Bandyopadyay/New age Publishers
2. Material science and Technology: A comprehensive treatment/Robert W.Cahn,/VCH
3. Engineering Mechanics of Composite Materials / Isaac and M Daniel/Oxford University Press

References:

1. Mechanics of Composite Materials / R. M. Jones/ McGraw Hill Company, New York, 1975.
2. Analysis of Laminated Composite Structures / L. R. Calcote/Van NostrandRainfold,NY 1969
3. Analysis and performance of fibre Composites /B. D. Agarwal and L. J. Broutman /Wiley-Interscience, New York, 1980
4. Mechanics of Composite Materials - Second Edition (Mechanical Engineering) /AutarK.Kaw / CRC Press

IV Year I Semester

DESIGN FOR MANUFACTURE
(ELECTIVE – II)

L	T	P	C
4	0	0	3

Course Objectives:

1. Understand the design rules and considerations with reference to various manufacturingprocesses
2. To discusses capabilities and limitations of each manufacturing process in relation to part design andcost
3. To examine DFM principles including how the design affects manufacturing cost, lean manufacturing, six sigma,etc.

UNIT - I

Introduction: Design philosophy-steps in design process-general design rules for manufacturability-basic principles of designing for economical production-creativity in design. Design for the life cycle total product life of consumer goods-design considerations.

UNIT – II

Machining processes: Overview of various machining processes-general design rules for machining- dimensional tolerance and surface roughness-Design for machining – ease – redesigning of components for machining ease with suitable examples. General design recommendations for machinedparts.

UNIT - III

Metal casting: Appraisal of various casting processes, selection of casting process,-general design considerations for casting-casting tolerance-use of solidification, simulation in casting design-product design rules for sand casting.

UNIT – IV

Metal joining: Appraisal of various welding processes, factors in design of weldments – general design guidelines-pre and post treatment of welds-effects of thermal stresses in weld joints-design of brazed joints. Forging: Design factors for forging – closed die forging design – parting lines of dies – drop forging die design – general design recommendations.

UNIT – V

Extrusion & Sheet metal work: Design guide lines extruded sections-design principles for punching, blanking, bending, deep drawing-Keeler Goodman forging line diagram – component design for blanking.

UNIT – VI

Plastics: Visco elastic and creep behavior in plastics-design guidelines for plastic components-design considerations for injection moulding – design guidelines for machining and joining of plastics.

Course outcomes:

Upon completion of the course, the student will be able to:

1. Design components formachining
2. Simulate the casting design and choose the best casting process for a specificproduct.
3. Evaluate the effect of thermal stresses in weldjoints
4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formationmechanisms
5. Design plastic components for machining and joining and selecting a proper processes for different joiningcases

Text Books:

1. Design for manufacture / John cobert / Adisson Wesley.1995
2. Design for Manufacture / Boothroyd/CRCPress
3. Design for manufacture/ James Bralla/McGrawHill Edition

Reference:

1. ASM Hand book Vol.20

IV Year I Semester

GAS DYNAMICS AND JET PROPULSION
(ELECTIVE – II)

L	T	P	C
4	0	0	3

Course objectives:

The purpose of this course is to provide the student with the knowledge of basic principles of gas dynamics and its importance in jet propulsionapplications.

UNIT-I

Introduction to gas dynamics: control volume and system approaches acoustic waves and sonic velocity - mach number - classification of fluid flow based on mach number - mach cone-compressibility factor - general features of one dimensional flow of a compressible fluid - continuity and momentum equations for a control volume.

UNIT-II

Isentropic flow of an ideal gas: basic equation - stagnation enthalpy, temperature, pressure and density- stagnation, acoustic speed - critical speed of sound- dimensionless velocity- governing equations for isentropic flow of a perfect gas - critical flow area - stream thrust and impulse function.

Steady one dimensional isentropic flow with area change-effect of area change on flow parameters- chocking- convergent nozzle - performance of a nozzle under decreasing back pressure -De lavel nozzle - optimum area ratio effect of back pressure - nozzle discharge coefficients - nozzleefficiencies.

UNIT- III

Simple frictional flow: adiabatic flow with friction in a constant area duct-governing equations - fanno line limiting conditions - effect of wall friction on flow properties in an Isothermal flow with friction in a constant area duct-governing equations - limitingconditions.

Steady one dimensional flow with heat transfer in constant area ducts- governing equations - Rayleigh line entropy change caused by heat transfer - conditions of maximum enthalpy and entropy.

UNIT-IV

Effect of heat transfer on flow parameters: Intersection of Fanno and Rayleigh lines. Shock waves in perfect gas- properties of flow across a normal shock - governing equations - RankineHugoniat equations - Prandtl's velocity relationship - converging diverging nozzle flow with shock thickness - shock strength.

UNIT- V

Propulsion: Air craft propulsion: - types of jet engines - energy flow through jet engines, thrust, thrust power and propulsive efficiency turbojet components-diffuser, compressor, combustion chamber, turbines, exhaust systems.

UNIT-VI

Performance of turbo propeller engines, ramjet and pulsejet, scramjet engines. Rocket propulsion - rocket engines, Basic theory of equations - thrust equation - effective jet velocity

- specific impulse - rocket engine performance - solid and liquid propellant rockets - comparison of various propulsionsystems.

Course outcomes:

Up on successful completion of this course the student should be able to analyze the gas flow in different situations with and without friction, with and without heat transfer in particular jet propulsion and rocket engineering applications.

Text Books:

1. Compressible fluid flow /A. H. Shapiro / Ronald Press Co.,1953
2. Fundamentals of compressible flow with aircraft and rocket propulsion/S. M. Yahya/New Age internationalPublishers
3. Fundamental of Gas dynamics-2nd edition/ M J Zucker/ Wileypublishers

References:

1. Elements of gas dynamics / HW Liepman& ARoshko/Wiley
2. Aircraft & Missile propulsion /MJZucrow/Wiley
3. Gas dynamics / M.J. Zucrow& Joe D.Holfman / KriegerPublishers

IV Year I Semester

CAD/CAM LAB

L	T	P	C
0	0	2	2

Course Objectives:

1. To impart the fundamental knowledge on using various analytical tools like ANSYS, FLUENT, etc., for EngineeringSimulation
2. To know various fields of engineering where these tools can be effectively used to improve the output of a product.
3. To impart knowledge on how these tools are used in Industries by solving some real time problems using thesetools.

1. **DRAFTING:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGESfiles.
2. **PART MODELING:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simplecomponents.
    a. Determination of deflection and stresses in 2D and 3D trusses andbeams.
    b. Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetriccomponents.
    c. Determination of stresses in 3D and shell structures (at least one example in each case)
    d. Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
    e. Steady state heat transfer Analysis of plane and Axisymmetriccomponents.
3.

a) Study of various post processors used in NCMachines.
b) Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS232.
c) Practice on CNC SinutrainTurning
d) Practice on CNC SinutrainMilling
e) CNC programming for turned components using FANUCController
f) CNC programming for milled components using FANUCController
g) Automated CNC Tool path & G-Code generation using Pro/E/MasterCAM

Packages to be provided to cater to drafting, modeling & analysis from the following: CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, Master CAM etc.

Courseoutcomes:

Upon successful completion of this course student should be able to:

1	Execute steps required for modeling 3D objects by using protrusion, cut, sweep, extrudecommands
2	Convert 3D solid models into 2D drawing-different views, sections
3	Use isometric views and dimensioning of part models
4	Understand and analyze the problem with the help of ANSYS software
5	Able to Machine simple components on CNC machines
6	Able to use CAM software to generate NC code

IV Year I Semester

MECHATRONICS LAB

L	T	P	C
4	0	0	3

Course Outcomes: At the end of the course, the student will be able to:

1. Measure load, displacement and temperature using analogue and digitalsensors.
2. Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts.
3. Simulate and analyse PID controllers for a physical system usingMATLAB.
4. Develop pneumatic and hydraulic circuits using Automaton studio.

List of Experiments

1. DYNA 1750 Transducers Kit:-
   a. Characteristics of LVDT
   b. Principle & Characteristics of StrainGauge
   c. Characteristics of SummingAmplifier
   d. Characteristics of Reflective OptoTransducer

2. PLCPROGRAMMING
   a. Ladder programming on Logic gates ,Timers &counters
   b. Ladder Programming for digital & Analogysensors
   c. Ladder programming for Traffic Light control, Water level control and Lift controlModules

3. AUTOMATION STUDIOsoftware
   a. Introduction to Automation studio & itscontrol
   b. Draw & Simulate the Hydraulic circuit for series & parallel cylindersconnection
   c. Draw & Simulate Meter-in, Meter-out and hydraulic press andclamping.

4. MATLABProgramming
   a. Sample programmes onMatlab
   b. Simulation and analysis of PID controller usingSIMULINK

Course Outcomes

1	Understand the basic principles of measurement and working mechanism of different transducers.
2	Understand the concept of strain gauge and strain rosettes for strain measurement.
3	Understand the construction and working of a LVDT and its application in measurement of displacement.
4	Able to work with PLC & Ladder Programming systems and its integration to mechanical systems for real time applications.

5	Selection of appropriate sensors and transducers depending on application.
6	DevelopmentofhydraulicandPneumaticsystemsandimplementationforreallifesystem.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

IV Year - II Semester

AUTOMOBILE ENGINEERING

L	T	P	C
4	0	0	3

Course Objectives:

The course imparts the principles of automobile systems and provides the salient features of safety, emission and service of automobiles.

UNIT – I

INTRODUCTION: Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.

UNIT – II

TRANSMISSION SYSTEM: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box, over drive torque converter. propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

UNIT – III

STEERING SYSTEM: Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears

– types, steering linkages.

UNIT – IV

SUSPENSION SYSTEM: Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

BRAKING SYSTEM: Mechanical brake system, hydraulic brake system, master cylinder, wheel cylinder tandem master cylinder requirement of brake fluid, pneumatic and vacuum brakes.

ELECTRICAL SYSTEM: Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT – V

ENGINE SPECIFICATION AND SAFETY SYSTEMS: Introduction- engine specifications with regard to power, speed, torque, no. of cylinders and arrangement, lubrication and cooling etc.

Safety: Introduction, safety systems - seat belt, air bags, bumper, anti lock brake system (ABS), wind shield, suspension sensors, traction control, mirrors, central locking and electric windows, speed control.

UNIT – VI

ENGINE EMISSION CONTROL: Introduction – types of pollutants, mechanism of formation, concentration measurement, methods of controlling-engine modification, exhaust gas treatment-thermal and catalytic converters-use of alternative fuels for emission control – National and International pollution standards

ENGINE SERVICE: Introduction, service details of engine cylinder head, valves and valve mechanism, piston- connecting rod assembly, cylinder block, crank shaft and main bearings, engine reassembly-precautions.

Course Outcomes:

1 Demonstratethevehicleconstruction,typesofautomobileengines,chassisandlubrication system in automobile.

2 Draw and explain the working of different types of transmission systems in automobile.

3 Sketch and explain steering system and its geometry.

4 Understand the working of different types of suspension, breaking and electrical systems.

5 Explain engine specifications and discuss various safety systems in automobile.

6 Understand engine emission control systems, pollution standards and demonstrate engine service

Text Books:

1. Automotive Mechanics – Vol. 1 & Vol. 2 / Kirpal Singh/standard publishers
2. Automobile Engineering / William Crouse/TMH Distributors
3. Automobile Engineering/P.S Gill/S.K. Kataria& Sons/New Delhi.

References:

1. Automotive Engines Theory and Servicing/James D. Halderman and Chase D. Mitchell Jr.,/ Pearson education inc.
2. Automotive Engineering / K Newton, W.Steeds& TK Garrett/SAE
3. Automotive Mechanics : Principles and Practices/ Joseph Heitner/Van Nostrand Reinhold
4. Automobile Engineering / C Srinivasan/McGrawHill

IV Year II Semester

PRODUCTION PLANNING AND CONTROL

L	T	P	C
4	0	0	3

Course objectives:

This subject provides students with

1. An understanding of the concepts of production and servicesystems;
2. The ability to apply principles and techniques in the design, planning and control of these systems to optimise/make best use of resources in achieving theirobjectives.
3. Identify different strategies employed in manufacturing and service industries to plan production and controlinventory.
4. Measure the effectiveness, identify likely areas for improvement,develop and implement improved planning and control methods for productionsystems.

UNIT – I

Introduction: Definition – objectives and functions of production planning and control – elements of production control – types of production – organization of production planning and control department – internal organization ofdepartment.

UNIT – II

Forecasting – importance of forecasting – types of forecasting, their uses – general principles of forecasting – forecasting techniques – qualitative methods and quantitive methods.

UNIT – III

Inventory management – functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P–Systems and Q-Systems Introduction to MRP I, MRP II, ERP, LOB (Line of Balance), JIT and KANBAN system.

UNIT – IV

Routing – definition – routing procedure –route sheets – bill of material – factors affecting routing procedure, schedule –definition – difference with loading

UNIT – V

Scheduling policies – techniques, standard scheduling methods.

Line Balancing, aggregate planning, chase planning, expediting, controlling aspects.

UNIT – VI

Dispatching – activities of dispatcher – dispatching procedure – follow up – definition – reason for existence of functions – types of follow up, applications of computer in production planning and control.

Course Outcomes

1	Understand the core features of the production planning and control at the operational and strategic levels, specifically the relationships between people, process, technology, productivity and quality and how it contributes to the competitiveness of firms.
2	Present and illustrate qualitative and quantitative forecasting techniques and their influence on production planning and control.
3	Demonstrate and explain the use of Manufacturing Requirements Planning (MRP2),Just - In - Time (JIT) techniques in terms of operation and their importance in Lean World Class Manufacturing
4	Solve routing and scheduling problems
5	Summarize various aggregate production planning techniques.
6	Identify the dispatching activities and various types of follow-ups

Text Books:

1. Elements of Production Planning and Control / Samuel Eilon/Universal BookCorp.
2. Manufacturing, Planning and Control/PartikJonssonStig-ArneMattsson/TataMcGrawHill

References:

1. Inventory Control Theory and Practice / Martin K. Starr and David W.Miller/Prentice-Hall
2. Production Planning andControl/Mukhopadyay/PHI.
3. Production Control A Quantitative Approach / John E.Biegel/Prentice-Hall
4. Production Control / Franklin G Moore & Ronald Jablonski/Mc-GrawHill
5. Production and Operations Management/Shailendra Kale/McGrawHill
6. Production and Operations Management/Ajay K Garg/McGrawHill

IV Year II Semester

Unconventional Machining Processes (C422)

L	T	P	C
4	0	0	3

Course Objectives:

- The course aims in identifying the classification of unconventional machiningprocesses.
- To understand the principle, mechanism of metal removal of various unconventional machiningprocesses.
- To study the various process parameters and their effect on the component machined on various unconventional machiningprocesses.
- To understand the applications of differentprocesses.

UNIT – I

INTRODUCTION: Need for non-traditional machining methods-classification of modern machining processes

– considerations in process selection,applications.

Ultrasonic machining – Elements of the process, mechanics of material removal, MRR process parameters, economic considerations, applications and limitations.

UNIT – II

ELECTRO – CHEMICAL MACHINING: Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and deburring process, metal removal rate in ECM, Tool design, Surface finish and accuracy, economic aspects of ECM – Simple problems for estimation of metal removal rate, fundamentals of chemical, machining, advantages andapplications.

UNIT - III

THERMAL METAL REMOVAL PROCESSES: General principle and applications of Electric Discharge Machining, Electric Discharge Grinding and wire EDM – Power circuits for EDM, Mechanics of metal removal in EDM, Process parameters, selection of tool electrode and dielectric fluids, surface finish and machining accuracy, characteristics of spark eroded surface

UNIT – VI

Electron Beam Machining, Laser Beam Machining - Basic principle and theory, mechanics of material removal, process parameters, efficiency & accuracy, applications

UNIT-V

Plasma Machining: Application of plasma for machining, metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries.

UNIT – VI

Abrasive jet machining, Water jet machining and abrasive water jet machining: Basic principles, equipments, process variables, mechanics of material removal, MRR, application and limitations, agnetic abrasive finishing, abrasive flow finishing, Electrostream drilling, shaped tube electrolytic machining.

Course outcomes:

1	Understand the significance of various nontraditional machining processes and the detailsof Ultrasonic machining in modern manufacturing.
2	Able to explain Working principle, advantages, disadvantages and applications of Electrochemical Machining Process
3	Able to explain the Process, equipment of Electric Discharge Machining (EDM) and wireEDM
4	Understand the Electron beam Machining and Laser Beam Machining processes
5	Demonstrate the Plasma Machining Processes and its applications
6	Explain the Abrasive and water jet machining processes and its applications

Text Books:

1. Fundamentals of Machining Processes-Conventional and non – conventional processes/Hassan Abdel – Gawad El-Hafy/CRCPress-2016.

References:

1. Modern Machining Process / Pandey P.C. and Shah H.S./TMH.
2. New Technology / Bhattacharya A/ the Institution of Engineers, India1984.
3. Non Traditional Manufacturing Processes / Benedict/

IV Year II Semester

NON - DESTRUCTIVE EVALUATION

(ELECTIVE – III)

L	T	P	C
4	0	0	3

Course Objectives

- The students are to be exposed to the concepts of various NDE techniques using radiography, ultrasonics, liquid penetrates, magnetic patches and Eddycurrents
- They will learn basic principles of these methods and will be able to select a testingprocess
- They will understand the advantages and disadvantages of thesetechniques.

UNIT – I

Introduction to non-destructive testing: Radiographic test**,** Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography

UNIT – II

Ultrasonic test: Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect , Ultrasonic Transducers and their Characteristics, Ultrasonic Equipment and Variables Affecting Ultrasonic Test, Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection - Effectiveness and Limitations of Ultrasonic Testing.

UNIT – III

Liquid Penetrant Test: Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing**,**

Eddy Current Test: Principle of Eddy Current, Eddy Current Test System, Applications of Eddy Current Testing Effectiveness of Eddy Current Testing

UNIT – IV

Magnetic Particle Test: Magnetic Materials, Magnetization of Materials , Demagnetization of Materials,Principle of Magnetic Particle Test, Magnetic Particle Test Equipment, Magnetic Particle Test Procedure, Standardization and Calibration, Interpretation and Evaluation, Effective Applications and Limitations of the Magnetic Particle Test

UNIT – V

Infrared And Thermal Testing: Introduction and fundamentals to infrared and thermal testing–Heat transfer –Active and passive techniques –Lock in and pulse thermography– Contact and non contact thermal inspection methods–Heat sensitive paints –Heat sensitive papers –-thermally quenched phosphors liquid crystals –techniques for applying liquid crystals –other temperature sensitive coatings –Inspection methods –Infrared radiation and infrared detectors–thermo mechanical behavior of materials–IR imaging in aerospace applications, electronic components, Honey comb and sandwich structures–Casestudies.

UNIT – VI

Industrial Applications of NDE: Span of NDE Activities Railways, Nuclear, Non-nuclear

and Chemical Industries, Aircraft and Aerospace Industries, Automotive Industries, Offshore Gas and Petroleum Projects, Coal Mining Industry, NDE of pressure vessels, castings, welded constructions

Text Books:

1. Non destructive test and evaluation of Materials/J Prasad, GCK Nair/TMHPublishers
2. Ultrasonic testing of materials/ HKrautkramer/Springer
3. Non destructive testing/Warren, J McGonnagle / Godan and Breach Sciencepublishers
4. Nondestructive evaluation of materials by infrared thermography / X. P. V. Maldague, Springer-Verlag, 1st edition,(1993)

References:

1. Ultrasonic inspection training for NDT/ E. A. Gingel/PrometheusPress,
2. ASTM Standards, Vol 3.01, Metals andalloys
3. Non-destructive, Hand Book – R.Hamchand

Course Outcomes

1	Identify different nondestructive testing methods and understand the Radiographic tests
2	Examine and evaluate the various Ultrasonic testing procedures
3	Study in detail about the nondestructive evaluation using Liquid Penetrant and Eddy currents
4	Know and study about the standardization and calibration of magnetic particle testing
5	To evaluate the different infrared and thermal testing procedures
6	Apply the Non Destructive Testing methods in various industrial applications

IV Year II Semester

QUALITY AND RELIABILITY ENGINEERING

(ELECTIVE – III)

L	T	P	C
4	0	0	3

Course objectives:

1. The aim of this course is to provide students with a basic understanding of the approaches and techniques to assess and improve process and/or product quality andreliability.
2. The objectives are to introduce the principles and techniques of Statistical Quality Control and their practical uses in product and/or process design andmonitoring
3. To understand techniques of modern reliability engineeringtools.

UNIT-I

Quality value and engineering – quality systems – quality engineering in product design and production process – system design – parameter design – tolerance design, quality costs – quality improvement.

UNIT-II

Statistical process control X , R, p, c charts, other types of control charts, process capability, process capability analysis, process capability index. (SQC tables can be used in the examination)

UNIT-III

Acceptance sampling by variables and attributes, design of sampling plans, single, double, sequential and continuous sampling plans, design of various sampling plans.

UNIT-IV

Loss function, tolerance design – N type, L type, S type; determination of tolerance for these types.online quality control – variable characteristics, attribute characteristics, parameter design.

Quality function deployment – house of quality, QFD matrix, total quality management concepts.quality information systems, quality circles, introduction to ISO 9000 standards.

UNIT-V

Reliability – Evaluation of design by tests - Hazard Models, Linear, Releigh, Weibull. Failure Data Analysis, reliability prediction based on weibull distribution, Reliability improvement.

UNIT-VI

Complex system, reliability, reliability of series, parallel & standby systems & complex systems & reliability prediction and system effectiveness.

Maintainability, availability, economics of reliability engineering, replacement of items, maintenance costing and budgeting, reliability testing.

Text Books:

1. Quality Engineering in Production Systems / G Taguchi /McGrawHill
2. Reliability Engineering/ E.BalaGuruswamy/Tata McGrawHill,
3. Statistical Quality Control : A Modern Introduction/Montgomery/Wiley

References:

1. Jurans Quality planning & Analysis/ Frank.M.Gryna Jr. / McGrawHill.
2. Taguchi Techniques for Quality Engineering/ Philipposs/ McGrawHill,
3. Reliability Engineering / LS Srinath / Affiliated East West Pvt.Ltd.,
4. Statistical Process Control/ Eugene Grant, Richard Leavenworth / McGrawHill.
5. Optimization & Variation Reduction in Quality / W.A. Taylor / Tata McGrawHill
6. Quality and Performance Excellence/ James R Evans/ Cengagelearning

IV Year II Semester

THERMAL EQUIPMNT DESIGN

(ELECTIVE – III)

L	T	P	C
4	0	0	3

UNIT - I:

Classification of heat exchangers: Introduction, Recuperation & Regeneration – Tubular heat exchangers: double pipe, shell & tube heat exchanger, Plate heat exchangers, Gasketed plate heat exchanger, spiral plate heat exchanger, Lamella heat exchanger, extended surface heat exchanger, Plate fin, and Tubular fin.

UNIT - II:

Basic Design Methods of Heat Exchanger: Introduction, Basic equations in design, Overall heat transfer coefficient – LMTD method for heat exchanger analysis – parallel flow, counter flow, multipass, cross flow heat exchanger design calculations.

Double Pipe Heat Exchanger: Film Coefficient for fluids in annulus, fouling factors, calorific temperature, average fluid temperature, the calculation of double pipe exchanger, Double pipe exchangers in series-parallel arrangements.

UNIT - III:

Shell & Tube Heat Exchangers: Tube layouts for exchangers, baffle Heat exchangers, calculation of shell and tube heat exchangers – shell side film coefficients, Shell side equivalent diameter, the true temperature difference in a 1-2 heat exchanger, influence of approach temperature on correction factor, shell side pressure drop, tube side pressure drop, Analysis of performance of 1-2 heat exchanger, and design calculation of shell & tube heat exchangers. Flow arrangements for increased heat recovery, the calculations of 2-4exchangers.

UNIT - IV:

Condensation of single vapors: Calculation of a horizontal condenser, vertical condenser, De-super heater condenser, vertical condenser – sub-cooler, horizontal condenser – subcooler, vertical reflux type condenser, condensation of steam.

UNIT – V:

Vaporizers, Evaporators and Reboilers: Vaporizing processes, forced circulation vaporizing exchangers, natural circulation vaporizing exchangers, calculations of a reboiler.

Extended Surfaces: Longitudinal fins, weighted fin efficiency curve, calculation of a double pipe fin efficiency curve, calculation of a double pipe finned exchanger, calculation of a longitudinal fin shell and tube exchanger.

UNIT - VI:

Direct Contact Heat Exchanger: Cooling towers, relation between wet bulb & dew point temperatures, the Lewis number, and classification of cooling towers, cooling tower internals and the roll of fill, Heat balance, heat transfer by simultaneous diffusion and convection. Analysis of cooling tower requirements, Design of cooling towers, Determination of the

number of diffusion units, calculation of cooling tower performance.

Text Books:

1. Process Heat Transfer – D.Q. Kern, TMH.
2. Cooling Towers by J.D.Gurney
3. Heat Exchanger Design – A.P.Fraas and M.N. Ozisick. John Wiely& sons, NewYork.

IV Year II Semester

PROJECT

L	T	P	C
0	0	0	10

Course Outcomes

1	Identify a topic in advanced areas of Mechanical Engineering
2	Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
3	Identify methods and materials to carry out experiments/simulations/development
4	Reorganize the procedures of design, development & manufacturing with a concern for society, environment and ethics
5	Analyze and discuss the results to draw valid conclusions
6	Prepare a report as per recommended format and defend the work

IV Year II Semester

SEMINAR

L	T	P	C
0	3	0	2

Course Outcomes

1	Identify a topic in advanced areas of Mechanical Engineering.
2	Identify and compare technical and practical issues related to the area of interest
3	Analyses the references/bibliography related to topic
4	Prepare a well-organized report including elements of technical writing and critical thinking
5	Interpret and Communicate technical issues and recent developments through presentation
6	Write technical documents for scientific communication and Promote and develop presentation skills

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor's theorem and Maclaurin's theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application and to know the importance of free electron theory for metals.
- Enlightenment of the importance of band theory for crystalline solids and metals. To understand the physics of Semiconductors and their working mechanism.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index-Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser –Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric Properties

Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations - Electronic and Ionic polarizations with mathematical derivations – Orientational polarization (Qualitative)–Internal field in solids -Claussius -Mosotti equation.

UNIT – IV: Quantum Mechanics and Free Electron Theory of Metals

Quantum Mechanics:

Introduction- Dual nature of matter-Matter waves, de-Broglie wavelength, Properties of wave function- time independent and time dependent Schrödinger's wave equation-Particle in a one dimensional infinite potential well.

Free Electron Theory of Meals:

Classical free electron theory (Qualitative with discussion of merits and demerits)-Quantum free electron theory-Equation for electrical conductivity based on quantum free electron theory-Fermi-Dirac Distribution-density of states (3D) - Fermi Energy.

UNIT –V: Band Theory of Solids and Semiconductors

Band Theory of Solids:

Bloch Theorem - Kronig-Penny Model (Qualitative)-E vs K and v vs K diagram- Origin of energy bands - Classification of solids based on energy bands – Effective Mass of an Electron-Concept of a Hole

Semiconductors:

Introduction– Intrinsic semiconductors - density of charge carriers-Fermi level – extrinsic semiconductors - P-type & N-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature - Drift and Diffusion currents – Einstein's equation - Hall effect- Hall coefficient - Applications of Hall effect.

Text Books:

1.M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017

2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018

3. P.K. Palanisamy, Applied Physics, SciTech Publications.

References:

1. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill.

2. Charles Kittel “Introduction to Solid State Physics”,Wiley Publications.
3. S.M.Sze “Semiconductor devices-Physics and Technology”-Wiley.
4. Halliday, Resnick and Walker, “Fundamentals of Physics”, John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers.
6. Ajoy Ghatak “Optics” Tata Mc GrawHill.

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger’s time independent wave equation in studying particle in one-dimensional infinite potential well. Identify the role of classical free electron theory in the study of electrical conductivity.

CO5**:** Explain the concept of quantum free electron theory in the study of electrical conductivity. Classify the energy bands of solids. Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices.

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.

2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- ➢ Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words
- ➢ Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary
- ➢ Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations
- ➢ Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary
- ➢ Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

I B.Tech I Semester

ENGINEERING GRAPHICS

ECE & EEE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To introduce the students to use drawing instruments and to draw polygons, engineering curves and use scales
- To introduce the students orthographic projections, projections of points & lines.
- The objective is to make the students draw the projections of the plane inclined to both the planes.
- The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
- The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

UNIT I

Introduction to Graphics
Curves: Ellipse, Parabola and Hyperbola by general methods, Tangent & Normal
Scales: Plain scale, Diagonal scale and Vernier scale.

UNIT II

Orthographic Projections: Introduction to Projections, Horizontal plane, Vertical plane, Profile plane, importance of reference lines.
Projections of points in various quadrants.
Projections of straight lines inclined to one plane, inclined to both the planes, traces.

UNIT III

Projections of planes: Inclined to one reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Projections of Prisms, Pyramids, Cones and Cylinders simple positions, the axis inclined to one of the reference planes.

UNIT V

Conversion of isometric views to orthographic views;
Conversion of orthographic views to isometric views.

COURSE OUTCOMES:

Students will be able to:

1. Construct Engineering Curves and scales
2. Understand orthographic projections, projections of points & lines.
3. Draw the projections of a plane inclined to both the planes.
4. Draw the projections of various types of solids in different positions inclined to one of the planes.
5. Visualize and convert the isometric view to orthographic view and vice versa.

TEXT BOOKS:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publications
2. Engineering Graphics for Degree by K.C. John, PHI Learning
3. Engineering Graphics by PI Varghese, McGrawHill Publishers.
4. Engineering Drawing + AutoCAD by K. Venugopal, V. Prabhu Raja, New Age

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

1. To teach problem solving through Algorithms and Flowcharts
2. To elucidate problem solving through Python programming language
3. To train in the development of solutions using modular concepts
4. To explain the role of data structures in programming
5. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer
2. Develop computational thinking and be able to use Python constructs to solve basic problems
3. Understand modularization and data structures concepts in Python
4. Apply file handling concepts in problem solving
5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners‘ English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner‘s Compass, 7th Edition
7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press

12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others
- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.
- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume Resonator
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:
    - Creating a Class with variables and methods
    - Class inheritance
    - Constructors
    - Exception handling

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(ECE Branch)

Course Title: Applied Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. To learn the basic principles and applications of Electrochemistry.
3. Advanced Analytical instrumental techniques are introduced for material characterization.With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.
4. Understanding of crystal structures and preparation of semiconductors and insulators.
5. A wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.

UNIT- I: Polymer Chemistry

Introduction to polymers, functionality of monomers, copolymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosetting, Preparation, Properties and Applications of–Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting polymers - polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and applications

UNIT -II: Electrochemistry and Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations).

Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries-working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

UNIT-III: Instrumental Methods AndNon-Conventional Energy Sources

Part-A:Instrumental Methods

Electromagnetic Spectrum. Absorption of radiation: Beer-Lambert's law - Principles of UV-Visible, Infrared (IR) and Nuclear Magnetic Resonance (NMR) spectroscopy.

Basic concepts of Thin Layer Chromatography (TLC), Gas Chromatography (GC) and HighPerformance Liquid Chromatography (HPLC), Separation and purification of mixture of compounds.

Part-B: Non-Conventional Energy Sources

Introduction – Renewable and Non –Renewable energy sources - Solar Energy- Introduction, application of solar energy – photovoltaic cell: design, working and its importance.Hydropower includes setup a hydropower plant (schematic diagram), Geo-Thermal energy: Introduction-schematic diagram of a geothermal power plant, Tidal power - Introduction- Design and working, Biomass energy.

UNIT -IV: Solid State Chemistry

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel.

Hall Effect and Applications.

Semiconductors:Preparation of pure semiconductors by Zone refining, Distillation and Czochralskicrystal pulling technique- Doping- Epitaxy, Diffusion and Ion-implantation technique. Intrinsic and Extrinsic semiconductors - Applications.

Insulators*:* Electrical Insulators and theirApplications.

UNIT - V: Material Chemistry

Nano materials –Introduction- Top- down and Bottom -up approaches, Sol-gel method. Characterization by BET and TEM methods.Carbon nano tubes and fullerenes - Types, Preparation (Arc discharge Laser ablation and Chemical Vapour Deposition methods) Properties and Applications.

Liquid crystals - Introduction – Types – Applications.

Superconductors - Type-I & Type-II, Properties &Applications.

Green chemistry- Principles and Applications.

Text Books:

1 Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.

2 Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1 Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.

2 A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.

3 Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.

4 A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course, students will be able to

1. Recall the information related to polymers and their application.(Remembering)
2. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing)
3. Understand about the different analytical techniques and its applications.(Understanding)
   Design the technologies related to renewable energy sources. (Creating)
4. Understand the conductivity phenomenon and applications of solids.(Understanding)
5. Choose the materials like nano materials, liquid crystals, superconductors, and green synthetic methods to solve the Engineering problems. (Applying)

Branch: ECE **I Year – II Semester**

Regulation: R20

Sub. Title: NETWORKS & ELECTRICAL TECHNOLOGY

Sub.Code:

L	T	P	C
3	0	0	3

Learning Objectives:

- To understand the basic concepts and analysis of DC Circuits and Network Theorems
- To understand the concepts and analysis of various types of AC Circuits
- To understand the concepts of DC transients and two port network concepts
- To understand the principles of operation and characteristics of DC machines.
- To understand the principle of operation of AC Machines and special electrical machines

UNIT – I

DC Circuits: Basic introduction to Electrical Energy sources and network elements- Series and Parallel circuits, Star-Delta conversion, Kirchhoff's laws, Mesh analysis, Nodal analysis- Numeric problems solving with resistances only with independent sources.

Network Theorems (DC Excitation): Superposition, Thevenin's, Norton's, Reciprocity, Max Power Transfer theorems-problem solving using independent sources

UNIT – II

AC Circuits: Definitions of alternating quantities- Response of network elements to sinusoidal excitation, phase angle, series R-L, R-C, R-L-C circuits-problems, Introduction to three phase, phase sequence, relation between line and phase voltages and currents.

Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, conductively coupled equivalent circuits- problems

Resonant Circuits: Series and parallel resonance, frequency-response of series and Parallel circuits, Q–Factor, Bandwidth.

UNIT – III

DC Transients: Transient response of R-L, R-C, R-L-C circuits for DC excitations, Solution using differential equations.

Two-port Networks : Concept of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Relationship between parameter sets, Cascading of two port networks, series connection and Parallel connection.

UNIT - IV

DC Machines: Constructional details of DC Machine **–**Classification of DC machines. Principle of operation of DC generator – EMF equation--- Magnetization Characteristics of DC shunt Generator-Principle operation of DC motor – applications – Torque equation-three point starter, speed control methods.

UNIT – V

Transformers: Principle of operation of single phase transformers, EMF equation, losses, efficiency and regulation.

AC Machines: Principle and operation of 3-phase Induction Motor and 3-phase Synchronous Generator.

Special Electrical Machines: Principle of Operation of Stepper motors **and Permanent** magnet brushless DC motors.- Applications

Course Outcomes:

- Able to solve the various types DC circuits by applying different network techniques and Network Theorems
- Able to analyze various types of AC Circuits
- Able to analyze different types DC transient circuits and two port networks
- Able to analyze the performance of DC machines
- Able to analyze the performance of AC Machines and Special electrical machines.

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TEXT BOOKS:

1. Electric Circuit Analysis by Hayt and Kimmarle, TMH
2. Special electrical Machines, K.VenkataRatnam, University press, New Delhi.
3. Electrical Machines by D. P.Kothari, I .J .Nagarth,McGrawHill Publications, 4th edition.

REFERENCE BOOKS:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, Reviced 3rd Edition, 2019
2. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications
3. Circuits and Network: Analysis and Synthesis by A sudhakar and Shyammohan S Palli, McGrawHill Publications
4. Circuit Theory Analysis and Synthesis by AbhijitChakrabarthi,DhanpaiRai& Co Publications
5. Theory and performance of Electrical machines, J.B.Gupta,3rd edition, Kataria. S.K & Sons.
6. Electrical Machines by R.K.Rajput, Lakshmi publications, 5th edition.

I Year - II Semester

SEMICONDUCTOR DEVICES AND CIRCUITS

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L	T	P	C
3	0	0	3

Objectives:

The main objectives of this course are:

- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- The application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- The principal of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics are explained.
- The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers in different configuration is explained.

Syllabus:

UNIT- I: Junction Diode Characteristics : Open circuited p-n junction, law of junction, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, LED, Photo diode, Tunnel Diode, UJT. Construction, operation and characteristics of all the diodes are required to be considered.

UNIT- II: Rectifiers and Filters: Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors.

UNIT- III: Transistor Characteristics:

BJT: Introduction to transistor, Operating modes of transistor, transistor current components, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT- I V: Transistor Biasing and Thermal Stabilization : Need for biasing and operating point, load line

analysis, Stability factors, (S, S , S), BJT biasing methods, fixed bias, collector to base bias, self bias, Stabilization against variations in V_{BE}, Ic, and β, Thermal runaway avoid

condition. FET Biasing- methods and stabilization.

UNIT- V: Small Signal Low Frequency Transistor Amplifier Models:

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers.

FET: Generalized analysis of small signal model, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition.
2. Integrated Electronics- Jacob Millman, C. Halkies, C.D.Parikh, Tata Mc-Graw Hill, 2009.

References:

1. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition
2. Electronic Devices and Circuits – A.P.Godse, U.A.Bakshi, Technical publications.

Outcomes:

At the end of this course the student can able to:

- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
- Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
- Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

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Year/Semester	I B. Tech/IISem	L	T	P	C
Regulation Year	2020-21	1	0	4	3
Subject	C and Data Structures				
Branch	ECE				

Course Objectives:

- To design & develop C programs using selection and repetition control statements
- To design & develop C programs using arrays and strings
- To design & develop C programs using structures, unions, pointers
- To design & develop modular programs using functions
- To design & develop C programs using Stacks, Queues and Linked Lists

Course Outcomes:

By the end of the course, the students should be able to:

- Use the appropriate control statements to write programs for the given task
- Write programs using arrays and strings
- Use structures, unions and pointers in programming
- Write programs using modular programming
- Write programs using the appropriate data structures such as Stacks, Queues and Linked Lists

Unit-1

Introduction to the C Language: C Programming Basics: Identifiers, Types, Variable, Constants, Input/output, Operators, Expression Evaluation, Control Statements - Decision Control, Repetition Control, break, continue, Exercise programs covering these concepts

Unit-2

Derived Datatypes: Arrays, Two Dimensional Arrays, Multidimensional Arrays, Programming Examples, Strings: String Concepts, C String, String Input / Output Functions, Predefined string handling functions, Exercise programs covering these concepts

Unit-3

Structures: Definition, Variable declaration and initialization, Programming Examples, Nested Structures, Unions, Difference between Structure and Union, Pointers - Declaration & initialization, Operations on pointers, Exercise programs covering these concepts

Unit-4

Functions: Definition, Declaration, Function call, Predefined vs. User defined Functions, return statement, Types of functions, Parameter passing techniques – Call by value and Call by reference, Recursion, Exercise programs covering these concepts

Unit-5

Data Structures: Definition, Linear vs. Non-linear data structure, Stack representation using arrays, applications of stacks, Queue representation using arrays, applications of queues, Linked Lists, Types of Linked Lists, Operations on Singly Linked Lists, Exercise programs covering these concepts

Text Books:

1) Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE.
2) The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson
3) Data Structures using C, E Balagurusamy, Mcgraw Hill

SEMICONDUCTOR DEVICES AND CIRCUITS LAB

IYear - II Semester

L T P C

0 0 3 1.5

Electronic Workshop Practice:

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.

2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JEETs, LEDs, LCDs, SCR, UST.

3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. P-N Junction Diode Characteristics Part A: Germanium Diode (Forward bias& Reverse bias) Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics Part A: V-I Characteristics Part B: Zener Diode as Voltage Regulator
3. Half-wave Rectifier(without and with c-filter)
4. Full-wave Rectifier(without and with c-filter)
5. BJT Characteristics(CB Configuration) Part A: Input Characteristics Part B: Output Characteristics
6. BJT Characteristics(CE Configuration) Part A: Input Characteristics Part B: Output Characteristics
7. FET Characteristics(CS Configuration) Part A: Drain Characteristics Part B: Transfer Characteristics
8. UJT Characteristics
9. Transistor Biasing
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier

Equipment Required:

Regulated Power supplies

Analog/Digital Storage Oscilloscopes

Analog/Digital Function Generators

Digital Multimeters

Decade Résistance Boxes/Rheostats Decade Capacitance Boxes

Ammeters (Analog or Digital) & Voltmeters (Analog or Digital)

Active & Passive Electronic Components

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(ECE Branch)

Course Title: Applied Chemistry Lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuri (2012) Laboratory Manual of engineering chemistry-II, VGSTechno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

I B.Tech II Semester

ENGINEERING WORKSHOP LAB

ECE

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
- To acquire skills in basic engineering practice
- To identify the hand tools and instruments
- To gain measuring skills
- To develop general machining skills in the students

Note: At least two exercises to be done from each trade.

TRADES:

Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel

COURSE OUT COMES:

The student will be able to:

1. Know the importance of general safety precautions on different• shop floors.
2. Identify the basics of tools and equipments used in fitting,• carpentry, sheet metal, machine, welding and smithy.
3. Fabrication of wooden joints and understand joining of metals.
4. Make metal joints and sheet metal work.
5. Understand the basics of removal of material from work piece surface to attain specific shape.
6. Familiarize with the production of simple models in fitting, carpentry, sheet metal, machine, welding and smithy trades.

TEXT BOOKS:

1. Workshop Technology Vol I & II/ S K Hajra Choudhury, A K Hajra Choudhury, N. Roy/ Media Promoters & Publishers Pvt. Ltd.

2. Workshop Practice/H S Bawa/ McGraw Hill Education; 2nd edition

REFERENCE BOOKS:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.

2. Engineering Practices Lab Manual/Jeyapoovan, Saravana Pandian, 4/e Vikas

3. Dictionary of Mechanical Engineering/GHF Nayler/Jaico Publishing House

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to ECE, CE, ME,AI&DS, CS&BS)

Course Title: Environmental Science

Objectives:

To make the student to get awareness on environment, to understand the important of protecting natural recourses, ecosystems for futures generations and pollution causes due to the day to day activates of human life to save Earth from the inventions by the engineers.

UNIT – I: Multidisciplinary nature of Environmental Science and Ecosystems

Definition, Scope and Importance – Sustainability: Need for public awareness-Human population and Environment.

Ecosystems:Concept of an ecosystem. - Structure and function of an ecosystem. -Types of Ecosystem-Forest, Grassland, Desert and Aquatic Ecosystems– Food chains, food webs and ecological pyramids.

UNIT – II: Natural Resources

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources: Conflicts over water, Dams – benefits and problems

Mineral resources: Use and exploitation, Environmental effects of extracting and using mineral resources.

Energy resources: Growing energy needs, renewable and non-renewable energy sources

Food resources: World food problems.

Land resources: Wasteland reclamation.

Role of an individual in conservation of natural resources.

UNIT – III: Biodiversity and its conservation

Definition, Genetic, species and ecosystem diversity- classification - Value of biodiversity: Consumptive use, Productive use, Social use, Biodiversity at national and local levels. Hot-spots of biodiversity - Threats to biodiversity - Endangered and Endemic species of India – Conservation of biodiversity

UNIT – IV: Environmental Pollution

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. Pollution case studies.

Solid Waste Management: Sources, effects and control measures of urban and industrial solid wastes. Bio medical and e-waste management.

Global Environmental Challenges: Global warming and climate change-Acid rains, Ozone layer depletion.

UNIT – V: Social Issues and Environmental Management

Urban problems related to energy -Water conservation, Rain water harvesting-Resettlement and rehabilitation of people. Environmental Protection Act –Air Act –Water Act - Wildlife Protection Act -Forest Conservation Act-Public awareness.

International protocols: Stockholm and Rio Summit, Kyoto protocol and Montreal Protocol.

Impact Assessment and its significance various stages of EIA, Environmental audit, Ecotourism. The student should Visit an Industry / Ecosystem.

Text Books

1. A Textbook of Environmental Studies, Shashi Chawla, TMH, NewDelhi.
2. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford UniversityPress

References

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers,Vijayawada.
2. Text Book of Environmental Studies, DeekshitaDave& P. Udaya Bhaskar, Cengage Learning.
3. Textbook of Environmental Science and Technology – Dr. Anji Reddy, BS Publications.
4. Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers,2014.
5. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education,Chennai.
6. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, NewDelhi.

Course Outcomes: Students will be able to

1. Articulate the basic structure, functions, and processes of key social systems affecting the Environment.
2. Explain how Natural Recourses should be used.
3. Identify the threats to biodiversity.
4. Understand causes, effects and control measures of Environmental pollution.
5. Gain knowledge about Watershed management and Environmental ethics.Gain a rigorous foundation

in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

II YEAR I SEMESTER									
S. No	**Subject Code**	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**	**Cat**
1.	19EC3T01	Electronic Devices and Circuits	3	0	0	3	40	60	PC
2.	19EC3T02	Signals and Systems	2	2	0	3	40	60	ES
3.	19EC3T03	Switching Theory and Logic Design	3	0	0	3	40	60	ES
4.	19EC3T04	Random Variables and Stochastic Process	2	0	0	2	40	60	BS
5.	19EE3T04	Electrical Technology	3	0	0	3	40	60	ES
6.	19CS3T03	Internet of Things	2	0	0	2	40	60	ES
7.	19EC3P01	Lab I: Electronic Devices and Circuits Lab	0	0	3	1.5	40	60	PC
8.	19EE3P02	Lab II: Network Analysis & Electrical Technology	0	0	3	1.5	40	60	ES
9.	19CS3P01	Lab III: IoT Lab	0	0	3	1.5	40	60	ES
10.	19BS3P01	Lab IV: Business English Communication Skills Lab	0	0	3	1.5	40	60	ES
11.	19BS3I01	Quantitative Aptitude -I	0	0	2	0	0	0	ES
			15	3	13	22	400	600	1000

Course Name	**ELECTRONIC DEVICES AND CIRCUITS**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

Objectives:

The main objectives of this course are:

- The basic concepts of semiconductor physics are to be reviewed.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- The application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- The principal of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics are explained.
- The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers in different configuration is explained.

Syllabus:

UNIT-I: SemiConductor Physics : Classification of solids using energy banddiagrams,Generation of charge carriers in intrinsic semi conductors and extrinsic semi conductors,mobility and conductivity ,drift and diffusion, charge densities in semiconductors, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors,continuity equation Hall effect.

UNIT- II: Junction Diode Characteristics : Open circuited p-n junction, law of junction,current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, LED, Photodiode, Tunnel Diode,UJT. Construction, operation and characteristics of all the diodes are required to be considered.

UNIT- III: Rectifiers and Filters: Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier,derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors.

UNIT- IV: Transistor Characteristics:

BJT: Introduction to transistor, Operating modes of transistor, transistor current components, transistor configurations, transistor asan amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation,characteristics, comparison between JFET and MOSFET.

UNIT- V: Transistor Biasing and Thermal Stabilization : Need for biasing and operating point, load line analysis,Stability factors, (S, S', S''), BJT biasing methods, fixed bias, collector to base bias, self bias, Stabilization against variations in V_{BE}, Ic, and β, Thermal runaway avoid condition. FET Biasing- methods and stabilization.

UNIT- VI: Small Signal Low Frequency Transistor Amplifier Models:

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters,generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers.

FET: Generalized analysis of small signal model, Analysis of CG, CS and CD amplifiers, comparison of FETamplifiers.

Text Books:

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition.
2. Integrated Electronics- Jacob Millman, C. Halkies, C.D.Parikh, Tata Mc-Graw Hill, 2009.

References:

1. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition
2. Electronic Devices and Circuits – A.P.Godse, U.A.Bakshi, Technical publications.

Outcomes:

At the end of this course the student can able to:

- Understand the basic concepts of semiconductor physics.
- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
- Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
- Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

Course Name	**SIGNALS & SYSTEMS**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	2	2	0	3

OBJECTIVES:

The main objectives of this course are given below:

- To introduce the terminology of signals and systems.
- To introduce Fourier series and Fourier Transform through signal analysis.
- To analyze the linear systems in time and frequency domains.
- To introduce Laplace transform as mathematical tool to analyze continuous-time signals and systems.
- To introduce Sampling theorem and to study z-transform to analyze discrete-time signals and systems.

UNIT- I: INTRODUCTION: Definition of Signals and Systems, Classification of Signals, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling, Complex exponential and sinusoidal signals, Singularity functions: unit impulse and unit doublet functions, properties, step function, signum function and ramp function. Classification of Systems, Causality and Stability Conditions, Problems on classification of Signals and Systems.

UNIT –II: SIGNAL ANALYSIS AND FOURIER SERIES: Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions, Gibb's Phenomenon.
Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum. Fourier transform of arbitrary signal,

UNIT –III: FOURIER TRANSFORM: Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

UNIT-IV: ANALYSIS OF LINEAR SYSTEMS: Linear time invariant (LTI) system, impulse response, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF,BPF and BSF characteristics.

UNIT –V: LAPLACE TRANSFORM: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT –VI: SAMPLING AND Z–TRANSFORM: Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling. Related Problems.
Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and

Z-transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, properties of Z-transforms, Inverse Z-transform.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Signals and Systems- I. Ravi Kumar, PHI,2009

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Principles of Linear Systems and Signals – BP Lathi, Oxford University Press, 2015
3. Signals and Systems – K Raja Rajeswari, B VisweswaraRao, PHI, 2009
4. Fundamentals of Signals and Systems- Michel J. Robert, MGH International Edition, 2008.
5. Signals and Systems – T K Rawat , Oxford University press, 2011

OUTCOMES:

At the end of this course the student will able to:

- Understand and differentiate among various classes of signals and Systems
- Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
- Understand the relationships among the various representations of LTI systems
- Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- Apply z-transform to analyze discrete-time signals and systems.

Course Name	**SWITCHING THOERY AND LOGIC DESIGN**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates.
- To optimize logic gates for digital circuits using various techniques.
- Boolean function simplification using Karnaugh maps and Quine-Mc Cluskey methods.
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

UNIT I

Review of Number systems: Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1's complement and r's complement of unsigned numbers subtraction, problem solving. Signed binary numbers, different forms, problem solving for subtraction. 4-bit codes: BCD, EXCESS 3, 2421, etc.,

UNIT II

Logic operation: Basic logic operations NOT, OR, AND, Boolean theorems, Complement and dual of logical expressions, NAND and NOR Gates, EX-OR, EX-NOR Gates, standard SOP and POS, Minimization of logic functions using theorems, Generation of self dual functions. Gray code, multi leveled AND-NOR Realizations.

UNIT III

Minimization of switching functions: Minimization of switching functions using K-Map up to 5-variables, Tabular minimization, minimal SOP and POS Realization. Problem solving using K-map such as code converters binary multiplier etc.,

UNIT IV

Combinational logic circuits: Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary adder, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit Excess3 adder circuit, look-a-head adder circuit. Design of decoder, Demultiplexer, higher order demultiplexing, encoder, multiplexer, higher order multiplexer, realization of Boolean functions using decoders and multiplexers, priority encoder.

UNIT V

Flip-Flops and Registers: Classification of sequential circuits (synchronous and asynchronous): basic flip-flops, truth tables and excitation tables. Conversion of flip-flop to

flip-flop. Registers: Serial in/ serial out, Serial in/ parallel out, Parallel in/ parallel out, Parallel in/ serial out shift registers, Bidirectional shift register, Universal shift register.

UNIT VI

Counters and State Machines:

Ring counter & Johnson counter, Asynchronous counter operations, Synchronous counter operations, Up/ down counter, Introduction to FSM - Mealy and Moore models, Examples.

TEXT BOOKS:

1. Switching Theory and Logic Design by Hill and Peterson Mc-Graw Hill TMH edition.
2. Switching Theory and Logic Design by A. Anand Kumar
3. Digital Design by Mano PHI.

REFERENCE BOOKS:

1. Modern Digital Electronics by RP Jain, TMH
2. Fundamentals of Logic Design by Charles H. Roth Jr, Jaico Publishers
3. Micro electronics by Milliman MH edition.

COURSE OUTCOMES:

- Classify different number systems and apply to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing of Registers and counters
- The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
- Produce innovative designs by modifying the traditional design techniques.

Course Name	**Random Variables and Stochastic Process**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	2	0	0	2

OBJECTIVES:

- To give students an introduction to elementary probability theory, in preparation for courses on statistical analysis, random variables and stochastic processes.
- To mathematically model the random phenomena with the help of probability theory concepts.
- To introduce the important concepts of random variables and stochastic processes.
- To analyze the LTI systems with stationary random process as input.
- To introduce the types of noise and modelling noise sources.

UNIT I

THE RANDOM VARIABLE : Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Conditional Density, Properties.

UNIT II

OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS : Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance, Characteristic Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Nonmonotonic Transformations of Continuous Random Variable.

UNIT III

MULTIPLE RANDOM VARIABLES : Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density, Statistical Independence, Sum of Two Random Variables.

OPERATIONS ON MULTIPLE RANDOM VARIABLES: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variables case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT IV

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second-order and Wide-Sense Stationarity, N^{th}-order and Strict-Sense Stationarity, Time Averages and Ergodicity, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT V

RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: The Power Density Spectrum: Properties, Relationship between Power Density Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Density Spectrum and Cross-Correlation Function.

UNIT VI

LINEAR SYSTEMS WITH RANDOM INPUTS : Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, Autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectra of Input and Output, Band pass, Band-Limited and Narrowband Processes.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, TMH, 4th Edition, 2001.

2. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S.Unnikrisha, PHI, 4th Edition, 2002.

REFERENCE BOOKS:

1.Probability Theory and Stochastic Processes – B. Prabhakara Rao, BS Publications

2. Probability and Random Processes with Applications to Signal Processing, Henry Stark and
John W. Woods, Pearson Education, 3rd Edition.

Schaum's Outline of Probability, Random Variables, and Random Processes.

3. An Introduction to Random Signals and Communication Theory, B.P. Lathi, International Textbook, 1968.

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OUTCOMES:

After completion of the course, the student will be able to

- ✓ Mathematically model the random phenomena and solve simple probabilistic problems.
- ✓ Identify different types of random variables and compute statistical averages of these random variables.
- ✓ Characterize the random processes in the time and frequency domains.
- ✓ Analyze the LTI systems with random inputs.
- ✓ Apply these techniques to analyze the systems in the presence of different types

Course Name	**Electrical Technology**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

Learning Objectives:

- To estimate parameters of two port networks
- To determine efficiency of dc shunt machine with actual loading.
- To analyze performance of 3 phase induction motor
- To investigate the performance of Single-phase transformer.
- To understand the significance of regulation of an alternators through synchronous impedance method.

UNIT-I

Two Port Networks: Open circuit impedance parameters, Short circuit admittance parameters, Transmission parameters, Inverse transmission parameters, Hybrid parameters, Inverse hybrid parameters, Inter connection of two port networks, T-Network, π network.

UNIT – II

Transients: Definition of time constants, R-L circuit, R-C circuit with DC excitation, Evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Solutions using Laplace transform method.

UNIT - III

DC Machines: Principle and operation of DC Generator EMF equations OCC characteristics of DC generator principle and operation of DC Motor Performance Characteristics of DC Motor Applications , speed control methods, three point starter.

UNITI- IV

AC Machines - I Principle and operation of Single Phase Transformer EMF equation OC and SC test on transformer regulation, losses and efficiency.

UNIT - V

AC Machines - II: Principle of operation of alternators, regulation by synchronous impedance method, principle of operation of 3-Phase induction motor, slip-torque characteristics, efficiency and applications.

UNIT-VI

Special Machines: Principle of operation AC & DC Servo motors, Stepper motors, Switched Reluctance Motors, Permanent magnet brushless DC Motors and Applications.

Learning Outcomes:

- Able to estimate the parameters of two port networks
- Able to describe the performance of dc shunt machine.
- Able to investigate the performance of Single-phase transformer.
- Able to perform tests on 3-phase induction motor and alternator to determine their performance characteristic

TEXT BOOKS:

T1. A Sudhakar and Shyam Mohan, "Network Analysis", 3rd Edition, TMH Edition, 2015.

T2. A Textbook of Electrical Technology: Volume 2 AC and DC Machines: -by B L Theraja ,

AK Theraja

T3.Theory & Performance of Electrical Machines by J.B.Gupta. S.K. Kataria & Sons;

REFERENCES:

R1. Basic Electrical Engineering by VK Mehta, Rohit Mehta

R2. Willam H. Hayt Jr., and Jack E. Kemmerly, "Engineering Circuit Analysis", 5 th Edition, Mc Graw-Hill, 1993.

Course Name	**INTERNET OF THINGS (IOT)**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	2	0	0	2

Course Objectives:

- To introduce the terminology, technology and itsapplications
- To introduce the concept of M2M (machine to machine) with necessaryprotocols
- To introduce the Python Scripting Language which is used in many IOTdevices
- To introduce the Raspberry PI platform, that is widely used in IOTapplications
- To introduce the implementation of web-based services on IOTdevices.

Course Outcomes:

- Interpret the impact and challenges posed by IOT networks leading to new architecturalmodels.
- Compare and contrast the deployment of smart objects and the technologies to connect them tonetwork.
- Appraise the role of IOT protocols for efficient networkcommunication.
- Elaborate the need for Data Analytics and Security inIOT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IOTinIndustry.

UNIT –I INTRODUCTION

Introduction to Internet of Things –Definition and Characteristics of IOT, Physical Design of IOT – IOT Protocols,IOT communication models, IOT Communication APIs, Networking basics, Machine-to-Machine Communications

IOT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols,

UNIT – II IOT SYSTEM MANAGEMENT

Software defined networks (SDN), network function virtualization, difference between SDN and NFV for IOT. Basics of IOT System Management with NETCOZF, YANG- NETCONF, YANG, SNMPNETOPEER

M2M to IOT, Definition and differing characteristics, M2M Value Chains, IOT Value Chains, An emerging industrialstructure for IOT.

UNIT III IOTArchitectural and Wireless Technologies for IOT

Building architecture, design principles and needed capabilities, IOT architecture outline, standards considerations. Reference Architecture and ReferenceModel, Wireless Technologies for IOT:Protocol Standardization for IOT, M2M,RFID & NFC protocols.

UNIT IV IOT Physical Devices

Introduction to different IOT tools, IOT Physical Devices and Endpoints, Introduction to Raspberry PI, Interfaces (serial, SPI, I2C)

Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT –V DOMAIN SPECIFIC APPLICTION

Home Automation,Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle, Embedded Systems, IOT Levels and Templates

UNIT – VI Cloud Analytics

Introduction to cloud computing, Role of Cloud Computing in IOT,Cloud-to-Device Connectivity. IOT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs. Webserver – Web server for IOT, Cloud for IOT, Python web application framework. Designing a RESTful web API

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN:9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN:9789350239759

REFERENCE BOOKS

1. 1.Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1stEdition, Academic Press,2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications,2013
3. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493-9357-1.

Course Name	**ELECTRONIC DEVICES AND CIRCUITS LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

Electronic Workshop Practice:

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JEETs, LEDs, LCDs, SCR, UST.
3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. P-N Junction Diode Characteristics Part A: Germanium Diode (Forward bias& Reverse bias) Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics Part A: V-I Characteristics Part B: Zener Diode as Voltage Regulator
3. Half-wave Rectifier(without and with c-filter)
4. Full-wave Rectifier(without and with c-filter)
5. BJT Characteristics(CB Configuration) Part A: Input Characteristics Part B: Output Characteristics
6. BJT Characteristics(CE Configuration) Part A: Input Characteristics Part B: Output Characteristics
7. FET Characteristics(CS Configuration) Part A: Drain Characteristics Part B: Transfer Characteristics
8. UJT Characteristics
9. Transistor Biasing
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

Equipment Required:

Regulated Power supplies

Analog/Digital Storage Oscilloscopes

Analog/Digital Function Generators

Digital Multimeters

Decade Résistance Boxes/Rheostats Decade Capacitance Boxes
Ammeters (Analog or Digital)
Voltmeters (Analog or Digital)
Active & Passive Electronic Components.

Course Name	**NETWORKS ANALYSIS & ELECTRICAL TECHNOLOGY LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

Learning Objectives:

- To determine resonance frequency, Q-factor of RLC networks.
- To estimate parameters of two port networks
- To understand the concept network theorems in network reduction of electrical networks.
- To determine efficiency of dc shunt machine with actual loading.
- To analyze performance of 3 phase induction motor
- To understand the significance of regulation of an alternators through synchronous impedance method.

PART – A

Any five experiments are to be conducted from each part

1. Verification of Thevenin's and Norton's theorems
2. Verification of Superposition theorem
3. Verification of Reciprocity theorems
4. Verification of Maximum power transfer theorem(DC)
5. Verification Milliman's Theorem
6. Series and Parallel Resonance Circuits
7. Z and Y parameters of two port Network

PART – B

1. Determination of critical field resistance of D.C. Shunt generator by using Magnetization characteristics
2. Speed control of D.C. Shunt motor by Armature & flux control methods
3. Determination of performance characteristics by conducting Brake test on DC shunt motor.
4. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Brake test on 3-phase Induction motor (performance characteristics).
6. Regulation of alternator by synchronous impedance method

Learning Outcomes:

- Able to analyze RLC resonance circuits and understand resonant frequency and Q-factor.
- Able to estimate the parameters of two port networks
- Able to apply network theorems to analyze the electrical network.
- Able to describe the performance of dc shunt machine.
- Able to investigate the performance of Single-phase transformer.

Able to perform tests on 3-phase induction motor and alternator to determine their performance characteristic.

Course Name	**INTERNET OF THINGS (IOT) LAB**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

Following are some of the programs that a student should be able to write and test on an Raspberry Pi, but not limited to this only.

Part A: All are compulsary

1. Start Raspberry Pi and try various Linix commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.
2. Study of Digital IO configuration
3. Study of different type of Sensors (IR Sensor, LDR, Ultrasonic sensors, Temperature, Humidity, Light Intensity).
4. Demonstration of peer to peer communication between coordinator and end device through Router.

Part B – 06 Experiments need to be conducted

1. Get input from two switches and switch on the corresponding LEDs.
2. Flash an LED at a given on time and off time cycle, where the two times are taken froma file.
3. Flash an LED based on cron output (acts as an alarm) with and without using Rasberry Pi.
4. Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.
5. Get the status of a bulb at a remote place (on the LAN) through web.
6. Controlling LEDs blinking pattern through UART.
7. Timer based LED Toggle.
8. Designing of power supply circuit in simulation.
9. Reading Temperature and Relative Humidity value from the sensor.
10. Reading Light intensity value from light sensor.
11. Echo each character typed on serial terminal.

Course Name	**BUSINESS ENGLISH COMMUNICATION LAB**				
Year/Semester	II B. Tech/ I Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

COURSE OBJECTIVES:

- To expose student to different situations for better communication
- To inculcate the habit of learning vocabulary for effective communication
- To enable students to acquire Business English communication

UNIT I: (2 sessions)

Listening: Listening to short conversations or monologues

Speaking: Giving information about oneself and their opinions and Giving a short talk on business related topics

Reading: Reading short and simple texts to understand the central idea/theme.

Writing: Writing a piece of internal business communication of 30-40 words (Email)

UNIT II: (2 sessions)

Listening: Listening to a conversation/ monologue and taking notes

Speaking: Giving short talk on business related topics.

Reading: Matching descriptions of people to short texts. Matching statements toinformation given in a graph or graphs.

Writing: Writing a piece of internal business communication of 30-40 words (Message)

UNIT III (2 sessions)

Listening: Listening to longer conversations/interviews.

Speaking: Debates & Extempore

Reading: Reading a longer text and deciding whether the statements about the text are right or wrong or if the information is not given.

Writing: Write a business letter 60-80 words, based on an input text and some notes.

UNIT IV (2 sessions)

Listening: Listening to TV news channels and taking notes.

Listening to songs and writing down the lyrics.

Speaking: Interview sessions

Reading: Read a longer text andanswering questions. .

Writing: Writing a Business Report

UNIT V: (2 sessions)

Listening: Watching short documentaries and making notes.(General)

Speaking: Short plays, Presentations.

Reading: Read short texts and fill in a form using information from the texts.

Writing: Write a skit and enact.

UNIT VI:(2 sessions)

Listening: Watching documentaries and making notes.(Business specific)

Speaking: Nail your point.

Reading: Critical Reading to know author's perspective.

Writing: Write a skit and enact.

REFERENCE BOOKS:

1. Cambridge English – Business English Certificate Preliminary
2. Suresh Kumar. E. &Sreehari P.A (2007), Handbook for English Language Laboratories,Cambridge University Press India Pvt. Ltd, New Delhi.
3. MandalS.K(2006), EffectiveCommunication&PublicSpeaking,JaicoPublishingHouse,New Delhi.
4. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
5. Balasubramanian.T(2000),AtextbookofEnglishPhoneticsforIndianStudent,MacMillan Publishers, India.
6. KamaleshSadanand,SusheelaPunitha(2008),SpokenEnglish:AfoundationCourse:Parts1& 2, New Delhi, Orient Longman Pvt. Ltd

WEB REFERENCES:

1. www.cambridgeenglish.org.
2. www.esl-lab.com

ADDITIONAL SOURCES:

1. A Planning Checklist for Business Messages https://open.lib.umn.edu/businesscommunication/chapter/5-2-a-planning-checklist-for-business-messages/
2. How to Improve Business Writing https://www.writing-skills.com/how-to-improve-your-business-writing
3. Self Compassion (Source - YouTube)
4. Bailey Finishes Marathon (Source - YouTube)
5. How to Conquer Public Speaking Fear (Source - Wordpress)
6. I am Sorry, I am so Nervous- RakeshGodhwani (Source - LinedIn)
7. Interpersonal Communication in the Future World (Source: YouTube)
8. The Power of Introverts (Source: YouTube)

9. Boost Power Through Body Language (Source: YouTube)
10. Take Control of your Non-Verbal Communication (Source: YouTube)
11. How to have a Good Conversation (Source: YouTube)

Course Name	**Quantitative Aptitude-I**				
Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-2021	2	0	0	0

Course Objectives:

Enable the students to

1. Understand different number systems, factorization, divisibility and concept of LCM and HCF.
2. Find averages, relation between ratio and proportion, average price of mixture of different quantities and relation between fraction and percentage.
3. Know the concepts of CP,SP, MRP, profit or loss incurred in a transaction.
4. Know the concepts of principal, interest, difference between SI and CI, EMIs.
5. Understand the relation between speed, distance and time for trains and boats in a river.
6. Understand the relation between time and efficiency, combined work and wages paid for the work.

Syllabus

UNIT –I: Number Systems

Basic number systems –Face and Place Value, Digital sum-Applications, Factors, Multipliers, Prime, & Composite Numbers, Divisibility Rules, LCM and HCF-Remainder Rules.

UNIT- II: Averages, Ratio& Proportion

Average-Weighted average, Ratio-Concept and properties, Proportions-Mean ,Third and Fourth proportions, Mixtures & Allegations-Definition-Allegation Rule, Percentages-Conversion of Percentages to Fractions and Vice-Versa.

UNIT –III: Profit& Loss

Cost Price- Selling Price- Marked Price, Discount- Successive Discounts, Profit or Loss Percentage, False Weights- Dishonest Dealer.

UNIT –IV: Simple & Compound Interest

Principal-Interest Rate-Tenure, Simple Interest-Formula-Sum, Compound Interest-Formula-Relation Between Simple & Compound Interest, loan-EMI, Investments-Shares.

UNIT – V:Time & Distance

Time-Distance-Speed-Relation, Conversion of Speed , Average Speed, Trains-Relative Speed-Same and Opposite –Platform, Races, Boats-Streams-Upstream and Downstream.

UNIT –VI: Time & Work

Work-Time-Efficiency, Combined Work-Partnership-Division of Wages, Chain Rule, Pipes and Cisterns-Inlet-Outlet.

Text Books:

1. Dr. R.S. Aggarwal , Quantitative Aptitude for competitive Examinations, Sultan Chand Publications, 2017.

References:

1. Arun Sharma, How to Prepare for Quantitative Aptitude for the CAT, Tata McGraw Hill Publishing Company, 2016.
2. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Pearson India, 2016

Course Outcomes:

After completing this course, the students will be able to

1. Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
2. Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
3. Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.
4. Calculate the simple and compound interests ,difference between them and the EMI repayment for a loan.
5. Evaluate the time taken by a train/car for crossing a static object or a moving object and time taken by a person to a row a boat in a river.
6. Calculate the time required for individual or combined work, shares of amount for their work and time taken for a tank/cistern to get filled by inlets and outlet.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

II YEAR II SEMESTER									
S. No	**Subject Code**	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**	**Cat**
1.	19EC4T01	Electronic Circuits and Analysis	3	0	0	3	40	60	PC
2.	19EC4T02	Pulse and Digital Circuits	3	0	0	3	40	60	PC
3.	19EC4T03	EM Waves and Transmission lines	2	0	0	2	40	60	PC
4.	19EC4T04	Analog Communications	3	0	0	3	40	60	PC
5.	19ME4T07	Basics of Civil and Mechanical Engineering	3	0	0	3	40	60	ES
6.	19EC4P01	Lab I: EC & PDC Lab	0	0	3	1.5	40	60	PC
7.	19EC4P02	Lab II: Analog Communications Lab	0	0	3	1.5	40	60	PC
8.	19ME4P04	Lab III: Civil and Mechanical Engineering Lab	0	0	3	1.5	40	60	ES
9.	19EC4J01	Mini Project-I	0	0	3	1.5	40	60	PR
10.	19BS4I01	Logical Reasoning	0	0	2	1	40	60	MC
		`	14	1	12	21	400	600	1000

Course Name	**Electronic Circuits and Analysis**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

COURSE OBJECTIVES:

The student will be able to

• Small signal high frequency BJT transistor amplifier Hybrid-p equivalent circuit and the expressions for

conductances and capacitances are derived.

• Cascading of single stage amplifiers is discussed. Expressions for overall voltage gain are derived.

• The concept of feedback is introduced. Effect of negative feedback on amplifier characteristics is explained

and necessary equations are derived.

• Basic principle of oscillator circuits is explained and different oscillator circuits are given with their analysis.

• Power amplifiers Class A, Class B, Class C, Class AB and other types of amplifiers are analyzed.

• Different types of tuned amplifier circuits are analyzed.

UNIT I : Small Signal High Frequency Transistor Amplifier Models :

BJT at High Frequencies, Hybrid- Common Emitter, Transistor Model, Hybrid- Conductances, Hybrid capacitances, validity of hybrid pi model, determination of high frequency parameters in terms of low frequency parameters, Current Gain with Resistance Load, CE Short Circuit Current Gain, cutoff frequencies, frequency response and gain bandwidth product.

FET: Analysis of common source and common drain amplifier circuits at high frequencies.

UNIT II :

Multi Stage Amplifiers :

Classification of amplifiers, methods of coupling, cascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis- Darlington pair amplifier, Cascode amplifier, boot-strap emitter follower, analysis of multi stage amplifiers using FET, differential amplifier using BJT

UNIT III :

Feedback Amplifiers :

feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, characteristics of negative feedback amplifiers, generalized analysis of feedback amplifiers, performance comparison of feedback amplifiers.

UNIT IV :

Oscillators :

oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and wein bridge oscillators with BJT and FET and their analysis, generalized analysis of LC oscillators, Hartley and colpitts oscillators with BJT and FET and their analysis, crystal oscillators.

UNIT V:

Power Amplifiers :

classification of amplifiers, class A power amplifiers and their analysis , harmonic distortions, class B push-pull amplifiers and their analysis , complimentary symmetry push pull amplifier, class AB power amplifier, class C power amplifier , thermal stability and heat sinks.

UNIT : VI

Tuned Amplifiers :

Introduction, Q-factor, small signal tuned amplifier, capacitance coupled single tuned amplifier , double tuned amplifiers , effect of cascading single tuned amplifiers on band width , effect of cascading double tuned amplifiers on band width , staggered tuned amplifiers.

TEXT BOOKS:

1. Integrated Electronics – J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.

2. Electronic Devices and Circuits- Salivahanan, N. Suressh kumar, A. vallavaraj, tatamcgraw hill , second edition.

REFERENCES:

1. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc GrawHill.

2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.

3. Electronic Circuit Analysis-B.V.Rao,K.R.Rajeswari, P.C.R.Pantulu, K.B.R.Murthy, Pearson Publications.

4. Microelectronic Circuits-Sedra A.S. and K.C. Smith, Oxford University Press, Sixth Edition.

COURSE OUTCOMES:

After going through this course the student will be able to

• Design and analysis of small signal high frequency transistor amplifier using BJT and FET.

• Design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT

• Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators

and their amplitude and frequency stability concept.

• Know the classification of the power and tuned amplifiers and their analysis with performance comparison.

Course Name	**Pulse and Digital Circuits**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

PREREQUISITES:

Familiarity with concepts of EDC and ECA

COURSE OBJECTIVES:

The student will be able to

• To understand the concept of wave shaping circuits, Switching Characteristics of diode and transistor.

• To study the design and analysis of various Multivibrators.

• To understand the functioning of different types of time-base Generators.

• To learn the working of logic families & Sampling Gates.

UNIT I

LINEAR WAVESHAPING:

High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and exponential inputs. RC network as differentiator and integrator; Attenuators , its applications in CRO probe.

UNIT II

NON-LINEAR WAVE SHAPING :

Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper; Clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, Transfer characteristics of clampers.

UNIT III

SWITCHING CHARACTERISTICS OF DEVICES :

Diode as a switch, piecewise linear diode characteristics, Design and analysis of Transistor as a switch, Design of transistor switch,

Bistable Multivibrator: Analysis And Design of Fixed Bias, Self Bias Bistable Multi Vibrator, Collector Catching Diodes, Triggering of Binary Circuits, Emitter Coupled Bistable Multivibrator (Schmitt Trigger).

UNIT IV

Monostable Multivibrator:

Analysis and Design of Collector Coupled Monostable Multi vibrator, Triggering of Monostable Multivibrator, Applications of Monostable Multivibrator.

Astable Multivibrator:

Analysis and Design of Collector Coupled Astable Multivibrator, Application of Astable Multivibrator as a Voltage to Frequency Converter.

UNIT V

VOLTAGE TIME BASE GENERATORS:

General features of a time base signal, Methods of generating time base waveform Exponential Sweep Circuits, Negative Resistance Switches, basic principles in Miller and Bootstrap time base generators, Transistor Miller time base generator, Transistor Bootstrap time base generator.

UNIT VI

LOGIC FAMILIES & SAMPLING GATES:

LOGIC FAMILIES: Diode Logic, Transistor Logic, Diode-Transistor Logic, Transistor-Transistor Logic, Emitter Coupled Logic, AOI Logic

SAMPLING GATES: Basic Operating Principles of Sampling Gates, Diode Unidirectional Sampling Gate and

Two-Diode Bi-Directional Sampling Gate, Four-Diode gatesApplications of Sampling Gates.

TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill

2. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005

REFERENCES:

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill, Second Edition, 2007.

2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002

3. Pulse & Digital Circuits by Venkata Rao,K,Ramasudha K, Manmadha Rao,G., Pearson,2010

COURSE OUTCOMES:

After going through this course the student will be able to

• Design linear and non-linear wave shaping circuits.

• Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.

• Design different multivibrators and time base generators.

• Utilize the non sinusoidal signals in many experimental research areas.

Course Name	**EM Waves and Transmission lines**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	2	0	0	2

PREREQUISITES:

Familiarity with concepts of M-1 and EDC.

COURSE OBJECTIVES:

The student will be able to

1. Fundamentals of steady electric and magnetic fields using various laws

2. The concept of static and time varying Maxwell equations and power flow using pointing theorem

3. Wave characteristics in different media for normal and oblique incidence

4. Various concepts of transmission lines and impedance measurements

UNIT I:

Electrostatics:

Coulomb's Law, Electric Field Intensity&Electric Flux Density, Gauss Law and Applications, Electric work&Potential, Divergence,Maxwell's Equations for Electrostatic Fields, . Convection and Conduction Currents, Continuity Equation, Poisson's and Laplace's Equations; Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces Illustrative Problems.

UNIT II: Magneto Statics :

Biot-Savart Law,, Magnetic Flux Density, Ampere's Circuital Law and Applications, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials. Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces

UNIT III: Time Varying Fields:

Induced emf,Faraday's Law ,Types of Induced emf , Displacement Current Density,Inconsistency of Ampere's Law and Maxwell's Equations in piont and Integral Forms and Word Statements.

UNIT IV: EM Wave Characteristics - I:

Plane Waves – Definition,Wave Equations for Conducting , Perfect Dielectric Media, hormonically time varrying field, Relations Between E & H, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space and good conductors, skin depth, Surface Impedance. Poynting Vector and Poynting Theorem – Applications,Polarization & Types. Illustrative Problems.

UNIT V: EM Wave Characteristics – II:

Reflection and Refraction of Plane Waves – Normal Incidences, for dielectric boundary and conducting boundary, Standing wave,SWR. Reflection and Refraction of Plane Waves – Oblique Incidence, types-vertical polaraisation and horizontal polaraisation, Brewster Angle, Critical Angle and Total Internal Reflection, Illustrative Problems.

UNIT VI: Transmission Lines :

Types, Parameters, Equivalent circuit Transmission Line Equations, Infinite Line ,Primary & Secondary Constants, Attenuation constant , Phase constant , velocity, characteristic impedance for different transmission lines , Input Impedance Relations for SC and OC Lines, Reflection Coefficient, VSWR. characteristic impedance in terms of Reflection Coefficient ,Impedance Transformations $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines –. Quarter wave transformer, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.

2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES:

1. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.

2.Engineering Electromagnetics:Nathan Ida, Springer(India)Pvt.Ltd., New Delhi, 2nd ed., 2005.

3 Transmission Lines and Networks–Umesh Sinha,S Prakashan (Tech. India pub New Delhi, 2001.

4.Electromagnetic Waves and Transmission Lines-U.A.Bakshi &A.V.Bakshi, Technical pub

5. Electromagnetic Waves and Transmission Lines-Y.Mallikharjuna Reddy,Universities press

COURSE OUTCOMES:

After going through this course the student will be able to

1. Determine E and H using various laws and applications of electric & magnetic fields

2. Apply the Maxwell equations to analyze the time varying behavior of EM waves

3. Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media

4. Calculate Brewster angle, critical angle and total internal reflection

5. Derive the expressions for input impedance of transmission lines

6. Calculate reflection coefficient, VSWR etc. using smith chart

Course Name	**Analog Communications**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

PREREQUISITES:

Familiarity with concepts of RVSP and M-1

COURSE OBJECTIVES:

The student will be able to

1. Familiarize with the fundamentals of analog communication systems

2. Familiarize with various techniques for analog modulation and demodulation of signals

3. Distinguish the figure of merits of various analog modulation methods

4. Develop the ability to classify and understand various fuctional blocks of radiao transmitters and receivers

5. Familiarize with basic techniques for generating and demodulating various pulse modulated signals

UNIT I AMPLITUDE MODULATION :

Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT II DSB & SSB MODULATION :

Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop. Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT III ANGLE MODULATION :

Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT IV TRANSMITTERS & RECEIVERS:

Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT V NOISE :

Review of noise and noise sources, noise figure, Noise in Analog communication Systems, Noise in DSB& SSB System, Noise in AM System, Noise in Angle Modulation Systems, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis

UNIT VI PULSE MODULATION :

Time Division Multiplexing,, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, TDM Vs FDM.

TEXT BOOKS:

1. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition.

2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES:

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed…

2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.

3. Communication Systems– R.P. Singh, SP Sapre, Second Edition TMH, 2007.

4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.

5. Electronic Communication systems – Tomasi, Pearson.

COURSE OUTCOMES:

After going through this course the student will be able to

1. Differentiate various Analog modulation and demodulation schemes and their spectral characteristics.

2. Analyze noise characteristics of various analog modulation methods

3. Analyze various functional blocks of radiao transmitters and receivers

4. Design simple analog systems for various modulation techniques.

Course Name	**Basics of Civil and Mechanical Engineering**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	3	0	0	3

PREREQUISITES:

Familiarity with concepts of M1 and M2

COURSE OBJECTIVES:

The student will be able to

- To be aware of the different fields of Civil Engineering, such as Surveying, Structural and Transportation Engineering.
- To provide the basic concepts of various mechanical systems
- To expose to a wide range of equipment and their utility in a practical situation.
- To provide the fundamentals of manufacturing methods, IC engines, heat transfer and transmission systems that usually exist in engineering.

UNIT – I

Introduction: Civil Engineering, branches of Civil Engineering, contribution to society, Scope**,**

Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections, glass, wood, FRP

Surveying: Objectives – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

UNIT – II

Sub Structure: Types, Bearing capacity – Requirement of good foundations. Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering– Types of Bridges and Dam

Building planning

Residential, Institutional and industrial – functional requirements. – Basics of Interior Design and Landscaping.

UNIT- III

Roads- Benefits- Classifications - Traffic signs

Bridges-components of Bridges - Dam-Purpose of reservoir.

Environmental Engineering: Protected water supply, water treatment methods-sewage treatment- Pollution-Types-causes-remedial measures

UNIT-IV

Engineering Materials: Classification, Properties of Materials. Composites: Fiber reinforced composites, Metal Matrix Composites. Smart materials: Piezoelectric materials, shape memory alloys.

Manufacturing Processes: Metal Casting: Steps involved in Casting process – Advantages and applications, Metal Working: Hot Working and Cold Working, Metal Forming: Extrusion, Forging, Rolling and Drawing

Welding: Arc Welding, Gas Welding, Soldering, and Brazing

Machine Tool: Lathe classification, specifications, and operations.

UNIT-V

Internal Combustion Engines: Classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines.

Heat Transfer: Modes of heat transfer, Laws of heat transfer and simple problems.

Belts – Ropes and chains: Belt and rope drives open belt and cross belt drives. Gears: classification of gears, applications.

UNIT-VI

Additive Manufacturing: Introduction to Additive Manufacturing (AM), Comparison between AM and Conventional Manufacturing, Applications of AM, Steps in AM.

Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

Robotics &Automation: Robot anatomy, classification based on robots configuration; Polar, cylindrical, Cartesian and spherical, Applications. Automation**:** Definition, NC/ CNC machines: Basic elements with simple block diagrams, advantages and disadvantages.

TEXT BOOKS:

1. Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kr. Jain, "Basic Civil Engineering", Laxmi Pulications
2. Elements of Mechanical Engineering, M.L. Mathur, F.S.Metha & R.P.Tiwari Jain Brothers Publs, 2009.
3. Production Technology by P.N.Rao by I & II McGraw-Hill publications.
4. Internal Combustion Engines by V Ganesan by Tata McGraw-Hill publications.
5. Chua Chee Kai, Leong Kah Fai, Lim Chu-Sing-Rapid Prototyping Principles and Applications (2nd Edition) (2003)
6. Hybrid Electric Vehicle Technology 1st Editionby Automotive Research and Design, ISBN-13: 978-0826900661
7. Industrial Robotics by GROOVER published by Tata McGraw-Hill education private limited
8. Computer-Aided Design and Manufacturing by Mikell P. Groover& Emory W. Jimmers, Jr. published by Pearson Education

REFERENCES:

1. Ramamrutham. S, "Basic Civil Engineering", Dhanpat Rai Publishing Co. (P) Ltd. (1999).
2. Seetharaman S. "Basic Civil Engineering", Anuradha Agencies, (2005).
3. Theory of machines by Rattan McGraw-Hill publications
4. Mechanical Engineering Science K R Gopala Krishna, Subhas publications
5. Thermal Engineering, Ballaney, P.L., Khanna Publishers, 2003.
6. Electric and Hybrid Vehicles 1st Edition, Kindle Edition by Tom Denton,ISBN-13: 978-1138842373
7. Robotics (Industrial Robotics) by P.Jaganathan (Local Author) Lakshmi Publications.

COURSE OUTCOMES:

After going through this course the student will be able to

- To impart basic knowledge on civil engineering
- The students will be able to analyze the material on the basis of their properties and thus assigning different weightage to their use for technical purposes
- To provide exposure on the fundamental elements of civil engineering structures
- Identify engineering materials, their properties, manufacturing methods encountered in engineering practice.

- Understand the basics of internal combustion engines, heat transfer and mechanism of power transfer through belt, rope, chain and gear drives.
- Understand the working of hybrid electric vehicles, basics of robotics and automation.

Course Name	**EC & PDC Lab**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

LIST OF EXPERIMENTS

List of Experiments :(Minimum of Ten Experiments has to be performed)

1. Two Stage RC Coupled Amplifier
2. Voltage-Series Feedback Amplifier
3. Current-Shunt Feedback Amplifier
4. RC Phase Shift Oscillator
5. Darlington Pair Amplifier
6. Single Tuned Voltage Amplifier
7. Linear wave shaping
8. Non Linear wave shaping – Clippers
9. Non Linear wave shaping – Clampers
10. Transistor as a switch
11. Study of Logic Gates & Some applications
12. Sampling Gates
13. Astable Multivibrator
14. Monostable Multivibrator
15. UJT Relaxation Oscillator
16. Schmitt Trigger

Equipment required:

Software:

i. Multisim/ Equivalent Industrial Standard Licensed simulation software tool.

ii. Computer Systems with required specifications

Hardware:

10. Regulated Power supplies
11. Analog/Digital Storage Oscilloscopes
12. Analog/Digital Function Generators
13. Digital Multimeters
14. Decade Résistance Boxes/Rheostats
15. Decade Capacitance Boxes
16. Ammeters (Analog or Digital)
17. Voltmeters (Analog or Digital)
18. Active & Passive Electronic Components

Course Name	**Analog Communications Lab**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

LIST OF EXPERIMENTS

List of Experiments (Twelve experiments to be done- **The students have to calculate the relevant parameters**) -

(a. Hardware, b. MATLAB Simulink, c. MATLAB Communication tool box)

1. Amplitude Modulation - Mod. & Demod.
2. AM - DSB SC - Mod. & Demod.
3. Spectrum Analysis of Modulated signal using Spectrum Analyser
4. Diode Detector
5. Pre-emphasis & De-emphasis
6. Frequency Modulation - Mod. & Demod.
7. AGC Circuits
8. Sampling Theorem
9. Pulse Amplitude Modulation - Mod. & Demod.
10. PWM , PPM - Mod. & Demod.
11. PLL

Equipments & Software required:

Software :

i) Computer Systems with latest specifications
ii) Connected in Lan (Optional)
iii) Operating system (Windows XP)
iv) Simulations software (Simulink & MATLAB)

Equipment:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multimeters
6. Spectrum Analyser

Course Name	**Civil and Mechanical Engineering Lab**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	3	1.5

LIST OF EXPERIMENTS

At least 5 experiments to be done from each Part
PART – A

CIVIL ENGINEERING

1. Determination of the fineness of cement
2. Determination of particle size distribution of coarse and fine aggregates
3. Determination of specific gravity of fine and coarse aggregates
4. Determination of water absorption of Bricks
5. Determination of efflorescence of Bricks
6. Determination of Compressive strength of concrete
7. Determination of elevation of various points by using Total Station
8. Determination of Dissolved Oxygen(DO) present in given water sample

PART – B

MECHANICAL ENGINEERING

1. Preparation of sand mould cavity.
2. Preparation of i) Butt joint and ii) Lap joint by Arc Welding.
3. Perform Turning and facing for a given work piece using CNC lathe machine.
4. Making an aluminum casting for a given pattern using a casting process.
5. Thermal conductivity of a metal rod.
6. Performance test on a 4-stroke CI Engine at constant speed.
7. Performance Test on 2-Stroke SI engines.
8. Making a metal joint using brazing and soldering process.

Course Name	**Logical Reasoning**				
Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-2021	0	0	2	1

Course Objectives:

Enable the students to

1. Be familiar with different relations in a family, concepts of clocks and calendars.
2. Find position and order of a person /object , routes between points.
3. Understand the techniques of coding and decoding .
4. Understand the validity of statements and inferences from them.
5. Draw valid conclusions from given statements.
6. Understand the concept of analogy and properties of dice.

Syllabus

UNIT –I:Blood Relations, Directions, Clocks & Calendars.

Blood relations -family tree, types of problems on blood relations- first person narrating type-coded relation-puzzle relation, direction-distance-direction and distance problems, angle between hands -correct or incorrect time, day of a date-repeated calendars.

UNIT- II: Ranks & Position, Puzzles.

Ranks-based on positions ,counting ,comparisons , puzzles-table based, selection based, seating based, graph and network Based .

UNIT –III: Coding & Decoding, Series.

Coding and decoding-letter coding, number coding, symbol coding, substitution and mixed type, Symbols and notations, series-number, letter and word type , missing term.

UNIT –IV: Critical Reasoning-I.

Syllogisms, logical consistency, inference & degree of truth, assertion & reason.

UNIT – V: Critical Reasoning-II

Statement & assumption, statement &conclusion, cause & effect, decision making.

UNIT –VI: Non Verbal Reasoning

Series, odd-man out, analogies, mirror & water images, paper cutting & folding, figure formation, cubes & dice .

Text Books:

1. Dr. R.S. Aggarwal , A Modern Approach to Verbal & Non-Verbal Reasoning Sultan Chand Publications, 2018.

References:

1. B.S.Sijwali and Indu Sijwali, A New Approach to Reasoning Verbal & Non-Verbal, Arihant Publishers, 2016.
2. M.K. Pandey, Analytical Reasoning , Bsc Publishing Co. Pvt. Ltd 2009.

Course Outcomes:

After completing this course, the students will be able to

1. Identify the relation between given persons, find the direction and distance from starting point, find angle between hands at given time and vice-versa, find day of given date and vice-versa.
2. Find the position and rank of a person/object in an arrangement, arranging in order using given data.
3. Decode the given code pattern and code given word in terms of alphabet, numbers, symbols and mixed, identify missing term in the pattern/series.
4. Draw a valid conclusion from the statements, consistency of inference drawn, valid reason from given assertions.
5. Identify the cause for the assumed effect, take decision logically from the given data.
6. Identify the odd one in the given series/group, number opposite any face of dice, figure completion from a folded figure.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

III Year-ISemester

L	T	P	C
4	0	0	3

COMPUTERARCHITECTUREANDORGANIZATION

OBJECTIVES:

- Understandthearchitectureofamoderncomputerwithitsvariousprocessingunits.Alsothe Performancemeasurementofthecomputersystem.
- Inadditiontothisthememorymanagementsystemofcomputer.

UNIT-I:

BasicStructureOfComputers: Functionalunit,BasicOperationalconcepts,Busstructures,SystemSoftware,Performance, Thehistoryofcomputerdevelopment.

UNIT-II:

MachineInstructionandPrograms:

InstructionandInstructionSequencing: RegisterTransferNotation, AssemblyLanguageNotation,BasicInstructionTypes, AddressingModes,BasicInput/outputOperations,TheroleofStacksandQueuesincomputerprogrammingequation.Compo nent ofInstructions:LogicInstructions, shiftand Rotate Instructions

UNIT-III:

TypeofInstructions: Arithmeticand LogicInstructions,BranchInstructions,AddressingModes,Input/outputOperations

UNIT-IV:

INPUT/OUTPUTORGANIZATION: AccessingI/ODevices,Interrupts:InterruptHardware,EnablingandDisablingInte rrupts, HandlingMultipleDevices,DirectMemoryAccess, Buses:SynchronousBus,AsynchronousBus,InterfaceCircuits,StandardI/OInterface:PeripheralComponentInterconnect(PCI)Bus,Universal SerialBus(USB)

UNIT-V:

TheMEMORYSYSTEMS: Basicmemorycircuits,MemorySystemConsideration,Read-OnlyMemory:ROM,PROM,EPROM, EEPROM, Flash Memory, CacheMemories:MappingFunctions,INTERLEAVING
SecondaryStorage: MagneticHardDisks,OpticalDisks,

UNIT-VI:

ProcessingUnit: FundamentalConcepts:RegisterTransfers,PerformingAnArithmeticOrLogicOperation,FetchingAW ordFromMemory, ExecutionofCompleteInstruction,HardwiredControl,
MicroprogrammedControl: Microinstructions,MicroprogramSequencing,WideBranchAddressingMicroinstructions with next –Address Field

TEXTBOOKS:

1. ComputerOrganization,CarlHamacher, ZvonksVranesic,SafeaZaky,5thEdition,McGrawHill.
2. Computer Architecture and Organization, John P. Hayes,3rdEdition,McGrawHill.

REFERENCEBOOKS:

1. ComputerOrganizationandArchitecture–WilliamStallingsSixthEdition,Pearson/PHI
2. StructuredComputerOrganization–AndrewS.Tanenbaum,4thEditionPHI/Pearson
3. FundamentalsorComputerOrganizationandDesign,-SivaraamaDandamudiSpringerInt.Edition.
4. "ComputerOrganizationandDesign:TheHardware/SoftwareInterface"byDavidA.PattersonandJohnL.Hennessy.
5. J .P.Hayes,"ComputerArchitectureandOrganization",McGraw-Hill,1998.

OUTCOMES:

- Studentscanunderstandthearchitectureofmoderncomputer.
- TheycananalyzethePerformanceofacomputerusingperformanceequation
- Understandingofdifferentinstructiontypes.
- 4.Studentscan calculate theeffectiveaddressofanoperandbyaddressingmodes
- 5.Theycanunderstand howcomputerstores positiveand negativenumbers.
- 6.Understandingofhowacomputerperforms arithmeticoperationofpositiveandnegativenumbers.

IIIYear-I Semester

L	T	P	C
4	0	0	3

LINEARICAPPLICATIONS

OBJECTIVES

- Tounderstandthebasicoperation&performance parametersofdifferential amplifiers.
- Tounderstand&learnthemeasuringtechniquesofperformanceparametersof OP-AMP
- Tolearnthelinearandnon-linearapplicationsof operationalamplifiers.
- Tounderstandtheanalysis&designofdifferenttypesofactive filtersusingopamps
- Tolearntheinternalstructure,operationandapplicationsofdifferentanalogICs
- ToAcquireskillsrequiredfordesigningandtestingintegratedcircuits

UNITI

INTEGRATEDCIRCUITS: DifferentialAmplifier-DCandACanalysisofDualinputBalancedoutputConfiguration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single EndedInput– Balanced/UnbalancedOutput),DCCouplingandCascadeDifferentialAmplifierStages,Leveltranslator.

UNITII

Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and Temperature ranges,Power supplies, Op-ampBlock Diagram, ideal and practical Op-amp Specifications, DC andAC characteristics,741 op-amp & its features, Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slewrate,CMRR, PSRR, drift, FrequencyCompensation techniques.

UNITIII

LINEARandNON-LINEARAPPLICATIONSOFOP-AMPS: InvertingandNon-invertingamplifier,Integratoranddifferentiator,Differenceamplifier,Instrumentationamplifier,ACamplifier,VtoI,ItoVconverters, Buffers. Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wavegenerators,Logand AntilogAmplifiers,Precision rectifiers.

UNITIV

ACTIVEFILTERS,ANALOGMULTIPLIERSANDMODULATORS: Design&AnalysisofButterworthactivefilters –1st order,2nd order LPF,HPFfilters. Band pass,Band rejectand allpass filters.
FourQuadrantMultiplier, IC1496,Sample&Holdcircuits.

UNITV

TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astableoperations and applications, Schmitt Trigger; PLL - introduction, block schematic, principles and description ofindividual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSKdemodulators.Applications ofVCO(566).

UNITVI

DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS: Introduction, basic DAC techniques,weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs –parallel Comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC.DAC andADCSpecifications, Specifications AD574 (12 bit ADC).

TEXTBOOKS:

1. LinearIntegratedCircuits–D.RoyChoudhury,NewAgeInternational(p) Ltd,2ndEdition,2003.
2. Op-Amps&LinearICs-RamakanthA.Gayakwad,PHI,1987.
3. OperationalAmplifiers–C.G.Clayton,Butterworth&CompanyPubl. Ltd./Elsevier,1971

REFERENCES:

1. OperationalAmplifiers &LinearIntegratedCircuits–SanjaySharma;SKKataria&Sons;2nd Edition,2010
2. Design withOperationalAmplifiers&AnalogIntegratedCircuits–SergioFranco,McGrawHill,1988.
3. OPAMPSand LinearIntegratedCircuitsconceptsandApplications,JamesMFiore,CenageLearning IndiaLtd.
4. OperationalAmplifiers&LinearIntegratedCircuits–R.F.Coughlin&FredrickDriscoll,PHI,6thEdition.
5. OperationalAmplifiers&LinearICs–DavidABell,OxfordUni.Press,3rdEdition

OUTCOMES

- Design circuitsusingoperationalamplifiersforvariousapplications.
- Analyzeanddesignamplifiersandactivefiltersusing Op-amp.
- Diagnoseandtrouble-shootlinearelectroniccircuits.
- Understandthe gain-bandwidthconceptandfrequencyresponseofthe amplifierconfigurations.
- Understandthoroughlytheoperationalamplifiers withlinearintegratedcircuits.

IIIYear-I Semester	L	T	P	C
	4	0	0	3

DIGITALICAPPLICATIONS

OBJECTIVES

Themainobjectivesofthiscourseare:

- Introductionofdigitallogicfamiliesandinterfacingconceptsfordigitaldesignisconsidered.
- VHDLfundamentalswerediscussedtomodelingthedigitalsystemdesignblocks.
- VHDLcompilers,simulatorsandsynthesistoolsaredescribed,whichareusedtoverify digitalsystemsinatechnology-independentfashion.
- Design andimplementationofcombinationaland sequentialdigitallogiccircuitsisexplained.

Syllabus:

UNIT-I

Digital Logic Families and Interfacing: Introduction to logic families, CMOS logic, CMOS steady state anddynamicelectricalbehavior,CMOSlogicfamilies.Bipolarlogic,transistor-transistorlogic,TTLfamilies,CMOS/TTLinterfacing,lowvoltageCMOS logic and interfacing, Emittercoupled logic.

(Textbook-1)

UNIT-II

Introduction to VHDL: Design flow, program structure, levels of abstraction, Elements of VHDL: Data types, dataobjects, operators and identifiers. Packages, Libraries and Bindings, Subprograms. VHDL Programming usingstructuraland dataflowmodeling.

(Textbook-2)

UNIT-III

BehavioralModeling:Processstatement,variableassignmentstatement,signalassignmentstatement,waitstatement , if statement, case statement ,null statement, loop statement, exit statement, next statement ,assertionstatement, more on signal assignment statement ,Inertial Delay Model, Transport Delay Model ,Creating SignalWaveforms, Signal Drivers , Other Sequential Statements , Multiple Processes. Logic Synthesis, Inside a logicSynthesizer.

(Textbook-2)

UNIT-IV

CombinationalLogicDesign:BinaryAdder-Subtractor,RippleAdder,LookAheadCarryGenerator,ALU,Decoders, encoders, multiplexers and demultiplexers,parity circuits, comparators, Barrel Shifter, Simple Floating-PointEncoder,DualPriority Encoder,Designconsiderations oftheabove combinationallogiccircuits withrelevantDigitalICs, modelingofaboveICsusing VHDL.

(Textbook-1)

UNIT-V

Sequential Logic Design: SSI Latches and flip flops, Ring Counter, Johnson Counter, Design of Modulus NSynchronous Counters, Shift Registers, Universal Shift Registers, Design considerations of the above sequentiallogiccircuits with relevantDigitalICs, modelingofaboveICsusingVHDL**.**

(Textbook-1)

UNIT-VI:

SynchronousandAsynchronousSequentialCircuits: Basicdesignsteps:Statediagram,statetable,stateassignment,choiceofflipflopsandderivationofnextstateandoutputexpressions,timingdiagram.Stateassignment problem: One hot encoding. Mealy and Moore type FSM for serial adder, VHDL code for the serialadder. Analysis of Asynchronous circuits, State Reduction, State Assignment. A complete design example: Thevendingmachinecontroller.

(**Referencetextbook-1)**

TextBooks:

1. DigitalDesignPrinciples&Practices–JohnF.Wakerly,PHI/PearsonEducationAsia,3rdEd.,2005.
2. VHDLPrimer–J.Bhasker,PearsonEducation/PHI,3rdEdition.

References:

1.FundamentalsofDigitalLogicwithVHDLDesign-StephenBrown,ZvonkoVranesic,McGrawHill,3rd Edition.

Outcomes:

Attheendof thiscoursethestudentcanableto:

- Understandthestructureofcommerciallyavailabledigitalintegratedcircuitfamilies.
- Learnthe IEEEStandard1076HardwareDescriptionLanguage(VHDL).
- Modelcomplexdigitalsystemsatseverallevelsofabstractions,behavioral,structural,simulation,synthesisandrapid system prototyping.
- Analyzeanddesignbasicdigitalcircuitswithcombinatorialandsequential logiccircuitsusingVHDL.

IIIYear-I Semester

L	T	P	C
4	0	0	3

DIGITALCOMMUNICATIONS

CourseObjectives:

1.Understanddifferent pulse digital modulation techniques and their comparision2.Familiarizevariousdigitalmodulationtechniquesandcalculationoftheirerrorprobabilities

3. Understandthe conceptofentropyanddifferentsourcecodingtechniques

4. Familirizewithblockcodes,cycliccodesand convolutionalcodes

UNITI

PULSEDIGITALMODULATION: Elementsofdigitalcommunicationsystems,advantagesofdigitalcommunication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding inPCM systems. Differential PCM systems (DPCM). Delta modulation, its draw backs, adaptive delta modulation,comparisonofPCM andDM systems,noisein PCM and DM systems.

UNITII

DIGITALMODULATIONTECHNIQUES: Introduction,ASK,FSK,PSK,DPSK,DEPSK,QPSK,M-ary PSK,ASK,FSK,similarityofBFSKandBPSK.

UNITIII

DATA TRANSMISSION : Base band signal receiver, probability of error, the optimum filter, matched filter,probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of errorprobabilityofASK,BPSK, BFSK,QPSK.

UNITIV

INFORMATION THEORY: Discrete messages, concept of amount of information and its properties. Averageinformation,Entropyanditsproperties.Informationrate, Mutualinformation andits properties.

UNITV

SOURCECODING: Introductions,Advantages,Shannon'stheorem,Shanon-Fanocoding,Huffmancoding,efficiencycalculations,channelcapacityofdiscreteandanalogChannels,capacityofaGaussianchannel,bandwidth–S/Ntradeoff.

UNITVI

LINEAR BLOCK CODES: Introduction, Matrix description of Linear Block codes, Error detection and errorcorrection capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding,syndrome calculation, BCHCodes.

CONVOLUTIONCODES: Introduction,encodingofconvolutioncodes,timedomainapproach,transformdomainapproach.Graphical approach:state, treeand trellisdiagram decodingusingViterbialgorithm.

TEXTBOOKS:

1. Digitalcommunications-SimonHaykin,JohnWiley,2005

2. PrinciplesofCommunicationSystems–H.TaubandD.Schilling,TMH,2003

REFERENCES:

1. DigitalandAnalogCommunicationSystems-SamShanmugam,JohnWiley,2005.
2. DigitalCommunications–JohnProakis,TMH,1983.CommunicationSystemsAnalog&Digital–Singh&Sapre,TMH, 2004.
3. ModernAnalogandDigitalCommunication–B.P.Lathi,Oxfordreprint,3rdedition,2004.

CourseOutcomes:

Afterundergoingthecoursestudents will beableto:

1. Determinetheperformanceofdifferentwaveformcodingtechniquesforthegenerationanddigitalrepresentationofthesignals.
2. Determinetheprobabilityoferrorforvariousdigital modulation schemes
3. Analyzedifferentsourcecodingtechniques
4. Computeandanalyzedifferenterrorcontrolcodingschemesforthereliabletransmissionofdigitalinformationoverthechannel.

IIIYear-ISemester

L	T	P	C
4	0	0	3

ANTENNAANDWAVEPROPAGATION

OBJECTIVES

Thestudent will beableto

- understandtheapplicationsoftheelectromagnetic wavesinfreespace.
- introducetheworkingprinciples ofvarioustypes ofantennas
- discussthemajorapplicationsofantennaswithanemphasisonhowantennasareemployedtomeetelectronicsystem requirements.
- understandtheconceptsofradiowavepropagationintheatmosphere.

UNITI

ANTENNAFUNDAMENTALS: Introduction,RadiationMechanism–singlewire,2wire,dipoles,CurrentDistribution on a thin wire antenna.Antenna Parameters - Radiation Patterns, Patterns in Principal Planes, MainLobe and Side Lobes, Beamwidths, Polarization, Beam Area, Radiation Intensity, Beam Efficiency, Directivity,GainandResolution,AntennaApertures,Aperture Efficiency,EffectiveHeight, illustratedProblems.

UNITII

THIN LINEAR WIRE ANTENNAS: Retarded Potentials, Radiation from Small Electric Dipole, Quarter waveMonopoleandHalfwaveDipole–CurrentDistributions,EvaluationofFieldComponents,PowerRadiated,Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Height. Natural current distributions,fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which isnot current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics,Loop Antennas: Small Loops - Field Components, Comparison of far fields of small loop and short dipole, Conceptofshort magneticdipole,Dand $R_r$relations forsmall loops.

UNITIII

ANTENNA ARRAYS : 2 element arrays – different cases, Principle of Pattern Multiplication, N element UniformLinear Arrays – Broadside, End-fire Arrays, EFA with Increased Directivity, Derivation of their characteristics andcomparison; Concept of Scanning Arrays. Directivity Relations (no derivations).Related Problems. BinomialArrays, Effects of Uniform and Non-uniform Amplitude Distributions, Design Relations. Arrays with ParasiticElements,Yagi-UdaArrays,FoldedDipolesand theircharacteristics.

UNITIV

NON-RESONANT RADIATORS : Introduction, Traveling wave radiators – basic concepts, Long wire antennas – field strength calculations and patterns, Microstrip Antennas-Introduction, Features, Advantages and Limitations,RectangularPatchAntennas–
GeometryandParameters,Impactofdifferentparametersoncharacteristics.BroadbandAntennas:HelicalAntennas–Significance,Geometry,basicproperties;Designconsiderationsformonofilarhelical antennas inAxial ModeandNormal Modes (Qualitative Treatment).

UNITV

VHF,UHFANDMICROWAVEANTENNAS: ReflectorAntennas:FlatSheetandCornerReflectors.Paraboloidal Reflectors – Geometry, characteristics, types of feeds, F/D Ratio, Spill Over, Back Lobes, ApertureBlocking,Off-setFeeds,Cassegrain Feeds.

Horn Antennas– Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry,Features, Dielectric Lenses and Zoning, Applications, Antenna Measurements – Patterns Required, Set Up, DistanceCriterion,DirectivityandGain Measurements(Comparison, Absoluteand3-AntennaMethods).

UNITVI

WAVE PROPAGATION : Concepts of Propagation – frequency ranges and types of propagations.Ground WavePropagation–Characteristics,Parameters,WaveTilt,FlatandSphericalEarthConsiderations.SkyWavePropagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction,Critical Frequency, MUF and Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency,LUHF,Virtual Height,IonosphericAbnormalities,IonosphericAbsorption.

FundamentalEquationforFree-SpacePropagation,BasicTransmission LossCalculations.SpaceWavePropagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, EffectiveEarth'sRadius,EffectofEarth'sCurvature,FieldStrengthCalculations,M-curvesandDuctPropagation,TroposphericScattering.

TEXTBOOKS

1. Antennasfor AllApplications–JohnD.KrausandRonaldJ.Marhefka,3rd Edition,TMH,2003.
2. ElectromagneticWavesandRadiatingSystems–E.C.JordanandK.G.Balmain,PHI,2ndEdition,2000.

REFERENCES

1. AntennaTheory-C.A. Balanis, John Wileyand Sons, 2ndEdition, 2001.
2. AntennasandWavePropagation–K.D.Prasad,SatyaPrakashan,TechIndiaPublications,NewDelhi,2001.
3. TransmissionandPropagation–
   E.V.D.GlazierandH.R.L.Lamont,TheServicesTextBookofRadio,vol.5,StandardPublishers Distributors, Delhi.
4. ElectronicandRadio Engineering–F.E. Terman,McGraw-Hill,4thEdition,1955.
5. Antennas–JohnD.Kraus,McGraw-Hill,2nd Edition,1988.

OUTCOMES

After goingthroughthiscoursethestudentwillbe ableto

- Identifybasicantennaparameters.
- Designandanalyzewireantennas,loopantennas,reflectorantennas,lensantennas,hornantennasandmicrostripantennas
- Quantifythefields radiated byvarious typesofantennas
- Design andanalyzeantennaarrays
- Analyzeantennameasurementstoassessantenna'sperformance
- Identifythecharacteristicsofradiowavepropagation

IIIYear-I Semester

L	T	P	C
0	0	3	2

PULSE&DIGITALCIRCUITSLAB

1. Linearwaveshaping.

2. NonLinearwaveshaping–Clippers.

3. NonLinearwaveshaping–Clampers.

4. Transistorasaswitch.

5. StudyofLogicGates &Someapplications.

6. StudyofFlip-Flops&someapplications.

7. SamplingGates.

8. AstableMultivibrator.

9. MonostableMultivibrator.

10. BistableMultivibrator.

11. SchmittTrigger.

12. UJTRelaxationOscillator.

13. Bootstrapsweepcircuit.

EquipmentrequiredforLaboratory:1.

RPS -0 – 30 V

2. CRO-0– 20 MHz.

3. FunctionGenerators-0–1MHz

4. Components

5. MultiMeters

IIIYear-I Semester

L	T	P	C
0	0	3	2

LICAPPLICATIONS LAB

MinimumTwelveExperimentstobeconducted:

1. StudyofOPAMPs–IC741,IC555,IC565,IC566,IC1496–functioning,parametersand Specifications.
2. OPAMPApplications–Adder,Subtractor,ComparatorCircuits.
3. IntegratorandDifferentiatorCircuitsusingIC741.
4. ActiveFilterApplications– LPF,HPF(firstorder)
5. ActiveFilterApplications–BPF,BandReject(Wideband)and NotchFilters.
6. IC741OscillatorCircuits–PhaseShiftandWienBridgeOscillators.
7. FunctionGeneratorusingOPAMPs.
8. IC555Timer–MonostableOperationCircuit.
9. IC555Timer– AstableOperationCircuit.
10. SchmittTriggerCircuits –usingIC741and IC555.
11. IC565– PLLApplications.
12. IC566–VCOApplications.
13. VoltageRegulatorusingIC723.
14. ThreeTerminalVoltageRegulators–7805,7809, 7912.

EquipmentrequiredforLaboratories:

1. RPS
2. CRO
3. FunctionGenerator
4. MultiMeters
5. ICTrainerKits(Optional)
6. BreadBoards
7. Components:-IC741,IC555,IC565,IC1496,IC723,7805,7809,7912 andother essentialcomponents.
8. AnalogIC Tester

IIIYear-I Semester	**L**	**T**	**P**	**C**
		0	**0**	**3**	**2**

DICALABORATORY

Note: The students are required to design and draw the internal logical structure of the following Digital IntegratedCircuits and to develop VHDL/Verilog HDL Source code, perform simulation using relevant simulator and analyzetheobtained simulation results usingnecessarysynthesizer.

All the experiments are required to verify and implement the logical operations on the latest FPGA Hardware in theLaboratory.

ListofExperiments:(MinimumofTenExperimentshastobeperformed)

1. RealizationofLogicGates
2. DesignofFull Adderusing3modelingsystems
3. 3to8 Decoder-74138
4. 8to3Encoder(withandwithoutparity)
5. 8x 1Multiplexer-74151and2x 4De-multiplexer-74155
6. 4-Bitcomparator-7485
7. DFlip-Flop-7474
8. Decadecounter-7490
9. Shiftregisters-7495
10. 8-bitserialin-paralleloutandparallelin-serialout
11. Fast In &FastOut(FIFO)
12. MAC(Multiplier&Accumulator)
13. ALUDesign.

Equipment/Softwarerequired:

1. Xilinx Vivadosoftware/Equivalent IndustryStandardSoftware
2. XilinxHardware/Equivalenthardware
3. Personalcomputersystemwithnecessarysoftwaretoruntheprogramsand Implement.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

IIIYear-IISemester

L	T	P	C
4	0	0	3

MICROPROCESSORSANDMICROCONTROLLERS

UNIT-I:

8086 ARCHITECTURE: Main features, pin diagram/description, 8086 microprocessor family, 8086 internalarchitecture, bus interfacing unit, execution unit, interrupts and interrupt responses, 8086 system timing, minimummodeand maximum modeconfiguration.

UNIT-II:

8086PROGRAMMING:Programdevelopmentsteps,instructions,addressingmodes,assemblerdirectives,writingsimpleprograms with anassembler, assemblylanguageprogram developmenttools.

UNIT-III:

8086INTERFACING:Semiconductormemoriesinterfacing(RAM,ROM),8254softwareprogrammabletimer/counter, Intel 8259 programmable interrupt controller, software and hardware interrupt applications, Intel8237a DMA controller, Intel 8255 programmable peripheral interface, keyboard interfacing, alphanumeric displays(LED,7-segmentdisplay,multiplexed7-segmentdisplay,LCD),Intel8279programmablekeyboard/displaycontroller,steppermotor, A/Dand D/Aconverters.

UNIT-IV:

80386AND80486MICROPROCESSORS: Introduction,programmingconcepts,specialpurposeregisters,memoryorganization,movingtoprotectedmode,virtualmode,memorypagingmechanism,architecturaldifferencesbetween 80386 and 80486 microprocessors.

UNIT-V:

Intel8051MICROCONTROLLER: Architecture,hardwareconcepts,input/outputportsandcircuits,externalmemory,counters/timers, serial datainput/output, interrupts.
Assembly language programming: Instructions, addressing modes, simple programs.Interfacing:keyboard,displays(LED,7-segmentdisplayunit),A/Dand D/Aconverters.

.

UNIT-VI:

PIC MICROCONTROLLER: Introduction, characteristics of PIC microcontroller, PIC microcontroller families,memory organization, parallel and serial input and output, timers,Interrupts, PIC 16F877 architecture, instructionsetofthePIC 16F877.

TextBooks:

1. MicroprocessorsandInterfacing–Programming andHardwarebyDouglasVHall,SSSPRao,TataMcGrawHillEducation PrivateLimited, 3rdEdition.
2. The8051Microcontroller&EmbeddedSystemsUsingAssemblyandCbyKennethJ.Ayala,DhananjayV.Gadre,CengageLearninbg,IndiaEdition.

References:

1. TheIntelMicroprocessors-Architecture,Programming,and InterfacingbyBarryB.Brey,Pearson,Eighth Edition-2012.
2. MicroprocessorsandMicrocontrollers-Architecture,ProgrammingandSystemDesignbyKrishnaKant,PHILearningPrivateLimited, Second Edition, 2014.
3. MicroprocessorsandMicrocontrollersbyN.SenthilKumar,M.SaravananandS.Jeevananthan, OxfordUniversityPress, SeventhImpression 2013

IIIYear-II Semester

L	T	P	C
4	0	0	3

MICROWAVEENGINEERING

OBJECTIVES

Thestudentwill

- Understandfundamentalcharacteristicsofwaveguidesand Microstriplinesthroughelectromagneticfieldanalysis.
- Understandthebasicpropertiesofwaveguidecomponentsand Ferritematerialscomposition
- Understandthefunction,design,andintegrationofthemajormicrowavecomponentsoscillators,poweramplifier.
- UnderstandaMicrowave testbenchsetupformeasurements.

UNITI

MICROWAVETRANSMISSIONLINES: Introduction,MicrowaveSpectrumandBands,ApplicationsofMicrowaves. Rectangular Waveguides – TE/TM mode analysis, Expressions for Fields, Characteristic Equation andCut-offFrequencies,FilterCharacteristics,DominantandDegenerateModes,SketchesofTEandTMmodefieldsin the cross-section, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations;PowerTransmissionandPower LossesinRectangularGuide,ImpossibilityofTEMmode.RelatedProblems.

UNITII

CIRCULAR WAVEGUIDES: Introduction, Nature of Fields, Characteristic Equation, Dominant and DegenerateModes.

CavityResonators–

Introduction,RectangularandCylindricalCavities,DominantModesandResonantFrequencies,QfactorandCouplingCoefficients,Excitationtechniques-waveguidesandcavities,RelatedProblems.

MICROSTRIPLINES– Introduction,ZoRelations,EffectiveDielectricConstant,Losses,Qfactor.

UNITIII

MICROWAVE TUBES : Limitations and Losses of conventional tubes at microwave frequencies. Re-entrantCavities,Microwave tubes – O type and M type classifications. O-type tubes :2 Cavity Klystrons – Structure,Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions foro/p Power and Efficiency, Applications, Reflex Klystrons – Structure, Applegate Diagram and Principle of working,Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/pCharacteristics,Electronicand MechanicalTuning, Applications, Related Problems.

UNIT-IV

HELIXTWTS: Significance,TypesandCharacteristicsofSlowWaveStructures;StructureofTWTandSuppressionofOscillations,NatureofthefourPropagation Constants(Qualitativetreatment).

M-typeTubes

Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron – HullCut-offCondition,ModesofResonanceand PI-ModeOperation,SeparationofPI-Mode,o/pcharacteristics.

UNITV

WAVEGUIDE COMPONENTS AND APPLICATIONS - I : Coupling Mechanisms – Probe, Loop, Aperturetypes.WaveguideDiscontinuities– Waveguideirises,Tuning ScrewsandPosts, MatchedLoads.WaveguideAttenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types.Scattering Matrix– Significance, Formulation and Properties. S-Matrix Calculations for – 2 port Junction, E-planeand H-plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – 2Hole, Bethe Hole types, Ferrite Components–FaradayRotation, S-MatrixCalculations forGyrator,Isolator,Circulator,RelatedProblems.

UNITVI

MICROWAVESOLIDSTATEDEVICES: Introduction,Classification,Applications.TEDs–Introduction,Gunn Diode – Principle, RWH Theory, Characteristics, Basic Modes of Operation, Oscillation Modes. AvalancheTransit Time Devices – Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics.**MICROWAVE MEASUREMENTS:** Description of Microwave Bench – Different Blocks and their Features,Precautions; Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, Q-factor,Phaseshift, VSWR,ImpedanceMeasurement.

TEXTBOOKS:

1. MicrowaveDevicesandCircuits–SamuelY. Liao,PHI,3rdEdition,1994.
2.FoundationsforMicrowaveEngineering–R.E.Collin,IEEEPress,JohnWiley,2ndEdition,2002.

REFERENCES:

1. MicrowavePrinciples– HerbertJ.Reich,J.G.Skalnik,P.F.OrdungandH.L.Krauss,CBSPublishersandDistributors,NewDelhi,2004
2. MicrowaveEngineering-AnnapurnaDas andSisirK.Das,McGrawHillEducation,3rd Edition.
3. MicrowaveandRadarEngineering-M.Kulkarni,UmeshPublications,3rd Edition.
4. MicrowaveEngineering–GSNRaju,IKInternational
5. MicrowaveandRadar Engineering–GSasibhushanaRaoPearson

OUTCOMES:Aftergoingthrough thiscoursethestudentwillbeableto

- Designdifferentmodesinwaveguidestructures
- CalculateS-matrixforvariouswaveguidecomponentsandsplittingthemicrowaveenergyinadesireddirection
- DistinguishbetweenMicrowavetubes andSolidStateDevices,calculationofefficiencyofdevices.
- Measurevariousmicrowaveparametersusinga Microwavetestbench

IIIYear-II Semester

L	T	P	C
4	0	0	3

VLSIDESIGN

Objectives:

Themainobjectivesofthiscourseare:

- BasiccharacteristicsofMOStransistorandexaminesvariouspossibilitiesforconfiguringinvertercircuitsandaspects oflatch-upareconsidered.
- Designprocessesareaidedby simpleconceptssuchasstickandsymbolicdiagramsbutthekey elementisasetofdesign rules, whichareexplained clearly.
- BasiccircuitconceptsareintroducedforMOSprocesseswecansetoutapproximatecircuitparameterswhich greatlyeasethedesign process.

Syllabus:

UNIT-I:

Introduction and Basic ElectricalPropertiesofMOS Circuits: Introduction toIC technology,Fabricationprocess: nMOS, pMOS and CMOS. I_{ds} versus V_{ds} Relationships, Aspects of MOS transistor Threshold Voltage,MOS transistor Trans, Output Conductance and Figure of Merit. nMOS Inverter, Pull-up to Pull-down Ratio fornMOS inverter driven by another nMOS inverter, and through one or more pass transistors. Alternative forms ofpull-up, The CMOS Inverter, Latch-up in CMOS circuits, Bi-CMOS Inverter, Comparison between CMOS andBiCMOStechnology.

(TextBook-1)

UNIT-II:

MOS and Bi-CMOS Circuit Design Processes: MOS Layers, Stick Diagrams, Design Rules and Layout, Generalobservations on the Design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µm Double Metal,Double Poly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOS inverter, Symbolic Diagrams-Translationto Mask Form.

(TextBook-1)

UNIT-III:

Basic Circuit Concepts: Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, AreaCapacitance of Layers, Standard unit of capacitance, Some area Capacitance Calculations, The Delay Unit, InverterDelays,Drivinglargecapacitiveloads,Propagation Delays, WiringCapacitances, Choiceoflayers.

Scaling of MOS Circuits: Scaling models and scaling factors, Scaling factors for device parameters, Limitations ofscaling, Limits due to sub threshold currents, Limits on logic levels and supply voltage due to noise and currentdensity.Switch logic, Gatelogic.

(TextBook-1)

UNIT-IV:

Chip Input and Output circuits: ESD Protection, Input Circuits, Output Circuits and L(di/dt) Noise, On-ChipclockGeneration and Distribution.

DesignforTestability:FaulttypesandModels,Controllability andObservability,AdHocTestableDesignTechniques,ScanBasedTechniquesandBuilt-InSelfTest techniques.

(TextBook-2)

UNIT-V:

FPGA Design: FPGA design flow, Basic FPGA architecture, FPGA Technologies, FPGA families- Altera Flex8000FPGA,Altera Flex10FPGA,XilinxXC4000seriesFPGA,XilinxSpartanXL FPGA,XilinxSpartanIIFPGAs,XilinxVertexFPGA.Casestudies: FPGA Implementation ofHalfadderandfull adder.

Introductiontosynthesis: Logicsynthesis,RTLsynthesis,HighlevelSynthesis.

(ReferenceTextBook-1)

UNIT-VI:

Introduction to Low Power VLSI Design: Introduction to Deep submicron digital IC design**,** Low Power CMOSLogic Circuits: Over view of power consumption, Low –power design through voltage scaling, Estimation andoptimisation of switching activity, Reduction of switching capacitance. Interconnect Design, Power Grid and ClockDesign.

(TextBook-2)

TextBooks:

1. EssentialsofVLSICircuitsandSystems-KamranEshraghian,DouglasandA.PucknellandSholehEshraghian,Prentice-Hall ofIndiaPrivate Limited, 2005 Edition.
2. CMOSDigitalIntegratedCircuitsAnalysisandDesign-Sung-MoKang, YusufLeblebici,TataMcGraw-HillEducation, 2003.

References:

1. AdvancedDigitalDesignwiththeVerilogHDL,MichaelD.Ciletti,XilinxDesignSeries,PearsonEducation
2. AnalysisandDesignofDigitalIntegratedCircuitsinDeepsubmicronTechnology,3’rdedition,DavidHodges.

Outcomes:

Attheendof thiscoursethestudentcanableto:

- UnderstandthepropertiesofMOSactivedevicesandsimplecircuitsconfiguredwhenusingthemandthereasonforsuchencumbrances asratiorules bywhichcircuits can beinterconnected in silicon.
- KnowthreesetsofdesignruleswithwhichnMOSand CMOSdesignsmaybe fabricated.
- Understandthescalingfactorsdeterminingthe characteristicsandperformanceofMOScircuitsinsilicon.

IIIYear-II Semester

L	T	P	C
4	0	0	3

DIGITALSIGNALPROCESSING

OBJECTIVES

Thestudent will beableto

- AnalyzetheDiscreteTimeSignalsandSystems
- Knowtheimportanceof FFT algorithmforcomputationofDiscrete FourierTransform
- Understandthevariousimplementationsofdigitalfilterstructures
- LearntheFIRandIIRFilterdesignprocedures
- Knowtheneed ofMultirateProcessing
- LearntheconceptsofDSPProcessors

UNIT IINTRODUCTION: Introduction to Digital Signal Processing: Discrete time signals & sequences,Classification of Discrete time systems ,stability of LTI systems,Invertability, Response of LTI systems toarbitrary inputs. Solution of Linear constant coefficient difference equations. Frequency domain representation ofdiscrete time signals and systems.Review of Z-transforms, solution of difference equations using Z-transforms,Systemfunction.

UNIT IIDISCRETE FOURIER SERIES & FOURIER TRANSFORMS: Properties of discrete Fourier series,DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear filtering methodsbased on DFT, Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFTAlgorithms,InverseFFT.

UNIT III.DESIGN OF IIR DIGITAL FILTERS& REALIZATIONS: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples, Analog and Digitalfrequencytransformations. BasicstructuresofIIRsystems, Transposedforms.

UNITIV DESIGNOFFIRDIGITAL FILTERS&REALIZATIONS:
Characteristics of FIR Digital Filters,frequency response. Design of FIR Digital Filters using Window TechniquesandFrequencySampling technique, Comparisonof IIR & FIR filters.

BasicstructuresofFIRsystems,***Latticestructures,Lattice-ladderstructures***

UNITVMULTIRATEDIGITALSIGNALPROCESSING: Introduction,Decimation,InterpolationSampling rate conversion ,Implementation of sampling rate converters***, Applications – Sub-band Coding of SpeechSignals,ImplementationofDigitalFilter Banks,Trans-multiplexers.***

UNIT VIINTRODUCTION TO DSP PROCESSORS: Introduction to programmable DSPs: Multiplier andMultiplier Accumulator, Modified bus structures and memory access schemes in P-DSPs ,Multiple Access Memory,Multiportedmemory,VLIW architecture, Pipelining,Specialaddressingmodes,On-ChipPeripherals.
Architecture of TMS320C5X: Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Register ALU,Index Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller,someflags in thestatusregisters, On-chip memory,On-chipperipherals.

TEXTBOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, DimitrisG.Manolakis,PearsonEducation / PHI, 2007.
2. DiscreteTimeSignal Processing– A.V.OppenheimandR.W.Schaffer, PHI
3. DigitalSignalProcessors– Architecture,ProgrammingandApplications,,B.Venkataramani,M.Bhaskar,TATAMcGraw Hill, 2002
4. DigitalSignalProcessing–KRajaRajeswari, I.K. InternationalPublishingHouse

ReferenceBooks:

1. DigitalSignalProcessing:AndreasAntoniou,TATAMcGrawHill,2006
2. DigitalSignalProcessing:MHHayes,Schaum'sOutlines,TATAMc-GrawHill,2007.
3. DSPPrimer-C.BrittonRorabaugh,TataMcGrawHill,2005.
4. Fundamentalsof DigitalSignalProcessingusingMatlab–RobertJ.Schilling,Sandra L.Harris,Thomson,2007.
5. DigitalSignalProcessing–Alan V.Oppenheim,RonaldW.Schafer,PHIEd.,2006
6. DigitalSignalProcessing–Rameshbabu,SciTechpublications

OUTCOMES

After goingthroughthiscoursethestudentwillbe ableto

- Applythedifference equationsconcept intheanayziationofDiscretetimesystems
- UsetheFFTalgorithmforsolvingtheDFTof a givensignal
- DesignaDigitalfilter(FIR&IIR)fromthegivenspecifications
- RealizetheFIRand IIRstructuresfromthedesigneddigitalfilter.
- UsetheMultirateProcessingconceptsinvariousapplications(eg:Designofphaseshifters,Interfacingofdigitalsystems…)
- Applythesignalprocessingconceptson DSPProcessor.

BIO-MEDICAL ENGINEERING(OPENELECTIVE)

UNIT-I:

INTRODUCTIONTOBIOMEDICALINSTRUMENTATION: AgeofBiomedicalEngineering,Development of Biomedical Instrumentation, Man Instrumentation System, Components of the Man-InstrumentSystem, Physiological System of the Body, Problems Encountered in Measuring a Living System, Sources ofBioelectric Potentials, Muscle, Bioelectric Potentials, Sources of Bioelectric Potentials, Resting and ActionPotentials,PropagationofActionPotential,BioelectricPotentials-ECG,EEGandEMG,EnvokedResponses.

UNIT-II:

ELECTRODES AND TRANSDUCERS: Introduction, Electrode Theory, Biopotential Electrodes, ExamplesofElectrodes,BasicTransducerPrinciples,BiochemicalTransducers,TheTransducerandTransductionPrinciples, Active Transducers, Passive Transducers, Transducers for Biomedical Applications, Pulse Sensors,RespirationSensor, Transducers with Digital Output.

UNIT-III:

CARDIOVASCULAR SYSTEM AND MEASUREMENTS: The Heart and Cardiovascular System, ElectroCardiography, Blood Pressure Measurement, Measurement of Blood Flow and Cardiac Output, Measurement ofHeartSound, Plethysmography.

MEASUREMENTSINTHERESPIRATORYSYSTEM: ThePhysiologyofThe RespiratorySystem,TestsandInstrumentationforTheMechanicsofBreathing,RespiratoryTherapyEquipment.

UNIT-IV:

PATIENTCAREANDMONITORING: ElementsofIntensive-CareMonitoring,PatientMonitoringDisplays, Diagnosis, Calibration and Repair ability of Patient-Monitoring Equipment, Other Instrumentation forMonitoring Patients, Organization of the Hospitalfor Patient-Care Monitoring, Pacemakers, Defibrillators,RadioFrequencyApplications ofTherapeuticuse.

THERAPEUTICANDPROSTHETICDEVICES: AudiometersandHearingAids, Myoelectric Arm, Laparoscope, Ophthalmology Instruments, Anatomy of Vision,Electrophysiological Tests,Ophthalmoscope,TonometerforEyePressureMeasurement,Diathermy,ClinicalLaboratoryInstruments,Biomaterials,Stimulators.

UNIT-V:

DIAGNOSTIC TECHNIQUES AND BIO-TELEMETRY: Principles of Ultrasonic Measurement, UltrasonicImaging,UltrasonicApplicationsofTherapeuticUses,UltrasonicDiagnosis,X-RayandRadio-IsotopeInstrumentations,CATScan,EmissionComputerizedTomography,MRI,IntroductiontoBiotelemetry,Physiological Parameters Adaptable to Biotelemetry, The Components of Biotelemetry System, ImplantableUnits,TelemetryforECGMeasurementsduring Exercise, Telemetryfor EmergencyPatient Monitoring

UNIT-VI:

MONITORS,RECORDERSANDSHOCKHAZARDS: BiopotentialAmplifiers,Monitors,Recorders,Shock Hazards and Prevention, Physiological Effects and Electrical Current, Shock Hazards from ElectricalEquipment,Methods ofAccident Prevention,IsolatedPowerDistribution System.

TextBooks:

1. "Bio-MedicalElectronicsand Instrumentation", OnkarN.Pandey,RakeshKumar,KatsonBooks.
2. "Bio-MedicalInstrumentation",Cromewell,Wiebell,Pfeiffer

References:

1. "IntroductiontoBio-MedicalEquipmentTechnology",4th Edition,JosephJ.Carr,JohnM.Brown,PearsonPublications.
2. "HandBookofBio-MedicalInstrumentation",Khandapur.McGrawHill

IIIYear-IISemester	L	T	P	C
	0	0	3	2

MICROPROCESSORSANDMICROCONTROLLERSLAB

LISTOFEXPERIMENTS

PART-A:(Minimumof 5Experimentshastobeperformed)
8086AssemblyLanguageProgrammingusingAssemblerDirectives

15. Sorting.
16. Multibyteaddition/subtraction
17. Sumofsquares/cubesofagivenn-numbers
18. Additionofn-BCDnumbers
19. Factorialofgivenn-numbers
20. MultiplicationandDivisionoperations
21. Stackoperations
22. BCDtoSevensegmentdisplaycodes

PART- B:(Minimum of 3 Experiments has to be performed)8086Interfacing

1. Hardware/SoftwareInterruptApplication
2. A/DInterfacethroughIntel8255
3. D/AInterfacethroughIntel8255
4. KeyboardandDisplayInterfacethroughIntel8279
5. GenerationofwaveformsusingIntel8253/8254

PART- C: (Minimum of 3 Experiments has to be performed)8051Assembly LanguagePrograms

1. Findingnumberof1’sandnumberof0’sin a given 8-bitnumber
2. Additionofevennumbersfrom a givenarray
3. Ascending/ Descendingorder
4. Averageofn-numbers

PART-D:(Minimum of 3 Experiments has to be performed)8051Interfacing

1. SwitchesandLEDs
2. 7-Segmentdisplay(multiplexed)
3. StepperMotorInterface
4. TrafficLightController

EquipmentRequired:

1. RegulatedPowersupplies
2. Analog/DigitalStorageOscilloscopes
3. 8086Microprocessorkits
4. 8051microcontrollerkits
5. ADCmodule
6. DACmodule
7. Steppermotormodule
8. Keyboardmodule
9. LED,7-SegemtUnits
10. DigitalMultimeters
11. ROM/RAMInterfacemodule
12. BreadBoard etc.

IIIYear-II Semester

L	T	P	C
0	0	3	2

VLSILABORATORY

Note: Thestudentsarerequiredtodesigntheschematicdiagramsusing CMOSlogicandtodrawthelayoutdiagramsto performthefollowingexperiments using130nm technologywith the IndustrystandardEDATools.

ListofExperiments:

i. Designand ImplementationofanUniversalGates
ii. Designand Implementationofan Inverter
iii. Designand ImplementationofFullAdder
iv. Designand ImplementationofFullSubtractor
v. Designand ImplementationofDecoder
vi. DesignandImplementationofRS-Latch
vii. Designand ImplementationofD-Latch
viii. DesignandImplementationasynchronouscounter
ix. Designand ImplementationofstaticRAMcell
x. Design andImplementationof8bitDACusingR-2Rlatternetwork

SoftwareRequired:

i. MentorGraphicsSoftware/Equivalent IndustryStandardSoftware.
ii. Personalcomputersystem withnecessarysoftwaretorun theprogramsand toimplement.

IIIYear-II Semester

DIGITALCOMMUNICATIONSLAB

1. Timedivisionmultiplexing.
2. Pulsecodemodulation.
3. Differentialpulsecodemodulation.
4. Deltamodulation.
5. Frequencyshiftkeying.
6. Phaseshiftkeying.
7. Differentialphaseshiftkeying.
8. Companding
9. SourceEncoderandDecoder
10. LinearBlockCode-EncoderandDecoder
11. BinaryCyclicCode–Encoder andDecoder
12. ConvolutionCode–Encoder andDecoder

EquipmentrequiredforLaboratories:

1.RPS – 0 – 30 V
2. CRO– 0 – 20 M Hz.
3. FunctionGenerators–0–1MHz
4. RFGenerators – 0– 1000 MHz./0 – 100M Hz.
5. Multimeters
6. LabExperimentalkitsforDigitalCommunication
7. Components

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

L	T	P	C
4	0	0	3

IV Year-ISemester **RADARSYSTEMS**

OBJECTIVES

Thestudentwillbeintroducedto:

1. TheBasicPrincipleofradarand radar rangeequation.
2. Differenttypesofradars; CW,FM-CW,MTIandpulseDopplerradars.
3. Understandthedifferenttrackingtechniquesforradar.
4. Understandthe characteristicsofamatchedfilterreceiveranditsperformance.
5. Understandthedifferenttypesofdisplays,duplexers and antennasusedin radarsystems.

UNIT–I:

Basics of Radar : Introduction, Maximum Unambiguous Range,simple Radar range Equation, Radar BlockDiagramandOperation,RadarFrequenciesandApplications.PredictionofRangePerformance,MinimumDetectableSignal, ReceiverNoise,IllustrativeProblems.

Radar Equation : Modified Radar Range Equation, SNR, probability of detection, probability of False Alarm,Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Creeping Wave,TransmitterPower,PRFandRangeAmbiguities,System Losses(qualitativetreatment),IllustrativeProblems.

UNIT–II:

CWandFrequencyModulatedRadar: DopplerEffect,CWRadar–BlockDiagram,IsolationbetweenTransmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar.IllustrativeProblems

FM-CWRadar: RangeandDopplerMeasurement,BlockDiagramandCharacteristics,FM-CWaltimeter,MultipleFrequencyCWRadar.

UNIT-III:

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter andPower Oscillator Transmitter, Delay Line Cancellers– Filter Characteristics, Blind Speeds, Double Cancellation,N^{th}CancellationStaggeredPRFs.RangeGatedDopplerFilters.MTIRadarParameters,LimitationstoMTIPerformance,MTIversus PulseDopplerRadar.

UNIT–IV:

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking Radar – AmplitudeComparisonMonopulse(one-andtwo-coordinates),PhaseComparisonMonopulse,TrackinginRange,Acquisitionand ScanningPatterns, Comparison ofTrackers.

UNIT–V:

Detection of Radar Signals in Noise : Introduction, Matched Filter Receiver – Response Characteristics andDerivation, Correlation detection and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched FilterwithNon-whiteNoise, NoiseFigureand NoiseTemperature.

UNIT–VI:

RadarReceivers–Displays–types.Duplexers–BranchtypeandBalancedtype,CirculatorsasDuplexers.Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Widthchanges,Series versusparallel feeds,Applications, AdvantagesandLimitations.Radomes.

TEXTBOOKS:

1.IntroductiontoRadar Systems – MerrillI. Skolnik, TMHSpecialIndian Edition, 2nd Ed., 2007.

REFERENCEBOOKS:

1. IntroductiontoRadarSystems,3rd edition–M.I.Skolnik,TMHEd.,2005
2. Radar:Principles,Technology,Applications– ByronEdde,PearsonEducation,2004.
3. RadarPrinciples–Peebles,Jr.,P.Z.,Wiley,NewYork,1998.
4. PrinciplesofModernRadar:BasicPrinciples–MarkA.Richards,JamesA.Scheer,WilliamA.Holm,Yesdee,
5. RadarEngineering–GSNRaju, IKInternational.

OUTCOMES

Aftergoingthroughthiscoursethestudentwillbeableto:

1. Derivethe radarrangeequationandtosolvesomeanalyticalproblems.
2. Understandthedifferenttypesof radarsanditsapplications.
3. Understandthe conceptoftrackinganddifferenttrackingtechniques.
4. Understandthevariouscomponentsofradarreceiveranditsperformanc.

IVYear-I Semester	L	T	P	C
	4	0	0	3

DIGITALIMAGEPROCESSING

CourseObjectives:

Studentsundergoingthis courseareexpectedto:

1. Familiarizewithbasic conceptsofdigitalimageprocessinganddifferentimagetransforms
2. Learnvariousimageprocessingtechniqueslikeimage enhancement,restoration,segmentationandcompression
3. Understandcolorfundamentalsanddifferentcolormodels
4. Understandwaveletsandmorphologicalimageprocessing

UNIT-1

Introduction: Introduction to Image Processing, Fundamental steps in digital image processing, components of animage processing system, image sensing and acquisition, image sampling and quantization, some basic relationshipsbetweenpixels, an introductionto themathematicaltools used indigital imageprocessing.

Image Transforms: Need for image transforms, Discrete Fourier transform (DFT) of one variable, Extension tofunctions of two variables, some properties of the 2-D Discrete Fourier transform, Importance of Phase, WalshTransform. Hadamard transform, Haar Transform, Slant transform, Discrete Cosine transform, KL Transform, SVDandRadon Transform, Comparison ofdifferent imagetransforms

UNIT-2

Intensity Transformations and Spatial Filtering: Background, Some basic intensity transformation functions,histogramprocessing,fundamentalsofspatialfiltering,smoothingspatialfilters,sharpeningspatialfilters,Combiningspatial enhancement methods

Filtering in the Frequency Domain: Preliminary concepts, The Basics of filtering in the frequency domain, imagesmoothingusingfrequencydomainfilters,Image Sharpeningusing frequencydomain filters,Selectivefiltering.

UNIT-3

Image Restoration and Reconstruction: A model of the image degradation / Restoration process, Noise models,restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering,Linear, Position –Invariant Degradations, Estimating the degradation function, Inverse filtering, Minimum meansquare error (Wiener) filtering, constrained least squares filtering ,geometric mean filter ,image reconstruction fromprojections.

UNIT-4

Image compression: Fundamentals, Basic compression methods: Huffman coding, Golomb coding, Arithmeticcoding,LZWcoding,Run-Lengthcoding,Symbol-Basedcoding,Bit-Planecoding,BlockTransformcoding,Predictivecoding

Wavelets and Multiresolution Processing: Image pyramids, subband coding, Multiresolution expansions, wavelettransformsin onedimensions &two dimensions, Wavelet coding.

UNIT-5

Image segmentation: Fundamentals, point, line, edge detection, thresholding, region –based segmentation.**MorphologicalImageProcessing:** Preliminaries, Erosion and dilation, opening and closing, basicmorphologicalalgorithmsforboundaryextraction,thinning,gray scalemorphology,Segmentationusingmorphologicalwatersheds.

UNIT-6

Color image processing: color fundamentals, color models, pseudo color image processing, basics of full colorimage processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise incolorimages, colorimagecompression.

TextBooks

1. R.C.GonzalezandR.E.Woods,DigitalImageProcessing,3rdedition,PrenticeHall,2008.
2. Jayaraman,S.Esakkirajan,andT.Veerakumar,"DigitalImageProcessing",TataMcGraw-HillEducation,2011.

ReferenceBooks

1. AnilK.Jain,"FundamentalsofDigitalImageProcessing",PrenticeHallofIndia,9thEdition,IndianReprint,2002.
2. B.Chanda,D.DuttaMajumder,"Digital ImageProcessingandAnalysis",PHI,2009.

CourseOutcomes:

Afterundergoingthecoursestudents will beableto

1. Performimagemanipulationsanddifferentdigitalimageprocessingtechniques
2. Performbasicoperationslike– Enhancement,segmentation,compression,Imagetransformsandrestorationtechniqueson image.
3. Analyzepseudoandfullcolorimageprocessingtechniques.
4. Applyvariousmorphologicaloperators onimages

IVYear-I Semester

L	T	P	C
4	0	0	3

COMPUTERNETWORKS

OBJECTIVES:

- Understandstate-of-the-artinnetworkprotocols,architectures,andapplications.
- Processofnetworkingresearch
- Constraintsandthought processes fornetworkingresearch
- ProblemFormulation—Approach—Analysis—

UNIT–I

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IPReferenceModel -AComparison oftheOSIandTCP/IP ReferenceModels

UNIT–II

Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - GuidedTransmissionMedia,DigitalModulationandMultiplexing:FrequencyDivisionMultiplexing,TimeDivisionMultiplexing,CodeDivision Multiplexing

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding WindowProtocols

UNIT–III

The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, ErrorDetection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols-AUtopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and WaitProtocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol UsingGo-Back-N-AProtocolUsingSelectiveRepeat

UNIT–IV

The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions forDynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Multiple Access Protocols-Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet PhysicalLayer-Classic Ethernet MAC Sublayer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-GigabitEthernet-RetrospectiveonEthernet,WirelessLans-The802.11ArchitectureandProtocolStack-The802.11PhysicalLayer-The802.11 MACSublayerProtocol-The805.11 FrameStructure-Services

UNIT–V

Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to theTransportlayer-ImplementationofConnectionlessService-ImplementationofConnectionOrientedService-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-ShortestpathAlgorithm,CongestionControlAlgorithms-ApproachestoCongestionControl-TrafficAwareRouting-AdmissionControl-TrafficThrottling-Load Shedding.

UNIT–VI

TransportLayer–TheInternetTransportProtocols:Udp,theInternetTransportProtocols:Tcp

ApplicationLayer–

TheDomainNameSystem:TheDNSNameSpace,ResourceRecords,NameServers,ElectronicMail:ArchitectureandServices,TheUserAgent,Message Formats,MessageTransfer,FinalDelivery

OUTCOMES:

- UnderstandOSIandTCP/IPmodels
- AnalyzeMAClayerprotocolsand LANtechnologies
- 3.Design applicationsusinginternetprotocols
- 4.Understandroutingandcongestioncontrolalgorithms
- 5.Understandhowinternetworks

TEXTBOOKS:

1. ComputerNetworks,TanenbaumandDavidJWetherall,5thEdition,PearsonEdu,2010
2. ComputerNetworks:ATopDownApproach,BehrouzA.Forouzan,FirouzMosharraf,McGrawHillEducation

REFERENCEBOOKS:

1.LarryL.PetersonandBruceS.Davie,“ComputerNetworks-ASystemsApproach”(5thed),MorganKaufmann/Elsevier, 2011

IVYear-I Semester

L	T	P	C
4	0	0	3

OPTICALCOMMUNICATIONS

OBJECTIVES

Thestudentwillbeintroducedtothefunctionalityofeachofthecomponentsthatcompriseafiber-opticcommunicationsystem

- thepropertiesofopticalfiberthataffecttheperformanceofacommunicationlinkandtypesoffibermaterialswith theirproperties and thelosses occurinfibers.
- theprinciplesofsingleandmulti-modeopticalfibersandtheircharacteristics
- workingofsemiconductorlasers,anddifferentiatebetweendirectmodulationandexternalelectro-opticmodulation.
- Analyze the operation of LEDs, laser diodes, and PIN photo detectors (spectralproperties,bandwidth, and circuits)and applyin opticalsystems.
- Analyzeanddesignopticalcommunicationandfiberopticsensorsystems.
- themodelsofanalogganddigitalreceivers.

UNITI

Overview of optical fiber communication - Historical development, The general system, advantages of optical fibercommunications.Opticalfiberwaveguides-Introduction,Ray theorytransmission,TotalInternalReflection,Acceptance angle, Numerical Aperture, Skew rays, Cylindrical fibers-Modes, V-number, Mode coupling, StepIndexfibers,GradedIndexfibers,Singlemodefibers-Cutoffwavelength,ModeFieldDiameter,EffectiveRefractiveIndex, Related problems.

UNITII

Fiber materials:- Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in opticalfibers-Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses, Information capacitydetermination, Group delay, Types of Dispersion:- Material dispersion, Wave-guide dispersion, Polarization-Modedispersion,Intermodal dispersion,Pulsebroadeningin Graded indexfiber,Relatedproblems.

UNITIII

. Optical fiber Connectors-Connector types, Single mode fiber connectors, Connector return loss, Fiber Splicing-Splicing techniques, Splicing single mode fibers, Fiber alignmentand jointloss- Multimode fiber joints, singlemodefiberjoints.

UNITIV

Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product.Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations,Resonant frequencies, Reliability of LED&ILD, Optical detectors- Physical principles of PIN and APD, Detectorresponsetime,Temperatureeffecton Avalanche gain, ComparisonofPhotodetectors, Relatedproblems.

UNITV

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium NumericalAperture, Laser diode to fiber coupling, Optical receiver operation- Fundamental receiver operation, Digital signaltransmission, error sources, Receiver configuration, Digital receiver performance, Probability of Error, Quantumlimit,Analogreceivers.

UNITVI

Optical system design - Point-to- point links- Component choice and considerations, Link power budget, Rise timebudget with examples, Line coding in Optical links, WDM, Necessity, Principles, Measurement of Attenuation andDispersion,Eyepattern.

TEXTBOOKS:

1. OpticalFiberCommunications–GerdKeiser, McGraw-HillInternationaledition,3rdEdition,2000.
2. OpticalFiberCommunications–JohnM.Senior,PHI,2ndEdition,2002.

RERFERENCES:

1. FiberOpticCommunications–D.K.Mynbaev ,S.C.GuptaandLowellL.Scheiner,PearsonEducation,2005.
2. TextBookonOpticalFiberCommunicationanditsApplications–S.C.Gupta,PHI,2005.
3. FiberOpticCommunicationSystems–GovindP.Agarwal,JohnWiley,3rdEdiition,2004.
4. FiberOpticCommunications–JosephC.Palais,4thEdition,PearsonEducation,2004.

OUTCOMES

After goingthroughthiscoursethestudentwillbe ableto

- Choosenecessarycomponents requiredinmodern opticalcommunicationssystems.
- Designandbuildopticalfiberexperimentsinthelaboratory,andlearnhowtocalculateelectromagneticmodesinwave guides,theamountoflightlostgoingthroughanopticalsystem,dispersionofopticalfibers.
- Usedifferenttypesofphotodetectorsandopticaltestequipmenttoanalyzeopticalfiberandlightwavesystems.
- Choosethe optical cables for better communication with minimum lossesDesign,build,anddemonstrateopticalfiberexperimentsinthelaboratory

.

IVYear-I Semester

L	T	P	C
4	0	0	3

TELEVISIONENGINEERING
(Elective-I)

UNITI

INTRODUCTION: TV transmitter and receivers, synchronization. Television Pictures: Geometric form and aspectratio,imagecontinuity,interlacedscanning,pictureresolution,Compositevideosignal:Horizontalandverticalsync, scanning sequence, Colour signal generation and Encoding: Perception of brightness and colours, additivecolour mixing, video signals for colours,luminance signal, colour difference signals, encoding of colour differencesignals,formation ofchrominancesignals, PALencoder.

UNITII

TVSIGNALTRANSMISSIONANDPROPAGATION: Picturesignaltransmission,positiveandnegativemodulation, VSBtransmission,soundsignaltransmission,standardchannelBW,TVtransmitter,TVsignalpropagation,interference, TVbroadcast channels.

MONOCHROME TV RECEIVER: RF tuner, IF subsystem, video amplifier, sound section, sync separation andprocessing,deflection circuits, scanning circuits.

PAL–D colour receiver: Electron tuners, IF subsystem, Y-signal channel, chroma decoder, separation of U & VColourphasors, synchronous demodulators, subcarriergeneration,rastercircuits.

UNITIII

VISION IF SUBSYSTEM: AGC, noise cancellation, video and intercarrier sound signal detection, Colour receiverIF subsystem, Receiver sound system: FM detection, FM Sound detectors, typical applications.TV Receiver Tuners:Tuneroperation, VHFand UHFtuners.

COLOUR SIGNAL DECODING:PAL-D decoder, chroma signal amplifiers, separation of U and V signals, Colorburst separation, Burst phase discriminator, Reference oscillator, Indent and color killer circuits, RO phase shift and180degrees PAL-SWITCHcircuitry,U&Vdemodulators, Coloursignal mixing.

UNIT-IV

HISTORY OF HDTV: Analog and Digital TV Compared, Going HD,Broadcast Engineering and InformationTechnology, The Road to HDTV, The Grand Alliance, A DTV Standard at Last, Producing HDTV, HD GoesCoast-to-Coast,DTVConversion.

COMPRESSIONTECHNIQUES: Compression,MPEG-2VideoCompression,MPEG-4,H.264,Motion–JPEG(M-JPEG)compression, AudioCompression, CompressedDataStreams,PacketizedTransport.

UNITV

DTVTRANSMITTERANDRECIEVER: EngineeringBasics,Presentation,Transmission,ReceptionandDemodulation,TransportStreamDemultiplexing,DecodingandDecompression,ProgramAssemblyandPresentation,ReceiverIssues, Presentation Concerns.

HDTVANDDTVSTANDARDS: StandardsBodies,TheATSCStandards,SMPTEStandards,TheAudioEngineeringSociety,CableDTVStandards,InstituteofElectronicandElectricalEngineers,TheConsumerElectronicsAssociation,OtherSocieties and Organizations.

UNITVI

EMERGING TECHNOLOGIES AND STANDARDS: Technology and Standards Development, Presentation,DeliveryandDistribution,MPEGandMetadata,Enhanced,InteractiveandPersonalized,VirtualProductPlacement,Multiplatform EmergencyAlert System.

TEXTBOOKS

1. ModernTelevisionPractice–Principles,TechnologyandService– R.R.Gulati,NewAgeInternationalPublication,2002

2. TelevisionandVideoEngineering–A.M.Dhake,2nd Edition,

3. "HDTVand the Transition to DigitalBroadcasting: UnderstandingNew Television Technologies"byPhilip J.Cianci,FocalPress,2007.

4. "DigitalVideoandHDTVAlgorithmsandInterfaces"byCharlesPoynton,MorganKaufmanpublishers,2007.

REFERENCES

1. BasicTelevisionandVideoSystems– B.Groband C.E.Herndon,McGrawHill,1999

2. "NewnesGuidetoTelevisionandVideoTechnology"byIbrahim.K.F,NewnesPublishers,4thedition,2007.

3. "H.264andMPEG-4andVideocompressionvideocodingforNext-generationMultimedia"byIainE.G.Richardson,JohnWiley&SonsLtd., 2003.

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ELECTRONICSWITCHINGSYSTEMS
(Elective-I)

OBJECTIVES:
Thestudentwill

- Understandthemeansof measuringtraffic.
- Understandtheimplicationofthetrafficlevelon systemdesign.

UNIT-I:
Introduction: Evolution of Telecommunications, Simple Telephone Communication, Basics of Switching System,ManualSwitchingSystem, MajorTelecommunication Networks.
CrossbarSwitching: PrinciplesofCommonControl,TouchToneDialTelephone,PrinciplesofCrossbarSwitching,CrossbarSwitchConfigurations, CrosspointTechnology, CrossbarExchangeOrganization.

UNIT-II:
Electronic Space Division Switching: Stored Program Control, Centralized SPC: Stand by mode, Synchronousduplexmode,DistributedSPC,SoftwareArchitecture,ApplicationSoftware,EnhancedServices,Two-StageNetworks,Three-StageNetworks, n-StageNetworks.

UNIT-III
TimeDivisionSwitching: BasicTimeDivisionSpaceSwitching,BasicTimeDivisionTimeSwitching,Generalised time division Space switch, Basic Time division time switching: modes of operation, simple problems,TimeMultiplexedSpaceSwitching,TimeMultiplexedTimedivisionspaceSwitch,TimeMultiplexedTimeSwitching,CombinationSwitching:TimeSpace(TS)Switching,Space-time(ST)Switching,Three-StageCombinationSwitching, n-StageCombination Switching.

UNITIV
TelephoneNetworks: SubscriberLoopSystem,SwitchingHierarchyandRouting,TransmissionPlan,Transmission Systems, Numbering Plan, Charging Plan, Signaling Techniques, In-channel Signaling, CommonChannel Signaling, CCITT Signaling System no.6, CCITT Signaling System no.7, **Packet Switching:** StatisticalMultiplexing,Local-AreaandWide-AreaNetworks,Large-scaleNetworks,Broadband Networks.

UNIT-V:
SwitchingNetworks: Single-StageNetworks,Grading,LinkSystems,Gradesofserviceoflinksystems,ApplicationofGraph Theoryto link Systems, UseofExpansion, Call Packing,
Rearrange-able Networks, Strict- Sense non-blocking Networks, Sectionalized Switching Networks**TelecommunicationsTraffic:**TheUnitofTraffic,Congestion,TrafficMeasurement,AMathematicalModel,Lost-callSystems, QueuingSystems. Problems

UNIT-VI:
Integrated Services Digital Network: Motivation for ISDN, New Services, Network and Protocol Architecture,Transmission Channels, User- Network Interfaces, Signaling, Numbering and Addressing, Service Characterization,Interworking, ISDNStandards,ExpertSystemsinISDN,BroadbandISDN,VoiceData Integration.

TEXTBOOKS:
1. TelecommunicationSwitchingSystemsandNetworks-ThiagarajanViswanathan,2000,PHI.
2. TelecommunicationsSwitching,TrafficandNetworks-J.E.Flood,2006,PearsonEducation.

REFERENCES:

1. DigitalTelephony-J.Bellamy,2ndEdition,2001,JohnWiley.
2. DataCommunicationsandNetworks-AchyutS.Godbole,2004,TMH.
3. PrinciplesofCommunicationStstems-H.Taub&D.Schilling,2ndEdition,2003,TMH.
4. DataCommunication&Networking- B.A.Forouzan,3rdEdition,2004,TMH.
5. TelecommunicationSystemEngineering–RogerL.Freeman,4thEd.,Wiley-InterScience,JohnWiley&Sons,2004.

Outcomes

Thestudent will beableto

- Evaluatethetimeandspaceparametersof aswitchedsignal
- Establishthedigitalsignalpathintimeandspace, betweentwoterminals
- EvaluatetheinherentfacilitieswithinthesystemtotestsomeoftheSLIC,CODECanddigitalswitchfunctions.
- Investigatethetrafficcapacityofthesystem.
- Evaluatemethodsofcollectingtrafficdata.
- Evaluatethemethodofinterconnectingtwoseparatedigitalswitches.

SYSTEMDESIGNTHROUGHVERILOG
(Elective-I)

UNIT-I
INTRODUCTIONTOVERILOG:
VerilogasHDL,
Levelsofdesigndescription,concurrency,simulationandsynthesis,functionalverification,systemtasks,programminglanguageinterface(PLI),module,simulationand synthesistools,testbenches.
LANGUAGECONSTRUCTSANDCONVENTIONS:
Introduction, keywords, identifiers, whitespace characters, comments, numbers, strings, logic values, data types,scalarsand vectors, parameters, memory, operators, systemtasks.

UNIT-II
GATELEVELMODELLING:
Introduction, AND gate primitive, module structure, other gate primitives, illustrative examples, tristate gates, arrayof instances of primitives, design of Flip flops with gate primitives, delays, strengths and contention resolution, nettypes,design ofbasiccircuits.

UNIT-III
BEHAVIORALMODELLING:
Introduction, operationsand assignments, functional Bifurcation, initial construct, alwaysconstruct, examples,assignments with delays, wait construct, multiple always blocks, designs at behavioral level, blocking and non-blocking assignments, the case statement, simulation flow, if and if else constructs, assign-De assign construct,repeat construct, FOR loop, the disable construct, While loop, Forever loop, parallel blocks, force-release construct,event.

UNIT-IV
DATAFLOWLEVELANDSWITCHLEVELMODELLING:
Introduction, continuous assignment structures, delays and continuous assignments, assignment to vectors, basictransistor switches, CMOS switch, Bidirectional gates and time delays with switch primitives, instantiations withstrengthsand delays, strength contention with triregnets.

UNIT-V
SYNTHSISOFCOMBINATIONALANDSEQUENTIALLOGICUSINGVERILOG: Synthesisof
combinational logic: Net list of structured primitives, a set of continuous assignment statements and level sensitivecyclic behavior with examples, Synthesis of priority structures, Exploiting logic don't care conditions. Synthesis ofsequential logic with latches: Accidental synthesis of latches and Intentional synthesis of latches, Synthesis ofsequentiallogicwith flip-flops, Synthesis ofexplicit statemachines.

UNIT-VI
VERILOGMODELS:
Static RAM Memory, A simplified 486 Bus Model, Interfacing Memory to a Microprocessor Bus, UART DesignandDesign ofMicrocontrollerCPU.

TEXTBOOKS:

1. Designthrough VerilogHDL–T.R.PadmanabhanandB. BalaTripuraSundari,WSE,IEEEPress, 2004.
2. Advanced DigitalDesign withVerilogHDL–MichaelD.Ciletti,PHI,2005.

REFERENCES:

1. FundamentalsofLogic Design withVerilog–Stephen.BrownandZvonkoVranesic,TMH,2005.
2. AVerilogPrimier–J.Bhasker,BSP,2003.

IVYear-I Semester

L	T	P	C
4	0	0	3

EMBEDDED SYSTEMS
ELECTIVE-II

OBJECTIVES:

Themainobjectivesofthiscoursearegivenbelow:

- Thebasicconceptsof anembeddedsystemareintroduced.
- Thevariouselementsof embeddedhardwareandtheirdesignprinciplesareexplained.
- Differentstepsinvolvedinthedesignanddevelopmentoffirmwareforembeddedsystemsiselaborated.
- InternalsofReal-Timeoperating systemandthefundamentalsofRTOSbasedembeddedfirmwaredesignisdiscussed.
- Fundamentalissuesinhardwaresoftwareco-designwerepresented andexplained.
- FamiliarisewiththedifferentIDEsforfirmwaredevelopmentfordifferentfamilyofprocessors/controllersandembedded operating systems.
- Embeddedsystemimplementationandtestingtoolsareintroducedanddiscussed.

Syllabus

UNIT-I
INTRODUCTION: Embeddedsystem-Definition,historyofembeddedsystems,classificationofembeddedsystems,majorapplicationareasofembedded systems,purposeofembeddedsystems,thetypicalembeddedsystem-coreoftheembeddedsystem,Memory,SensorsandActuators,CommunicationInterface,Embeddedfirmware, Characteristics of an embedded system, Quality attributes of embedded systems, Application-specific andDomain-Specific examples ofan embedded system.

UNIT-II
EMBEDDED HARDWARE DESIGN: Analog and digital electronic components, I/O types and examples, Serialcommunication devices, Parallel device ports, Wireless devices, Timer and counting devices, Watchdog timer, Realtimeclock.

UNIT-III

EMBEDDEDFIRMWAREDESIGN: EmbeddedFirmwaredesignapproaches,EmbeddedFirmwaredevelopment languages, ISR concept, Interrupt sources, Interrupt servicing mechanism, Multiple interrupts, DMA,Devicedriverprogramming,ConceptsofCversusEmbeddedC andCompilerversusCross-compiler.

UNIT-IV

REAL TIME OPERATINGSYSTEM: Operating system basics, Types of operating systems, Tasks, Process andThreads,MultiprocessingandMultitasking,TaskScheduling,Threads,ProcessesandScheduling,Taskcommunication ,Task synchronisation, DeviceDrivers.

HARDWARE SOFTWARE CO-DESIGN: Fundamental Issues in Hardware Software Co-Design, Computationalmodelsinembeddeddesign,HardwaresoftwareTrade-offs,Integrationof Hardware andFirmware,ICE.

UNIT-V

EMBEDDED SYSTEM DEVELOPMENT: The integrated developmentenvironment, Typesof filesgeneratedoncross-compilation,Deassembler/Decompiler,Simulators,EmulatorsandDebugging,Targethardwaredebugging,BoundaryScan, Embedded Softwaredevelopmentprocess andtools.

UNIT-VI

EMBEDDED SYSTEM IMPLEMENTATION AND TESTING: The main software utility tool, CAD and thehardware,Translationtools-Pre-processors,Interpreters,CompilersandLinkers,Debuggingtools,Qualityassuranceand testingofthedesign,Testingon host machine, Simulators,LaboratoryTools.

TextBooks:

1. EmbeddedSystemsArchitecture-ByTammyNoergaard,ElsevierPublications,2013.
2. EmbeddedSystems-ByShibu.K.V-TataMcGraw HillEducationPrivate Limited,2013.

References:

1. EmbeddedSystemDesign,FrankVahid,TonyGivargis,JohnWileyPublications,2013.
2. EmbeddedSystems-Lyla B.Das-PearsonPublications,2013.

Outcomes:

Attheendof thiscoursethestudentcanableto:

- Understandthebasicconceptsofanembeddedsystemandabletoknowanembeddedsystemdesignapproachto perform aspecificfunction.
- Thehardwarecomponentsrequiredforanembeddedsystemandthedesignapproachofanembeddedhardware.
- Thevariousembeddedfirmwaredesignapproachesonembeddedenvironment.
- Understandhowtointegratehardwareandfirmwareofanembeddedsystemusingrealtimeoperatingsystem.

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ANALOG IC DESIGN

ELECTIVE-II

OBJECTIVES

Thestudentwillbeintroducedto

- ThestudentwillbeabletounderstandthebehaviorofMOSDevicesandSmall-Signal&Large-SignalModelingofMOS Transistorand AnalogSub-Circuits.
- Inthiscourse,studentscanstudy CMOSAmplifierslikeDifferentialAmplifiers,CascodeAmplifiers,OutputAmplifiers, and Operational Amplifiers.
- AnothermainobjectofthiscourseistomotivatethegraduatestudentstodesignandtodeveloptheAnalogCMOSCircuits fordifferent Analogoperations.
- TheconceptsofOpen-LoopComparatorsandDifferentTypesofOscillatorslikeRingOscillator,LCOscillatoretc.

UNIT-I:

MOS Devices and Modeling: The MOS Transistor, Passive Components- Capacitor & Resistor, Integrated circuitLayout, CMOS Device Modeling - Simple MOSLarge-Signal Model, Other ModelParameters, Small-SignalModelfortheMOSTransistor, ComputerSimulation Models,Sub-threshold MOS Model.

UNIT-II:

Analog CMOS Sub-Circuits: MOS Switch, MOS Diode, MOS Active Resistor, Current Sinks and Sources,CurrentMirrors-CurrentmirrorwithBetaHelper,Degeneration,CascodecurrentMirrorandWilsonCurrentMirror,Currentand VoltageReferences,Bandgap Reference.

UNIT-III:

CMOS Amplifiers: Inverters, Differential Amplifiers, Cascode Amplifiers, Current Amplifiers, Output Amplifiers,HighGain Amplifiers Architectures.

UNIT-IV:

CMOSOperationalAmplifiers: DesignofCMOSOpAmps,CompensationofOpAmps,DesignofTwo-StageOp Amps, Power- Supply Rejection Ratio of Two-Stage Op Amps, Cascode Op Amps, Measurement Techniques ofOPAmp.

UNIT-V:

Comparators: CharacterizationofComparator,Two-Stage,Open-LoopComparators,OtherOpen-LoopComparators,ImprovingthePerformanceof Open-LoopComparators, Discrete-TimeComparators.

UNIT-VI:

Oscillators&Phase-LockedLoops: GeneralConsiderations,RingOscillators,LCOscillators,VoltageControlledOscillators. SimplePLL,ChargePumpPLLs,Non-IdealEffectsinPLLs,DelayLocked Loops,Applications.

TextBooks:

1. DesignofAnalogCMOSIntegratedCircuits-BehzadRazavi,TMHEdition.
2. CMOSAnalogCircuitDesign-PhilipE.AllenandDouglasR.Holberg,OxfordUniversityPress,InternationalSecond Edition/Indian Edition, 2010.

References:

1. AnalysisandDesignofAnalogIntegratedCircuits-PaulR.Gray,PaulJ.Hurst,S.LewisandR.G.Meyer,WileyIndia, Fifth Edition, 2010.
2. Analog IntegratedCircuitDesign- DavidA.Johns,KenMartin,WileyStudentEdn,2013.

OUTCOMES

After goingthroughthiscoursethestudentwillbe ableto

- UnderstandtheconceptsofMOSDevicesandModeling.
- Design andanalyzeanyAnalogCircuitsinrealtimeapplications.
- ExtendtheAnalogCircuitDesigntoDifferentApplicationsinRealTime.
- UnderstandofOpen-LoopComparatorsandDifferentTypesofOscillators.

NETWORKSECURITYANDCRYPTOGRAPHY
ELECTIVE-II

OBJECTIVES:

- Inthis coursethefollowingprinciplesand practiceofcryptographyand networksecurityarecovered:
- Classicalsystems,symmetricblockciphers(DES, AES,othercontemporarysymmetricciphers)
- Public-keycryptography(RSA,discretelogarithms),
- Algorithms for factoring and discrete logarithms, cryptographic protocols,hash functions, authentication, keymanagement,keyexchange, signatureschemes,
- Emailandwebsecurity, viruses,firewalls,digital rightmanagement,andothertopics.

UNIT-I:

BasicPrinciples

SecurityGoals,CryptographicAttacks,ServicesandMechanisms,MathematicsofCryptography.

UNIT-II:

SymmetricEncryption

MathematicsofSymmetricKeyCryptography,IntroductiontoModernSymmetricKeyCiphers,DataEncryptionStandard,Advanced Encryption Standard.

UNIT-III:

AsymmetricEncryption

MathematicsofAsymmetricKeyCryptography,Asymmetric KeyCryptography

UNIT-IV:

DataIntegrity,DigitalSignatureSchemes &KeyManagement

MessageIntegrityandMessageAuthentication,CryptographicHashFunctions,DigitalSignature,KeyManagement.

UNIT-V:

NetworkSecurity-I

Securityatapplicationlayer:PGPandS/MIME,SecurityattheTransportLayer:SSLandTLS

UNIT-VI:

NetworkSecurity-II

SecurityattheNetworkLayer: IPSec,SystemSecurity

TEXTBOOKS:

1. CryptographyandNetworkSecurity,BehrouzAForouzan,DebdeepMukhopadhyay, (3e)McGraw Hill.
2. CryptographyandNetworkSecurity,WilliamStallings,(6e)Pearson.
3. EverydayCryptography,KeithM.Martin,Oxford.

REFERENCEBOOKS:

1.NetworkSecurityandCryptography,BernardMeneges,Cengage Learning.

OUTCOMES:

- Tobefamiliaritywith information securityawareness and aclearunderstandingofitsimportance.
- Tomasterfundamentalsofsecret andpubliccryptography
- Tomasterprotocols forsecurityservices
- Tobefamiliarwithnetworksecuritythreatsand countermeasures
- Tobefamiliarwithnetwork securitydesigns usingavailablesecuresolutions (suchasPGP,
- SSL, IPSec,etc)

IVYear-ISemester

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MICROWAVEENGINEERING&OPTICALLAB

Minimum Twelve Experiments to be conducted:Part–A(Any7Experiments(8&9compulsory)):

1. ReflexKlystronCharacteristics.
2. GunnDiodeCharacteristics.
3. AttenuationMeasurement.
4. DirectionalCouplerCharacteristics.
5. Impedanceand FrequencyMeasurement.
6. Scatteringparameters ofCirculator.
7. Scatteringparameters ofMagicTee.
8. RadiationPatternofHornandParabolic Antennas.
9. SynthesisofMicrostipantennas(RectangularStructure)UsingHFSS.

Part–B(Any5Experiments):

10. CharacterizationofLED.
11. CharacterizationofLaserDiode.
12. IntensitymodulationofLaseroutputthroughanopticalfiber.
13. MeasurementofData ratefor DigitalOpticallink.
14. MeasurementofNA.
15. MeasurementoflossesforAnalogOpticallink.

EquipmentrequiredforLaboratories:

1. RegulatedKlystronPowerSupply,Klystronmount
2. VSWRMeter
3. MicroAmmeter
4. Multimeter
5. CRO
6. GUNNPowerSupply,PinModulator
7. CrystalDiodedetector
8. Microwavecomponents(Attenuation)
9. FrequencyMeter
10. Slottedlinecarriage
11. Probedetector
12. Waveguideshorts
13. SSTuner
14. DirectionalCoupler
15. E,H,MagicTees
16. Circulators,Isolator
17. MatchedLoads
18. PyramidalHornand ParabolicAntennas
19. TurntableforAntennaMeasurements
20. HFSSSoftware
21. FiberOpticAnalogTrainerbased LED
22. FiberOptic AnalogTrainerbasedlaser
23. FiberOpticDigitalTrainer
24. Fibercables-(Plastic,Glass)

IVYear-ISemester

L	T	P	C
0	0	3	2

DIGITALSIGNALPROCESSING LABORATORY

ListoftheExperiments /programs

ToStudenthastoperformatleastFOURExperimentsineachpart

PART-1(SIGNALS)

1) Generationofdiscretetimesignalsfordiscretesignals
2) To verifytheLinearConvolution
   a) UsingMATLAB
   b) UsingCodeComposerStudio(CCS)
3) ToverifytheCircularConvolution fordiscretesignals
   a) UsingMATLAB
   b) UsingCodeComposerStudio(CCS)
4) ToFindtheadditionofSinusoidalSignals
5) ToverifyDiscreteFourierTransform(DFT)andInverseDiscreteFourierTransform(IDFT)
   a) UsingMATLAB
   b) UsingCodeComposerStudio(CCS)
6) TransferFunctionStabilityAnalysis: usingpole-zeroplot,bodeplot,Nyquistplot,z-planeplot.

PART-2(FILTERS)

7) FrequencyResponseofIIRlowpass ButterworthFilter
8) FrequencyResponseofIIRhighpass ButterworthFilter
9) FrequencyResponseof IIRlowpass ChebyshevFilter
10) FrequencyResponseofIIRhighpassChebyshevFilter
11) FrequencyResponseofFIRlowpassFilterusingRectangleWindow
12) FrequencyResponseofFIRlowpassFilterusingTriangleWindow

PART–3(IMAGEPROCESSING)

13) Animageprocessingina falsecontouringsystem
14) Togeneratethehistogramequalizationtotheimage
15) ToverifytheNormalizedCrossCorrelationtotheadditionofnoiseandremovalofnoiseusingfilterstoanimage.
16) Computetheedgeofan imageusingspatialfilters.
17) Performtheimagemotionblurandcalculate PSNRtothenoiseimage andalsonoisefreeimage.
18) Toverifythe PSNRtothe Secondorder Decompositionof Discrete Wavelettransformsandtothereconstructedimageusing inverseDiscreteWavelet transform

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

IV Year - II Semester

L	T	P	C
4	0	0	3

CELLULAR AND MOBILE COMMUNICATIONS

OBJECTIVES

The student will be introduced to:

1. Understand the basic cellular concepts like frequency reuse, cell splitting, cell sectoring etc., and various cellular systems.
2. Understand the different types of interference s influencing cellular and mobile communications.
3. Understand the frequency management, channel assignment and various propagation effects in cellular environment.
4. Understand the different types antennas used at cell site and mobile.
5. Understand the concepts of handoff and types of handoffs.
6. Understand the architectures of GSM and 3G cellular systems.

UNIT I

CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, uniqueness of mobile radio environment, operation of cellular systems, consideration of the components of Cellular system, Hexagonal shaped cells, Analog and Digital Cellular systems.

CELLULAR CONCEPTS: Evolution of Cellular systems, Concept of frequency reuse, frequency reuse ratio, Number of channels in a cellular system, Cellular traffic: trunking and blocking, Grade of Service; Cellular structures: macro, micro, pico and femto cells; Cell splitting, Cell sectoring.

UNIT II

INTERFERENCE: Types of interferences, Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, design of Antenna system, antenna parameters and their effects, diversity receiver, non-cochannel interference-different types.

UNIT III

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access and paging channels, channel assignments to cell sites and mobile units: fixed channel and non-fixed channel assignment, channel sharing and borrowing, overlaid cells.

CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation, antenna height gain, form of a point to point model.

UNIT IV

CELL SITE AND MOBILE ANTENNAS : Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT V
HANDOFF STRATEGIES
Concept of Handoff, types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assigned handoff, intersystem handoff, vehicle locating methods, dropped call rates and their evaluation.

UNIT VI
DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, multiple access schemes; TDMA, CDMA, OFDMA; architecture of 3G cellular systems.

TEXTBOOKS :

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.

2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

REFERENCES :

1. Wireless Communications – Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.

2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.

3. Mobile Cellular Communication – G Sasibhushana Rao Pearson

3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.

4. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

Outcomes:

At the end of this course the student can able to:

1. Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.
2. Understand the frequency management, channel assignment strategies and antennas in cellular systems.
3. Understand the concepts of handoff and architectures of various cellular systems.

IV Year - II Semester

L	T	P	C
4	0	0	3

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT I

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. DC Voltmeters- Multi-range, Range extension/Solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt. Thermocouple type RF ammeter, Ohmmeters series type, shunt type, Multi-meter for Voltage, Current and resistance measurements.

UNIT II

Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform. Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

UNIT III

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, . Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type.

UNIT IV

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance - Schearing Bridge. Wheat stone bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter.

UNIT V

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors.

UNIT VI

Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement. Data acquisition systems.

TEXTBOOKS :

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

REFERENCES :

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed., 2004.
3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education - 2005.

OUTCOMES

The student will be able to

- Select the instrument to be used based on the requirements.
- Understand and analyze different signal generators and analyzers.
- Understand the design of oscilloscopes for different applications.
- Design different transducers for measurement of different parameters.

IV Year - II Semester

L	T	P	C
4	0	0	3

SATELLITE COMMUNICATIONS

OBJECTIVES

The student will be introduced to:

1. Understand the basic concepts, applications, frequencies used and types of satellite communications.
2. Understand the concept of look angles, launches and launch vehicles and orbital effects in satellite communications.
3. Understand the various satellite subsystems and its functionality.
4. Understand the concepts of satellite link design and calculation of C/N ratio.
5. Understand the concepts of multiple access and various types of multiple access techniques in satellite systems.
6. Understand the concepts of satellite navigation, architecture and applications of GPS.

UNIT I

INTRODUCTION [2] : Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

ORBITAL MECHANICS AND LAUNCHERS[1] : Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

UNIT II

SATELLITE SUBSYSTEMS[1] : Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

UNIT III

SATELLITE LINK DESIGN[1] : Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

UNIT IV

MULTIPLE ACCESS[1][2] : Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception.

UNIT V

EARTH STATION TECHNOLOGY[3] : Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS[1] : Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs

UNIT VI

SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM [1] : Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS:

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES :

1. Satellite Communications : Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

Outcomes:

At the end of this course the student can able to:

1. Understand the concepts, applications and subsystems of Satellite communications.
2. Derive the expression for G/T ratio and to solve some analytical problems on satellite link design.
3. Understand the various types of multiple access techniques and architecture of earth station design.
4. Understand the concepts of GPS and its architecture.

IV Year - II Semester

L	T	P	C
4	0	0	3

WIRELESS SENSORS AND NETWORKS
ELECTIVE-III

UNIT I
OVERVIEW OF WIRELESS SENSOR NETWORKS:
Key definitions of sensor networks, Advantages of sensor Networks, Unique constraints an challenges, Driving Applications, Enabling Technologies for Wireless Sensor Networks.
ARCHITECTURES:
Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT II
NETWORKING Technologies:
Physical Layer and Transceiver Design Considerations, Personal area networks (PANs), hidden node and exposed node problem, Topologies of PANs, MANETs, WANETs.

UNIT-III
MAC Protocols for Wireless Sensor Networks:
Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT-IV
ROUTING PROTOCOLS:
Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols, Proactive Routing

UNIT-V
TRANSPORT LAYER AND SECURITY PROTOCOLS:
Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks,

UNIT- VI
SECURITY IN WSNs:
Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.
SENSOR NETWORK PLATFORMS AND TOOLS:
Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.
APPLICATIONS of WSN:
S Ultra wide band radio communication, Wireless fidelity systems. Future directions, Home automation, smart metering Applications

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – Jagannathan Sarangapani, CRC Press
3. Holger Karl & Andreas Willig, “Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

REFERENCES:

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, and Applications”, John Wiley, 2007.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.
4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer
5. Wireless Sensor Networks – S Anandamurugan , Lakshmi Publications

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DIGITAL IC DESIGN
ELECTIVE-III

OBJECTIVES

- The student will be able to understand the MOS Design.
- In this course, students can study Combinational MOS Logic Circuits and Sequential MOS Logic Circuits.
- Another main object of this course is to motivate the graduate students to design and to develop the Digital Integreated Circuits for different Applications.
- The concepts of Semiconductor Memories, Flash Memory, RAM array organization.

UNIT-I:
MOS Design: Pseudo NMOS Logic – Inverter, Inverter threshold voltage, Output high voltage, Output Low voltage, Gain at gate threshold voltage, Transient response, Rise time, Fall time, Pseudo NMOS logic gates, Transistor equivalency, CMOS Inverter logic.

UNIT-II:
Combinational MOS Logic Circuits: MOS logic circuits with NMOS loads, Primitive CMOS logic gates – NOR & NAND gate, Complex Logic circuits design – Realizing Boolean expressions using NMOS gates and CMOS gates , AOI and OIA gates, CMOS full adder, CMOS transmission gates, Designing with Transmission gates.

UNIT-III:
Sequential MOS Logic Circuits: Behaviour of bistable elements, SR Latch, Clocked latch and flip flop circuits, CMOS D latch and edge triggered flip-flop.

UNIT-IV:
Dynamic Logic Circuits: Basic principle, Voltage Bootstrapping, Synchronous dynamic pass transistor circuits, Dynamic CMOS transmission gate logic, High performance Dynamic CMOS circuits.

UNIT-V:
Interconnect: Capacitive Parasitics, Resistive Parasitics, Inductive Parasitics, Advanced Interconncet Techniques.

UNIT-VI:
Semiconductor Memories: Memory Types, RAM array organization, DRAM – Types, Operation, Leakage currents in DRAM cell and refresh operation, SRAM operation Leakage currents in SRAM cells, Flash Memory-NOR flash and NAND flash.

Text Books:

1. Digital Integrated Circuits – A Design Perspective, Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic, 2nd Ed., PHI.
2. Digital Integrated Circuit Design – Ken Martin, Oxford University Press, 2011.

References:

1. CMOS Digital Integrated Circuits Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 3rd Ed., 2011.
2. CMOS VLSI Design – Neil H.E Weste, David harris, Ayan Banerjee 3rd Edition, Pearson

OUTCOMES

After going through this course the student will be able to

- Understand the concepts of MOS Design.
- Design and analysis of Combinational and Sequential MOS Circuits.
- Extend the Digital IC Design to Different Applications.
- Understand the Concepts of Semiconductor Memories, Flash Memory, RAM array organization.

OPERATING SYSTEMS
ELECTIVE-III

OBJECTIVES:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I
Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

UNIT-II:
Process Management – Process concept, The process, Process State Diagram , Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Interprocess Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

UNIT-III:
Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation
Virtual Memory Management:
Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:
Concurrency: ProcessSynchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples
Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-V:
File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.
File System implementation- File system structure, allocation methods, free-space management
Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT VI:
Linux System: Components of LINUX, Interprocess Communication, Synchronisation, Interrupt, Exception and System Call.
Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

OUTCOMES:

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers
- Introduction to Android Operating System Internals

TEXT BOOK:

1. Operating System Concepts,Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.
3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach,Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA& Affiliated to JNTUK, Kakinada

Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor’s theorem and Maclaurin’s

theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common toCSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. To learn the basic principles and applications of Electrochemistry.
3. Advanced Analytical instrumental techniques are introduced for material characterization.With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.
4. Understanding of crystal structures and preparation of semiconductors and insulators.
5. A wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.

UNIT- I: Polymer Chemistry

Introduction to polymers, functionality of monomers, co-polymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosettings, Preparation, Properties and Applications of – Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting polymers - polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and Applications.

UNIT -II: Electrochemistry and Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations), Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries- working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

UNIT - III: Instrumental Methods and Non-Conventional Energy Sources

Part-A: **Instrumental Methods**

Electromagnetic Spectrum. Absorption of radiation: Beer-Lambert's law - Principles of UV-Visible, Infrared (IR) and Nuclear Magnetic Resonance (NMR) spectroscopy.

Basic concepts of Thin Layer Chromatography (TLC), Gas Chromatography (GC) and High-Performance Liquid Chromatography (HPLC), Separation and purification of mixture of compounds.

Part-B: **Non-Conventional Energy Sources**

Introduction – Renewable and Non –Renewable energy sources - Solar Energy- Introduction, Applications of Solar energy – Photovoltaic cell: design, working and its importance. Hydropower includes setup a Hydropower plant (schematic diagram), Geo-Thermal energy: Introduction-schematic diagram of a Geothermal power plant, Tidal power - Introduction- Design and working, Biomass energy.

UNIT- IV: Solid State Chemistry

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel.

Hall Effect and Applications.

Semiconductors:Preparation of pure semiconductors by Zone refining, Distillation and Czochralskicrystal pulling technique, Doping- Epitaxy, Diffusion and Ion-implantation technique- Intrinsic and Extrinsic semiconductors - Applications.

Insulators*:* Electrical Insulators and their Applications.

UNIT -V: Material Chemistry

Nano materials –Introduction- Top-down and Bottom- up approaches, Sol-gel method. Characterization by BET and TEM methods. Carbon nano tubes and fullerenes - Types, Preparation (Arc discharge Laser ablation and ChemicalVapour Deposition methods) Properties and Applications.

Liquid crystals - Introduction – Types – Applications.

Superconductors - Type-I & Type-II, Properties &Applications.

Green chemistry- Principles and Applications.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course,students will be able to

1. Recall the information related to polymers and their application.(Remembering)
2. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing)
3. Understand about the different analytical techniques and its applications.(Understanding)
   Design the technologies related to renewable energy sources. (Creating)
4. Understand the conductivity phenomenon and applications of solids. (Understanding)
5. Choose the materials like nano materials, liquid crystals, superconductors, and green synthetic methods to solve the Engineering problems. (Applying)

VISHNU INSTITUTE OF TECHNOLOGY :: BHIMAVARAM

(AUTONOMOUS)

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words

- Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary

- Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations

- Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary

- Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

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VISHNU INSTITUTE OF TECHNOLOGY :: BHIMAVARAM

(AUTONOMOUS)

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

To teach problem solving through Algorithms and Flowcharts

1. To elucidate problem solving through Python programming language
2. To train in the development of solutions using modular concepts
3. To explain the role of data structures in programming
4. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer

2. Develop computational thinking and be able to use Python constructs to solve basic problems

3. Understand modularization and data structures concepts in Python

4. Apply file handling concepts in problem solving

5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

Branch: CSE, IT, AI&DS & AIML **I Year – I Semester** **Regulation: R20**

Sub. Title: ELEMENTS OF ELECTRICAL & ELECTRONICS ENGINEERING

Sub.Code:

L	T	P	C
3	0	0	3

Preamble:

This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines, electronic components to perform well in their respective fields.

Learning Objectives:

- To learn the basic principles of electrical law's and analysis of DC circuits and AC circuits.
- To understand the principles of operation and characteristics of DC machines.
- To understand the principle of operation of Transformer and Induction motor.
- To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
- To learn the operation of PNP and NPN transistors and various amplifiers.

UNIT - I

DC Circuits: Basic definitions, Electrical circuit elements (R - L and C), Ohm's-Law, Kirchhoff laws, Series and parallel connection of resistances with DC excitation, Mesh Analysis and Nodal Analysis.

AC Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Introduction to three phase, phase sequence, relation between line and phase voltages and currents.

UNIT - II

DC Machines: Principle and operation of DC Generator, EMF equation, Applications. Principle and operation of DC Motor, Back EMF, Types of DC machines, Speed- Torque Characteristics of DC Motors, Speed control of DC Motors, Applications.

UNIT - III

AC Machines: Classification of AC machines, Principle and operation of 3-phase Induction Motor and 3-phase Synchronous Generator.

Transformers: Principle of operation and construction of Single Phase Transformer, OC and SC test on transformer, efficiency

UNIT IV

Rectifiers & Linear ICs: PN junction diodes, Applications -Half wave and Bridge rectifiers. Characteristics of Operation Amplifiers (OP- AMPs), Applications of OP-AMPs -Inverting, Non-Inverting, Integrator and Differentiator.

UNIT V

Transistors : PNP and NPN junction transistor, transistor as an amplifier, Transistor Configurations-CE,CB,CC configurations, CE Amplifier Characteristics, Application of Transistors.

Course Outcomes:

- Able to analyze the various DC networks and AC circuits.
- Able to understand the operation and Applications of DC Generators and DC Motor.
- Able to analyze the performance of Transformer and Induction motor and Synchronous generator.
- Able to analyze the operation of half wave, full wave rectifiers and OP- AMPs.
- Able to explain the operation of transistors and its applications.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 10th edition, PEI/PHI2006
2. Theory and performance of Electrical Machines ,J.B.Gupta,3rd edition,Kataria.S.K& Sons
3. Electrical Circuit Theory and Technology by John Bird, 6th Edition Routledge Taylor & Francis Group

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4. Industrial Electronics by G.K. Mittal, PHI.
5. Electrical Technology by Surinder Pal Bali, Pearson Publications.
6. Principles of Basic Electrical Engineering by T.N. Nagsarkar, M.S. Sukhija, Oxford University Press.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to CSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry Lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. JyotsnaCherukuri (2012) Laboratory Manual of Engineering chemistry-II, VGSTechno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:

- Creating a Class with variables and methods
- Class inheritance
- Constructors
- Exception handling

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners‘ English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner‘s Compass, 7th Edition
7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press
12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application and to know the importance of free electron theory for metals.
- Enlightenment of the importance of band theory for crystalline solids and metals. To understand the physics of Semiconductors and their working mechanism.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index-Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser –Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric Properties

Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations - Electronic and Ionic polarizations with mathematical derivations – Orientational polarization (Qualitative)–Internal field in solids -Claussius -Mosotti equation.

UNIT – IV: Quantum Mechanics and Free Electron Theory of Metals

Quantum Mechanics:

Introduction- Dual nature of matter-Matter waves, de-Broglie wavelength, Properties of wave function- time independent and time dependent Schrödinger's wave equation-Particle in a one dimensional infinite potential well.

Free Electron Theory of Meals:

Classical free electron theory (Qualitative with discussion of merits and demerits)-Quantum free electron theory-Equation for electrical conductivity based on quantum free electron theory-Fermi-Dirac Distribution-density of states (3D) - Fermi Energy.

UNIT –V: Band Theory of Solids and Semiconductors

Band Theory of Solids:

Bloch Theorem - Kronig-Penny Model (Qualitative)-E vs K and v vs K diagram- Origin of energy bands - Classification of solids based on energy bands – Effective Mass of an Electron-Concept of a Hole

Semiconductors:

Introduction– Intrinsic semiconductors - density of charge carriers-Fermi level – extrinsic semiconductors - P-type & N-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature - Drift and Diffusion currents – Einstein's equation - Hall effect- Hall coefficient - Applications of Hall effect.

Text Books:

1.M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017
2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018
3. P.K. Palanisamy, Applied Physics, SciTech Publications.

References:

1. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill.
2. Charles Kittel "Introduction to Solid State Physics",Wiley Publications.
3. S.M.Sze "Semiconductor devices-Physics and Technology"-Wiley.
4. Halliday, Resnick and Walker, "Fundamentals of Physics", John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers.
6. Ajoy Ghatak "Optics" Tata Mc GrawHill.

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well. Identify the role of classical free electron theory in the study of electrical conductivity.

CO5**:** Explain the concept of quantum free electron theory in the study of electrical conductivity. Classify the energy bands of solids. Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices.

DIGITAL LOGIC DESIGN

UNIT- I: Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction

UNIT -II: Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms,

UNIT- III: Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT- IV: Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers.

UNIT- V: Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines

UNIT -VI: Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, Ripple Counter

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.

2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.

2. Digital Logic Design, Leach, Malvino, Saha, TMH. 3. Modern Digital Electronics, R.P. Jain, TMH.

VISHNU INSTITUTE OF TECHNOLOGY :: BHIMAVARAM

(AUTONOMOUS)

Approved by AICTE, Accredited by NAAC-A^{++}, NBA & Affiliated to JNTUK, Kakinada

Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Programming for Problem Solving				
Branch	CSE,IT, AI&DS,EEE				

Course Objectives:

- Formulating algorithmic solutions to problems and implementing algorithms in C.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding arrays, pointers and dynamic memory allocation.
- Understanding Strings and Structures

UNIT-I:

Introduction to C Programming- Identifiers, The main () Function, The printf () Function **Programming Style** - Indentation, Comments, Data Types**,** Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization.

Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT-II:

Control Flow-Relational Expressions - Logical Operators:

Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement.

UNIT-III:

Arrays & Pointers:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

Pointers: Concept of a Pointer, Initialisation of pointer variables, passing by address, Dangling memory, address arithmetic, Dynamic memory management functions, command line arguments.

UNIT-IV:

Modular Programming: Function and Parameter Declarations, Returning a Value, Classifications of Functions, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Array as a Function arguments.

Case Study: Recursion - Mathematical Recursion, Recursion versus Iteration

UNIT-V:

Strings & Structures:

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.

TEXT BOOKS:

1. ANSI C Programming, Gary J. Bronson, Cengage Learning.
2. Let us C Authentic Guide to C Programming Language by yashavant kanetkar.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

REFERENCE BOOKS:

1. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, Bichkar, Universities Press.
3. Programming in C, ReemaThareja, OXFORD.
4. C by Example, Noel Kalicharan, Cambridge.

Course Outcomes:

1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops and functions.
4. Explain the difference between call by value and call by reference
5. Understand the dynamics of memory by the use of pointers
6. Understand the sorting and searching algorithms.

Course Objectives:

The objective of this course is to

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self-paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes:

Students should be able to:

- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, summarize various Linux operating system commands,
- Recognize characters & extract text from scanned images, Create audio files and podcasts

Computer Hardware:

Experiment 1: Identification of peripherals of a PC, Laptop, Server and Smart Phones: Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.

Operating Systems:

Experiment 2: Virtual Machine setup: o Setting up and configuring a new Virtual Machine o Setting up and configuring an existing Virtual Machine o Exporting and packaging an existing Virtual Machine into a portable format

Or

Experiment 2: Operating System installation: o Installing an Operating System such as Linux on Computer hardware.

Experiment 3: Linux Operating System commands: o General command syntax o Basic help commands

- Basic File system commands

- Date and Time

- Basic Filters and Text processing

- Basic File compression commands o Miscellaneous: apt-get, vi editor.

Networking and Internet:

Experiment 4: Networking Commands:

- ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget, route

Experiment 5: Internet Services:

- Web Browser usage and advanced settings like LAN, proxy, content, privacy, security, cookies, extensions/ plugins o Antivirus installation, configuring a firewall, blocking pop-ups
- Email creation and usage, Creating a Digital Profile on LinkedIn.

Productivity Tools:

Experiment 6: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage,

Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices

Office Tools:

Experiment 7: Demonstration and Practice on Text Editors like Notepad++, Sublime Text, Atom, Brackets, Visual code, etc

Experiment 8: Demonstration and practice on Microsoft Word, Power Point, Microsoft Excel

Experiment 9: Demonstration and practice on LaTeX and produce professional pdf documents.

Text Books:

1) Computer Fundamentals, Anita Goel, Pearson Education, 2017 2) PC Hardware Trouble Shooting Made Easy, TMH

References Books:

1) Essential Computer and IT Fundamentals for Engineering and Science Students, Dr.N.B.Vekateswarlu, S.Chand

e-Resources:

1) https://explorersposts.grc.nasa.gov/post631/2006- 2007/computer_basics/ComputerPorts.doc

VISHNU INSTITUTE OF TECHNOLOGY :: BHIMAVARAM

(AUTONOMOUS)

Approved by AICTE, Accredited by NAAC-A^{++}, NBA & Affiliated to JNTUK, Kakinada

Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Programming for Problem Solving				
Branch	CSE,IT, AI&DS,EEE				

Course Objectives:

- Formulating algorithmic solutions to problems and implementing algorithms in C.
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- Understanding Strings and Structures

UNIT-I:

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UNIT-IV:

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Case Study: Recursion - Mathematical Recursion, Recursion versus Iteration

UNIT-V:

Strings & Structures:

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.

TEXT BOOKS:

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2. Let us C Authentic Guide to C Programming Language by yashavant kanetkar.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

REFERENCE BOOKS:

1. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, Bichkar, Universities Press.
3. Programming in C, ReemaThareja, OXFORD.
4. C by Example, Noel Kalicharan, Cambridge.

Course Outcomes:

7. Write, compile and debug programs in C language.
8. Use different data types in a computer program.
9. Design programs involving decision structures, loops and functions.
10. Explain the difference between call by value and call by reference
11. Understand the dynamics of memory by the use of pointers
12. Understand the sorting and searching algorithms.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC- A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume Resonator
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

I B.Tech – II Sem **L T P C**

0 0 0 1.5

Programming for Problem Solving Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers Structures.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of functions involving the idea of Modularity.

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math
a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow – I
a)Write a C Program to Find Whether the Given Year is a Leap Year or not.
b)Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow – II
a)Write a C Program to Find Whether the Given Number is
    i) Prime Number
    ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle

Exercise – 5 Functions
a) Write a C Program demonstrating parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise – 6 Control Flow – III
a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions – Continued

Write a C Program to compute the values of sinx and cos x and e^x values using Series expansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a)Write a C Program to Store Information of a Movie Using Structure

b)Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a)Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find the sum of n elements entered by the user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find the sum of n elements entered by the user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations with library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

b) Implementation of string manipulation operations without library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

Course Outcomes:

1. Apply and practice logical ability to solve the problem.
2. Understand C programming development environment, compiling, debugging and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs.
4. Understand and apply the inbuilt functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC- A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to CSE, IT & EEE Branches)

Course Title: Constitution of India

L	T	P	C
2	0	0	0

Course Objectives:

- To train students in understanding the basic structure of Indian Constitution
- To prepare students to live better and happily with other fellow beings through the application of Fundamental Rights in their lives.

UNIT-I: Introduction to Indian Constitution

Meaning of the term Indian Constitution –Preamble- Constituent Assembly- Salient Features of Indian Constitution

UNIT-II: Fundamental Rights

Fundamental Rights -Fundamental Duties -The Directive Principles of State Policy

UNIT-III: Union Government

Union Government -Union Legislature (Parliament) -Lok Sabha and Rajya Sabha (with Powers and Functions) -Union Excecutive -President of India (with Powers and Functions) -Prime Minister of India (with Powers and Functions) -Union Judiciary (Supreme Court) -Jurisdiction of the Supreme Court

UNIT-IV State Government

State Government -State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council / Vidhan Parishad) -Powers and Functions of the State Legislature -State Executive-Governor of the State (with Powers and Functions) -The Chief Minister of the State (with Powers and Functions) -State Judiciary (High Courts)

UNIT-V: Local Self Governance and Sovereign Bodies

Powers and functions of Municipalities, Panchyats, ZP's and Co – Operative Societies

Election Commission of India (with Powers and Functions) -The Union Public Service Commission (with Powers and Functions)

Text Books:

1. Introduction to constitution of India, Durga Das Basu, Lexis Nexis Publications
2. Constitution of India by PRFESSIONAL BOOK PUBLISHERS
3. The Constitution of India by Arun K Tiru vengadam, Blooms bury publishers.
4. The constitution of India by PM Bakshi, Universal law publishing co
5. The Constitution of India by S.R. Bhansali, Universal law publishing co

Course Outcomes:

Upon the completion of the course, the student will be able to

1. Examine salient features of Indian Constitution and live accordingly in society.

2. Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.

3. Discover various aspects of Union Government legislation and live up to the expectations of the rules.

4. Critically examine State Government legislation and improve your living standards by following the rules strictly

5. Examine powers and functions of local bodies such as Muncipalities and Panchayats and, ake advantage of available resources for better living, and analyze the powers and functions of Election Commission and The Union Public Service Commission and decide upon it for safe and secured life.

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

II YEAR I SEMESTER							
S.No	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**
1	Discrete Mathematical Structures	2	1	-	3	40	60
2	Internet of Things (IoT)	3	-	-	3	40	60
3	Data Structures and Algorithms	3	-	-	3	40	60
4	Computer Organization & Architecture	3	-	-	3	40	60
5	Object Oriented Programming through Java	3	-	-	3	40	60
6	Quantitative Aptitude – I	3	-	-	0	0	0
7	Internet of Things Lab	-	-	3	1.5	40	60
8	Data Structures and Algorithms Lab	-	-	3	1.5	40	60
9	Object Oriented Programming through Java Lab	-	-	3	1.5	40	60
	Total	**17**	**1**	**9**	**19.5**	**320**	**480**
						800	

II YEAR II SEMESTER							
S.No	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**
1	Software Engineering	3	-	-	3	40	60
2	E-Commerce	3	-	-	3	40	60
3	Database Management Systems	3	-	-	3	40	60
4	Web Technologies	3	-	-	3	40	60
5	Digital Logic Design	3	-	-	3	40	60
6	Logical Reasoning	3	-	-	0	0	0
7	Socially Relevant Project (15 Hrs/Sem)	-	-	1	0.5	20	30
8	Business English Communication Lab	-	-	3	1.5	40	60
9	Design Thinking & Product Innovation Lab	-	-	3	1.5	40	60
10	Database Management Systems Lab	-	-	3	1.5	40	60
11	Web Technologies Lab	-	-	3	1.5	40	60
	Total	**18**	**0**	**13**	**21.5**	**380**	**570**
						950	

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

II YEAR I SEMISTER
COMPUTER SCIENCE AND ENGINEERING
R19 SYLLABUS

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	2	1	0	3
Subject	Discrete Mathematical Structures				

COURSE OBJECTIVES:

1. To introduce the concepts of mathematical logic.
2. To introduce the concepts of sets, relations, and functions.
3. To perform the operations associated with sets, functions, and relations.
4. To introduce generating functions and recurrence relations.
5. To relate practical examples to the appropriate set, function, or relation model, and interpret the Associated operations and terminology in context. To use Graph Theory for solving problems.

UNIT-I:

Mathematical Logic : Propositional Calculus: Statements and Notations, Connectives, Truth Tables, Tautologies, Equivalence of Formulas, Duality law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof. Predicate calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Inference theory for predicate calculus.

UNIT-II:

Number Theory: Number Theory: Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

UNIT-III:

Set Theory: Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion. **Relations:** Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams.

Functions: Bijective Functions, Composition of Functions, Lattices and its Properties

UNIT-IV:

Combinatorics: Basic of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, Pigeonhole Principle and its Application.

UNIT-V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

UNIT-VI:

Recurrence Relations: Generating Functions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

COURSE OUTCOMES:

1. Ability to apply mathematical logic to solve problems.
2. Understand sets, relations, functions and discrete structures.
3. Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions.
4. Able to formulate problems and solve recurrence relations.
5. Able to model and solve real world problems using graphs and trees.

TEXT BOOKS :

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.

3. Discrete Mathematics and its Applicatio-ns with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.

2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI.

3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Internet of Things				

COURSE OBJECTIVES:

1. To understand the fundamentals of the Internet of Things and to know the physical design, logical design and various IoT level models.
2. To teach a student how to design IoT applications and to know the various communication models and protocols.
3. To understand the fundamentals of 8051 Microcontroller and various IoT Platforms.
4. To build a real time IoT application and deploy using Arduino,NodeMCU8266 and Raspberry Pi.
5. To understand various Cloud Computing platforms and Big Data analytics applied in IoT.

UNIT-I :

Introduction to IoT : Introduction to IoT-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs.

UNIT-II:

IoT Design and Wireless Communication Protocols : IoT Design Methodology , IoT Components, IoT Design Methodology using home automation and Weather monitoring, Wireless Communication Protocols : 6LoWPAN, Zigbee, WIFI, , Bluetooth and BLE ,LPWANs,Cellular 4G,5G,RFID, Lifi,Widi.

UNIT-III:

8051 Microcontroller and IoT Development Boards : Introduction to Microcontrollers, the 8051 Instruction Set, AT89S8253 Microcontroller, Assembly Language, IoT Development Boards - NodeMCU, ESP8266, Arduino, Intel Galileo and Raspberry Pi.

UNIT-IV:

IoT Protocols : MQTT, UDP, MQTT brokers, publish subscribe modes, HTTP, COAP,XMPP and gateway protocols, IEEE 802.15.4 protocols.

UNIT-V:

Building IoT Applications with Raspberry Pi : Building IoT with RASPBERRY PI- IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces -Programming Raspberry Pi with Python, Introduction to NodeMCU, Arduino and working example.

UNIT-VI:

IoT Platforms, Cloud and Big Data in IoT : Introduction to Cloud computing : Cloud Computing, clouds types and their features, Open Source IoT Platforms, AWS cloud for IoT, ThingSpeak, Python Web Application Framework, Django, AWS web services for IoT.

Introduction to Big Data Analytics : Introduction Big Data, Apache Hadoop framework , Apache Spark and Python Web Application Framework, Django, Data Analytics.

Challenges in IoT and future directions.

COURSE OUTCOMES:

1. Describe IoT basics, different IoT levels and IoT application domains.
2. Describe IoT design methodology and wireless communication protocols.
3. Describe microcontrollers and identify different IoT development boards.
4. Describe application layer and gateway protocols.
5. Describe and use Raspberry Pi to interface with sensors and actuators by writing programs.
6. Gain experience on using IoT with cloud, big data and describe IoT challenges.

TEXT BOOKS:

1. Internet of Things – A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015 .

2. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017

3. Enabling things to talk – Designing IoT solutions with the IoT Architecture Reference Model, Alessandro Bassi, Martin Bauer, Martin Fiedler, Thorsten Kramp, Rob van Kranenburg, Sebastian Lange, Stefan Meissner, Springer

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Data Structures and Algorithms				

COURSE OBJECTIVES:

1. The fundamental design, analysis, and implementation of basic data structures.
2. Basic concepts in the specification and analysis of programs.
3. Principles for good program design, especially the uses of data abstraction.
4. Significance of algorithms in the computer field.
5. Various aspects of algorithm development.
6. To present different sorting algorithms.

UNIT-I:

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples. Searching and Sorting: Linear and binary search methods. Bubble sort, Insertion sort, Selection Sort, Quicksort, Merge sort, Heap sort, comparison of sorting methods.

UNIT-II:

Data structures-Linear and non linear data structures, Linear List, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two-dimensional arrays

UNIT-III:

Stack and Queue, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion, and deletion, Dequeue, array and linked list representations.

UNIT-IV:

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree representations, recursive and non-recursive traversals, Inserting a Node into a Threaded Binary

Tree, Heaps, Definition of a Max Heap, Insertion into a Max Heap, Deletion from a Max Heap, Priority Queues.

UNIT-V:

Search trees- Binary search tree-Binary search tree, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition, operations, Red-Black trees –Definition, operations.

UNIT-VI:

Graphs- Introduction, Definition, Graph Representation, Elementary Graph Operations – Vertex Insertion, Vertex Deletion, Edge Insertion, Edge Deletion etc, Depth First Search, Breadth-First Search

Hashing: Definition, Hash table, Hash function, Collision, Collision Evaluation Techniques-Chaining, Open Addressing.

COURSE OUTCOMES:

1. Provide solutions using data structures
2. Analyze space and time complexity for both iterative and recursive functions.
3. Understand various sorting algorithms and their performance
4. Understand hash functions and collision handling.
5. Identify the right data structure required to solve a problem.

TEXT BOOKS:

1. Data Structures, Using C, Second Edition, Reema Thareja, OXFORD Higher Education.
2. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
4. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
5. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison- Wesley (Pearson Education).

REFERENCES:

1. Introduction to Algorithms, Third Edition, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stien.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
4. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computer Organization and Architecture				

COURSE OBJECTIVES:

1. To understand the structure, function, and characteristics of computer systems.
2. To understand the design of the various functional units and components of computers.
3. To identify the elements of modern instruction sets and their impact on processor design.
4. To explain the function of each element of a memory hierarchy.
5. To identify and compare different methods for computer I/O.
6. To Understand computer arithmetic formulate and solve problems, understand the performance requirements of systems
7. To understand the structure of the multiprocessor system

UNIT-I

Basic Structure Of Computers : Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: complements, Fixed Point Representation. Floating – Point Representation, Error Detection codes.

UNIT-II

Register Transfer Language And Microoperations: Register Transfer language, Bus and memory transfers, Binary adder, Binary adder-subtractor,Arithmetic circuit, logic micro operations, shift micro operations, Arithmetic logic shift unit.

UNI- III

Type of instructions : Data transfer instructions, Arithmetic and Logic instructions,shift and rotate instructions,Branch instructions Stack organization. Instruction formats. Addressing modes.

Computer Arithmetic: Addition,subtraction, Multiplication algorithm, Division algorithm.

UNIT- IV

The Memory Systems : Memory Hierarchy, Main memory, Read Only Memory: ROM,PROM,EPROM,EEPROM,Flash memory, Cache Memory: Mapping techniques, Virtual Memory.

Secondary storage: Auxiliary memory(Magnetic Hard Disks,Optical Disks)

UNIT-V

Input-Output Organization : Peripheral Devices, Input-Output Interface, Asynchronous data transfer:Source initiated data transfer,Destination initiated data transfer,Priority Interrupts : Daisy-chaining interrupt, Parallel priority Interrupt Direct memory Access(DMA).

Design of Control Unit :Hardwired control, Micro programmed control methods.

UNIT-VI

Multi Processors : Introduction, Characteristics of Multiprocessors, Interconnection Structures:(i)Time-shared common bus,(ii)Multi port memory,(iii)8 X 8 Omega switching network ,(iv)Hypercube interconnection, Inter processor Arbitration:Serial and Parallel Arbitration

COURSE OUTCOMES:

1. Students can understand the architecture of modern computer.
2. They can analyze the Performance of a computer using performance equation Understanding of different instruction types.
3. Students can calculate the effective address of an operand by addressing modes.
4. They can understand how computer stores positive and negative numbers.
5. Understanding of how a computer performs arithmetic operation of positive and negative numbers.

TEXT BOOKS

T1. Computer system architecture, M. Morris Mano, 3 rd edition, pearson/phi

T2. Computer organization , carl hamacher, zvonks vranesic, safeazaky, 5 th edition, mcgraw hill.

T3. Computer architecture a quantitative approach, john l. hennessy and david a. patterson, fourth edition elsevier

REFERENCES

1. Computer organization and architecture – william stallings sixth edition, pearson/phi
2. Structured computer organization – andrew s. tanenbaum, 4th edition phi/pearson
3. Fundamentals or computer organization and design, - sivaraama dandamudi springer int. edition

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Object oriented programming through java				

COURSE OBJECTIVES:

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc.
3. Understand the Object-oriented Programming principles like inheritance, polymorphism, and relate these principles to software design.
4. Implementation of Packages, Interfaces and multi-threaded programs in Java.
5. Introduce the concepts of Exception Handling and Files in Java.
6. To Introduce concept of Collections framework.
7. Applying the above concepts for problem solving using Java.

UNIT-I:

Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of Java, Java features, JVM, structure of a Java program. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control, arrays, strings, functions, Introduction to lambda expressions.

UNIT-II:

Classes and objects, class declaration, creating objects, methods, method overloading, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, command line arguments, nested classes.

UNIT-III:

Inheritance, types of inheritance, method overriding, super keyword, final keyword, overriding and abstract class. Interfaces, creating packages, using packages, importance of CLASSPATH and java.lang package, access modifiers. Multithreading: Introduction, Thread life cycle, Creation of threads, Thread priorities, Thread synchronization, Communication between threads

UNIT-IV:

Exception handlings, importance of try, catch, throw, throws, and finally block, user-defined exceptions, assertions. **File I/O:** Reading data from files and writing data to files, random access in a file, accessing data from CSV and Excel files.

UNIT-V:

Arrays, Array vs ArrayList, Strings, StringBuffer, StringBuilder, StringTokenizer. Collections: Introduction to generics, Autoboxing, Overview and hierarchy of Collection framework, List interface, ArrayList, LinkedList, Stack, Queue interface, PriorityQueue, Set interface, HashSet, LinkedHashSet, TreeSet, Collection interface, Iterator interface, Iterable interface, Collections class, Comparable and Comparator interfaces.

UNIT-VI:

Problem Solving: Strings Practice, Arrays Practice, Using Collections, problems using Lists, Priority Queue, Set, Maps, functional filtering and mapping operations on lists with lambdas. Recursion problems.

COURSE OUTCOMES:

Upon successful completion, students will have the knowledge and skills to

1. Understand basic Java language syntax and semantics to write Java programs and use concepts.
2. Apply fundamental object oriented programming concepts to solve problems.
3. Develop Packages, and create Interface and multithreaded applications with synchronization.
4. Apply exception handling and understand file operations.
5. Understand the use of Collection Framework.
6. Apply various concepts of java to solve real world problems.

TEXT BOOKS:

1. The complete Reference Java, 11th edition, Herbert Schildt, TMH.

2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.

REFERENCE BOOKS:

1. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	0
Subject	Quantitative Aptitude-I				

COURSE OBJECTIVES:

1. Understand different number systems, factorization, divisibility and concept of LCM and HCF.
2. Find averages, relation between ratio and proportion, average price of mixture of different quantities and relation between fraction and percentage.
3. Know the concepts of CP,SP, MRP, profit or loss incurred in a transaction.
4. Know the concepts of principal, interest, difference between SI and CI, EMIs.
5. Understand the relation between speed, distance and time for trains and boats in a river.
6. Understand the relation between time and efficiency, combined work and wages paid for the work.

UNIT-I:

Number Systems: Basic number systems –Face and Place Value, Digital sum-Applications, Factors, Multipliers, Prime, & Composite Numbers, Divisibility Rules, LCM and HCF-Remainder Rules.

UNIT-II:

Averages, Ratio& Proportion: Average-Weighted average, Ratio-Concept and properties, Proportions-Mean ,Third and Fourth proportions, Mixtures & Allegations-Definition-Allegation Rule, Percentages-Conversion of Percentages to Fractions and Vice-Versa.

UNIT-III:

Profit& Loss: Cost Price- Selling Price- Marked Price, Discount- Successive Discounts, Profit or Loss Percentage, False Weights- Dishonest Dealer.

UNIT-IV:

Simple & Compound Interest: Principal-Interest Rate-Tenure , Simple Interest-Formula-Sum, Compound Interest-Formula-Relation Between Simple & Compound Interest, loan-EMI, Investments-Shares.

UNIT-V:

Time & Distance: Time-Distance-Speed-Relation, Conversion of Speed , Average Speed, Trains-Relative Speed- Same and Opposite –Platform, Races, Boats-Streams-Upstream and Downstream.

UNIT-VI:

Time & Work: Work-Time-Efficiency, Combined Work-Partnership-Division of Wages, Chain Rule, Pipes and Cisterns-Inlet-Outlet.

COURSE OUTCOMES:

After completing this course, the students will be able to

1. Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
2. Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
3. Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.
4. Calculate the simple and compound interests ,difference between them and the EMI repayment for a loan.
5. Evaluate the time taken by a train/car for crossing a static object or a moving object and time taken by a person to a row a boat in a river.
6. Calculate the time required for individual or combined work, shares of amount for their work and time taken for a tank/cistern to get filled by inlets and outlet.

TEXT BOOKS:

1. Dr. R.S. Aggarwal , Quantitative Aptitude for competitive Examinations, Sultan Chand Publications, 2017.

REFERENCES:

1. Arun Sharma, How to Prepare for Quantitative Aptitude for the CAT, Tata McGraw Hill Publishing Company, 2016.
2. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Pearson India, 2016

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Internet Of Things (IOT) Lab				

Note: Below experiments need to be done with NodeMCU or Arduino or RaspberryPi

List of experiments:

1. Digital Input/output
2. Analog Input/output
3. Using IR Sensor to detect objects.
4. Using LDR
5. PWM application to control LED Brightness
6. Create a localhost server
7. Use NodeMCU to upload free data from Environmental Sensors to Cloud Server
8. Automatically Tweet Sensor Data on Twitter
9. Control Home devices from self-hosted webpage on Amazon AWS
10. Controlling Home Appliance using Google Assistant
11. Calculating Distance using Ultrasonic Sensor
12. Fetching Humidity and Temperature using DHT 11 Sensor
    (Using ThingSpeak, Adafruit and Blynk IoT Platforms)

Project: Home Automation Project

Case Study:

1. Lighting as a service
2. Intelligent Traffic systems
3. Smart Parking
4. Smart water management

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Data Structures and Algorithms lab				

COURSE OBJECTIVES:

1. To present stacks, queues and their applications
2. To introduce linked lists and its operations.
3. To introduce sorting, searching algorithms.
4. To gain knowledge on trees, graphs and their applications.

COURSE OUTCOMES:

1. Develop ADT necessary for solving applications based on Stacks and Queues.
2. Implement various types of linked lists.
3. Implement various Sorting and searching algorithms.
4. Identify suitable data structures for providing solutions to the real-world problems.

Lab Experiments:

1. Implementation of Searching : (a) Linear Search (b) Binary Search
2. Implementation of Sorting : (a) Bubble Sort (b) Selection Sort
   (c) Insertion Sort(d) Quick Sort (e) Merge Sort
3. Implementation of singly linked list.
4. Implementation of Doubly Linked list.
5. Implementation of Stack using arrays.
6. Implementation of Queue using arrays.
7. Implementation of Converting infix to postfix.
8. Implementation of Stack using linked list.
9. Implementation of Queue using linked list.
10. Implementation of Circular Queue.
11. Implementation of Heap.
12. Implementation of Binary Search Trees.
13. Implementation of Depth First Search technique.
14. Implementation of Breadth First Search technique.
15. Implementation of Dijkstra's Algorithm.
16. Implementation of Prims Algorithm.
17. Implementation of Kruskal's Algorithm.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Oops through Java lab				

COURSE OBJECTIVES:

1. To gain fundamental programming knowledge of OOP
2. To use Exception Handling mechanism in the applications
3. To apply the knowledge of generics and Collections Framework
4. To handle files

COURSE OUTCOMES:

1. Develop Java applications with concepts like Inheritance, Interfaces, packages etc.
2. Implement Exception Handling and Multithreading in Java applications.
3. Develop applications using Collections framework.
4. Read and Write data using different Java I/O streams.

Exercise - 1 (Basics)

a) Write a JAVA program to find the Euclidean distance between two points.

b) Write a java program that displays the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminant D and basing on value of D, describe the nature of root.

c) Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a) Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b) Write a JAVA program to sort for an element in a given list of elements using bubble sort.

c) Write a JAVA program to sort for an element in a given list of elements using merge sort.

d) Write a JAVA program using StringBuffer to delete, remove characters.

Exercise - 3 (Arrays)

a) Find smallest number in an array.

b) Find largest number in an array.

c) Count even numbers in an array.
d) Count occurrence of a given number in an array.
e) Check if given number is palindrome or not.
f) Input two arrays and merge them in a new array in ascending order.
g) Find Addition of two 3X3 matrices.
h) Find Multiplication of two 3X3 matrices.
i) Find Transpose of a given matrices.
j) Implement Binary Search.
k) Implement Bubble Sort.
l) Implement Selection Sort.
m) Implement Insertion Sort.

Exercise - 4 (Class, Objects)

a) Write a JAVA program to implement classes – Create a class, methods and invoke them inside the main method.

b) Write a JAVA program to implement a constructor.

Exercise - 5 (Methods)

a) Create a Point class has variables int x and int y. Provide parameterized constructor. Create a class Rectangle. Point p1 is the bottom-left corner and Point p2 is the top-right corner. Write two constructors, one to take Point p1 and Point p2 as arguments and the other to take width and height (in this case (0,0) will be the bottom-left corner). It should have methods to calculate the perimeter() and the area() of the rectangle, move the rectangle by deltax and deltay, find out if a Point p is inside the rectangle or not. Method isInside(Point p). It should also have get methods for both width and height. Write a drive program to test your class.

Exercise - 6 (Inheritance)

a) Create a class Employee and the sub classes Manager and Clerk:

Employee:
Instance Variables: name, empId, salary.
Methods: set and get methods for name, empId, getSalary,setSalary Method

Manager:
Instance Variables: type
Methods: setSalary()

Clerk:
Instance Variables: int speed, int accuacy
Methods: setSalary()

Provide proper constructors for all classes. Create a general class "MyClass". In this class create objects of Manager, Clerk and Employee class. Set the name, empId and salary attributes for each object, and accordingly display them

Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.

b) Definition of a hierarchy of fruits is given below
Fruit contains an abstract method getVitamin() that returns String. Fruit contains a String field color.
Apple's vitamins are "A B12".
Banana's vitamins are "C D".
Strawberry's vitamins are "B5 E".
Blackberry's vitamins are "C K".
Apples and bananas grow on trees. All tree fruits provide a void method named peel().
Define class (or interface?) named TreeFruit that has method peel.
Make Apple and Banana extend (or implement?) TreeFruit.
When an Apple is being peeled, it prints out "Peeling an apple."
GroundFruit.
When a Strawberry is being picked, it prints out "Picking a strawberry."
i. Implement the classes.

ii. Implement a method named prepareFruits that takes a list of fruits and invokes tree fruits peel method and ground fruits picks methods. i.e. you have to distinguish tree fruits from ground fruits.

```
Public static void prepareFruits (Fruit [] fruits){
 //Implement
}
```

Use the following main method

```
Public static void main(String [] args){
Fruit [] fruits = new Fruit[4];
fruits[0] = new Apple();
fruits [1] = new Banana();
fruits [2] = new Strawberry();
fruits [3] = new Blackberry();
prepareFruits(fruits);
}
```

c) (Shape Hierarchy) Implement the Shape (interface) hierarchy has an abstract function draw() which will be instantiated in concrete classes with what it is drawing. Each abstract class TwoDimensionalShape should contain a method getArea to calculate the area of the two-dimensional shape. Each abstract class ThreeDimensionalShape should have methods getArea and getVolume to calculate the surface area and volume, respectively, of the three dimensional shape. Create a program that uses an array of Shape references to objects of each concrete class in the hierarchy. The program should print a text description of the object to which each array element refers. Also, in the loop that processes all the shapes in the array, determine whether each shape is a Two-DimensionalShape or a ThreeDimensionalShape. If a shape is a TwoDimensionalShape, display its area. If a shape is a ThreeDimensionalShape, display its area and volume.

Shape

2D or 3D

2D – Circle, square

3D – Cube, Sphere

Hint use instanceof to find if it is 2D or 3D.

Your output should appear as follows:

Circle: radius: 4

Circle's area is 50

Square: side: 10

Square's area is 100

Sphere: radius: 2

Sphere's area is 50

Sphere's volume is 33

Cube: side: 8

Cube's area is 384

Cube's volume is 512

Exercise - 7 (Runtime Polymorphism)

a) Write a JAVA program that implements runtime polymorphism.

b) Write a JAVA program to create three classes Shape, Circle and Rectangle. Demonstrate runtime polymorphism.

Exercise – 8 (Packages)

a) Write a JAVA program to illustrate CLASSPATH.

b) Write a JAVA program that imports and uses the defined class in your package in the previous problem.

Exercise - 9 (Exception Handling)

a) Design Java Programs that handle the Java built-in Exception to demonstrate exception handling mechanisms.

b) Write a JAVA program to demonstrate multiple catch clauses.

Exercise – 10 (Exception Handling)

a) Write a JAVA program for illustrating throw clause.

b) Write a JAVA program for illustrating finally block.

c) Define an exception called ‘NoMatchException’ that is thrown when a string is not equal to “VITBhimavaram” and Design a Java program that uses this exception.

Exercise – 11 (Strings)

a) Reverse the string
b) Anagram string
c) Count duplicate character
d) Print uppercase & lowercase letters
e) Palindrome String
f) Repeated & non-repeated character
g) Find repeated word in file
h) Reverse words of string object
i) Count the number of vowels
j) Count number of words in string
k) Display vowel, digits & blank spaces

Exercise – 12 (Collections Framework)

a) Write a JAVA program to add, retrieve & remove element from ArrayList
b) Write a JAVA program to Implement LinkedList
c) Write a JAVA program to Sort & reverse the LinkedList elements
d) Write a JAVA program to Implement push() and pop() on Stack
e) Write a JAVA program to display HashTable content
f) Write a JAVA program to search key & value from HashTable
g) Write a JAVA program to remove duplicate key from hashtable
h) Write a JAVA program to copy elements from HashSet to Array
i) Write a JAVA Program to find common elements
j) Write a JAVA Program to insert, retrieve & remove record
k) Write a JAVA Program for binary search
l) Write a JAVA Program to delete duplicate object
m) Write a JAVA Program to implement intersection & union

Exercise – 13 (Collections Framework)

a) Write a JAVA program to implement a stack using LinkedList class.

b) Write a JAVA program to implement a queue using LinkedList class.

c) Write a JAVA program to read a string and print only the unique characters.

d) Write a JAVA program to read a string and print the frequency of each character.

Exercise – 14 (File I/O)

a) Write a JAVA program to read the data from a file and print it on the console.

b) Write a JAVA program to read name, age, and email details and store them in a file.

c) Write a JAVA program to read a CSV file containing marks of students in a class and display the average marks for each subject.

d) Write a JAVA program to read an Excel file containing age of students in a class and display the median age value.

Exercise – 15 (Threads)

a) Write a JAVA program that creates threads by extending Thread class. First thread display "Good Morning", every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)

b) Write a program illustrating isAlive() and join()

c) Write a Program illustrating Daemon Threads.

Exercise - 16 (Threads)

a) Write a JAVA program for solving Producer-Consumer problem.

b) Write a case study on thread Synchronization after solving the above producer consumer problem.

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

II YEAR I SEMESTER							
S.No	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**
1	Discrete Mathematical Structures	2	1	-	3	40	60
2	Internet of Things (IoT)	3	-	-	3	40	60
3	Data Structures and Algorithms	3	-	-	3	40	60
4	Computer Organization & Architecture	3	-	-	3	40	60
5	Object Oriented Programming through Java	3	-	-	3	40	60
6	Quantitative Aptitude – I	3	-	-	0	0	0
7	Internet of Things Lab	-	-	3	1.5	40	60
8	Data Structures and Algorithms Lab	-	-	3	1.5	40	60
9	Object Oriented Programming through Java Lab	-	-	3	1.5	40	60
	Total	**17**	**1**	**9**	**19.5**	**320**	**480**
						800	

II YEAR II SEMESTER							
S.No	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**
1	Software Engineering	3	-	-	3	40	60
2	E-Commerce	3	-	-	3	40	60
3	Database Management Systems	3	-	-	3	40	60
4	Web Technologies	3	-	-	3	40	60
5	Digital Logic Design	3	-	-	3	40	60
6	Logical Reasoning	3	-	-	0	0	0
7	Socially Relevant Project (15 Hrs/Sem)	-	-	1	0.5	20	30
8	Business English Communication Lab	-	-	3	1.5	40	60
9	Design Thinking & Product Innovation Lab	-	-	3	1.5	40	60
10	Database Management Systems Lab	-	-	3	1.5	40	60
11	Web Technologies Lab	-	-	3	1.5	40	60
	Total	**18**	**0**	**13**	**21.5**	**380**	**570**
						950	

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II YEAR II SEMESTER
COMPUTER SCIENCE AND ENGINEERING

R19 SYLLABUS

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Software Engineering				

COURSE OBJECTIVES:

1. To help students to develop skills that will enable them to construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain.
2. This course introduces the concepts and methods required for the construction of large software intensive systems. It aims to develop a broad understanding of the discipline of software engineering.
3. Capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
4. Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes

UNIT-I:

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps ,Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT-II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterize of a Design? Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT–III:

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User

Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT–IV:

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

UNIT–V:

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

Planning a software project: Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

UNIT–VI

Software Maintenance: Software maintenance, Maintenance Process Models, Maintenance Cost, Software Configuration Management.

Software Reuse: what can be Reused? Why almost No Reuse So Far? Basic Issues in Reuse Approach, Reuse at Organization Level.

COURSE OUTCOMES:

1. Define and develop a software project from requirement gathering to implementation.
2. Obtain knowledge about principles and practices of software engineering.
3. Focus on the fundamentals of modeling a software project.
4. Obtain knowledge about estimation and maintenance of software systems.

TEXT BOOKS:

1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGraw-Hill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education

REFERENCE BOOKS:

1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	E-COMMERCE				

COURSE OBJECTIVES:

1. Identify the major categories and trends of e-commerce applications.
2. Identify the essential processes of an e-commerce system.
3. Identify several factors and web store requirements needed to succeed in e-commerce.
4. Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
5. Understand the main technologies behind e-commerce systems and how these technologies interact.
6. Discuss the various marketing strategies for an online business.
7. Define various electronic payment types and associated security risks and the ways to protect against them.

UNIT–I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT–II

Electronic Payment Systems – Types of Electronic Payment Systems, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Software Implementation.

UNIT- III

Intra Organizational Commerce - Work Flow Automation and Co-ordination, Customization and Internal Commerce, Supply chain Management.

UNIT–IV

Corporate Digital Library - Document Library, Digital Document types, Corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, On-line marketing process, Market research.

UNIT–V

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT – VI

Multimedia - key multimedia concepts, Digital Video and Electronic Commerce, Desktop video processing, Desktop Video Conferencing.

COURSE OUTCOMES:

1. Understand the basic concepts and technologies used in the field of E-Commerce
2. Compare and Contrast various Electronic Payment systems and understand the working of EDI
3. Understand the basic concepts of Intra Organizational commerce.
4. Apply theories and principles of corporate digital library and identify the strategies of advertising
5. To effectively understand the process of information search and retrieval.
6. Understand the basic concepts and technologies of multimedia concepts.

TEXT BOOK:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Database Management System				

COURSE OBJECTIVES:

1. Understand the basic concepts and the applications of database systems.
2. Master the basics of SQL and construct queries using SQL.
3. Understand the relational database design principles.
4. Familiar with the basic issues of transaction processing and concurrency control.
5. Familiar with database storage structures and access techniques.

UNIT- I

An Overview of Database Management : Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas –data base Users and Administrator -- Data Independence -- data Models – Database Languages

Database system architecture, Introduction- The Three Levels of Architecture-The External Level- the Conceptual Level- the Internal Level- Mapping-The Database Management Systems-Client/Server Architecture.

UNIT-II

The E/R Models, The Relational Model, Relational Calculus, Introduction to Database Design, Database Design and Er Diagrams-Entities Attributes, and Entity Sets-Relationship and Relationship Sets-Conceptual Design With the Er Models, The Relational Model Integrity Constraints Over Relations- Key Constraints –Foreign Key Constraints-General Constraints, Relational Algebra and Calculus, Relational Algebra- Selection and Projection- Set Operation, Renaming – Joins- Division- More Examples of Queries, Relational Calculus, Tuple Relational Calculus- Domain Relational Calculus.

UNIT-III

Queries, Constraints, Triggers: The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.

UNIT-IV

Schema Refinement (Normalization) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT-V

Transaction Management and Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint. Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

UNIT-VI

Overview of Storages and Indexing, Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization.

COURSE OUTCOMES:

1. Design and implement a database schema for a given problem-domain
2. Normalize a database
3. Populate and query a database using SQL DML/DDL commands.
4. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
5. Programming PL/SQL including stored procedures, stored functions, cursors, packages.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition
2. Database Systems - The Complete Book, H G Molina, J D Ullman, J Widom Pearson

REFERENCES BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Web Technologies				

Course Objectives:

From the course the student will learn

1. Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
2. Writing optimized front end code HTML and JavaScript.
3. Monitor the performance of web applications & infrastructure and Troubleshooting web application with a fast and accurate a resolution
4. Design and implementation of Robust and Scalable Front End Applications.

UNIT-I:

HTML: Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5

CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model, Conflict Resolution

UNIT-II:

The Basic of Javascript: Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions

DHTML: Positioning Moving and Changing Elements

UNIT- III:

XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches.

AJAX: A New Approach: Introduction to AJAX, Integrating PHP and AJAX.

UNIT-IV:

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script. Working with variables and constants: Using variables, Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases such as MySql.

UNIT-V:

Angular JS: Introduction, Expressions, Modules, Directives, Controllers, Filters, Forms, Single Page Application development using AngularJS

UNIT-VI:

React Js: Welcome to React, Pure React, Page Setup, The Virtual DOM, React Elements, ReactDOM, Children, Constructing Elements with Data, React Components, DOM Rendering, Factories, Props, State.

Text Books:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. AngularJS: Up and Running, Shyam Seshadri and Brad Green, O'Reilly
3. Learning React: Functional Web Development with React and Redux, Book by Alex Banks and Eve Porcello, O'Reilly

Reference Books:

1. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
2. Pro Mean Stack Development, ELadElrom, Apress
3. Express.JS Guide, The Comprehensive Book on Express.js, Azat Mardan, Lean Publishing.
4. Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech
5. JavaScript & jQuery the missing manual, David sawyer mcfarland, O'Reilly
6. Web Hosting for Dummies, Peter Pollock, John Wiley Brand

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Digital Logical Design				

UNIT- I:

Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction

UNIT -II:

Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms,

UNIT- III:

Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT- IV:

Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers.

UNIT- V:

Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines

UNIT -VI:

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, Ripple Counter

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.

2. Digital Logic Design, Leach, Malvino, Saha, TMH. 3. Modern Digital Electronics, R.P. Jain, TMH.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	0
Subject	Logical Reasoning				

COURSE OBJECTIVES:

1. Be familiar with different relations in a family, concepts of clocks and calendars.
2. Find position and order of a person /object , routes between points.
3. Understand the techniques of coding and decoding.
4. Understand the validity of statements and inferences from them.
5. Draw valid conclusions from given statements.
6. Understand the concept of analogy and properties of dice.

UNIT-I:

Blood Relations, Directions, Clocks & Calendars.: Blood relations -family tree, types of problems on blood relations- first person narrating type-coded relation-puzzle relation, direction-distance-direction and distance problems, angle between hands -correct or incorrect time, day of a date-repeated calendars.

UNIT-II:

Ranks & Position, Puzzles: Ranks-based on positions ,counting ,comparisons , puzzles-table based, selection based, seating based, graph and network Based .

UNIT-III:

Coding & Decoding, Series.: Coding and decoding-letter coding, number coding, symbol coding, substitution and mixed type, Symbols and notations, series-number, letter and word type , missing term.

UNIT-IV:

Critical Reasoning-I:Syllogisms, logical consistency, inference & degree of truth, assertion & reason.

UNIT-V:

Critical Reasoning-II: Statement & assumption, statement &conclusion, cause& effect, decision making.

UNIT-VI:

Non Verbal Reasoning: Series, odd-man out, analogies, mirror & water images, paper cutting & folding, figure formation, cubes &dice .

COURSE OUTCOMES:

After completing this course, the students will be able to

1. Identify the relation between given persons, find the direction and distance from starting point, find angle between hands at given time and vice-versa, find day of given date and vice-versa.
2. Find the position and rank of a person/object in an arrangement, arranging in order using given data.
3. Decode the given code pattern and code given word in terms of alphabet, numbers, symbols and mixed, identify missing term in the pattern/series.
4. Draw a valid conclusion from the statements, consistency of inference drawn, valid reason from given assertions.
5. Identify the cause for the assumed effect, take decision logically from the given data.
6. Identify the odd one in the given series/group, number opposite any face of dice, figure completion from a folded figure.

TEXT BOOKS:

1. Dr. R.S. Aggarwal ,A Modern Approach to Verbal & Non-Verbal Reasoning Sultan Chand Publications, 2018.

REFERENCES:

1. B.S.Sijwali and Indu Sijwali, A New Approach to Reasoning Verbal & Non-Verbal, Arihant Publishers, 2016.
2. M.K. Pandey, Analytical Reasoning , Bsc Publishing Co. Pvt. Ltd 2009.1

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Business Communication Lab				

COURSE OBJECTIVES:

1. To expose student to different situations for better communication
2. To inculcate the habit of learning vocabulary for effective communication
3. To enable students to acquire Business English communication

COURSE OUTCOMES:

Upon the completion of the course, the student will be able to:

1. Understand and interpret conversations in informal and formal contexts.
2. Exhibit one's vocabulary, body language, pronunciation and intonation with proper etiquette.
3. Critique various written texts.
4. Construct appropriate Business English writing skills.
5. Develop skit exhibiting all LSRW skills.
6. Develop the skill of note making.

UNIT- I:

Listening: Listening to short conversations or monologues

Speaking: Giving information about oneself and their opinions and Giving a short talk on business related topics

Reading: Reading short and simple texts to understand the central idea/theme.

Writing: Writing a piece of internal business communication of 30-40 words (Email)

UNIT-II:

Listening : Listening to a conversation/ monologue and taking notes

Speaking : Giving short talk on business related topics.

Reading: Matching descriptions of people to short texts. Matching statements to information given in a graph or graphs.

Writing : Writing a piece of internal business communication of 30-40 words (Message)

UNIT-III :

Listening: Listening to longer conversations/interviews.

Speaking: Debates & Extempore

Reading : Reading a longer text and deciding whether the statements about the text are right or wrong or if the information is not given.

Writing : Write a business letter 60-80 words, based on an input text and some notes.

UNIT-IV :

Listening: Listening to TV news channels and taking notes.
Listening to songs and writing down the lyrics.

Speaking: Interview sessions

Reading: Read a longer text and answering questions. .

Writing: Writing a Business Report

UNIT-V:

Listening: Watching short documentaries and making notes.(General)

Speaking: Short plays, Presentations.

Reading : Read short texts and fill in a form using information from the texts.

Writing : Write a skit and enact.

UNIT-VI:

Listening: Watching documentaries and making notes.(Business specific)

Speaking: Nail your point.

Reading : Critical Reading to know author's perspective.

Writing : Write a skit and enact.

REFERENCE BOOKS:

1. Cambridge English – Business English Certificate Preliminary
2. Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
3. Cambridge University Press India Pvt. Ltd, New Delhi.
4. Mandal S. K (2006),Effective Communication & Public Speaking , Jaico

Publishing House, New Delhi.

5. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
6. Balasubramanian .T (2000), A text book of English Phonetics for Indian Student,MacMillan Publishers, India.
7. Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1& 2, New Delhi, Orient Longman Pvt. Ltd

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Design Thinking & Product Innovation Lab				

COURSE OBJECTIVES:

1. To provide the basic concepts and techniques of engineering and reverse engineering, process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.
2. To get exposure of exhibiting their creativity in terms of an innovative product development in a structured process through this course.

COURSE OUTCOMES:

Upon the successful completion of the course, students will be able to:

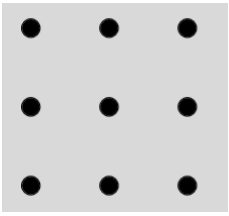
1. Gather deep insights of design thinking and appreciate various design process procedure.
2. Develop design ideas through different technique and Analyse innovative product design.
3. Identify the significance of reverse Engineering to understand products.
4. Draw technical drawing for design ideas.

List of Experiments

1. List specific inventions that were (or might have been) suggested to creative thinkers by the following natural phenomena:
   i. human arms
   ii. cats
   iii. seagulls
   iv. a frozen salmon
   v. spiders
   vi. earthworms
   vii. a flower
   viii. the eye of a fly
   ix. conical shells
   x. animal bone structures
   xi. dew drops on leaves
   xii. human skulls
   xiii. bamboo

xiv. human foot
xv. human lungs
xvi. larynx

2. On a spare piece of paper draw a square of nine dots like this:



Now see if you can connect up the dots with four consecutive straight lines, that is, without taking your pencil off the paper. You have one minute to complete the task.

3. Diagram a process for planning and cooking a family dinner. Does your process resemble the generic product development process? Is cooking dinner is analogous into a market-pull, technology push, platform process-intensive, customization, high-risk, quick-build, or complex system process?
4. Sketch the organization (in some appropriate graphical representation) of a consulting firm that develops new products for clients on a project by project basis. Assume that the individuals in the firm represent all of the different functions required to develop a new product. Would this organization most likely to be aligned with functions, be aligned by projects, or be a hybrid?
5. Create a product technology road-map illustrating the availability of technologies for a class of products you understand well, such as personal computers?
6. How can the concept selection methods be used to benchmark or evaluate existing products? Perform such an evaluation for five automobiles you might consider purchasing.
7. Perform concept screening for the four pencil holder concepts shown below. Assume the pencil holders are for a member of a product development team who is continually moving from site to site.
8. Draw the polygon using Auto CAD
9. Create a 2D view of the given diagram using Auto CAD
10. Create a 2D view of the given diagram using Auto CAD
11. Create a 2D view of the given diagram using Auto CAD
12. Create a 3D view of the given diagram using Auto CAD

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Data Base Management System Lab				

COURSE OBJECTIVES:

1. To explain basic database concepts, applications, data models, schemas and instances.
2. To demonstrate the use of constraints and relational algebra operations. IV. Describe the basics of SQL and construct queries using SQL.
3. To emphasize the importance of normalization in databases.
4. To facilitate students in Database design
5. To familiarize issues of concurrency control and transaction management.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Apply the basic concepts of Database Systems and Applications.
2. Use the basics of SQL and construct queries using SQL in database creation and Interaction.
3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
4. Analyze and Select storage and recovery techniques of database system.

SQL-Experiments:

1. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
2. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
3. Queries using Group By, Order By, and Having Clauses.
4. Queries using operators in SQL
5. Queries on Controlling Data: Commit, Rollback, and Save point
6. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, EXCEPT, CONSTAINTS etc.
7. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), and Creation and dropping of Views.
8. Queries on Joins and Correlated Sub-Queries.

9. Practicing on Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updating using trigger

PL/SQL

10. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation
11. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL
12. Write a PL/SQL block using SQL and Control Structures in PL/SQL
13. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types
14. Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Web Technologies Lab				

List of Experiments

1. Design the following static web pages required for an online bookstore website.

HOME PAGE:

The static home page must contain three **parts**.

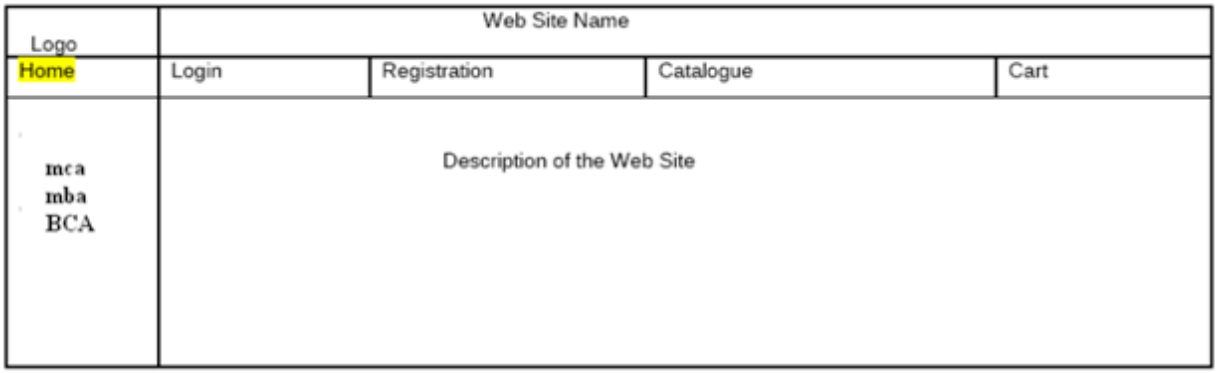
Header: Logo and the college name and links to Home page, Login page, Registration page,

Catalogue page and Cart page (the description of these pages will be given below).

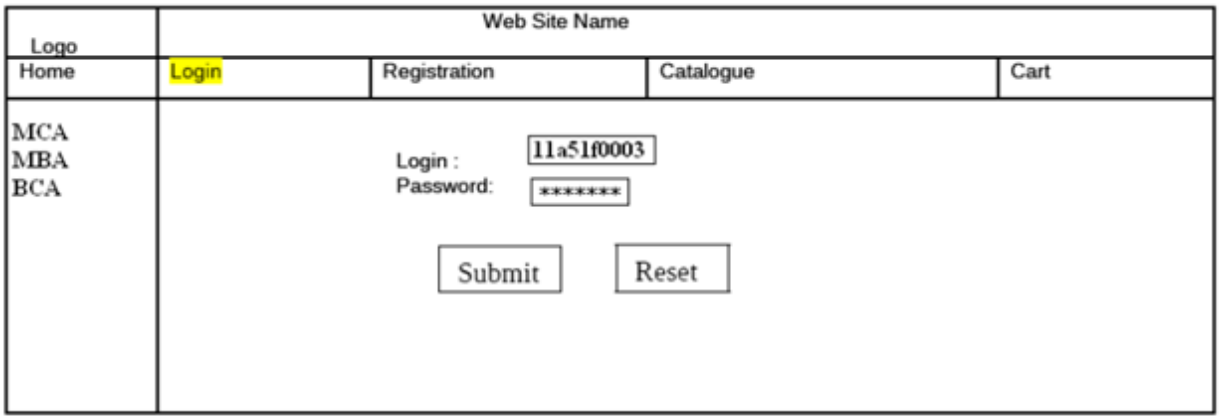
Footer: At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame.

Side Menu: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the website.



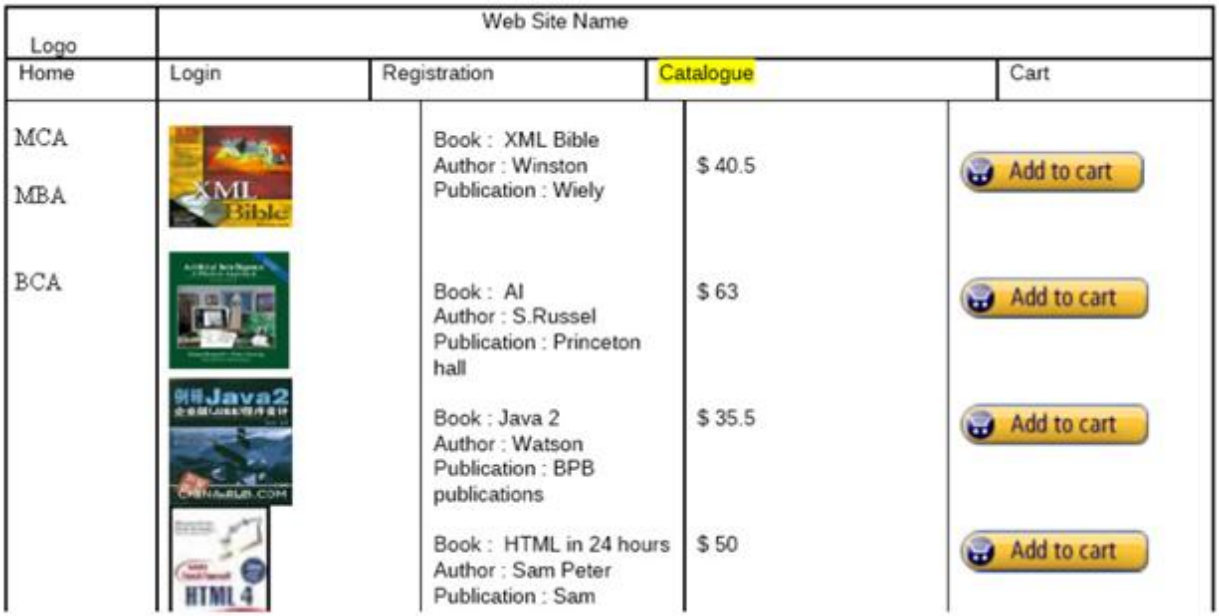
2) Login page



3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the website in a table. The details should contain the following:

- Snap shot of Cover Page.
- Author Name.
- Publisher.
- Price.
- Add to cart button.



4. **REGISTRATION PAGE:**

Create a "*registration form* "with the following fields

- Name (Text field)
- Password (password field)
- E-mail id (text field)
- Phone number (text field)
- Sex (radio button)
- Date of birth (3 select boxes)
- Languages known (checkboxes – English, Telugu, Hindi, Tamil)
- Address (text area)

5. Design a web page using CSS (Cascading **S**tyle **S**heets**)** which includes the following:

- Use different font, styles:
- In the style definition you define how each selector should work (font, color etc.).
- Then, in the body of your pages, you refer to these selectors to activate the styles

6. Write an XML file which will display the Book information which includes the following:

- Title of the book
- Author Name
- ISBN number
- Publisher name
- Edition
- Price

Write a Document Type Definition (DTD) to validate the above XML file.

7. Write a PHP program for contact us page.

8. **User Authentication**:

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.

- Create a Cookie and add these four user id's and passwords to this Cookie.
- Read the user id and passwords entered in the Login form (Program 2) and authenticate with the values (user id and passwords) available in the cookies.
- If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ''.
- Use init-parameters to do this.

9. Example PHP program for registering users of a website and login.

10. **Install a database (Mysql or Oracle).**

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page..

11. Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.

12. Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (Program 3) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

13. HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of local host). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session. Invalidate (). Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

14. Implement the following in React JS

- Using React Js creating constructs data elements.
- Using React Js implementations DoM.

15. Implement the following in AngularJS

- AngularJS data binding.
- AngularJS directives and Events.
- Using angular Js fetching data from MySQL.

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

III Year – I Semester

L	T	P	C
4	0	0	3

COMPILER DESIGN

OBJECTIVES:

- Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.

UNIT – I

Introduction Language Processing, Structure of a compiler the evaluation of Programming language, The Science of building a Compiler application of Compiler Technology. Programming Language Basics.

Lexical Analysis-: The role of lexical analysis buffing, specification of tokens. Recognitions of tokens the lexical analyzer generator lexical

UNIT –II

Syntax Analysis -: The Role of a parser, Context free Grammars Writing A grammar, top down passing bottom up parsing Introduction to Lr Parser.

UNIT –III

More Powerful LR parser (LR1, LALR) Using Armigers Grammars Equal Recovery in Lr parser Syntax Directed Transactions Definition, Evolution order of SDTS Application of SDTS. Syntax Directed Translation Schemes.

UNIT – IV

Intermediated Code: Generation Variants of Syntax trees 3 Address code, Types and Deceleration, Translation of Expressions, Type Checking. Canted Flow Back patching?

UNIT – V

Runtime Environments, Stack allocation of space, access to Non Local date on the stack Heap Management code generation – Issues in design of code generation the target Language Address in the target code Basic blocks and Flow graphs. A Simple Code generation.

UNIT –VI

Machine Independent Optimization. The principle sources of Optimization peep hole Optimization, Introduction to Date flow Analysis.

OUTCOMES:

- Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc.
- Parser and its types i.e. Top-down and Bottom-up parsers.
- Construction of LL, SLR, CLR and LALR parse table.
- Syntax directed translation, synthesized and inherited attributes.
- Techniques for code optimization.

TEXT BOOKS:

1. Compilers, Principles Techniques and Tools.Alfred V Aho, Monical S. Lam, Ravi Sethi Jeffery D. Ullman,2nd edition,pearson,2007

2. Compiler Design K.Muneeswaran, OXFORD

3. Principles of compiler design,2nd edition,Nandhini Prasad,Elsebier.

REFERENCE BOOKS:

1. Compiler Construction, Principles and practice, Kenneth C Louden, CENGAGE

2. Implementations of Compiler, A New approach to Compilers including the algebraic methods, Yunlinsu ,SPRINGER

III Year – I Semester

L	T	P	C
4	0	0	3

DATA BASE MANAGEMENT SYSTEMS

OBJECTIVES

- To learn the principles of systematically designing and using large scale Database Management Systems for various applications.

UNIT-I: An Overview of Database Management, Introduction- What is Database System- What is Database-Why Database- Data Independence- Relation Systems and Others- Summary,
Database system architecture, Introduction- The Three Levels of Architecture-The External Level- the Conceptual Level- the Internal Level- Mapping- the Database Administrator-The Database Management Systems- Client/Server Architecture.

UNIT-II:
The E/R Models, The Relational Model, Relational Calculus, Introduction to Database Design, Database Design and Er Diagrams-Entities Attributes, and Entity Sets-Relationship and Relationship Sets-Conceptual Design With the Er Models, The Relational Model Integrity Constraints Over Relations- Key Constraints –Foreign Key Constraints-General Constraints, Relational Algebra and Calculus, Relational Algebra- Selection and Projection- Set Operation, Renaming – Joins- Division- More Examples of Queries, Relational Calculus, Tuple Relational Calculus- Domain Relational Calculus.

UNIT-III:
Queries, Constraints, Triggers: The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.

UNIT-IV:
Schema Refinement (Normalization) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT-V:

Transaction Management and Concurrency Control:

Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and save point.

Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

UNIT-VI:

Overview of Storages and Indexing, Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization

OUTCOMES

- Describe a relational database and object-oriented database.
- Create, maintain and manipulate a relational database using SQL
- Describe ER model and normalization for database design.
- Examine issues in data storage and query processing and can formulate appropriate solutions.
- Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.
- Design and build database system for a given real world problem

TEXT BOOKS:

1. Introduction to Database Systems, CJ Date, Pearson

2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

3. Database Systems - The Complete Book, H G Molina, J D Ullman, J Widom Pearson

REFERENCES BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education

3. Introduction to Database Systems, C.J.Date Pearson Education

III Year – I Semester

L	T	P	C
4	0	0	3

OBJECT ORIENTED ANALYSIS & DESIGN USING UML

OBJECTIVE:

- To understand how to solve complex problems
- Analyze and design solutions to problems using object oriented approach
- Study the notations of Unified Modeling Language

UNIT-I:

Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model.

UNIT-II:

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT-III:

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT-IV:

Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

UNIT-V:

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-VI:

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

Case Study: The Unified Library application.

OUTCOME:

- Ability to find solutions to the complex problems using object oriented approach
- Represent classes, responsibilities and states using UML notation
- Identify classes and responsibilities of the problem domain

TEXT BOOKS:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON.
2. "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.

REFERENCE BOOKS:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O"Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning
1. "The Unified modeling language Reference manual", James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley

III Year – I Semester

L	T	P	C
4	0	0	3

OPERATING SYSTEMS

OBJECTIVES:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

UNIT-II:

Process Management – Process concept, The process, Process State Diagram , Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Interprocess Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

Concurrency: ProcessSynchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-V:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT VI:

Linux System: Components of LINUX, Interprocess Communication, Synchronisation, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

OUTCOMES:

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers
- Introduction to Android Operating System Internals

TEXT BOOK:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2.Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.
3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

III Year – I Semester

L	T	P	C
0	3	0	0

PROFESSIONAL ETHICSAND HUMAN VALUES

Course Objectives:

***To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.**
***Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.**

UNIT I: Human Values:
Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT: II: Principles for Harmony:
Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:
History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism —Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument – Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past – Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:

Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:

Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights – Confidential and Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes-Industrial Espionage- Price Fixing-Whistle Blowing.

UNIT VI: Global Issues:

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

- Related Cases Shall be dealt where ever necessary.

Outcome:

***It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.**

***It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.**

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M. Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013
9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

III Year – I Semester

L	T	P	C
4	0	0	3

UNIX PROGRAMMING

OBJECTIVES:

- Written technical communication and effective use of concepts and terminology.
- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Individual capability in problem solving using the tools presented within the class. Students will demonstrate a mastery of the course materials and concepts within in class discussions.

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

UNIT-VI

The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-Process Creation-The Trap Command-The Stty Command-The Kill Command-Job Control.

OUTCOMES:

- Documentation will demonstrate good organization and readability.
- File processing projects will require data organization, problem solving and research.
- Scripts and programs will demonstrate simple effective user interfaces.
- Scripts and programs will demonstrate effective use of structured programming.
- Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.
- Testing will demonstrate both black and glass box testing strategies.
- Project work will involve group participation.

TEXT BOOKS:

1. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.
2. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.

REFERENCE BOOKS:

1. Unix and shell programmingby B.M. Harwani, OXFORD university press.

III Year – I Semester

L	T	P	C
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OPERATING SYSEMS AND LINUX PROGRAMMING LAB

OBJECTIVES:

- To understand the design aspects of operating system.
- To study the process management concepts & Techniques.
- To study the storage management concepts.
- To familiarize students with theLinux environment
- To learn the fundamentals of shell scripting/programming
- To conceptualize Data Mining and the need for pre-processing.
- To learn the algorithms used for various types of Data Mining Problem

OPERATING SYSTEMS

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Multiprogramming-Memory management- Implementation of fork (), wait (), exec() and exit (), System calls
3. Simulate the following
   a) Multiprogramming with a fixed number of tasks (MFT)
   b) Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate the following page replacement algorithms.
   a) FIFO b) LRU c) LFU
7. Simulate the following File allocation strategies
   a) Sequenced b) Indexed c) Linked

LINUX PROGRAMMING

1. a) Study of Unix/Linux general purpose utility command list
   man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.
   b) Study of vi editor.
   c) Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
   d) Study of Unix/Linux file system (tree structure).
   e) Study of .bashrc, /etc/bashrc and Environment variables.

2.Write a C program that makes a copy of a file using standard I/O, and system calls

3. Write a C program to emulate the UNIX ls –l command.

4. Write a C program that illustrates how to execute two commands concurrently with a command pipe.

   Ex: - ls –l | sort

5. Write a C program that illustrates two processes communicating using sharedmemory

6. Write a C program to simulate producer and consumer problem usingsemaphores

7. Write C program to create a thread using pthreads library and let it run its function.

8. Write a C program to illustrate concurrent execution of threads using pthreads library.

OUTCOMES:

- To use Unix utilities and perform basic shell control of the utilities
- To use the Unix file system and file access control.
- To use of an operating system to develop software
- Students will be able to use Linux environment efficiently
- Solve problems using bash for shell scripting
- Will be able to implement algorithms to solve data mining problems using weka tool

III Year – I Semester

L	T	P	C
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UNIFIED MODELING LAB

OBJECTIVES:

- Construct UML diagrams for static view and dynamic view of the system.
- Generate creational patterns by applicable patterns for given context.
- Create refined model for given Scenario using structural patterns.
- Construct behavioral patterns for given applications.

Week 1:
Familiarization with Rational Rose or Umbrello

For each case study:

Week 2, 3 & 4:
For each case study:

- a) Identify and analyze events
- b) Identify Use cases
- c) Develop event table
- d) Identify & analyze domain classes
- e) Represent use cases and a domain class diagram using Rational Rose
- f) Develop CRUD matrix to represent relationships between use cases and problem domain classes

Week 5 & 6:

- **For each case study:**
- a) Develop Use case diagrams
- b) Develop elaborate Use case descriptions & scenarios
- c) Develop prototypes (without functionality)
- d) Develop system sequence diagrams

Week 7, 8, 9 & 10:
For each case study:

- a) Develop high-level sequence diagrams for each use case
- b) Identify MVC classes / objects for each use case
- c) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects
- d) Develop detailed design class model (use GRASP patterns for responsibility assignment)
- e) Develop three-layer package diagrams for each case study

Week 11 & 12:

- **For each case study:**
- a) Develop Use case Packages
- b) Develop component diagrams
- c) Identify relationships between use cases and represent them
- d) Refine domain class model by showing all the associations among classes

- **Week 13 onwards:**
- **For each case study:**

- a) Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

OUTCOMES:

- Understand the Case studies and design the Model.
- Understand how design patterns solve design problems.
- Develop design solutions using creational patterns.

Construct design solutions by using structural and behavioral patterns

III Year – I Semester

L	T	P	C
0	0	3	2

DATA BASE MANAGEMENT SYSTEM LAB

OBJECTIVES:

- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
- To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework
- To give a good formal foundation on the relational model of data
- To present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design

List of Experiments:

SQL

1. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
2. Queries using operators in SQL
3. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
4. Queries using Group By, Order By, and Having Clauses
5. Queries on Controlling Data: Commit, Rollback, and Save point
6. Queries to Build Report in SQL *PLUS
7. Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
8. Queries on Joins and Correlated Sub-Queries
9. Queries on Working with Index, Sequence, Synonym, Controlling Access, and Locking Rows for Update, Creating Password and Security features

PL/SQL

10. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of

Assignment Operation

11. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL

12. Write a PL/SQL block using SQL and Control Structures in PL/SQL

13. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types

14. Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

15. Write a PL/SQL Code Creation of forms for any Information System such as Student Information System, Employee Information System etc. 18

16. Demonstration of database connectivity

OUTCOMES:

- Understand, appreciate and effectively explain the underlying concepts of database technologies
- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database using a state-of-the-artRDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- Design and build a GUI application using a 4GL

Note: The creation of sample database for the purpose of the experiments is expected to be predecided by the instructor.

Text Books/Suggested Reading:

1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007.
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

III Year – II Semester

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ARTIFICIAL INTELLIGENCE
(Open Elective)

OBJECTIVES:

- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
- To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.
- To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning

UNIT-I:

Introduction to artificial intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI

UNIT-II:

Problem solving: state-space search and control strategies : Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a*, constraint satisfaction

Problem reduction and game playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

UNIT-III:

Logic concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic

UNIT-IV:

Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames **advanced knowledge representation techniques:** Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web

UNIT-V:

Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

UNIT-VI:

Uncertainty measure: probability theory: Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster-shafer theory

Fuzzy sets and fuzzy logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

OUTCOMES:

- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

TEXT BOOKS:

1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

REFERNCE BOOKS:

1. Atificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5th ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

III Year – II Semester

L	T	P	C
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COMPUTER NETWORKS

OBJECTIVES:

- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis—

UNIT – I:

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT – II:

Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols

UNIT – III:

The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-N-A Protocol Using Selective Repeat

UNIT – IV:

The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Access Protocols-Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet Physical Layer-Classic Ethernet MAC Sublayer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-Gigabit Ethernet-Retrospective on Ethernet, Wireless Lans-The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sublayer Protocol-The 805.11 Frame Structure-Services

UNIT – V:

Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Congestion Control Algorithms-Approaches to Congestion Control-Traffic Aware Routing-Admission Control-Traffic Throttling-Load Shedding.

UNIT – VI:

Transport Layer – The Internet Transport Protocols: Udp, the Internet Transport Protocols: Tcp **Application Layer –**The Domain Name System: The DNS Name Space, Resource Records, Name Servers, Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery

OUTCOMES:

- Understand OSI and TCP/IP models
- Analyze MAC layer protocols and LAN technologies
- Design applications using internet protocols
- Understand routing and congestion control algorithms
- Understand how internet works

TEXT BOOKS:

1. Tanenbaum and David J Wetherall, Computer Networks, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie, "Computer Networks - A Systems Approach" (5th ed), Morgan Kaufmann/ Elsevier, 2011

CYBER SECURITY

(Open Elective)

OBJECTIVES:

- The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
- Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

UNIT- I: Introduction to Cybercrime:

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security ,Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens

UNIT -II: Cyber offenses:

How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

UNIT -III: Cybercrime Mobile and Wireless Devices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT -IV: Tools and Methods Used in Cybercrime:

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft:Introduction,Phishing,IdentityTheft(IDTheft)

UNIT -V: Cybercrimes and Cyber security:

Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

UNIT -VI: Understanding Computer Forensics:

Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Antiforensics

OUTCOMES:

- Cyber Security architecture principles
- Identifying System and application security threats and vulnerabilities
- Identifying different classes of attacks
- Cyber Security incidents to apply appropriate response
- Describing risk management processes and practices
- Evaluation of decision making outcomes of Cyber Security scenarios

TEXT BOOKS:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.
2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning.

REFERENCES:

1. Information Security, Mark Rhodes, Ousley, MGH.

III Year – II Semester

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DESIGN AND ANALYSIS OF ALGORITHMS

OBJECTIVES:

Upon completion of this course, students will be able to do the following:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations

UNIT-I:

Introduction: What is an Algorithm, Algorithm Specification, Pseudocode Conventions Recursive Algorithm, Performance Analysis, Space Complexity, Time Complexity, Amortized Complexity, Amortized Complexity, Asymptotic Notation, Practical Complexities, Performance Measurement.

UNIT-II:

Dived and Conquer: General Method, Defective Chessboard, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Performance Measurement, Randomized Sorting Algorithms.

UNIT-III:

The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithms, An Optimal Randomized Algorithm, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT-IV:

Dynamic Programming: All - Pairs Shortest Paths, Single – Source Shortest paths General Weights, String Edition, 0/1 Knapsack, Reliability Design,

UNIT-V:

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring , Hamiltonian Cycles.

UNIT-VI:

Branch and Bound: The Method, Least cost (LC) Search, The 15-Puzzle: an Example, Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound, 0/1 Knapsack Problem, LC Branch-and Bound Solution, FIFO Branch-and-Bound Solution, Traveling Salesperson.

OUTCOMES:

Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.
- Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
- Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.
- Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press
2. Introduction to AlgorithmsThomas H. Cormen, PHI Learning

REFERENCE BOOKS

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman
2. Algorithm Design, Jon Kleinberg, Pearson.

DIGITAL SIGNAL PROCESSING

(Open Elective)

OBJECTIVES:

- To study DFT and its computation
- To study the design techniques for digital filters
- To study the finite word length effects in signal processing
- To study the non-parametric methods of power spectrum estimations
- To study the fundamentals of digital signal processors.

UNIT -I

Discrete Fourier Transform

DFT and its properties, Relation between DTFT and DFT, FFT computations using Decimation in time and Decimation in frequency algorithms, Overlap-add and save methods

UNIT -II

Infinite Impulse Response Digital Filters

Review of design of analogue Butterworth and Chebyshev Filters, Frequency transformation in analogue domain - Design of IIR digital filters using impulse invariance technique - Design of digital filters using bilinear transform - pre warping - Realization using direct, cascade and parallel forms.

UNIT- III

Finite Impulse Response Digital Filters

Symmetric and Ant symmetric FIR filters - Linear phase FIR filters - Design using Hamming, Henning and Blackman Windows - Frequency sampling method - Realization of FIR filters - Transversal, Linear phase and Polyphasestructures.

UNIT -IV

Finite Word Length Effects

Fixed point and floating point number representations - Comparison - Truncation and Rounding errors - Quantization noise - derivation for quantization noise power - coefficient quantization error - Product quantization error –

UNIT -V

Overflow error - Round off noise power - limit cycle oscillations due to product round off and overflow errors - signal scaling

UNIT -VI

Multirate Signal Processing

Introduction to Multirate signal processing-Decimation-Interpolation-Polyphase implementation of FIR filters for interpolator and decimator -Multistage implementation of sampling rate conversion- Design of narrow band filters - Applications of Multirate signal processing.

OUTCOMES:

- an ability to apply knowledge of Mathematics, science, and engineering
- an ability to design and conduct experiments and interpret data
- an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function as part of a multi-disciplinary team

TEXT BOOKS:

1. John G Proakis and Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2007.
2. S.Salivahanan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, TMH/McGraw HillInternational, 2007

REFERENCE BOOKS:

1. E.C. Ifeachor and B.W. Jervis, " Digital signal processing - A practical approach", Second edition, Pearson, 2002.
2. S.K. Mitra, Digital Signal Processing, A Computer Based approach, Tata Mc GrawHill, 1998.
3. P.P.Vaidyanathan, Multirate Systems & Filter Banks, Prentice Hall, Englewood cliffs, NJ, 1993.
4. Johny R. Johnson, Introduction to Digital Signal Processing, PHI, 2006.

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III Year – II Semester

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DATA WARE HOUSING AND DATA MINING

OBJECTIVES:

- Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
- They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
- They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

UNIT –I:

Introduction:Why Data Mining? What Is Data Mining?1.3 What Kinds of Data Can Be Mined?1.4 What Kinds of Patterns Can Be Mined?Which Technologies Are Used?Which Kinds of Applications Are Targeted?Major Issues in Data Mining.Data Objects and Attribute Types,Basic Statistical Descriptions of Data,Data Visualization, Measuring Data Similarity and Dissimilarity

UNIT –II:

Data Pre-processing: Data Preprocessing: An Overview,Data Cleaning,Data Integration,Data Reduction,Data Transformation and Data Discretization

UNIT –III:

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

UNIT –IV:

Classification: Alterative Techniques, Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks

UNIT –V

Association Analysis: Basic Concepts and Algorithms: Problem Defecation, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm. **(Tan &Vipin)**

UNIT –VI

Cluster Analysis: Basic Concepts and Algorithms:Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. **(Tan &Vipin)**

OUTCOMES:

- Understand stages in building a Data Warehouse
- Understand the need and importance of preprocessing techniques
- Understand the need and importance of Similarity and dissimilarity techniques
- Analyze and evaluate performance of algorithms for Association Rules.
- Analyze Classification and Clustering algorithms

TEXT BOOKS:

1. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.

REFERENCE BOOKS:

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining : VikramPudi and P. Radha Krishna, Oxford.
3. Data Mining and Analysis - Fundamental Concepts and Algorithms; Mohammed J. Zaki, Wagner Meira, Jr, Oxford
4. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.

EMBEDDED SYSTEMS

(Open Elective)

OBJECTIVES:

- Technology capabilities and limitations of the hardware, software components
- Methods to evaluate design tradeoffs between different technology choices.
- Design Methodologies

UNIT-I:

Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT-II:

8—bit microcontrollers architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT-III:

RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-IV:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-V:

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-VI:

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

OUTCOMES:

Understand the basics of an embedded system

- Program an embedded system
- Design, implement and test an embedded system.

Identify the unique characteristics of real-time systems

- Explain the general structure of a real-time system
- Define the unique design problems and challenges of real-time systems

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

INTERNET OF THINGS

(Open Elective)

OBJECTIVES:

- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

UNIT - I:

The Internet of Things: An Overview of Internet of things,Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples OF IoTs, Design Principles For Connected Devices

UNIT – II:

Business Models for Business Processes in the Internet of Things ,IoT/M2M systems LAYERS AND designs standardizations ,Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

UNIT – III:

Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

UNIT– IV:

Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT– V:

Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in

the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT – VI

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology ,Sensing the World.

OUTCOMES:

- Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
- Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things
- Develop critical thinking skills
- Compare and contrast the threat environment based on industry and/or device type

TEXTBOOKS:

- Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
- Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERNCE BOOKS:

1. Designingthe Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
2. Getting Started with the Internet of Things CunoPfister , Oreilly

III Year - II Semester

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INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Objectives:

***To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.**

***Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.**

Unit I: Introduction to Intellectual Property Rights (IPR)

Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO -Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

Unit II: Copyrights and Neighboring Rights

Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers – Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.

UNIT III: Patents

Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer — Revocation of Patent – Patent Appellate Board - Infringement of Patent – Compulsory Licensing — Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations.

UNIT IV: Trademarks

Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing Off Action.

UNIT V: Trade Secrets

Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

UNIT VI: Cyber Law and Cyber Crime

Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions - E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers.

- Relevant Cases Shall be dealt where ever necessary.

Outcome:

*** IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.**

***Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.**

References:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.
2. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
3. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi
4. Richard Stim: Intellectual Property, Cengage Learning, New Delhi.
5. Kompal Bansal &Parishit Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press).
6. Cyber Law - Texts & Cases, South-Western's Special Topics Collections.
7. R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.
8. M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub.

ROBOTICS

(Open Elective)

OBJECTIVES:

- To introduce the basic concepts, parts of robots and types of robots.
- To make the student familiar with the various drive systems for robot, sensors and their applications in robots and programming of robots.
- To discuss about the various applications of robots, justification and implementation of robot.

UNIT- I:

Introduction

Specifications of Robots- Classifications of robots – Work envelope - Flexible automation versus Robotic technology – Applications of Robots ROBOT KINEMATICS AND DYNAMICS Positions,

UNIT-II:

Orientations and frames, Mappings

Changing descriptions from frame to frame, Operators: Translations, Rotations and Transformations - Transformation Arithmetic - D-H Representation - Forward and inverse Kinematics Of Six Degree of Freedom Robot Arm – Robot Arm dynamics

UNIT- III:

Robot Drives and Power Transmission Systems

Robot drive mechanisms, hydraulic – electric – servomotor- stepper motor - pneumatic drives, Mechanical transmission method - Gear transmission, Belt drives, cables, Roller chains, Link - Rod systems - Rotary-to-Rotary motion conversion, Rotary-to-Linear motion conversion, Rack and Pinion drives, Lead screws, Ball Bearing screws,

UNIT -IV:

Manipulators

Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators

UNIT- V:

Robot End Effectors

Classification of End effectors – Tools as end effectors. Drive system for grippers-Mechanical adhesive-vacuum-magnetic-grippers. Hooks&scoops. Gripper force analysis and gripper design. Active and passive grippers.

UNIT -VI:

Path planning & Programming

Trajectory planning and avoidance of obstacles, path planning, skew motion, joint integrated motion – straight line motion-Robot languages-computer control and Robot software.

OUTCOMES:

- The Student must be able to design automatic manufacturing cells with robotic control using
- The principle behind robotic drive system, end effectors, sensor, machine vision robot Kinematics and programming.

TEXT BOOKS:

1. Deb S. R. and Deb S., “Robotics Technology and Flexible Automation”, Tata McGraw HillEducation Pvt. Ltd, 2010.
2. John J.Craig, “Introduction to Robotics”, Pearson, 2009.
3. Mikell P. Grooveret. al., "Industrial Robots - Technology, Programming and Applications", McGraw Hill, New York, 2008.

REFERENCE BOOKS:

1. Richard D Klafter, Thomas A Chmielewski, Michael Negin, "Robotics Engineering – An Integrated Approach", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd., 2006.
2. Fu K S, Gonzalez R C, Lee C.S.G, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, 1987

III Year – II Semester

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SOFTWARE TESTING METHODOLOGIES

OBJECTIVE:

Fundamentals for various testing methodologies.

- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods.
- Acts as the reference for software testing techniques and strategies.

UNIT-I:

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs.

Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT-II:

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.

UNIT-III:

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains andInterfaces Testing, Domain and Interface Testing, Domains and Testability.

Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

UNIT-IV:

Syntax Testing: Why, What and How, A Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips.

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, and Specifications.

UNIT – V:

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips.

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.

UNIT -VI:

Software Testing Tools: Introduction to Testing, Automated Testing, Concepts of Test Automation, Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

OUTCOME:

- Understand the basic testing procedures.
- Able to support in generating test cases and test suites.
- Able to test the applications manually by applying different testing methods and automation tools.
- Apply tools to resolve the problems in Real time environment.

TEXT BOOKS:

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing- Yogesh Singh, Camebridge

REFERENCE BOOKS:

1. The Craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
6. Software Testing Concepts and Tools, P.NageswaraRao, dreamtech Press
7. Win Runner in simple steps by Hakeem Shittu, 2007Genixpress.
8. Foundations of Software Testing, D.Graham& Others, Cengage Learning.

III Year – II Semester

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NETWORK PROGRAMMING LAB

OBJECTIVES:

- To write, execute and debug c programs which use Socket API.
- To understand the use of client/server architecture in application development
- To understand how to use TCP and UDP based sockets and their differences.
- To get acquainted with unix system internals like Socket files, IPC structures.
- To Design reliable servers using both TCP and UDP sockets

Prerequisites:

Knowledge of C Programming, Basic commands of UNIX.

List of Programs

1. Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(),connect(),send(),recv(),sendto(),recvfrom()).

2. Implementation of Connection oriented concurrent service (TCP).

3. Implementation of Connectionless Iterative time service (UDP).

4. Implementation of Select system call.

5. Implementation of gesockopt (), setsockopt () system calls.

6. Implementation of getpeername () system call.

7. Implementation of remote command execution using socket system calls.

8. Implementation of Distance Vector Routing Algorithm.

9. Implementation of SMTP.

10. Implementation of FTP.

11. Implementation of HTTP.

12. Implementation of RSA algorithm.

Note: Implement programs 2 to 7 in C and 8 to 12 in JAVA.

OUTCOMES:

- Understand and explain the basic concepts of Grid Computing;
- Explain the advantages of using Grid Computing within a given environment;
- Prepare for any upcoming Grid deployments and be able to get started with a potentially available Grid setup.
- Discuss some of the enabling technologies e.g. high-speed links and storage area networks.
- Build computer grids.

SUGGESTED READING:

III Year – II Semester

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SOFTWARE TESTING LAB

OBJECTIVES:

- Demonstrate the UML diagrams with ATM system descriptions.
- Demonstrate the working of software testing tools with c language.
- Study of testing tools- win runner, selenium etc.
- Writing test cases for various applications

1 Write programs in 'C' Language to demonstrate the working ofthe following constructs:

i) do...while
ii) while….do
iii) if…else
iv) switch
v) for

2 "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

3 Take any system (e.g. ATM system) and study its system specifications and report the various bugs.

4 Write the test cases for any known application (e.g. Banking application)

5 Create a test plan document for any application (e.g. Library Management System)

6 Study of Win Runner Testing Tool and its implementation

a) Win runner Testing Process and Win runner User Interface.
b) How Win Runner identifies GUI(Graphical User Interface) objects in an application and describes the two modesfor organizing GUI map files.
c) How to record a test script and explains the basics of Test Script Language (TSL).
d) How to synchronize a test when the application responds slowly.
e) How to create a test that checks GUI objects and compare the behaviour of GUI objects in different versions of the sample application.
f) How to create and run a test that checks bitmaps in your application and run the test on different versions ofthe sample application and examine any differences, pixel by pixel.

g) How to Create Data-Driven Tests which supports to run a single test on several sets of data from a data table.

h) How to read and check text found in GUI objects and bitmaps.

i) How to create a batch test that automatically runs the tests.

j) How to update the GUI object descriptions which in turn supports test scripts as the application changes.

7 Apply Win Runner testing tool implementation in any real time applications.

OUTCOMES:

- Find practical solutions to the problems
- Solve specific problems alone or in teams
- Manage a project from beginning to end
- Work independently as well as in teams

Define, formulate and analyze a problem

III Year – II Semester

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DATA WARE HOUSING AND DATA MINING LAB

OBJECTIVES:

- Practical exposure on implementation of well known data mining tasks.
- Exposure to real life data sets for analysis and prediction.
- Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.
- Handling a small data mining project for a given practical domain.

System/Software Requirements:

- **Intel based desktop PC**
- **WEKA TOOL**

1. Demonstration of preprocessing on dataset student.arff

2. Demonstration of preprocessing on dataset labor.arff

3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm

4. Demonstration of Association rule process on dataset test.arff using apriori algorithm

5. Demonstration of classification rule process on dataset student.arff using j48 algorithm

6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm

7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm

8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm

9. Demonstration of clustering rule process on dataset iris.arff using simple k-means

10. Demonstration of clustering rule process on dataset student.arff using simple k- means.

OUTCOMES:

- The data mining process and important issues around data cleaning, pre-processing and integration.
- The principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction..

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

IV Year – I Semester

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BIG DATA ANALYTICS

(Elective - 1)

OBJECTIVES:

- Optimize business decisions and create competitive advantage with Big Data analytics
- Introducing Java concepts required for developing map reduce programs
- Derive business benefit from unstructured data
- Imparting the architectural concepts of Hadoop and introducing map reduce paradigm
- To introduce programming tools PIG & HIVE in Hadoop echo system.

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, RecordReader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

UNIT-V

Pig: Hadoop Programming Made Easier

Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

UNIT-VI

Applying Structure to Hadoop Data with Hive:

Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

OUTCOMES:

- Preparing for data summarization, query, and analysis.
- Applying data modeling techniques to large data sets
- Creating applications for Big Data analytics
- Building a complete business data analytic solution

TEXT BOOKS:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

REFERENCE BOOKS:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, SrinathPerera, ThilinaGunarathne

SOFTWARE LINKS:

1. Hadoop:http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html

IV Year – I Semester

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CLOUD COMPUTING

(Elective - 2)

OBJECTIVES:

- The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internetcloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

UNIT -I: Systems modeling, Clustering and virtualization

Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency

UNIT- II:Virtual Machines and Virtualization of Clusters and Data Centers

Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

UNIT- III: Cloud Platform Architecture

Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT -IV: Cloud Programming and Software Environments

Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT- V: Cloud Resource Management and Scheduling

Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

UNIT- VI: Storage Systems

Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore, Amazon Simple Storage Service (S3)

OUTCOMES:

- Understanding the key dimensions of the challenge of Cloud Computing
- Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization
- Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
- Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press

REFERNCE BOOKS:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

IV Year – I Semester

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CRYPTOGRAPHY AND NETWORK SECURITY

OBJECTIVES:

- In this course the following principles and practice of cryptography and network security are covered:
- Classical systems, symmetric block ciphers (DES, AES, other contemporary symmetric ciphers)
- Public-key cryptography (RSA, discrete logarithms),
- Algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes,
- Email and web security, viruses, firewalls, digital right management, and other topics.

UNIT- I:

Basic Principles

Security Goals, Cryptographic Attacks, Services and Mechanisms, Mathematics of Cryptography

UNIT- II:

Symmetric Encryption

Mathematics of Symmetric Key Cryptography, Introduction to Modern Symmetric Key Ciphers, Data Encryption Standard, Advanced Encryption Standard.

UNIT- III:

Asymmetric Encryption

Mathematics of Asymmetric Key Cryptography, Asymmetric Key Cryptography

UNIT- IV:

Data Integrity, Digital Signature Schemes & Key Management

Message Integrity and Message Authentication, Cryptographic Hash Functions, Digital Signature, Key Management.

UNIT -V:

Network Security-I

Security at application layer: PGP and S/MIME, Security at the Transport Layer: SSL and TLS

UNIT -VI:

Network Security-II

Security at the Network Layer: IPSec, System Security

OUTCOMES:

- To be familiarity with information security awareness and a clear understanding of its importance.
- To master fundamentals of secret and public cryptography
- To master protocols for security services
- To be familiar with network security threats and countermeasures
- To be familiar with network security designs using available secure solutions (such asPGP,
- SSL, IPSec, etc)

TEXT BOOKS:

1) Cryptography and Network Security, Behrouz A Forouzan, DebdeepMukhopadhyay, (3e) Mc Graw Hill.
2) Cryptography and Network Security, William Stallings, (6e) Pearson.
3) Everyday Cryptography, Keith M.Martin, Oxford.

REFERENCE BOOKS:

1) Network Security and Cryptography, Bernard Meneges, Cengage Learning.

INFORMATION RETRIEVAL SYSTEMS

(Elective - 1)

OBJECTIVES

- To provide the foundation knowledge in information retrieval.
- To equip students with sound skills to solve computational search problems.
- To appreciate how to evaluate search engines.
- To appreciate the different applications of information retrieval techniques in the Internet or Web environment.
- To provide hands-on experience in building search engines and/or hands-on experience in evaluating search engines.

UNIT - I:

Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation.
Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms

UNIT- II:

Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

UNIT -III:

Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT- IV:

New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.

UNIT- V:

Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files

UNIT- VI:

Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri

OUTCOMES

- Identify basic theories in information retrieval systems
- Identify the analysis tools as they apply to information retrieval systems
- Understands the problems solved in current IR systems
- Describes the advantages of current IR systems
- Understand the difficulty of representing and retrieving documents.
- Understand the latest technologies for linking, describing and searching the web.

TEXT BOOK:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2 Modern Information Retrieval by Yates Pearson Education.
3 Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.

REFERENCES:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Information retrieval Algorithms and Heuristics, 2ed, Springer

IV Year – I Semester

L	T	P	C
4	0	0	3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to all Branches)

- **Course Objectives:**
- The Learning objectives of this paper is to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting, Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

UNIT-I

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects –Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting, Concept of Supply and Law of Supply.

UNIT – II:

Production and Cost Analyses:

Concept of Production function- Cobb-Douglas Production function- Leontief production function - Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs –Cost – Volume-Profit analysis-Determination of Breakeven point(simple problems)-Managerial significance and limitations of Breakeven point.

UNIT – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Managerial Theories of firm: Marris and Williamson's models – other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms – Business Cycles : Meaning and Features – Phases of a Business Cycle.

Unit – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow and cash flow statements (Simple Problems)

UNIT – VI:

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods(pay back period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

Course Outcome:

*****The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.

***** One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.

*****The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

TEXT BOOKS

1. Dr. N. AppaRao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1.Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House, 2014.
2. V. Maheswari: Managerial Economics, Sultan Chand.2014
3. Suma Damodaran: Managerial Economics, Oxford 2011.
4. VanithaAgarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.
6. Maheswari: Financial Accounting, Vikas Publications.
7. S. A. Siddiqui& A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012
8. Ramesh Singh, Indian Economy, 7th Edn., TMH2015
9. Pankaj Tandon A Text Book of Microeconomic Theory, Sage Publishers, 2015
10. Shailaja Gajjala and Usha Munipalle, Univerties press, 2015

MOBILE COMPUTING

(Elective - 1)

OBJECTIVE:

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

UNIT- I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT –II

(Wireless) Medium Access Control (MAC) : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT –III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process &QoS Issues.

UNIT- V

Data Dissemination and Synchronization : Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

UNIT- VI

Mobile Ad hoc Networks (MANETs) : Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing :WAP, Bluetooth, XML, J2ME, Java Card, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

OUTCOMES:

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

REFERENCE BOOKS:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
2. UWE Hansmann, LotherMerk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer.

IV Year – I Semester

L	T	P	C
4	0	0	3

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

OBJECTIVES:

The course should enable the student:

- To understand interrelationships, principles and guidelines governing architecture and evolution over time.
- To understand various architectural styles of software systems.
- To understand design patterns and their underlying object oriented concepts.
- To understand implementation of design patterns and providing solutions to real world software design problems.
- To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

UNIT-I:

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating and Architecture Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT-II:

Analyzing Architectures

Architecture Evaluation, Architecture design decision making, ATAM, CBAM

Moving from One System to Many

Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT-III:

Patterns

Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage.

Creational Patterns

Abstract factory, Builder, Factory method, Prototype, Singleton

UNIT-IV:

Structural Patterns

Adapter, Bridge, Composite, Decorator, Façade, Flyweight, PROXY.

UNIT-V:

Behavioral Patterns

Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

UNIT-VI:

Case Studies

A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in Interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development.

A Case Study (Designing a Document Editor): Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.
8. Pattern Oriented Software Architecture, F.Buschmann & others, John Wiley & Sons.

SCRIPTING LANGUAGES

(Elective - 2)

OBJECTIVES:

- The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data.
- The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT - I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT - II

Advanced perl Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT- III

PHP Basics PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT - IV

Advanced PHP Programming PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT -V

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT- VI

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling. Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

OUTCOMES:

- To master the theory behind scripting and its relationship to classic programming.
- To survey many of the modern and way cool language features that show up frequently in scripting languages.
- To gain some fluency programming in Ruby, JavaScript, Perl, Python, and related languages.
- To design and implement one's own scripting language.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.

IV Year – I Semester

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4	0	0	3

WEB TECHNOLOGIES

OBJECTIVES:

- This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web. The course will introduce web-based media-rich programming tools for creating interactive web pages.

UNIT-I: HTML, CSS

Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5

CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model, Conflict Resolution

UNIT-II:

Java script

The Basic of Java script: Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions

DHTML: Positioning Moving and Changing Elements

UNIT-III:

XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches,

AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX.

UNIT-IV:

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script. **Working with variables and constants:** Using variables, Using constants, Data types,Operators.**Controlling program flow:** Conditional statements,Control statements,Arrays,functions.Working with forms and Databases such as MySQL.

UNIT-V:

Introduction to PERL, Operators and if statements, Program design and control structures, Arrays, Hashs and File handling, Regular expressions, Subroutines, Retrieving documents from the web with Perl.

UNIT-VI:

Introduction to Ruby, Variables, types, simple I/O, Control, Arrays, Hashes, Methods, Classes, Iterators, Pattern Matching. Overview of Rails.

OUTCOMES:

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Styles sheets.
- Build dynamic web pages.
- Build web applications using PHP.
- Programming through PERL and Ruby
- Write simple client-side scripts using AJAX

TEXT BOOKS:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrelll, Gosselin, Zak, Karparhi, Maclntyre, Morrissey, Cengage

REFERENCE BOOKS:

1. Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
5. http://www.upriss.org.uk/perl/PerlCourse.html

SOFTWARE PROJECT MANAGEMENT

(Elective - 2)

OBJECTIVES:

- To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
- To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
- To understand successful software projects that support organization's strategic goals

UNIT -I:Introduction

Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals

Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

UNIT -II:Project Approach

Lifecycle models, Choosing Technology, Prototyping

Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2)

UNIT -III:Effort estimation & activity Planning

Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation , Activity Identification Approaches, Network planning models, Critical path analysis

UNIT -IV: Risk Management

Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT -V:Project Monitoring & Control, Resource Allocation

Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

UNIT -VI:Software Quality

Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality

Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality (Book3)

OUTCOMES:

- To match organizational needs to the most effective software development model
- To understand the basic concepts and issues of software project management
- To effectively Planning the software projects
- To implement the project plans through managing people, communications and change
- To select and employ mechanisms for tracking the software projects
- To conduct activities necessary to successfully complete and close the Software projects
- To develop the skills for tracking and controlling software deliverables
- To create project plans that address real-world management challenges

TEXT BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, Pankaj Jalote, Pearson.

REFERENCE BOOKS:

1. Software Project Management, Joel Henry, Pearson Education.

IV Year – I Semester

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SOFTWARE ARCHITECTURE AND DESIGN PATTERNS LAB

Software Architecture Lab

The course project is divided in 6 small components that will be performed during the different lab sessions; there are, in principle, 7 lab sessions. The project consists of the design and implementation of the software architecture of a Weather Mapping System (WMS). Implementation will take place both in Java and C++ (combination of both languages). Each lab assignment consists of a theoretical part and a practical part, which are defined in specific lab assignment statements that are posted at least one or two weeks before the session.

Report and demo (if applicable) for each assignment is due for the following session.

1. Tool Presentation

This session is an introductory session; there is no lab assignment for this session.

Introduction to working with an industrial strength software development environment, namely Rational Rose: how to write and maintain a UML specification; configuration management; architecture design; CORBA-IDL document generation; Java code generation from a UML model etc.

Presentation of the Project: Weather Mapping System.

2. Use Case View

Design of the Use Case View. Risk Analysis.

3: Logical View

Design of the Logical View of the Weather Mapping System (WMS).

4: Integrating Patterns in the Architecture

Integration of selected architectural and design patterns in the logical view obtained previously.

5: Implementation, Process, and Deployment Views

Design of the implementation, process, and deployment views for the Weather Mapping System.

6: Component and Interprocess Communication Design

Generation from the previous architecture design of CORBA Interfaces and Components Definitions.

7: Implementation of WMS

Implementation of the Weather Mapping System (Java & C++), with a particular emphasis on the Interprocess communication mechanism and the software components identified.

Lab Reports:

Lab reports should include:

- The answers to the questions included in the assignment statement. The answers should motivate briefly your design choices.
- The printout of the diagrams and related documents (e.g. class, use cases, operations descriptions etc.) produced using Rational Rose.

Reference: http://www.ece.uvic.ca/~itraore/seng422-06/eng422-06.html

Design Patterns Lab

S. No	Programs
1.	Use case Diagram for Librarian Scenario
2.	Using UML design Abstract factory design pattern
3.	Using UML design Adapter-class Design pattern
4.	Using UML design Adapter-object Design pattern
5.	Using UML design Strategy Design pattern
6.	Using UML design Builder Design pattern
7.	Using UML design Bridge Design pattern
8.	Using UML design Decorator Design pattern
9.	User gives a print command from a word document. Design to represent this chain of responsibility Design pattern
10.	Design a Flyweight Design pattern
11.	Using UML design Facade Design pattern

12. Using UML design Iterator Design pattern .
13. Using UML design Mediator Design pattern
14. Using UML design Proxy Design pattern
15. Using UML design Visitor Design pattern

IV Year – I Semester

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WEB TECHNOLOGIES LAB

OBJECTIVES:

- To acquire knowledge of XHTML, Java Script and XML to develop web applications
- Ability to develop dynamic web content using Java Servlets and JSP
- To understand JDBC connections and Java Mail API
- To understand the design and development process of a complete web application

1. Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

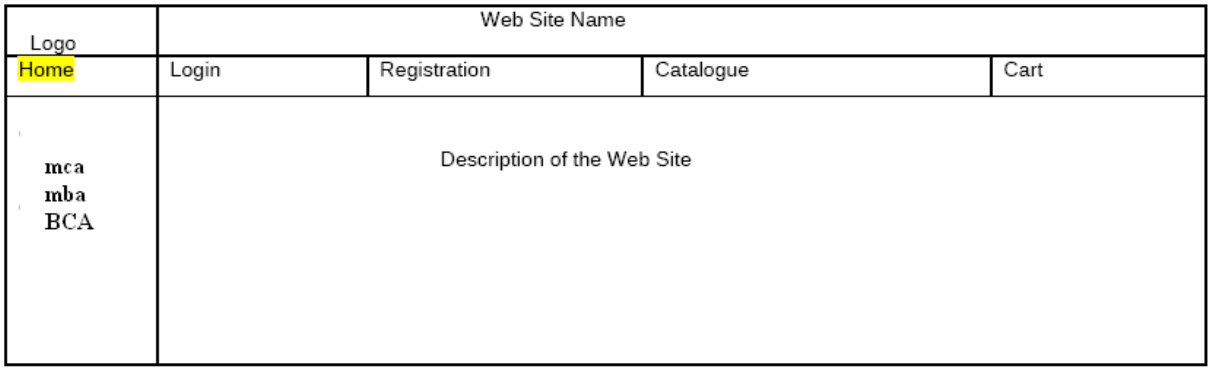
The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

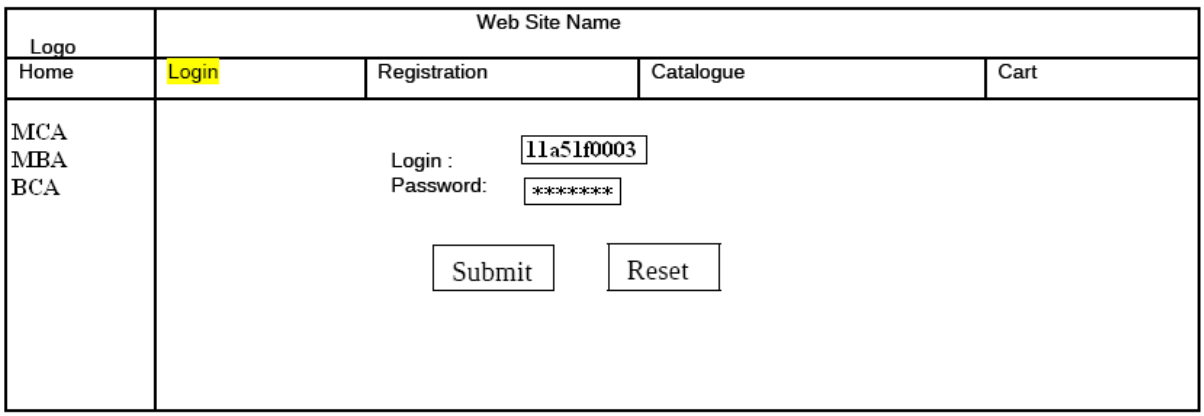
Left frame: At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"MCA"** the catalogue for MCABooks should be displayed in the Right frame.

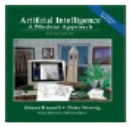
Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.



2)**login page**



3) **CATOLOGUE PAGE:**
The catalogue page should contain the details of all the books available in the web site in a table.
The details should contain the following:
1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	Add to cart
BCA		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam	$ 50	Add to cart

4. **REGISTRATION PAGE:**
Create a "*registration form* "with the following fields
1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

5. Design a web page using CSS (Cascading **S**tyle **S**heets**)** which includes the following:
1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles

6. Write an XML file which will display the Book information which includes the following:
1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

7. Write Ruby program reads a number and calculates the factorial value of it and prints the Same.

8. Write a Ruby program which counts number of lines in a text files using its regular Expressions facility.

9.Write a Ruby program that uses iterator to find out the length of a string.

10. Write simple Ruby programs that uses arrays in Ruby.

11. Write programs which uses associative arrays concept of Ruby.

12. Write Ruby program which uses Math module to find area of a triangle.

13. Write Ruby program which uses tk module to display a window

14. Define complex class in Ruby and do write methods to carry operations on complex objects.

15. Write a program which illustrates the use of associative arrays in perl.

16.Write perl program takes set names along the command line and prints whether they are regular files or special files

17. Write a perl program to implement UNIX `passed' program

18. An example perl program to connect to a MySQl database table and executing simple commands.

19. Example PHP program for cotactus page.

20. User Authentication:
Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.
1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.
If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ''.
Use init-parameters to do this.

21. Example PHP program for registering users of a website and login.

22. Install a database(Mysql or Oracle).
Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).
Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

23. Write a PHP which does the following job:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

24.Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

25.HTTP is a stateless protocol. Session is required to maintain the state.
The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of local host). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session. Invalidate ().
Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

OUTCOMES:

- Students will be able to develop static web sites using XHTML and Java Scripts
- To implement XML and XSLT for web applications
- Develop Dynamic web content using Java Servlets and JSP
- To develop JDBC connections and implement a complete Dynamic web application

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

ARTIFICIAL NEURAL NETWORKS

(Elective-3)

OBJECTIVES:

- Understand the role of neural networks in engineering, artificial intelligence, and cognitive modeling.
- Provide knowledge of supervised learning in neural networks
- Provide knowledge of computation and dynamical systems using neural networks
- Provide knowledge of reinforcement learning using neural networks.
- Provide knowledge of unsupervised learning using neural networks.
- Provide hands-on experience in selected applications

UNIT-I: Introduction and ANN Structure.

Biological neurons and artificial neurons. Model of an ANN. Activation functions used in ANNs. Typical classes of network architectures.

UNIT-II

Mathematical Foundations and Learning mechanisms.Re-visiting vector and matrix algebra. State-space concepts. Concepts of optimization. Error-correction learning. Memory-based learning. Hebbian learning. Competitive learning.

UNIT-III

Single layer perceptrons. Structure and learning of perceptrons. Pattern classifier - introduction and Bayes' classifiers. Perceptron as a pattern classifier. Perceptron convergence. Limitations of a perceptrons.

UNIT-IV: Feed forward ANN.

Structures of Multi-layer feed forward networks. Back propagation algorithm. Back propagation - training and convergence. Functional approximation with back propagation. Practical and design issues of back propagation learning.

UNIT-V: Radial Basis Function Networks.

Pattern separability and interpolation. Regularization Theory. Regularization and RBF networks.RBF network design and training. Approximation properties of RBF.

UNIT-VI: Support Vector machines.

Linear separability and optimal hyperplane.Determination of optimal hyperplane. Optimal hyperplane for nonseparable patterns.Design of an SVM.Examples of SVM.

OUTCOMES:

- This course has been designed to offer as a graduate-level/ final year undergraduate level elective subject to the students of any branch of engineering/ science, having basic foundations of matrix algebra, calculus and preferably (not essential) with a basic knowledge of optimization.
- Students and researchers desirous of working on pattern recognition and classification, regression and interpolation from sparse observations; control and optimization are expected to find this course useful. The course covers theories and usage of artificial neural networks (ANN) for problems pertaining to classification (supervised/ unsupervised) and regression.
- The course starts with some mathematical foundations and the structures of artificial neurons, which mimics biological neurons in a grossly scaled down version. It offers mathematical basis of learning mechanisms through ANN. The course introduces perceptrons, discusses its capabilities and limitations as a pattern classifier and later develops concepts of multilayer perceptrons with back propagation learning.

TEXT BOOKS:

1. Simon Haykin, "Neural Networks: A comprehensive foundation", Second Edition, Pearson Education Asia.
2. Satish Kumar, "Neural Networks: A classroom approach", Tata McGraw Hill, 2004.

REFERENCE BOOKS:

1. Robert J. Schalkoff, "Artificial Neural Networks", McGraw-Hill International Editions, 1997.

IV Year – II Semester

L	T	P	C
4	0	0	3

CONCURRENT AND PARALLEL PROGRAMMING

(Elective - 3)

OBJECTIVES:

- Improvement of students comprehension of CPP, new programming concepts, paradigms and idioms
- Change of 'mood' regarding Concurrency counter-intuitiveness
- Proactive attitude: theoretical teaching shouldn't be so dull
- Multipath, individually paced, stop–and–replay, personalized learning process
- Frequent assessment of learning advances on the subject

UNIT- 1

Concurrent versus sequential programming. Concurrent programming constructs and race condition. Synchronization primitives.

UNIT-II

Processes and threads. Interprocess communication. Livelock and deadlocks, starvation, and deadlock prevention. Issues and challenges in concurrent programming paradigm and current trends.

UNIT-III

Parallel algorithms – sorting, ranking, searching, traversals, prefix sum etc.,

UNIT- IV

Parallel programming paradigms – Data parallel, Task parallel, Shared memory and message passing, Parallel Architectures, GPGPU, pthreads, STM,

UNIT-V

OpenMP, OpenCL, Cilk++, Intel TBB, CUDA

UNIT-VI

Heterogeneous Computing: C++AMP, OpenCL

OUTCOMES:

- Understanding improvement of CPP concepts presented
- The number of reinforcement–exercises assigned
- The time required for the resolution of exercises
- Compliance level with the new model of theoretical teaching

TEXT BOOKS:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall International.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.
3. GadiTaubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.
4. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
5. Fred B. Schneider. On Concurrent Programming, Springer.
6. Brinch Hansen. The Origins of Concurrent Programming: From Semaphor

IV Year – II Semester

L	T	P	C
4	0	0	3

DISTRIBUTED SYSTEMS

OBJECTIVES:

- Provides an introduction to the fundamentals of distributed computer systems, assuming the availability of facilities for data transmission, IPC mechanisms in distributed systems, Remote procedure calls.
- Expose students to current technology used to build architectures to enhance distributed Computing infrastructures with various computing principles

UNIT-I:

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT-II:

Interprocess Communication: Introduction, The API for the Internet Protocols- The Characteristics of Interprocess communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.

UNIT-III:

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT-IV:

Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads.

UNIT-V:

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication.

UNIT-VI:

Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication.

OUTCOMES:

- Develop a familiarity with distributed file systems.
- Describe important characteristics of distributed systems and the salient architectural features of such systems.
- Describe the features and applications of important standard protocols which are used in distributed systems.
- Gaining practical experience of inter-process communication in a distributed environment

TEXT BOOKS:

1. Ajay D Kshemkalyani, MukeshSighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication

REFERENCE BOOKS

1. Distributed-Systems-Principles-Paradigms-Tanenbaum PHI

IV Year – II Semester

L	T	P	C
4	0	0	3

MACHINE LEARNING

OBJECTIVES:

- Familiarity with a set of well-known supervised, unsupervised and semi-supervised
- learning algorithms.
- The ability to implement some basic machine learning algorithms
- Understanding of how machine learning algorithms are evaluated

UNIT -I:The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. **Binary classification and related tasks:** Classification, Scoring and ranking, Class probability estimation

UNIT- II:Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. **Concept learning**: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT- III: Tree models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. **Rule models:**Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT -IV:Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods.**Distance Based Models:** Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.

UNIT- V:Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihoodProbabilistic models with hidden variables.**Features:** Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

UNIT- VI: Dimensionality Reduction: Principal Component Analysis (PCA), Implementation and demonstration. **Artificial Neural Networks:**Introduction, Neural network representation, appropriate problems for neural network learning, Multilayer networks and the back propagation algorithm.

OUTCOMES:

- Recognize the characteristics of machine learning that make it useful to real-world
- Problems.
- Characterize machine learning algorithms as supervised, semi-supervised, and
- Unsupervised.
- Have heard of a few machine learning toolboxes.
- Be able to use support vector machines.
- Be able to use regularized regression algorithms.
- Understand the concept behind neural networks for learning non-linear functions.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. UnderstandingMachine Learning: From Theory toAlgorithms, Shai Shalev-Shwartz, Shai Ben-
David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

IV Year – II Semester

L	T	P	C
4	0	0	3

MANAGEMENT SCIENCE

Course Objectives:

***To familiarize with the process of management and to provide basic insight into select contemporary management practices**

***To provide conceptual knowledge on functional management and strategic management.**

UNIT I

Introduction to Management: Concept –nature and importance of Management –Generic Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Organizational typology- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure

UNIT II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions. Operationlizing change through performance management.

UNIT IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)

Unit V

Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives. Global strategies, theories of Multinational Companies.

UNIT VI

Contemporary Management Practice: Basic concepts of MIS, MRP, Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management , Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Course Outcome:

***After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior.**

***Will familiarize with the concepts of functional management project management and strategic management.**

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, '*Management Science'* Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, *Management Science'* TMH 2011.

References:

1. Koontz & Weihrich: 'Essentials *of management'* TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011
5. Philip Kotler & Armstrong: Principles of Marketing, Pearson publications
6. Biswajit Patnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Starategic Management, Cengage learning
8. Prem Chadha: Performance Management, Trinity Press(An imprint of Laxmi Publications Pvt. Ltd.) Delhi 2015.
9. Anil Bhat& Arya Kumar : Principles of Management, Oxford University Press, New Delhi, 2015.

OPERATION RESEARCH

(Elective - 3)

OBJECTIVE:

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimisation problems.
- Use mathematical software to solve the proposed models.
- Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering

UNIT-I:

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem – Formulation of LPP, Graphical solution of LPP. Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions**.**

UNIT-II:

Transportation Problem. Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method

UNIT-III:

Assignment model. Formulation. Hungarian method for optimal solution. Solving unbalanced problem. Traveling salesman problem and assignment problem Sequencing models. Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines – Processing n Jobs through m Machines

UNIT-IV:

Dynamic programming. Characteristics of dynamic programming. Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems Games Theory. Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle. Rectangular games without saddle point – mixed strategy for 2 X 2 games

UNIT-V:

Replacement Models. Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy

UNIT-VI:

Inventory models. Inventory costs. Models with deterministic demand – model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

OUTCOME:

- Methodology of Operations Research.
- Linear programming: solving methods, duality, and sensitivity analysis.
- Integer Programming.
- Network flows.
- Multi-criteria decision techniques.
- Decision making under uncertainty and risk.
- Game theory. Dynamic programming**.**

TEXT BOOKS:

1. P. Sankara Iyer,"Operations Research", Tata McGraw-Hill, 2008.
2. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005**.**

REFERENCE BOOKS:

1. J K Sharma. "Operations Research Theory & Applications, 3e", Macmillan India Ltd, 2007.
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.
3. J K Sharma., "Operations Research, Problems and Solutions, 3e", Macmillan India Ltd
4. N.V.S. Raju, "Operations Research", HI-TECH, 2002

IV Year – II Semester

L	T	P	C
0	0	0	10

PROJECT

IV Year – II Semester

L	T	P	C
0	3	0	2

SEMINAR

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA& Affiliated to JNTUK, Kakinada

Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor’s theorem and Maclaurin’s

theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common toCSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. To learn the basic principles and applications of Electrochemistry.
3. Advanced Analytical instrumental techniques are introduced for material characterization.With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.
4. Understanding of crystal structures and preparation of semiconductors and insulators.
5. A wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.

UNIT- I: Polymer Chemistry

Introduction to polymers, functionality of monomers, co-polymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosettings, Preparation, Properties and Applications of – Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting polymers - polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and Applications.

UNIT -II: Electrochemistry and Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations), Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries- working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

UNIT - III: Instrumental Methods and Non-Conventional Energy Sources

Part-A: **Instrumental Methods**

Electromagnetic Spectrum. Absorption of radiation: Beer-Lambert's law - Principles of UV-Visible, Infrared (IR) and Nuclear Magnetic Resonance (NMR) spectroscopy.

Basic concepts of Thin Layer Chromatography (TLC), Gas Chromatography (GC) and High-Performance Liquid Chromatography (HPLC), Separation and purification of mixture of compounds.

Part-B: **Non-Conventional Energy Sources**

Introduction – Renewable and Non –Renewable energy sources - Solar Energy- Introduction, Applications of Solar energy – Photovoltaic cell: design, working and its importance. Hydropower includes setup a Hydropower plant (schematic diagram), Geo-Thermal energy: Introduction-schematic diagram of a Geothermal power plant, Tidal power - Introduction- Design and working, Biomass energy.

UNIT- IV: Solid State Chemistry

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel.

Hall Effect and Applications.

Semiconductors:Preparation of pure semiconductors by Zone refining, Distillation and Czochralskicrystal pulling technique, Doping- Epitaxy, Diffusion and Ion-implantation technique- Intrinsic and Extrinsic semiconductors - Applications.

Insulators*:* Electrical Insulators and their Applications.

UNIT -V: Material Chemistry

Nano materials –Introduction- Top-down and Bottom- up approaches, Sol-gel method. Characterization by BET and TEM methods. Carbon nano tubes and fullerenes - Types, Preparation (Arc discharge Laser ablation and ChemicalVapour Deposition methods) Properties and Applications.

Liquid crystals - Introduction – Types – Applications.

Superconductors - Type-I & Type-II, Properties &Applications.

Green chemistry- Principles and Applications.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course,students will be able to

1. Recall the information related to polymers and their application.(Remembering)
2. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing)
3. Understand about the different analytical techniques and its applications.(Understanding)
   Design the technologies related to renewable energy sources. (Creating)
4. Understand the conductivity phenomenon and applications of solids. (Understanding)
5. Choose the materials like nano materials, liquid crystals, superconductors, and green synthetic methods to solve the Engineering problems. (Applying)

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words

- Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary

- Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations

- Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary

- Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

To teach problem solving through Algorithms and Flowcharts

1. To elucidate problem solving through Python programming language
2. To train in the development of solutions using modular concepts
3. To explain the role of data structures in programming
4. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer

2. Develop computational thinking and be able to use Python constructs to solve basic problems

3. Understand modularization and data structures concepts in Python

4. Apply file handling concepts in problem solving

5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

Branch: CSE, IT, AI&DS & AIML **I Year – I Semester** **Regulation: R20**

Sub. Title: ELEMENTS OF ELECTRICAL & ELECTRONICS ENGINEERING

Sub.Code:

L	T	P	C
3	0	0	3

Preamble:

This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines, electronic components to perform well in their respective fields.

Learning Objectives:

- To learn the basic principles of electrical law's and analysis of DC circuits and AC circuits.
- To understand the principles of operation and characteristics of DC machines.
- To understand the principle of operation of Transformer and Induction motor.
- To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
- To learn the operation of PNP and NPN transistors and various amplifiers.

UNIT - I

DC Circuits: Basic definitions, Electrical circuit elements (R - L and C), Ohm's-Law, Kirchhoff laws, Series and parallel connection of resistances with DC excitation, Mesh Analysis and Nodal Analysis.

AC Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Introduction to three phase, phase sequence, relation between line and phase voltages and currents.

UNIT - II

DC Machines: Principle and operation of DC Generator, EMF equation, Applications. Principle and operation of DC Motor, Back EMF, Types of DC machines, Speed- Torque Characteristics of DC Motors, Speed control of DC Motors, Applications.

UNIT - III

AC Machines: Classification of AC machines, Principle and operation of 3-phase Induction Motor and 3-phase Synchronous Generator.

Transformers: Principle of operation and construction of Single Phase Transformer, OC and SC test on transformer, efficiency

UNIT IV

Rectifiers & Linear ICs: PN junction diodes, Applications -Half wave and Bridge rectifiers. Characteristics of Operation Amplifiers (OP- AMPs), Applications of OP-AMPs -Inverting, Non-Inverting, Integrator and Differentiator.

UNIT V

Transistors : PNP and NPN junction transistor, transistor as an amplifier, Transistor Configurations-CE,CB,CC configurations, CE Amplifier Characteristics, Application of Transistors.

Course Outcomes:

- Able to analyze the various DC networks and AC circuits.
- Able to understand the operation and Applications of DC Generators and DC Motor.
- Able to analyze the performance of Transformer and Induction motor and Synchronous generator.
- Able to analyze the operation of half wave, full wave rectifiers and OP- AMPs.
- Able to explain the operation of transistors and its applications.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 10th edition, PEI/PHI2006
2. Theory and performance of Electrical Machines ,J.B.Gupta,3rd edition,Kataria.S.K& Sons
3. Electrical Circuit Theory and Technology by John Bird, 6th Edition Routledge Taylor & Francis Group

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4. Industrial Electronics by G.K. Mittal, PHI.
5. Electrical Technology by Surinder Pal Bali, Pearson Publications.
6. Principles of Basic Electrical Engineering by T.N. Nagsarkar, M.S. Sukhija, Oxford University Press.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to CSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry Lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. JyotsnaCherukuri (2012) Laboratory Manual of Engineering chemistry-II, VGSTechno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:

- Creating a Class with variables and methods
- Class inheritance
- Constructors
- Exception handling

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners‘ English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner‘s Compass, 7th Edition
7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press
12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC- A^{++}, NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application and to know the importance of free electron theory for metals.
- Enlightenment of the importance of band theory for crystalline solids and metals. To understand the physics of Semiconductors and their working mechanism.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index-Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser –Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric Properties

Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations - Electronic and Ionic polarizations with mathematical derivations – Orientational polarization (Qualitative)–Internal field in solids -Claussius -Mosotti equation.

UNIT – IV: Quantum Mechanics and Free Electron Theory of Metals

Quantum Mechanics:

Introduction- Dual nature of matter-Matter waves, de-Broglie wavelength, Properties of wave function- time independent and time dependent Schrödinger's wave equation-Particle in a one dimensional infinite potential well.

Free Electron Theory of Meals:

Classical free electron theory (Qualitative with discussion of merits and demerits)-Quantum free electron theory-Equation for electrical conductivity based on quantum free electron theory-Fermi-Dirac Distribution-density of states (3D) - Fermi Energy.

UNIT –V: Band Theory of Solids and Semiconductors

Band Theory of Solids:

Bloch Theorem - Kronig-Penny Model (Qualitative)-E vs K and v vs K diagram- Origin of energy bands - Classification of solids based on energy bands – Effective Mass of an Electron-Concept of a Hole

Semiconductors:

Introduction– Intrinsic semiconductors - density of charge carriers-Fermi level – extrinsic semiconductors - P-type & N-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature - Drift and Diffusion currents – Einstein's equation - Hall effect- Hall coefficient - Applications of Hall effect.

Text Books:

1.M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017
2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018
3. P.K. Palanisamy, Applied Physics, SciTech Publications.

References:

1. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill.
2. Charles Kittel "Introduction to Solid State Physics",Wiley Publications.
3. S.M.Sze "Semiconductor devices-Physics and Technology"-Wiley.
4. Halliday, Resnick and Walker, "Fundamentals of Physics", John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers.
6. Ajoy Ghatak "Optics" Tata Mc GrawHill.

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well. Identify the role of classical free electron theory in the study of electrical conductivity.

CO5**:** Explain the concept of quantum free electron theory in the study of electrical conductivity. Classify the energy bands of solids. Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices.

DIGITAL LOGIC DESIGN

UNIT- I: Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction

UNIT -II: Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms,

UNIT- III: Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT- IV: Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers.

UNIT- V: Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines

UNIT -VI: Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, Ripple Counter

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.

2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.

2. Digital Logic Design, Leach, Malvino, Saha, TMH. 3. Modern Digital Electronics, R.P. Jain, TMH.

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Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Programming for Problem Solving				
Branch	CSE,IT, AI&DS,EEE				

Course Objectives:

- Formulating algorithmic solutions to problems and implementing algorithms in C.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding arrays, pointers and dynamic memory allocation.
- Understanding Strings and Structures

UNIT-I:

Introduction to C Programming- Identifiers, The main () Function, The printf () Function **Programming Style** - Indentation, Comments, Data Types**,** Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization.

Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT-II:

Control Flow-Relational Expressions - Logical Operators:

Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement.

UNIT-III:

Arrays & Pointers:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

Pointers: Concept of a Pointer, Initialisation of pointer variables, passing by address, Dangling memory, address arithmetic, Dynamic memory management functions, command line arguments.

UNIT-IV:

Modular Programming: Function and Parameter Declarations, Returning a Value, Classifications of Functions, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Array as a Function arguments.

Case Study: Recursion - Mathematical Recursion, Recursion versus Iteration

UNIT-V:

Strings & Structures:

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.

TEXT BOOKS:

1. ANSI C Programming, Gary J. Bronson, Cengage Learning.
2. Let us C Authentic Guide to C Programming Language by yashavant kanetkar.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

REFERENCE BOOKS:

1. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, Bichkar, Universities Press.
3. Programming in C, ReemaThareja, OXFORD.
4. C by Example, Noel Kalicharan, Cambridge.

Course Outcomes:

1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops and functions.
4. Explain the difference between call by value and call by reference
5. Understand the dynamics of memory by the use of pointers
6. Understand the sorting and searching algorithms.

Course Objectives:

The objective of this course is to

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self-paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes:

Students should be able to:

- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, summarize various Linux operating system commands,
- Recognize characters & extract text from scanned images, Create audio files and podcasts

Computer Hardware:

Experiment 1: Identification of peripherals of a PC, Laptop, Server and Smart Phones: Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.

Operating Systems:

Experiment 2: Virtual Machine setup: o Setting up and configuring a new Virtual Machine o Setting up and configuring an existing Virtual Machine o Exporting and packaging an existing Virtual Machine into a portable format

Or

Experiment 2: Operating System installation: o Installing an Operating System such as Linux on Computer hardware.

Experiment 3: Linux Operating System commands: o General command syntax o Basic help commands

- Basic File system commands

- Date and Time

- Basic Filters and Text processing

- Basic File compression commands o Miscellaneous: apt-get, vi editor.

Networking and Internet:

Experiment 4: Networking Commands:

- ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget, route

Experiment 5: Internet Services:

- Web Browser usage and advanced settings like LAN, proxy, content, privacy, security, cookies, extensions/ plugins o Antivirus installation, configuring a firewall, blocking pop-ups
- Email creation and usage, Creating a Digital Profile on LinkedIn.

Productivity Tools:

Experiment 6: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage,

Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices

Office Tools:

Experiment 7: Demonstration and Practice on Text Editors like Notepad++, Sublime Text, Atom, Brackets, Visual code, etc

Experiment 8: Demonstration and practice on Microsoft Word, Power Point, Microsoft Excel

Experiment 9: Demonstration and practice on LaTeX and produce professional pdf documents.

Text Books:

1) Computer Fundamentals, Anita Goel, Pearson Education, 2017 2) PC Hardware Trouble Shooting Made Easy, TMH

References Books:

1) Essential Computer and IT Fundamentals for Engineering and Science Students, Dr.N.B.Vekateswarlu, S.Chand

e-Resources:

1) https://explorersposts.grc.nasa.gov/post631/2006- 2007/computer_basics/ComputerPorts.doc

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Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Programming for Problem Solving				
Branch	CSE,IT, AI&DS,EEE				

Course Objectives:

- Formulating algorithmic solutions to problems and implementing algorithms in C.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding arrays, pointers and dynamic memory allocation.
- Understanding Strings and Structures

UNIT-I:

Introduction to C Programming- Identifiers, The main () Function, The printf () Function **Programming Style** - Indentation, Comments, Data Types**,** Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization.

Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT-II:

Control Flow-Relational Expressions - Logical Operators:

Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement.

UNIT-III:

Arrays & Pointers:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

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UNIT-IV:

Modular Programming: Function and Parameter Declarations, Returning a Value, Classifications of Functions, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Array as a Function arguments.

Case Study: Recursion - Mathematical Recursion, Recursion versus Iteration

UNIT-V:

Strings & Structures:

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.

TEXT BOOKS:

1. ANSI C Programming, Gary J. Bronson, Cengage Learning.
2. Let us C Authentic Guide to C Programming Language by yashavant kanetkar.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

REFERENCE BOOKS:

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2. Programming with C, Bichkar, Universities Press.
3. Programming in C, ReemaThareja, OXFORD.
4. C by Example, Noel Kalicharan, Cambridge.

Course Outcomes:

7. Write, compile and debug programs in C language.
8. Use different data types in a computer program.
9. Design programs involving decision structures, loops and functions.
10. Explain the difference between call by value and call by reference
11. Understand the dynamics of memory by the use of pointers
12. Understand the sorting and searching algorithms.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

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Approved by AICTE, Accredited by NAAC- A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume Resonator
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

I B.Tech – II Sem **L T P C**

0 0 0 1.5

Programming for Problem Solving Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers Structures.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of functions involving the idea of Modularity.

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math
a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow – I
a)Write a C Program to Find Whether the Given Year is a Leap Year or not.
b)Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow – II
a)Write a C Program to Find Whether the Given Number is
    i) Prime Number
    ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle

Exercise – 5 Functions
a) Write a C Program demonstrating parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise – 6 Control Flow – III
a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions – Continued

Write a C Program to compute the values of sinx and cos x and e^x values using Series expansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a)Write a C Program to Store Information of a Movie Using Structure

b)Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a)Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find the sum of n elements entered by the user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find the sum of n elements entered by the user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations with library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

b) Implementation of string manipulation operations without library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

Course Outcomes:

1. Apply and practice logical ability to solve the problem.
2. Understand C programming development environment, compiling, debugging and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs.
4. Understand and apply the inbuilt functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

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Approved by AICTE, Accredited by NAAC- A^{++} , NBA & Affiliated to JNTUK, Kakinada

Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to CSE, IT & EEE Branches)

Course Title: Constitution of India

L	T	P	C
2	0	0	0

Course Objectives:

- To train students in understanding the basic structure of Indian Constitution
- To prepare students to live better and happily with other fellow beings through the application of Fundamental Rights in their lives.

UNIT-I: Introduction to Indian Constitution

Meaning of the term Indian Constitution –Preamble- Constituent Assembly- Salient Features of Indian Constitution

UNIT-II: Fundamental Rights

Fundamental Rights -Fundamental Duties -The Directive Principles of State Policy

UNIT-III: Union Government

Union Government -Union Legislature (Parliament) -Lok Sabha and Rajya Sabha (with Powers and Functions) -Union Excecutive -President of India (with Powers and Functions) -Prime Minister of India (with Powers and Functions) -Union Judiciary (Supreme Court) -Jurisdiction of the Supreme Court

UNIT-IV State Government

State Government -State Legislature (Legislative Assembly / Vidhan Sabha, Legislative Council / Vidhan Parishad) -Powers and Functions of the State Legislature -State Executive-Governor of the State (with Powers and Functions) -The Chief Minister of the State (with Powers and Functions) -State Judiciary (High Courts)

UNIT-V: Local Self Governance and Sovereign Bodies

Powers and functions of Municipalities, Panchyats, ZP's and Co – Operative Societies

Election Commission of India (with Powers and Functions) -The Union Public Service Commission (with Powers and Functions)

Text Books:

1. Introduction to constitution of India, Durga Das Basu, Lexis Nexis Publications
2. Constitution of India by PRFESSIONAL BOOK PUBLISHERS
3. The Constitution of India by Arun K Tiru vengadam, Blooms bury publishers.
4. The constitution of India by PM Bakshi, Universal law publishing co
5. The Constitution of India by S.R. Bhansali, Universal law publishing co

Course Outcomes:

Upon the completion of the course, the student will be able to

1. Examine salient features of Indian Constitution and live accordingly in society.

2. Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.

3. Discover various aspects of Union Government legislation and live up to the expectations of the rules.

4. Critically examine State Government legislation and improve your living standards by following the rules strictly

5. Examine powers and functions of local bodies such as Muncipalities and Panchayats and, ake advantage of available resources for better living, and analyze the powers and functions of Election Commission and The Union Public Service Commission and decide upon it for safe and secured life.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

II YEAR I SEMESTER							
S.No	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**
1	Software Engineering	3	-	-	3	40	60
2	Discrete Mathematical Structures	2	1	-	3	40	60
3	AI Tools, Techniques & Applications	3	-	-	3	40	60
4	Data Structures & Algorithms	3	-	-	3	40	60
5	Digital Logic Design	3	-	-	3	40	60
6	Object Oriented Programming through Java	3	-	-	3	40	60
7	Quantitative Aptitude I	3	-	-	0	0	0
8	AI Tools, Techniques & Applications Lab	-	-	3	1.5	40	60
9	Data Structures & Algorithms Lab	-	-	3	1.5	40	60
10	Object Oriented Programming through Java Lab	-	-	3	1.5	40	60
	Total	**20**	**1**	**9**	**22.5**	**360**	**540**
						900	

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II YEAR I SEMISTER
INFORMATION TECHNOLOGY
R19 SYLLABUS

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Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Software Engineering				

COURSE OBJECTIVES:

1. To help students to develop skills that will enable them to construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain.
2. This course introduces the concepts and methods required for the construction of large software intensive systems. It aims to develop a broad understanding of the discipline of software engineering.
3. Capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
4. Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes

UNIT-I:

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps ,Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

UNIT-II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterize of a Design? Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT–III:

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design

Methodology.

UNIT–IV:

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

UNIT–V:

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

Planning a software project: Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

UNIT–VI

Software Maintenance: Software maintenance, Maintenance Process Models, Maintenance Cost, Software Configuration Management.

Software Reuse: what can be Reused? Why almost No Reuse So Far? Basic Issues in Reuse Approach, Reuse at Organization Level.

COURSE OUTCOMES:

1. Define and develop a software project from requirement gathering to implementation.
2. Obtain knowledge about principles and practices of software engineering.
3. Focus on the fundamentals of modeling a software project.
4. Obtain knowledge about estimation and maintenance of software systems.

TEXT BOOKS:

1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGraw-Hill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education

REFERENCE BOOKS:

1. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
2. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
3. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
4. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Discrete Mathematical Structures				

COURSE OBJECTIVES:

1. To introduce the concepts of mathematical logic.
2. To introduce the concepts of sets, relations, and functions.
3. To perform the operations associated with sets, functions, and relations.
4. To introduce generating functions and recurrence relations.
5. To relate practical examples to the appropriate set, function, or relation model, and interpret the Associated operations and terminology in context. To use Graph Theory for solving problems.

UNIT-I:

Mathematical Logic : Propositional Calculus: Statements and Notations, Connectives, Truth Tables, Tautologies, Equivalence of Formulas, Duality law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof. Predicate calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Inference theory for predicate calculus.

UNIT-II:

Number Theory: Number Theory: Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

UNIT-III:

Set Theory: Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion. **Relations:** Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams.

Functions: Bijective Functions, Composition of Functions, Lattices and its Properties

UNIT-IV:

Combinatorics: Basic of Counting, Permutations, Permutations with Repetitions, Circular

Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, Pigeonhole Principle and its Application.

UNIT-V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

UNIT-VI:

Recurrence Relations: Generating Functions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

COURSE OUTCOMES:

1. Ability to apply mathematical logic to solve problems.
2. Understand sets, relations, functions and discrete structures.
3. Able to use logical notations to define and reason about fundamental mathematical concepts such as sets relations and functions.
4. Able to formulate problems and solve recurrence relations.
5. Able to model and solve real world problems using graphs and trees.

TEXT BOOKS :

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.
3. Discrete Mathematics and its Applicatio-ns with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.

2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI.

3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Artificial intelligence tools, techniques and applications				

COURSE OBJECTIVES:

1. Define AI and ML and understand their relationship with data
2. Understand different data wrangling techniques in Python and their significance.
3. Understand different types of supervised learning techniques with their implementation in Python.
4. Intuitively understand basic math fundamental behind each technique
5. Understand performance metrics and tuning performance.
6. Explain the mechanism of unsupervised learning and practice various clustering techniques, Dimensionality reduction and their importance
7. Comprehend text mining and its applications
8. Understand basic working of recommender system
9. Know probabilistic learning models and their applications
10. Understand basics of Artificial and Deep Neural Networks.

UNIT-I:

Intro and basic tools in Python: Introduction to AI and Machine Learning. Emergence of AI. Relationship between AI, ML and Data Science. Types of Machine Learning with definitions and application areas. Types of Data. Data wrangling and manipulation using Numpy and Pandas in Python. Types of data. Data visualization using matplotlib and seaborn.

UNIT-II:

Supervised learning – Regression: Introduction, KNN, Train-Test-Split. k-fold Cross Validation, Linear Regression, Least Squares, Mean Square Error. Plotting regression line and predicting with Scikit Learn. Gradient Descent. Stochastic Gradient Descent. Learning rate. Polynomial Regression in Scikit Learn. Overfitting, Underfitting. Regularization. Measures of accuracy. Bias Vs. Variance trade-off. Hyperparameter tuning.

UNIT-III:

Supervised Learning – Classification: Definition of classification, use cases and algorithms using Scikit Learn, KNN, Logistic Regression, Decision Tree classifier, Support Vector Machines, Naïve

Bayes, Performance measures for classification.

UNIT-IV:

Unsupervised Learning: Introduction, K-Means, Hierarchical clustering techniques. Dimensionality reduction using PCA. Feature Selection and Feature Engineering.

UNIT-V:

Natural Language Processing / Text mining: Introduction. Applications NLP. Components of Natural Language. Steps to get text data into workable format. Term Frequency, Inverse Document Frequency, Bag of Words, ngram, One hot encoding. Notion of corpus. Introduction to NLTK.

UNIT-VI:

Introduction to other common learning methods and applications: Introduction to ANN and deep learning with applications, introduction to ensemble learning with bagging and boosting, random forest and AdaBoost, Recommender Systems-Content and collaborative filtering, Association Rule Mining- Apriori algorithm.

COURSE OUTCOMES:

1. Understand the necessary packages needed for various machine learning algorithms
2. Understand the importance and applications of AI
3. Understand concepts of Machine Learning algorithms and their limitations
4. Understand how to showcase the machine learning outcomes
5. Understand smart solutions for various domains

TEXT BOOKS:

1.Python Machine Learning Cookbook- Practical Solutions from Preprocessing to Deep learning- Chris Albon- O'Reilly publication-First Edition.

2. Introduction to Machine Learning with Python A Guide for Data Scientists, Andreas C. Müller and Sarah Guido, O'Reilly

REFERENCE BOOKS:

1. Python for Data Analysis Data Wrangling with Pandas, NumPy, and IPython, Wes McKinney, O'Reilly

2. Python Data Science Handbook, Essential Tools for Working with Data, Jake VanderPlas, O'Reilly

3. Machine Learning Algorithms, Giuseppe Bonaccorso, Packt Publishing.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Data Structures and Algorithms				

COURSE OBJECTIVES:

1. The fundamental design, analysis, and implementation of basic data structures.
2. Basic concepts in the specification and analysis of programs.
3. Principles for good program design, especially the uses of data abstraction.
4. Significance of algorithms in the computer field.
5. Various aspects of algorithm development.
6. To present different sorting algorithms.

UNIT-I:

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples. Searching and Sorting: Linear and binary search methods. Bubble sort, Insertion sort, Selection Sort, Quicksort, Merge sort, Heap sort, comparison of sorting methods.

UNIT-II:

Data structures-Linear and non linear data structures, Linear List, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two-dimensional arrays

UNIT-III:

Stack and Queue, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion, and deletion, Dequeue, array and linked list representations.

UNIT-IV:

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree representations, recursive and non-recursive traversals, Inserting a Node into a Threaded Binary Tree, Heaps, Definition of a Max Heap, Insertion into a Max Heap, Deletion from a Max Heap, Priority Queues.

UNIT-V:

Search trees- Binary search tree-Binary search tree, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition, operations, Red-Black trees –Definition, operations.

UNIT-VI:

Graphs- Introduction, Definition, Graph Representation, Elementary Graph Operations – Vertex Insertion, Vertex Deletion, Edge Insertion, Edge Deletion etc, Depth First Search, Breadth-First Search,

Hashing: Definition, Hash table, Hash function, Collision, Collision Evaluation Techniques-Chaining, Open Addressing.

COURSE OUTCOMES:

1. Provide solutions using data structures
2. Analyze space and time complexity for both iterative and recursive functions.
3. Understand various sorting algorithms and their performance
4. Understand hash functions and collision handling.
5. Identify the right data structure required to solve a problem.

TEXT BOOKS:

1. Data Structures, Using C, Second Edition, Reema Thareja, OXFORD Higher Education.
2. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
4. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
5. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison- Wesley (Pearson Education).

REFERENCES:

1. Introduction to Algorithms, Third Edition, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stien.

2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
4. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Digital Logic Design				

COURSE OBJECTIVES:

1. To learn basic tools for the design of digital circuits and fundamental concepts used in the design of digital systems
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits
4. To design combinational logic circuits, sequential logic circuits
5. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
6. To implement synchronous state machines using flip flops.

UNIT-I:

Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction

UNIT-II:

Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms,

UNIT-III:

Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT-IV:

Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers.

UNIT-V:

Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches,

Storage Elements: Flip-Flops, Analysis of Clocked Sequential Circuits, Mealy and Moore Models of Finite State Machines

UNIT-VI:

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter, Ripple Counter

COURSE OUTCOMES:

1. Able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, gray, and BCD.
2. Able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.
2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.
2. Digital Logic Design, Leach, Malvino, Saha, TMH. 3. Modern Digital Electronics, R.P. Jain, TMH.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Object oriented programming through java				

COURSE OBJECTIVES:

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc.
3. Understand the Object-oriented Programming principles like inheritance, polymorphism, and relate these principles to software design.
4. Implementation of Packages, Interfaces and multi-threaded programs in Java.
5. Introduce the concepts of Exception Handling and Files in Java.
6. To Introduce concept of Collections framework.
7. Applying the above concepts for problem solving using Java.

UNIT-I:

Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of Java, Java features, JVM, structure of a Java program. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control, arrays, strings, functions, Introduction to lambda expressions.

UNIT-II:

Classes and objects, class declaration, creating objects, methods, method overloading, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, command line arguments, nested classes.

UNIT-III:

Inheritance, types of inheritance, method overriding, super keyword, final keyword, overriding and abstract class. Interfaces, creating packages, using packages, importance of CLASSPATH and java.lang package, access modifiers. Multithreading: Introduction, Thread life cycle, Creation of threads, Thread priorities, Thread synchronization, Communication between threads

UNIT-IV:

Exception handlings, importance of try, catch, throw, throws, and finally block, user-defined exceptions, assertions. **File I/O:** Reading data from files and writing data to files, random access in a file, accessing data from CSV and Excel files.

UNIT-V:

Arrays, Array vs ArrayList, Strings, StringBuffer, StringBuilder, StringTokenizer. Collections: Introduction to generics, Autoboxing, Overview and hierarchy of Collection framework, List interface, ArrayList, LinkedList, Stack, Queue interface, PriorityQueue, Set interface, HashSet, LinkedHashSet, TreeSet, Collection interface, Iterator interface, Iterable interface, Collections class, Comparable and Comparator interfaces.

UNIT-VI:

Problem Solving: Strings Practice, Arrays Practice, Using Collections, problems using Lists, Priority Queue, Set, Maps, functional filtering and mapping operations on lists with lambdas. Recursion problems.

COURSE OUTCOMES:

Upon successful completion, students will have the knowledge and skills to

1. Write / Read and understand Java-based software code of medium-to-high complexity.
2. Able to understand OOPs concepts, and apply OOPs concepts to solve real world problems.
3. Able to handle Files, and do multi-threaded programs in Java.
4. Able to write robust programs by which handle exceptions.
5. Able to understand and use Collections Framework in Java.
6. Able to apply the above concept to solve real-world problems using appropriate algorithms.

TEXT BOOKS:

1. The complete Reference Java, 11th edition, Herbert Schildt, TMH.

2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford.

REFERENCE BOOKS:

1. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.

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Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	0
Subject	Quantitative Aptitude-I				

COURSE OBJECTIVES:

1. Understand different number systems, factorization, divisibility and concept of LCM and HCF.
2. Find averages, relation between ratio and proportion, average price of mixture of different quantities and relation between fraction and percentage.
3. Know the concepts of CP,SP, MRP, profit or loss incurred in a transaction.
4. Know the concepts of principal, interest, difference between SI and CI, EMIs.
5. Understand the relation between speed, distance and time for trains and boats in a river.
6. Understand the relation between time and efficiency, combined work and wages paid for the work.

UNIT-I:

Number Systems: Basic number systems –Face and Place Value, Digital sum-Applications, Factors, Multipliers, Prime, & Composite Numbers, Divisibility Rules, LCM and HCF-Remainder Rules.

UNIT-II:

Averages, Ratio& Proportion: Average-Weighted average, Ratio-Concept and properties, Proportions-Mean ,Third and Fourth proportions, Mixtures & Allegations-Definition-Allegation Rule, Percentages-Conversion of Percentages to Fractions and Vice-Versa.

UNIT-III:

Profit& Loss: Cost Price- Selling Price- Marked Price, Discount- Successive Discounts, Profit or Loss Percentage, False Weights- Dishonest Dealer.

UNIT-IV:

Simple & Compound Interest: Principal-Interest Rate-Tenure , Simple Interest-Formula-Sum, Compound Interest-Formula-Relation Between Simple & Compound Interest, loan-EMI, Investments-Shares.

UNIT-V:

Time & Distance: Time-Distance-Speed-Relation, Conversion of Speed , Average Speed, Trains-Relative Speed- Same and Opposite –Platform, Races, Boats-Streams-Upstream and Downstream.

UNIT-VI:

Time & Work: Work-Time-Efficiency, Combined Work-Partnership-Division of Wages, Chain Rule, Pipes and Cisterns-Inlet-Outlet.

COURSE OUTCOMES:

After completing this course, the students will be able to

1. Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
2. Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
3. Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.
4. Calculate the simple and compound interests ,difference between them and the EMI repayment for a loan.
5. Evaluate the time taken by a train/car for crossing a static object or a moving object and time taken by a person to a row a boat in a river.
6. Calculate the time required for individual or combined work, shares of amount for their work and time taken for a tank/cistern to get filled by inlets and outlet.

TEXT BOOKS:

1. Dr. R.S. Aggarwal , Quantitative Aptitude for competitive Examinations, Sultan Chand Publications, 2017.

REFERENCES:

1. Arun Sharma, How to Prepare for Quantitative Aptitude for the CAT, Tata McGraw Hill Publishing Company, 2016.
2. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Pearson India, 2016

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Artificial intelligence Tools, Techniques and Applications lab				

COURSE OBJECTIVES:

1) Apply various NumPy and pandas' concepts to preprocess the data.
2) Understand visualization techniques and create reports for machine learning outcomes
3) Understand the importance of statistics in machine learning and apply them on datasets.
4) Understand how to apply machine learning models on data get inference from them.

COURSE OUTCOMES:

1) Preprocess the raw data
2) Apply various statistical methods to understand the data
3) Apply various visualization techniques to understand the data and building reports.
4) Apply Machine learning models on real time data and check the quality of model.

Lab Experiments:

1) **NumPy**

i) Different ways to create NumPy arrays
ii) Add, remove, modify elements in an array.
iii) Arithmetic operations on NumPy array
iv) Slicing and iterating of NumPy arrays
V) Matrix operations onNumPy arrays

2) **Pandas**

i) Create a data Frame manually
ii) Different ways of importing a data frame
iii) Adding, Deleting, Modifying the rows/columns in a dataframe.
iv) Apply functions on dataframe.
V) Iterations on dataframe
vi) Accessing the elements from a dataframe
Vii) Different ways to deal with NA's in dataframe
viii) Groupby operations on dataframe
ix) Merging dataframes

3) Data Visualizations:

i) Line Graphs

ii) Scatter Plots

iii) Histograms

iv) Subplots

v) Joinplots

vi) Heatmaps

4) Basic statistics for machine learning:

Consider a dataset. Apply the following statistical operations on it.

i) Central Tendency- Mean, Median, Mode

ii) Distribution of Data- Range, Interquartile range, Variance, Standard deviation, Correlation.

iii) Draw a box plot to demonstrate Range, Interquartile range.

iv) Show correlation between 2 variables using scatter plot.

V) Draw histogram to show how data is distributed for a given data.

Vi) For the given data, show which attributes as a) continuous b) Ordered c) Binary

5) Prediction

a. Consider a data set and perform univariate linear regression and find the coefficients. Show the relation between independent variable and dependent variable using scatter plot. Show the performance of the model using R-Square error, mean absolute error and Mean Square error

b. Consider a data set and perform multivariate linear regression and find the coefficients. Which attributes are mostly influencing the target variable? Show the performance of the model using R-Square error, mean absolute error and Mean Square error

6) Classification

Consider a datasetand apply following classifiers on it

i) KNN- Classifier

ii) Decision Tree

iii) SVM

iv) Logistic regression

Show the confusion matrix for every model.

Find the accuracy, sensitivity, specificity, F1 score of every model.

Compare the performance of all models

7) Clustering and feature reduction

Consider a dataset and apply the following

i) Apply K-means clustering on the data. Use Elbow method and find the optimal value of K.

ii) Apply Agglomerative clustering on the data. Use dendrograms.

iii) Apply PCA to reduce the number of features in a dataset.

8) Natural Language processing

a. Use NLTK package and perform the following

i) Tokenization

ii) Stemming

iii)Lemmatization

iv) Bag of words

v)TF/IDF

b. Given set of documents, use NLTK to classify them.

9) Ensemble methods.

Consider a dataset

i) Use ensemble method to combine predictive power of decision tree, Logistic regression using bagging technique

ii) Apply ADABOOST on the given data set and draw the confusion matrix for the strong classifier. Apply simple decision tree on the same dataset and compare the performance

iii)) Apply Random Forest on the given data set and draw the confusion matrix for the strong classifier. Apply simple decision tree on the same dataset and compare the performance

10) Association analysis

For a given sales dataset, apply apriori algorithm to generate association rules which is able certain support and confidence.

11) Recommender system.

Use collaborative filtering technique and find similar movies based on the movies watched and rated by a user.

Datasets url's:

1) Kaggle.com

2) https://archive.ics.uci.edu/ml/index.php

3) https://data.gov.in/

4) https://vincentarelbundock.github.io/Rdatasets/datasets.html

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Data Structures and Algorithms lab				

COURSE OBJECTIVES:

1. To present stacks, queues and their applications
2. To introduce linked lists and its operations.
3. To introduce sorting, searching algorithms.
4. To gain knowledge on trees, graphs and their applications.

COURSE OUTCOMES:

1. Develop ADT necessary for solving applications based on Stacks and Queues.
2. Implement various types of linked lists.
3. Implement various Sorting and searching algorithms.
4. Identify suitable data structures for providing solutions to the real-world problems.

Lab Experiments:

1. Implementation of Searching : (a) Linear Search (b) Binary Search
2. Implementation of Sorting : (a) Bubble Sort (b) Selection Sort
   (c) Insertion Sort(d) Quick Sort (e) Merge Sort
3. Implementation of singly linked list.
4. Implementation of Doubly Linked list.
5. Implementation of Stack using arrays.
6. Implementation of Queue using arrays.
7. Implementation of Converting infix to postfix.
8. Implementation of Stack using linked list.
9. Implementation of Queue using linked list.
10. Implementation of Circular Queue.
11. Implementation of Heap.
12. Implementation of Binary Search Trees.
13. Implementation of Depth First Search technique.
14. Implementation of Breadth First Search technique.
15. Implementation of Dijkstra's Algorithm.
16. Implementation of Prims Algorithm.
17. Implementation of Kruskal's Algorithm.

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Oops through Java lab				

COURSE OBJECTIVES:

1. To gain fundamental programming knowledge of OOP
2. To use Exception Handling mechanism in the applications
3. To apply the knowledge of generics and Collections Framework
4. To handle files

COURSE OUTCOMES:

1. Develop Java applications with concepts like Inheritance, Interfaces, packages etc.
2. Implement Exception Handling and Multithreading in Java applications.
3. Develop applications using Collections framework.
4. Read and Write data using different Java I/O streams.

Exercise - 1 (Basics)

a) Write a JAVA program to find the Euclidean distance between two points.

b) Write a java program that displays the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminant D and basing on value of D, describe the nature of root.

c) Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a) Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b) Write a JAVA program to sort for an element in a given list of elements using bubble sort.

c) Write a JAVA program to sort for an element in a given list of elements using merge sort.

d) Write a JAVA program using StringBuffer to delete, remove characters.

Exercise - 3 (Arrays)

a) Find smallest number in an array.

b) Find largest number in an array.

c) Count even numbers in an array.
d) Count occurrence of a given number in an array.
e) Check if given number is palindrome or not.
f) Input two arrays and merge them in a new array in ascending order.
g) Find Addition of two 3X3 matrices.
h) Find Multiplication of two 3X3 matrices.
i) Find Transpose of a given matrices.
j) Implement Binary Search.
k) Implement Bubble Sort.
l) Implement Selection Sort.
m) Implement Insertion Sort.

Exercise - 4 (Class, Objects)

a) Write a JAVA program to implement classes – Create a class, methods and invoke them inside the main method.

b) Write a JAVA program to implement a constructor.

Exercise - 5 (Methods)

a) Create a Point class has variables int x and int y. Provide parameterized constructor. Create a class Rectangle. Point p1 is the bottom-left corner and Point p2 is the top-right corner. Write two constructors, one to take Point p1 and Point p2 as arguments and the other to take width and height (in this case (0,0) will be the bottom-left corner). It should have methods to calculate the perimeter() and the area() of the rectangle, move the rectangle by deltax and deltay, find out if a Point p is inside the rectangle or not. Method isInside(Point p). It should also have get methods for both width and height. Write a drive program to test your class.

Exercise - 6 (Inheritance)

a) Create a class Employee and the sub classes Manager and Clerk:

Employee:
Instance Variables: name, empId, salary.
Methods: set and get methods for name, empId, getSalary,setSalary Method

Manager:

Instance Variables: type
Methods: setSalary()

Clerk:
Instance Variables: int speed, int accuacy
Methods: setSalary()

Provide proper constructors for all classes. Create a general class "MyClass". In this class create objects of Manager, Clerk and Employee class. Set the name, empId and salary attributes for each object, and accordingly display them

Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.

b) Definition of a hierarchy of fruits is given below
Fruit contains an abstract method getVitamin() that returns String. Fruit contains a String field color.
Apple's vitamins are "A B12".
Banana's vitamins are "C D".
Strawberry's vitamins are "B5 E".
Blackberry's vitamins are "C K".
Apples and bananas grow on trees. All tree fruits provide a void method named peel(). Define class (or interface?) named TreeFruit that has method peel.
Make Apple and Banana extend (or implement?) TreeFruit.
When an Apple is being peeled, it prints out "Peeling an apple."
GroundFruit.
When a Strawberry is being picked, it prints out "Picking a strawberry."
i. Implement the classes.
ii. Implement a method named prepareFruits that takes a list of fruits and invokes tree fruits peel method and ground fruits picks methods. i.e. you have to distinguish tree fruits from ground fruits.

```
Public static void prepareFruits (Fruit [] fruits){
 //Implement
}
Use the following main method
Public static void main(String [] args){
Fruit [] fruits = new Fruit[4];
fruits[0] = new Apple();
fruits [1] = new Banana();
fruits [2] = new Strawberry();
fruits [3] = new Blackberry();
prepareFruits(fruits);
}
```

c) (Shape Hierarchy) Implement the Shape (interface) hierarchy has an abstract function draw() which will be instantiated in concrete classes with what it is drawing. Each abstract class TwoDimensionalShape should contain a method getArea to calculate the area of the two-dimensional shape. Each abstract class ThreeDimensionalShape should have methods getArea and getVolume to calculate the surface area and volume, respectively, of the three dimensional shape. Create a program that uses an array of Shape references to objects of each concrete class in the hierarchy. The program should print a text description of the object to which each array element refers. Also, in the loop that processes all the shapes in the array, determine whether each shape is a Two-DimensionalShape or a ThreeDimensionalShape. If a shape is a TwoDimensionalShape, display its area. If a shape is a ThreeDimensionalShape, display its area and volume.

Shape

2D or 3D

2D – Circle, square

3D – Cube, Sphere

Hint use instanceof to find if it is 2D or 3D.

Your output should appear as follows:

Circle: radius: 4

Circle's area is 50

Square: side: 10

Square's area is 100

Sphere: radius: 2

Sphere's area is 50

Sphere's volume is 33

Cube: side: 8

Cube's area is 384

Cube's volume is 512

Exercise - 7 (Runtime Polymorphism)

a) Write a JAVA program that implements runtime polymorphism.

b) Write a JAVA program to create three classes Shape, Circle and Rectangle. Demonstrate runtime polymorphism.

Exercise – 8 (Packages)

a) Write a JAVA program to illustrate CLASSPATH.

b) Write a JAVA program that imports and uses the defined class in your package in the previous problem.

Exercise - 9 (Exception Handling)

a) Design Java Programs that handle the Java built-in Exception to demonstrate exception handling mechanisms.

b) Write a JAVA program to demonstrate multiple catch clauses.

Exercise – 10 (Exception Handling)

a) Write a JAVA program for illustrating throw clause.

b) Write a JAVA program for illustrating finally block.

c) Define an exception called 'NoMatchException' that is thrown when a string is not equal to "VITBhimavaram" and Design a Java program that uses this exception.

Exercise – 11 (Strings)

a) Reverse the string

b) Anagram string

c) Count duplicate character

d) Print uppercase & lowercase letters

e) Palindrome String
f) Repeated & non-repeated character
g) Find repeated word in file
h) Reverse words of string object
i) Count the number of vowels
j) Count number of words in string
k) Display vowel, digits & blank spaces

Exercise – 12 (Collections Framework)

a) Write a JAVA program to add, retrieve & remove element from ArrayList
b) Write a JAVA program to Implement LinkedList
c) Write a JAVA program to Sort & reverse the LinkedList elements
d) Write a JAVA program to Implement push() and pop() on Stack
e) Write a JAVA program to display HashTable content
f) Write a JAVA program to search key & value from HashTable
g) Write a JAVA program to remove duplicate key from hashtable
h) Write a JAVA program to copy elements from HashSet to Array
i) Write a JAVA Program to find common elements
j) Write a JAVA Program to insert, retrieve & remove record
k) Write a JAVA Program for binary search
l) Write a JAVA Program to delete duplicate object
m) Write a JAVA Program to implement intersection & union

Exercise – 13 (Collections Framework)

a) Write a JAVA program to implement a stack using LinkedList class.
b) Write a JAVA program to implement a queue using LinkedList class.
c) Write a JAVA program to read a string and print only the unique characters.
d) Write a JAVA program to read a string and print the frequency of each character.

Exercise – 14 (File I/O)

a) Write a JAVA program to read the data from a file and print it on the console.

b) Write a JAVA program to read name, age, and email details and store them in a file.

c) Write a JAVA program to read a CSV file containing marks of students in a class and display the average marks for each subject.

d) Write a JAVA program to read an Excel file containing age of students in a class and display the median age value.

Exercise – 15 (Threads)

a) Write a JAVA program that creates threads by extending Thread class. First thread display "Good Morning", every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)

b) Write a program illustrating isAlive() and join()

c) Write a Program illustrating Daemon Threads.

Exercise - 16 (Threads)

a) Write a JAVA program for solving Producer-Consumer problem.

b) Write a case study on thread Synchronization after solving the above producer consumer problem.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

II YEAR II SEMESTER							
S.No	**Subjects**	**L**	**T**	**P**	**C**	**I**	**E**
1	Internet of Things (IOT)	3	-	-	3	40	60
2	E Commerce	3	-	-	3	40	60
3	Database Management Systems	3	-	-	3	40	60
4	Formal Language Automata Theory	3	-	-	3	40	60
5	Computer Organization and Architecture	3	-	-	3	40	60
6	Logical Reasoning	3	-	-	0	0	0
7	Socially Relevant Project (15 Hrs/Sem)	-	-	1	0.5	20	30
8	Business English Communication Lab	-	-	3	1.5	40	60
9	Design Thinking & Product Innovation Lab	-	-	3	1.5	40	60
10	Database Management Systems Lab	-	-	3	1.5	40	60
11	Internet of Things Lab	-	-	3	1.5	40	60
	Total	**18**	**0**	**13**	**21.5**	**380**	**570**
						950	

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DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

II YEAR II SEMISTER
INFORMATION TECHNOLOGY
R19 SYLLABUS

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DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Internet Of Things				

COURSE OBJECTIVES:

1. To understand the fundamentals of the Internet of Things and to know the physical design ,logical design and various IoT level models.
2. To teach a student how to design IoT applications and to know the various communication models and protocols.
3. To understand the fundamentals of 8051 Microcontroller and various IoT Platforms.
4. To build a real time IoT application and deploy using Arduino,NodeMCU8266 and Raspberry Pi.
5. To understand various Cloud Computing platforms and Big Data analytics applied in IoT.

UNIT-I :

Introduction to IoT : Introduction to IoT-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs.

UNIT-II:

IoT Design and Wireless Communication Protocols : IoT Design Methodology , IoT Components, IoT Design Methodology using home automation and Weather monitoring, Wireless Communication Protocols : 6LoWPAN, Zigbee, WIFI, , Bluetooth and BLE ,LPWANs,Cellular 4G,5G,RFID, Lifi,Widi.

UNIT-III:

8051 Microcontroller and IoT Development Boards : Introduction to Microcontrollers, the 8051 Instruction Set, AT89S8253 Microcontroller, Assembly Language, IoT Development Boards - NodeMCU, ESP8266, Arduino, Intel Galileo and Raspberry Pi.

UNIT-IV:

IoT Protocols : MQTT, UDP, MQTT brokers, publish subscribe modes, HTTP, COAP,XMPP and gateway protocols, IEEE 802.15.4 protocols.

UNIT-V:

Building IoT Applications with Raspberry Pi : Building IoT with RASPBERRY PI- IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces -Programming Raspberry Pi with Python, Introduction to NodeMCU, Arduino and working example.

UNIT-VI:

IoT Platforms, Cloud and Big Data in IoT : Introduction to Cloud computing : Cloud Computing, clouds types and their features, Open Source IoT Platforms, AWS cloud for IoT, ThingSpeak, Python Web Application Framework, Django, AWS web services for IoT.

Introduction to Big Data Analytics : Introduction Big Data, Apache Hadoop framework , Apache Spark and Python Web Application Framework, Django, Data Analytics.

Challenges in IoT and future directions.

COURSE OUTCOMES:

1. Describe IoT basics, different IoT levels and IoT application domains.
2. Describe IoT design methodology and wireless communication protocols.
3. Describe microcontrollers and identify different IoT development boards.
4. Describe application layer and gateway protocols.
5. Describe and use Raspberry Pi to interface with sensors and actuators by writing programs.
6. Gain experience on using IoT with cloud, big data and describe IoT challenges.

TEXT BOOKS:

1. Internet of Things – A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015 .

2. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017

3. Enabling things to talk – Designing IoT solutions with the IoT Architecture Reference Model, Alessandro Bassi, Martin Bauer, Martin Fiedler, Thorsten Kramp, Rob van Kranenburg, Sebastian Lange, Stefan Meissner, Springer

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	E-COMMERCE				

COURSE OBJECTIVES:

1. Identify the major categories and trends of e-commerce applications.
2. Identify the essential processes of an e-commerce system.
3. Identify several factors and web store requirements needed to succeed in e-commerce.
4. Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
5. Understand the main technologies behind e-commerce systems and how these technologies interact.
6. Discuss the various marketing strategies for an online business.
7. Define various electronic payment types and associated security risks and the ways to protect against them.

UNIT–I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT–II

Electronic Payment Systems – Types of Electronic Payment Systems, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Software Implementation.

UNIT- III

Intra Organizational Commerce - Work Flow Automation and Co-ordination, Customization and Internal Commerce, Supply chain Management.

UNIT–IV

Corporate Digital Library - Document Library, Digital Document types, Corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, On-line marketing process, Market research.

UNIT–V

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT – VI

Multimedia - key multimedia concepts, Digital Video and Electronic Commerce, Desktop video processing, Desktop Video Conferencing.

COURSE OUTCOMES:

1. Understand the basic concepts and technologies used in the field of E-Commerce
2. Compare and Contrast various Electronic Payment systems and understand the working of EDI
3. Understand the basic concepts of Intra Organizational commerce.
4. Apply theories and principles of corporate digital library and identify the strategies of advertising
5. To effectively understand the process of information search and retrieval.
6. Understand the basic concepts and technologies of multimedia concepts.

TEXT BOOK:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Database Management System				

COURSE OBJECTIVES:

1. Understand the basic concepts and the applications of database systems.
2. Master the basics of SQL and construct queries using SQL.
3. Understand the relational database design principles.
4. Familiar with the basic issues of transaction processing and concurrency control.
5. Familiar with database storage structures and access techniques.

UNIT- I

An Overview of Database Management : Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas –data base Users and Administrator -- Data Independence -- data Models – Database Languages

Database system architecture, Introduction- The Three Levels of Architecture-The External Level- the Conceptual Level- the Internal Level- Mapping-The Database Management Systems-Client/Server Architecture.

UNIT-II

The E/R Models, The Relational Model, Relational Calculus, Introduction to Database Design, Database Design and Er Diagrams-Entities Attributes, and Entity Sets-Relationship and Relationship Sets-Conceptual Design With the Er Models, The Relational Model Integrity Constraints Over Relations- Key Constraints –Foreign Key Constraints-General Constraints, Relational Algebra and Calculus, Relational Algebra- Selection and Projection- Set Operation, Renaming – Joins- Division- More Examples of Queries, Relational Calculus, Tuple Relational Calculus- Domain Relational Calculus.

UNIT-III

Queries, Constraints, Triggers: The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.

UNIT-IV

Schema Refinement (Normalization) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT-V

Transaction Management and Concurrency Control: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint. Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

UNIT-VI

Overview of Storages and Indexing, Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization.

COURSE OUTCOMES:

1. Design and implement a database schema for a given problem-domain
2. Normalize a database
3. Populate and query a database using SQL DML/DDL commands.
4. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
5. Programming PL/SQL including stored procedures, stored functions, cursors, packages.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition
2. Database Systems - The Complete Book, H G Molina, J D Ullman, J Widom Pearson

REFERENCES BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Formal Languages and Automata Theory				

COURSE OBJECTIVES:

1. To classify machines by their power to recognize languages.
2. Employ finite state machines to solve problems in computing.
3. Explain deterministic and non-deterministic machines.
4. Comprehend the hierarchy of problems arising in the computer sciences.

UNIT-I:

Why Study Automata Theory?, Automation Computation, Finite State Machine, Components of Finite State Automata, Elements of Finite State System, Mathematical representation of Finite State Automata, Automata Classification, Automat in real world.

Formal Languages Theory: Symbols, Alphabets and Strings, Operations on Strings, Formal Languages, Operations on Languages.

UNIT-II:

Finite Automata: Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

UNIT-III:

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-IV:

Context Free Grammars: Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E-Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

UNIT-V:

Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Application of Pushdown Automata.

UNIT-VI:

Turing Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church's Thesis, Universal Turing Machine, Restricted Turing Machine.

COURSE OUTCOMES:

1. Understanding basic kinds of finite automata and their capabilities.
2. Understanding regular and context-free languages.
3. Ability to describe and transform regular expressions and grammars.
4. Learn about context free grammars and push down automata.
5. Gain insight on types of Turing machines, models, computable Functions.
6. Learn about computability theory.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007.

REFERENCE BOOKS:

1. Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.

2. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu Kandar, Pearson, 2013.

3. Theory of Computation, V.Kulkarni, Oxford University Press, 2013.

4. Theory of Automata, Languages and Computation, Rajendra Kumar, McGraw Hill, 2014.

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) :: BHIMAVARAM

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computer Organization and Architecture				

COURSE OBJECTIVES:

1. To understand the structure, function, and characteristics of computer systems.
2. To understand the design of the various functional units and components of computers.
3. To identify the elements of modern instruction sets and their impact on processor design.
4. To explain the function of each element of a memory hierarchy.
5. To identify and compare different methods for computer I/O.
6. To Understand computer arithmetic formulate and solve problems, understand the performance requirements of systems
7. To understand the structure of the multiprocessor system

UNIT-I

Basic Structure Of Computers : Computer Types, Functional unit, Basic Operational concepts, Bus structures, Data Representation: complements, Fixed Point Representation. Floating – Point Representation, Error Detection codes.

UNIT-II

Register Transfer Language And Microoperations: Register Transfer language, Bus and memory transfers, Binary adder, Binary adder-subtractor,Arithmetic circuit, logic micro operations, shift micro operations, Arithmetic logic shift unit.

UNI- III

Type of instructions : Data transfer instructions, Arithmetic and Logic instructions,shift and rotate instructions,Branch instructions Stack organization. Instruction formats. Addressing modes.

Computer Arithmetic: Addition,subtraction, Multiplication algorithm, Division algorithm.

UNIT- IV

The Memory Systems : Memory Hierarchy, Main memory, Read Only Memory: ROM,PROM,EPROM,EEPROM,Flash memory, Cache Memory: Mapping techniques, Virtual Memory.

Secondary storage: Auxiliary memory(Magnetic Hard Disks,Optical Disks)

UNIT-V

Input-Output Organization : Peripheral Devices, Input-Output Interface, Asynchronous data transfer:Source initiated data transfer,Destination initiated data transfer,Priority Interrupts : Daisy-chaining interrupt, Parallel priority Interrupt Direct memory Access(DMA).

Design of Control Unit :Hardwired control, Micro programmed control methods.

UNIT-VI

Multi Processors : Introduction, Characteristics of Multiprocessors, Interconnection Structures:(i)Time-shared common bus,(ii)Multi port memory,(iii)8 X 8 Omega switching network ,(iv)Hypercube interconnection, Inter processor Arbitration:Serial and Parallel Arbitration

COURSE OUTCOMES:

1. Students can understand the architecture of modern computer.
2. They can analyze the Performance of a computer using performance equation Understanding of different instruction types.
3. Students can calculate the effective address of an operand by addressing modes.
4. They can understand how computer stores positive and negative numbers.
5. Understanding of how a computer performs arithmetic operation of positive and negative numbers.

TEXT BOOKS

T1. Computer system architecture, M. Morris Mano, 3 rd edition, pearson/phi

T2. Computer organization , carl hamacher, zvonks vranesic, safeazaky, 5 th edition, mcgraw hill.

T3. Computer architecture a quantitative approach, john l. hennessy and david a. patterson, fourth edition elsevier

REFERENCES

1. Computer organization and architecture – william stallings sixth edition, pearson/phi
2. Structured computer organization – andrew s. tanenbaum, 4th edition phi/pearson

3. Fundamentals or computer organization and design, - sivaraama dandamudi springer int. edition

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	0
Subject	Logical Reasoning				

COURSE OBJECTIVES:

1. Be familiar with different relations in a family, concepts of clocks and calendars.
2. Find position and order of a person /object , routes between points.
3. Understand the techniques of coding and decoding.
4. Understand the validity of statements and inferences from them.
5. Draw valid conclusions from given statements.
6. Understand the concept of analogy and properties of dice.

UNIT-I:

Blood Relations, Directions, Clocks & Calendars.: Blood relations -family tree, types of problems on blood relations- first person narrating type-coded relation-puzzle relation, direction-distance-direction and distance problems, angle between hands -correct or incorrect time, day of a date-repeated calendars.

UNIT-II:

Ranks & Position, Puzzles: Ranks-based on positions ,counting ,comparisons , puzzles-table based, selection based, seating based, graph and network Based .

UNIT-III:

Coding & Decoding, Series.: Coding and decoding-letter coding, number coding, symbol coding, substitution and mixed type, Symbols and notations, series-number, letter and word type , missing term.

UNIT-IV:

Critical Reasoning-I:Syllogisms, logical consistency, inference & degree of truth, assertion & reason.

UNIT-V:

Critical Reasoning-II: Statement & assumption, statement &conclusion, cause& effect, decision making.

UNIT-VI:

Non Verbal Reasoning: Series, odd-man out, analogies, mirror & water images, paper cutting & folding, figure formation, cubes &dice .

COURSE OUTCOMES:

After completing this course, the students will be able to

1. Identify the relation between given persons, find the direction and distance from starting point, find angle between hands at given time and vice-versa, find day of given date and vice-versa.
2. Find the position and rank of a person/object in an arrangement, arranging in order using given data.
3. Decode the given code pattern and code given word in terms of alphabet, numbers, symbols and mixed, identify missing term in the pattern/series.
4. Draw a valid conclusion from the statements, consistency of inference drawn, valid reason from given assertions.
5. Identify the cause for the assumed effect, take decision logically from the given data.
6. Identify the odd one in the given series/group, number opposite any face of dice, figure completion from a folded figure.

TEXT BOOKS:

1. Dr. R.S. Aggarwal ,A Modern Approach to Verbal & Non-Verbal Reasoning Sultan Chand Publications, 2018.

REFERENCES:

1. B.S.Sijwali and Indu Sijwali, A New Approach to Reasoning Verbal & Non-Verbal, Arihant Publishers, 2016.
2. M.K. Pandey, Analytical Reasoning , Bsc Publishing Co. Pvt. Ltd 2009.

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Business Communication Lab				

COURSE OBJECTIVES:

1. To expose student to different situations for better communication
2. To inculcate the habit of learning vocabulary for effective communication
3. To enable students to acquire Business English communication

COURSE OUTCOMES:

Upon the completion of the course, the student will be able to:

1. Understand and interpret conversations in informal and formal contexts.
2. Exhibit one's vocabulary, body language, pronunciation and intonation with proper etiquette.
3. Critique various written texts.
4. Construct appropriate Business English writing skills.
5. Develop skit exhibiting all LSRW skills.
6. Develop the skill of note making.

UNIT- I:

Listening: Listening to short conversations or monologues

Speaking: Giving information about oneself and their opinions and Giving a short talk on business related topics

Reading: Reading short and simple texts to understand the central idea/theme.

Writing: Writing a piece of internal business communication of 30-40 words (Email)

UNIT-II:

Listening : Listening to a conversation/ monologue and taking notes

Speaking : Giving short talk on business related topics.

Reading: Matching descriptions of people to short texts. Matching statements to information given in a graph or graphs.

Writing : Writing a piece of internal business communication of 30-40 words (Message)

UNIT-III :

Listening: Listening to longer conversations/interviews.

Speaking: Debates & Extempore

Reading : Reading a longer text and deciding whether the statements about

the text are right or wrong or if the information is not given.

Writing : Write a business letter 60-80 words, based on an input text and some notes.

UNIT-IV :

Listening: Listening to TV news channels and taking notes.

Listening to songs and writing down the lyrics.

Speaking: Interview sessions

Reading: Read a longer text and answering questions. .

Writing: Writing a Business Report

UNIT-V:

Listening: Watching short documentaries and making notes.(General)

Speaking: Short plays, Presentations.

Reading : Read short texts and fill in a form using information from the texts.

Writing : Write a skit and enact.

UNIT-VI:

Listening: Watching documentaries and making notes.(Business specific)

Speaking: Nail your point.

Reading : Critical Reading to know author's perspective.

Writing : Write a skit and enact.

REFERENCE BOOKS:

1. Cambridge English – Business English Certificate Preliminary
2. Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
3. Cambridge University Press India Pvt. Ltd, New Delhi.
4. Mandal S. K (2006),Effective Communication & Public Speaking , Jaico Publishing House, New Delhi.
5. Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
6. Balasubramanian .T (2000), A text book of English Phonetics for Indian Student,MacMillan Publishers, India.
7. Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1& 2, New Delhi, Orient Longman Pvt. Ltd

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Design Thinking & Product Innovation Lab				

COURSE OBJECTIVES:

1. To provide the basic concepts and techniques of engineering and reverse engineering, process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.
2. To get exposure of exhibiting their creativity in terms of an innovative product development in a structured process through this course.

COURSE OUTCOMES:

Upon the successful completion of the course, students will be able to:

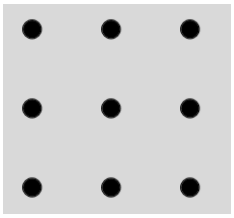
1. Gather deep insights of design thinking and appreciate various design process procedure.
2. Develop design ideas through different technique and Analyse innovative product design.
3. Identify the significance of reverse Engineering to understand products.
4. Draw technical drawing for design ideas.

List of Experiments

1. List specific inventions that were (or might have been) suggested to creative thinkers by the following natural phenomena:
   i. human arms
   ii. cats
   iii. seagulls
   iv. a frozen salmon
   v. spiders
   vi. earthworms
   vii. a flower
   viii. the eye of a fly
   ix. conical shells
   x. animal bone structures
   xi. dew drops on leaves
   xii. human skulls
   xiii. bamboo
   xiv. human foot

xv. human lungs
xvi. larynx

2. On a spare piece of paper draw a square of nine dots like this:



Now see if you can connect up the dots with four consecutive straight lines, that is, without taking your pencil off the paper. You have one minute to complete the task.

3. Diagram a process for planning and cooking a family dinner. Does your process resemble the generic product development process? Is cooking dinner is analogous into a market-pull, technology push, platform process-intensive, customization, high-risk, quick-build, or complex system process?
4. Sketch the organization (in some appropriate graphical representation) of a consulting firm that develops new products for clients on a project by project basis. Assume that the individuals in the firm represent all of the different functions required to develop a new product. Would this organization most likely to be aligned with functions, be aligned by projects, or be a hybrid?
5. Create a product technology road-map illustrating the availability of technologies for a class of products you understand well, such as personal computers?
6. How can the concept selection methods be used to benchmark or evaluate existing products? Perform such an evaluation for five automobiles you might consider purchasing.
7. Perform concept screening for the four pencil holder concepts shown below. Assume the pencil holders are for a member of a product development team who is continually moving from site to site.
8. Draw the polygon using Auto CAD
9. Create a 2D view of the given diagram using Auto CAD
10. Create a 2D view of the given diagram using Auto CAD
11. Create a 2D view of the given diagram using Auto CAD
12. Create a 3D view of the given diagram using Auto CAD

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Data Base Management System Lab				

COURSE OBJECTIVES:

1. To explain basic database concepts, applications, data models, schemas and instances.
2. To demonstrate the use of constraints and relational algebra operations. IV. Describe the basics of SQL and construct queries using SQL.
3. To emphasize the importance of normalization in databases.
4. To facilitate students in Database design
5. To familiarize issues of concurrency control and transaction management.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Apply the basic concepts of Database Systems and Applications.
2. Use the basics of SQL and construct queries using SQL in database creation and Interaction.
3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
4. Analyze and Select storage and recovery techniques of database system.

SQL-Experiments:

1. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
2. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
3. Queries using Group By, Order By, and Having Clauses.
4. Queries using operators in SQL
5. Queries on Controlling Data: Commit, Rollback, and Save point
6. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, EXCEPT, CONSTAINTS etc.
7. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), and Creation and dropping of Views.
8. Queries on Joins and Correlated Sub-Queries.

9. Practicing on Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updating using trigger

PL/SQL

10. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation
11. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL
12. Write a PL/SQL block using SQL and Control Structures in PL/SQL
13. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types
14. Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

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Course Structure for B. Tech. (With effect from 2019-2020)

Year/Semester	II B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Internet Of Things (IOT) Lab				

Note: Below experiments need to be done with NodeMCU or Arduino orRaspberryPi

List of experiments:

1. Digital Input/output
2. Analog Input/output
3. Using IR Sensor to detect objects.
4. Using LDR
5. PWM application to control LED Brightness
6. Create a localhost server
7. Use NodeMCU to upload free data from Environmental Sensors to Cloud Server
8. Automatically Tweet Sensor Data on Twitter
9. Control Home devices from self-hosted webpage on Amazon AWS
10. Controlling Home Appliance using Google Assistant
11. Calculating Distance using Ultrasonic Sensor
12. Fetching Humidity and Temperature using DHT 11 Sensor
    (Using ThingSpeak, Adafruit and Blynk IoT Platforms)

Project: Home Automation Project

Case Study:

1. Lighting as a service
2. Intelligent Traffic systems
3. Smart Parking
4. Smart water management

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

III Year - I Semester

L	T	P	C
4	0	0	3

DATA BASE MANAGEMENT SYSTEMS

OBJECTIVES

- To learn the principles of systematically designing and using large scale Database Management Systems for various applications.

UNIT-I: An Overview of Database Management, Introduction- What is Database System- What is Database-Why Database- Data Independence- Relation Systems and Others- Summary,
Database system architecture, Introduction- The Three Levels of Architecture-The External Level- the Conceptual Level- the Internal Level- Mapping- the Database Administrator-The Database Management Systems- Client/Server Architecture.

UNIT-II:
The E/R Models, The Relational Model, Relational Calculus, Introduction to Database Design, Database Design and Er Diagrams-Entities Attributes, and Entity Sets-Relationship and Relationship Sets-Conceptual Design With the Er Models, The Relational Model Integrity Constraints Over Relations- Key Constraints –Foreign Key Constraints-General Constraints, Relational Algebra and Calculus, Relational Algebra- Selection and Projection- Set Operation, Renaming – Joins- Division- More Examples of Queries, Relational Calculus, Tuple Relational Calculus- Domain Relational Calculus.

UNIT-III:
Queries, Constraints, Triggers: The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Database.

UNIT-IV:
Schema Refinement (Normalization) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT-V:

Transaction Management and Concurrency Control:

Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint.

Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

UNIT-VI:

Overview of Storages and Indexing, Data on External Storage- File Organization and Indexing – Clustered Indexing – Primary and Secondary Indexes, Index Data Structures, Hash-Based Indexing – Tree-Based Indexing, Comparison of File Organization

OUTCOMES

- Describe a relational database and object-oriented database.
- Create, maintain and manipulate a relational database using SQL
- Describe ER model and normalization for database design.
- Examine issues in data storage and query processing and can formulate appropriate solutions.
- Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.
- Design and build database system for a given real world problem

TEXT BOOKS:

1. Introduction to Database Systems, CJ Date, Pearson

2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

3. Database Systems - The Complete Book, H G Molina, J D Ullman, J Widom Pearson

REFERENCES BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education

3. Introduction to Database Systems, C.J.Date Pearson Education

III Year - I Semester

L	T	P	C
4	0	0	3

HUMAN COMPUTER INTERACTION

OBJECTIVES:

- Demonstrate an understanding of guidelines, principles, and theories influencing human Computer interaction.
- Recognize how a computer system may be modified to include human diversity.
- Select an effective style for a specific application.
- Design mock ups and carry out user and expert evaluation of interfaces.
- Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.
- Use the information sources available, and be aware of the methodologies and technologies supporting advances in HCI.

UNIT-I:

The User Interface: Introduction, Importance of the User Interface, Importance and benefits of Good Design History of Human Computer Interface. Characteristics of Graphical and Web User Interface: Graphical User Interface, popularity of graphics, concepts of Direct Manipulation, Graphical System advantage and disadvantage, Characteristics of GUI. Web User Interface, popularity of web, Characteristics of Web Interface, Merging of Graphical Business systems& the Web, Principles of User Interface Design

UNIT-II:

The User Interface Design Process: Obstacles and Pitfall in the development Process, Usability, The Design Team, Human Interaction with Computers, Important Human Characteristics in Design, Human Consideration in Design, Human Interaction Speeds, Performance versus Preference, Methods for Gaining and Understanding of Users

UNIT-III:

Understanding Business Functions: Business Definitions & Requirement analysis, Determining Business Functions, Design standards or Style Guides, System Training and Documentation

UNIT-IV:

Principles of Good Screen Design: Human considerations in screen Design, interface design goals, test for a good design, screen meaning and purpose, Technological considerations in Interface Design System Menus and Navigation Schemes: Structure, Functions, Context, Formatting, Phrasing and Selecting, Navigating of Menus, Kinds of Graphical Menus Windows Interface: Windows characteristic, Components of Window, Windows Presentation Styles, Types of Windows, Window Management, Web systems

UNIT-V:

Device and Screen-Based Control: Device based controls, Operable Controls, Text entry/read-Only Controls, Section Controls, Combining Entry/Selection Controls, Other Operable Controls and Presentation Controls, Selecting proper controls

UNIT-VI:

Effective Feedback Guidance and Assistance: Providing the Proper Feedback, Guidance and Assistance Effective Internationalization and Accessibility- International consideration, Accessibility, Create meaningful Graphics, Icons and Images, Colors-uses, possible problems with colors, choosing colors

OUTCOMES:

- Students are assessed on their ability to communicate and apply UCD methods in the capstone project course. Assessment includes examination of team reports and how HCI students can discuss challenges and solutions for adapting UCD methods to fit the practical needs of an actual project

TEXT BOOKS:

1. Wilbert O. Galitz, “The Essential Guide to User Interface Design”, Wiley India Edition
2. Prece, Rogers, “Sharps Interaction Design”, Wiley India.
3. Ben Shneidermann,”Designing the user interfaces”. 3rd Edition, Pearson Education Asia.

REFERENCES BOOKS:

1. Soren Lauesen, “User Interface Design” , Pearson Education
2. Alan Cooper, Robert Riemann, David Cronin, “Essentials of Interaction Design”, Wiley
3. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell, Bealg,”HumanComputer Interaction”, Pearson Education.

III Year - I Semester

L	T	P	C
4	0	0	3

OPERATING SYSTEMS

OBJECTIVES:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I

Introduction to Operating System Concept: Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types.

UNIT-II:

Process Management – Process concept, The process, Process State Diagram , Process control block, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes, Interprocess Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

UNIT-III:

Memory Management: Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation

Virtual Memory Management:

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing

UNIT-IV:

Concurrency: ProcessSynchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization examples

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-V:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers,

UNIT VI:

Linux System: Components of LINUX, Interprocess Communication, Synchronization, Interrupt, Exception and System Call.

Android Software Platform: Android Architecture, Operating System Services, Android Runtime Application Development, Application Structure, Application Process management

OUTCOMES:

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers
- Introduction to Android Operating System Internals

TEXT BOOK:

1. Operating System Concepts,Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2.Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.
3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second Edition 2016 .

REFERENCES:

1.Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata Mc Graw-Hill Education, 2007.

III Year - I Semester

L	T	P	C
0	3	0	0

PROFESSIONAL ETHICSAND HUMAN VALUES

Course Objectives:

***To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.**
***Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.**

UNIT I: Human Values:
Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT: II: Principles for Harmony:
Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias - Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:
History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism —Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument – Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past – Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:

Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects - Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:

Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights – Confidential and Proprietary Information - Conflict of Interest-Ethical egoism - Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes-Industrial Espionage- Price Fixing-Whistle Blowing.

UNIT VI: Global Issues:

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics - Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics -Intellectual Property Rights.

- Related Cases Shall be dealt where ever necessary.

Outcome:

***It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.**

***It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.**

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill – 2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana - Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M. Jayakumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013
9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

III Year - I Semester

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UNIX AND SHELL PROGRAMMING

OBJECTIVES:

- Written technical communication and effective use of concepts and terminology.
- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Individual capability in problem solving using the tools presented within the class. Students will demonstrate a mastery of the course materials and concepts within in class discussions.

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

UNIT-VI

The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-Process Creation-The Trap Command-The Stty Command-The Kill Command-Job Control.

OUTCOMES:

- Documentation will demonstrate good organization and readability.
- File processing projects will require data organization, problem solving and research.
- Scripts and programs will demonstrate simple effective user interfaces.
- Scripts and programs will demonstrate effective use of structured programming.
- Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.
- Testing will demonstrate both black and glass box testing strategies.
- Project work will involve group participation.

TEXT BOOKS:

1. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.
2. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.

REFERENCE BOOKS:

Unix and shell programmingby B.M. Harwani, OXFORD university press.

III Year - I Semester

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ADVANCED JAVA PROGRAMMING

OBJECTIVES:

- Getting the student to be well trained in Advanced Java Programming skills for an easy entry in the IT Industry.

UNIT –I:

Recapitulation of XTML, XTML5, Java Swing package – use of System class – Applet Context – signed applet – object serialization- shallow and deep copying – Java collections –Iterators – Array Lists – sets –hashset-hash table- queue- priority queue class-vector class- comparable interface.

UNIT – II:

Java Beans Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans API

UNIT - III:

Introduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, servlet chaining-Security Issues.

UNIT -IV:

Introduction to JSP The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

UNIT - V:

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data

Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

UNIT - VI:

Database Access Database Programming using JDBC Studying Javax.sql. package. Accessing MySql database- Accessing MS Access database- Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page. Introduction to struts framework.

OUTCOMES:

- Construct a Web Application using Servlets
- Construct a Web application using Java Server Pages
- Construct an enterprise application using Session Beans
- Construct an enterprise application using Entity Beans linked with Database
- Construct an asynchronous enterprise application using Message-Driven Beans

TEXT BOOKS:

1. Internet and World wide web- How to program , Dietel and Nieto , Pearson. (Chapters: 3, 4, 8, 9, 10, 11, 12 to 18)
2. The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH. (Chapters: 19, 20, 21, 22, 25, 27)
3. Java Server Pages , Hans Bergstan, Oreilly (Chapters: 1-9)

REFERENCE BOOKS:

1. Jakarta Struts cook book, Bill Siggelkow, SPD, Oreilly (Chapter 8)
2. Murach's, Beginning Java JDK5, Murach, SPD.
3. An introduction to Web Design and Programming, Wang Thomson
4. Web application technologies concepts, Knuckles, John Wiley.
5. Programming world wide web, Sebesta, Pearson
6. Building Web Applications, NIIT, PHI
7. Web Warrior Guide to Web Programing, Bai, Ekedaw, Thomas, Wiley
8. Beginning Web Programming, Jon Duckett ,Wrox, Wiley
9. Java server pages, Pekowsky, Pearson

III Year - I Semester

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ADVANCED JAVA PROGRAMING LAB

OBJECTIVES:

- To develop skills in students in developing applications using advanced concepts of advanced Java programming concepts like JDBC, Servlets, JSP, Java Beans, etc.

PROGRAMS LIST:

1. Write a program to prompt the user for a hostname and then looks up the IP address for the hostname and displays the results.

2**.** Write a program to read the webpage from a website and display the contents of the webpage.

3**.** Write programs for TCP server and Client interaction as per given below.

i). A program to create TCP server to send a message to client.
ii). A program to create TCP client to receive the message sent by the server.

4. Write programs for Datagram server and Client interaction as per given below.

i). A program to create Datagram server to send a message to client.
ii). A program to create Datagram client to receive the message sent by the server

5. Write a program by using JDBC to execute a SQL query for a database and display the results.

6. Write a program by using JDBC to execute an update query without using Prepared Statement and display the results.

7. Write a program by using JDBC to execute an update query by using Prepared Statement and display the results.

8. Write a program to execute a stored procedure in the database by using Callable Statement and display the results.

9. Write a program to display a greeting message in the browser by using Http Servlet.

10. Write a program to receive two numbers from a HTML form and display their sum in the browser by using Http Servlet.

11. Write a program to display a list of five websites in a HTML form and visit to the selected website by using Response redirection.

12. Write a program to store the user information into Cookies. Write another program to display the above stored information by retrieving from Cookies.

13. Write a program in Java Beans to add a Button to the Bean and display the number of times the button has been clicked.

14. Write a program for Java Bean with Simple property by using SimpleBeanInfo class.

15. Write a program for Java Bean with Indexed Property by using SimpleBeanInfo class.

16. Write a program to develop a Enterprise Java Bean of "Session Bean" type.

OUTCOMES:

- After successful completion of course, students will be able appreciate and apply the advanced concepts of Java including JDBC, Servlets, JSP, Java Beans, etc.

III Year - I Semester

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UNIX AND OPERATING SYSTEMS LAB

OBJECTIVES:

- To understand the design aspects of operating system.
- To study the process management concepts & Techniques.
- To study the storage management concepts.
- To familiarize students with the Linux environment
- To learn the fundamentals of shell scripting/programming
- To familiarize students with basic Unix administration

Operating Systems

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Multiprogramming-Memory management- Implementation of fork (), wait (), exec() and exit (), System calls
3. Simulate the following
   a) Multiprogramming with a fixed number of tasks (MFT)
   b) Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate the following page replacement algorithms.
   a) FIFO b) LRU c) LFU
7. Simulate the following File allocation strategies
   a) Sequenced b) Indexed c) Linked

UNIX Programming

List of Experiments:

1. Basic Shell Commands Shell Programs:
2. Fibonacci Series
3. Designing Calculator
4. File Operations
5. Base conversion
6. Usage of cut and grep commands
7. Usage of user defined functions Administration
8. Managing User Accounts
9. User Quota Management
10. Installation of RPM software and Zipping, tar
11. Configuring RAID
12. Configuring Web server

OUTCOMES:

- To use Unix utilities and perform basic shell control of the utilities
- To use the Unix file system and file access control.
- To use of an operating system to develop software
- Work confidently in Unix/Linux environment
- Write shell scripts to automate various tasks
- Master the basics of Linux administration

III Year - I Semester

L	T	P	C
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DATA BASE MANAGEMENT SYSTEM LAB

OBJECTIVES:

- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
- To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework
- To give a good formal foundation on the relational model of data
- To present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design

List of Experiments:

SQL

1. Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions, Date Functions and Conversion Functions.
2. Queries using operators in SQL
3. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
4. Queries using Group By, Order By, and Having Clauses
5. Queries on Controlling Data: Commit, Rollback, and Save point
6. Queries to Build Report in SQL *PLUS
7. Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
8. Queries on Joins and Correlated Sub-Queries
9. Queries on Working with Index, Sequence, Synonym, Controlling Access, and Locking Rows for Update, Creating Password and Security features

PL/SQL

10. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation

11. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL

12. Write a PL/SQL block using SQL and Control Structures in PL/SQL

13. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types

14. Write a PL/SQL Code using Procedures, Functions, and Packages FORMS

15. Write a PL/SQL Code Creation of forms for any Information System such as Student Information System, Employee Information System etc. 18

16. Demonstration of database connectivity

OUTCOMES:

- Understand, appreciate and effectively explain the underlying concepts of database technologies
- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database using a state-of-the-artRDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- Design and build a GUI application using a 4GL

Note: The creation of sample database for the purpose of the experiments is expected to be predecided by the instructor.

Text Books/Suggested Reading:

1. Oracle: The Complete Reference by Oracle Press

2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007.

3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

III Year - II Semester

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ARTIFICIAL INTELLIGENCE

(Open Elective)

OBJECTIVES:

- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
- To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs.
- To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning

UNIT-I:

Introduction to artificial intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI

UNIT-II:

Problem solving: state-space search and control strategies : Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a*, constraint satisfaction

Problem reduction and game playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

UNIT-III:

Logic concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic

UNIT-IV:

Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames **advanced knowledge representation techniques:** Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web

UNIT-V:

Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

UNIT-VI:

Uncertainty measure: probability theory: Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster-shafer theory

Fuzzy sets and fuzzy logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

OUTCOMES:

- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.

TEXT BOOKS:

1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

REFERNCE BOOKS:

1. Atificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5th ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

III Year - II Semester

L	T	P	C
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COMPUTER NETWORKS

OBJECTIVES:

- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis—

UNIT – I:
Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT – II:
Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing
Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols

UNIT – III:
The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-N-A Protocol Using Selective Repeat

UNIT – IV:
The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Access Protocols-Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet Physical Layer-Classic Ethernet MAC Sublayer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-Gigabit Ethernet-Retrospective on Ethernet, Wireless Lans-The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sublayer Protocol-The 805.11 Frame Structure-Services

UNIT – V:
Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Congestion Control Algorithms-

Approaches to Congestion Control-Traffic Aware Routing-Admission Control-Traffic Throttling-Load Shedding.

UNIT – VI:

Transport Layer – The Internet Transport Protocols: Udp, the Internet Transport Protocols: Tcp
Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers, Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery

OUTCOMES:

- Understand OSI and TCP/IP models
- Analyze MAC layer protocols and LAN technologies
- 3 .Design applications using internet protocols
- 4 .Understand routing and congestion control algorithms
- 5 .Understand how internet works

TEXT BOOKS:

1. Tanenbaum and David J Wetherall, Computer Networks, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks - A Systems Approach” (5th ed), Morgan Kaufmann/ Elsevier, 2011

III Year - II Semester

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DATA MINING

OBJECTIVES:

- Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
- They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
- They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

UNIT –I:

Introduction: Why Data Mining? What Is Data Mining?1.3 What Kinds of Data Can Be Mined?1.4 What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted? Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity

UNIT –II:

Data Pre-processing: Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization

UNIT –III:

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

UNIT –IV:

Classification: Alterative Techniques, Bayes' Theorem, Naïve Bayesian Classification, Bayesian Belief Networks

UNIT –V

Association Analysis: Basic Concepts and Algorithms: Problem Defecation, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm. **(Tan & Vipin)**

UNIT –VI

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. **(Tan & Vipin)**

OUTCOMES:

- Understand stages in building a Data Warehouse
- Understand the need and importance of preprocessing techniques
- Understand the need and importance of Similarity and dissimilarity techniques
- Analyze and evaluate performance of algorithms for Association Rules.
- Analyze Classification and Clustering algorithms

TEXT BOOKS:

1. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.

REFERENCE BOOKS:

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining : Vikram Pudi and P. Radha Krishna, Oxford.
3. Data Mining and Analysis - Fundamental Concepts and Algorithms; Mohammed J. Zaki, Wagner Meira, Jr, Oxford
4. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.

DIGITAL SIGNAL PROCESSING

(Open Elective)

OBJECTIVES:

- To study DFT and its computation
- To study the design techniques for digital filters
- To study the finite word length effects in signal processing
- To study the non-parametric methods of power spectrum estimations
- To study the fundamentals of digital signal processors.

UNIT -I

Discrete Fourier Transform

DFT and its properties, Relation between DTFT and DFT, FFT computations using Decimation in time and Decimation in frequency algorithms, Overlap-add and save methods

UNIT -II

Infinite Impulse Response Digital Filters

Review of design of analogue Butterworth and Chebyshev Filters, Frequency transformation in analogue domain - Design of IIR digital filters using impulse invariance technique - Design of digital filters using bilinear transform - pre warping - Realization using direct, cascade and parallel forms.

UNIT- III

Finite Impulse Response Digital Filters

Symmetric and Ant symmetric FIR filters - Linear phase FIR filters - Design using Hamming, Henning and Blackman Windows - Frequency sampling method - Realization of FIR filters - Transversal, Linear phase and Polyphasestructures.

UNIT -IV

Finite Word Length Effects

Fixed point and floating point number representations - Comparison - Truncation and Rounding errors - Quantization noise - derivation for quantization noise power - coefficient quantization error - Product quantization error –

UNIT -V

Overflow error - Round off noise power - limit cycle oscillations due to product round off and overflow errors - signal scaling

UNIT -VI

Multirate Signal Processing

Introduction to Multirate signal processing-Decimation-Interpolation-Polyphase implementation of FIR filters for interpolator and decimator -Multistage implementation of sampling rate conversion- Design of narrow band filters - Applications of Multirate signal processing.

OUTCOMES:

- an ability to apply knowledge of Mathematics, science, and engineering
- an ability to design and conduct experiments and interpret data
- an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function as part of a multi-disciplinary team

TEXT BOOKS:

1. John G Proakis and Manolakis, “Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2007.
2. S.Salivahanan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, TMH/McGraw HillInternational, 2007

REFERENCE BOOKS:

1. E.C. Ifeachor and B.W. Jervis, " Digital signal processing - A practical approach", Second edition, Pearson, 2002.
2. S.K. Mitra, Digital Signal Processing, A Computer Based approach, Tata Mc GrawHill, 1998.
3. P.P.Vaidyanathan, Multirate Systems & Filter Banks, Prentice Hall, Englewood cliffs, NJ, 1993.
4. Johny R. Johnson, Introduction to Digital Signal Processing, PHI, 2006.

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EMBEDDED SYSTEMS

(Open Elective)

OBJECTIVES:

- Technology capabilities and limitations of the hardware, software components
- Methods to evaluate design tradeoffs between different technology choices.
- Design Methodologies

UNIT-I:

Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT-II:

8—bit microcontrollers architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT-III:

RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-IV:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-V:

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-VI:

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

OUTCOMES:

Understand the basics of an embedded system

- Program an embedded system
- Design, implement and test an embedded system.
- Identify the unique characteristics of real-time systems
- Explain the general structure of a real-time system
- Define the unique design problems and challenges of real-time systems

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

REFERENCE BOOKS:

1. Ayala & Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

III Year - II Semester

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INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Objectives:

***To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.**

***Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.**

Unit I: Introduction to Intellectual Property Rights (IPR)

Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO -Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR - Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

Unit II: Copyrights and Neighboring Rights

Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers – Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.

UNIT III: Patents

Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer — Revocation of Patent – Patent Appellate Board - Infringement of Patent – Compulsory Licensing — Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations.

UNIT IV: Trademarks

Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing Off Action.

UNIT V: Trade Secrets

Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee

Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

UNIT VI: Cyber Law and Cyber Crime

Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions - E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers.

- Relevant Cases Shall be dealt where ever necessary.

Outcome:

*** IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.**

***Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.**

References:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.
2. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
3. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi
4. Richard Stim: Intellectual Property, Cengage Learning, New Delhi.
5. Kompal Bansal &Parishit Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press).
6. Cyber Law - Texts & Cases, South-Western's Special Topics Collections.
7. R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.
8. M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub.

OPERATION RESEARCH

(Open Elective)

OBJECTIVE:

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimisation problems.
- Use mathematical software to solve the proposed models.
- Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering

UNIT-I:

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem – Formulation of LPP, Graphical solution of LPP. Simple Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions**.**

UNIT-II:

Transportation Problem. Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method

UNIT-III:

Assignment model. Formulation. Hungarian method for optimal solution. Solving unbalanced problem. Traveling salesman problem and assignment problem Sequencing models. Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines – Processing n Jobs through m Machines

UNIT-IV:

Dynamic programming. Characteristics of dynamic programming. Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems Games Theory. Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle. Rectangular games without saddle point – mixed strategy for 2 X 2 games

UNIT-V:

Replacement Models. Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy

UNIT-VI:

Inventory models. Inventory costs. Models with deterministic demand – model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

OUTCOME:

- Methodology of Operations Research.
- Linear programming: solving methods, duality, and sensitivity analysis.
- Integer Programming.
- Network flows.
- Multi-criteria decision techniques.
- Decision making under uncertainty and risk.
- Game theory. Dynamic programming**.**

TEXT BOOKS:

1. P. Sankara Iyer,"Operations Research", Tata McGraw-Hill, 2008.
2. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005**.**

REFERENCE BOOKS:

1. J K Sharma. "Operations Research Theory & Applications, 3e", Macmillan India Ltd, 2007.
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.
3. J K Sharma., "Operations Research, Problems and Solutions, 3e", Macmillan India Ltd
4. N.V.S. Raju, "Operations Research", HI-TECH, 2002

ROBOTICS

(Open Elective)

OBJECTIVES:

- To introduce the basic concepts, parts of robots and types of robots.
- To make the student familiar with the various drive systems for robot, sensors and their applications in robots and programming of robots.
- To discuss about the various applications of robots, justification and implementation of robot.

UNIT -I:

Introduction

Specifications of Robots- Classifications of robots – Work envelope - Flexible automation versus Robotic technology – Applications of Robots ROBOT KINEMATICS AND DYNAMICS Positions,

UNIT-II:

Orientations and frames, Mappings

Changing descriptions from frame to frame, Operators: Translations, Rotations and Transformations - Transformation Arithmetic - D-H Representation - Forward and inverse Kinematics Of Six Degree of Freedom Robot Arm – Robot Arm dynamics

UNIT -III:

Robot Drives and Power Transmission Systems

Robot drive mechanisms, hydraulic – electric – servomotor- stepper motor - pneumatic drives, Mechanical transmission method - Gear transmission, Belt drives, cables, Roller chains, Link - Rod systems - Rotary-to-Rotary motion conversion, Rotary-to-Linear motion conversion, Rack and Pinion drives, Lead screws, Ball Bearing screws,

UNIT- IV:

Manipulators

Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators

UNIT- V:

Robot End Effectors

Classification of End effectors – Tools as end effectors. Drive system for grippers-Mechanical adhesive-vacuum-magnetic-grippers. Hooks&scoops. Gripper force analysis and gripper design. Active and passive grippers.

UNIT- VI:

Path planning & Programming

Trajectory planning and avoidance of obstacles, path planning, skew motion, joint integrated motion – straight line motion-Robot languages-computer control and Robot software.

OUTCOMES:

- The Student must be able to design automatic manufacturing cells with robotic control using
- The principle behind robotic drive system, end effectors, sensor, machine vision robot Kinematics and programming.

TEXT BOOKS:

1. Deb S. R. and Deb S., "Robotics Technology and Flexible Automation", Tata McGraw Hill Education Pvt. Ltd, 2010.
2. John J.Craig, "Introduction to Robotics", Pearson, 2009.
3. Mikell P. Groover et. al., "Industrial Robots - Technology, Programming and Applications", McGraw Hill, New York, 2008.

REFERENCE BOOKS:

1. Richard D Klafter, Thomas A Chmielewski, Michael Negin, "Robotics Engineering – An Integrated Approach", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd., 2006.
2. Fu K S, Gonzalez R C, Lee C.S.G, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, 1987

SOCIAL NETWORKS AND SEMANTIC WEB

(Open Elective)

OBJECTIVES:

- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

UNIT –I:

Web Intelligence Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT -II:

Knowledge Representation for the Semantic Web Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT-III:

Ontology Engineering Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT-IV:

Semantic Web Applications, Services and Technology Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT-V:

Social Network Analysis and semantic web What is social Networks analysis, development of the social networks analysis.

UNIT- VI

Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

OUTCOMES:

Understand semantic web basics, architecture and technologies

- Able to represent data from a chosen problem in XML with appropriate semantic
- Tags obtained or derived from the ontology Able to understand the semantic relationships among these data elements using
- Resource Description Framework (RDF) Able to design and implement a web services
- application that "discovers" the
- Data and/or other web services via the semantic web Able to discover the capabilities and limitations of semantic web technology for social networks

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Gödel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, R.Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications. 4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reilly, SPD.

III Year - II Semester

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SOFTWARE TESTING METHODOLOGIES

OBJECTIVE:

Fundamentals for various testing methodologies.

- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods.
- Acts as the reference for software testing techniques and strategies.

UNIT-I:

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs.

Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT-II:

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.

UNIT-III:

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains andInterfaces Testing, Domain and Interface Testing, Domains and Testability.

Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

UNIT-IV:

Syntax Testing: Why, What and How, A Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips.

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, and Specifications.

UNIT – V:

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips.

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.

UNIT -VI:

Software Testing Tools: Introduction to Testing, Automated Testing, Concepts of Test Automation, Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

OUTCOME:

- Understand the basic testing procedures.
- Able to support in generating test cases and test suites.
- Able to test the applications manually by applying different testing methods and automation tools.
- Apply tools to resolve the problems in Real time environment.

TEXT BOOKS:

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing- Yogesh Singh, Camebridge

REFERENCE BOOKS:

1. The Craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
6. Software Testing Concepts and Tools, P.NageswaraRao, dreamtech Press
7. Win Runner in simple steps by Hakeem Shittu, 2007 Genixpress.
8. Foundations of Software Testing, D.Graham& Others, Cengage Learning

III Year - II Semester

L	T	P	C
4	0	0	3

WEB TECHNOLOGIES

OBJECTIVES:

- This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web. The course will introduce web-based media-rich programming tools for creating interactive web pages.

UNIT-I: HTML, CSS

Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5

CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, The Box Model, Conflict Resolution

UNIT-II:
Javascript

The Basic of Javascript: Objects, Primitives Operations and Expressions, ScreenOutput and Keyboard Input, Control Statements, Object Creation and Modfication, Arrays, Functions, Constructors, Patttern Matching using Regular Expressions

DHTML: Positioning Moving and Changing Elements

UNIT-III:

XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches,

AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX.

UNIT-IV:

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script. **Working with variables and constants:** Using variables, Using constants, Data types,Operators.**Controlling program flow:** Conditional statements,Control statements,Arrays,functions.Working with forms and Databases such as MySQL.

UNIT-V:

Introduction to PERL, Operators and if statements, Program design and control structures, Arrays, Hashs and File handling, Regular expressions, Subroutines, Retrieving documents from the web with Perl.

UNIT-VI:

Introduction to Ruby, Variables, types, simple I/O, Control, Arrays, Hashes, Methods, Classes, Iterators, Pattern Matching. Overview of Rails.

OUTCOMES:

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Styles sheets.
- Build dynamic web pages.
- Build web applications using PHP.
- Programming through PERL and Ruby
- Write simple client-side scripts using AJAX

TEXT BOOKS:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrelll, Gosselin, Zak, Karparhi, Maclntyre, Morrissey, Cengage

REFERENCE BOOKS:

1. Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
5. http://www.upriss.org.uk/perl/PerlCourse.html

III Year - II Semester

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DATA MINING LAB

OBJECTIVES:

- Practical exposure on implementation of well known data mining tasks.
- Exposure to real life data sets for analysis and prediction.
- Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.
- Handling a small data mining project for a given practical domain.

System/Software Requirements:

- **Intel based desktop PC**
- **WEKA TOOL**

1. Demonstration of preprocessing on dataset student.arff

2. Demonstration of preprocessing on dataset labor.arff

3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm

4. Demonstration of Association rule process on dataset test.arff using apriori algorithm

5. Demonstration of classification rule process on dataset student.arff using j48 algorithm

6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm

7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm

8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm

9. Demonstration of clustering rule process on dataset iris.arff using simple k-means

10. Demonstration of clustering rule process on dataset student.arff using simple k- means.

OUTCOMES:

- The data mining process and important issues around data cleaning, pre-processing and integration.
- The principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.

III Year - II Semester

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WEB TECHNOLOGIES LAB

OBJECTIVES:

- To acquire knowledge of XHTML, Java Script and XML to develop web applications
- Ability to develop dynamic web content using Java Servlets and JSP
- To understand JDBC connections and Java Mail API
- To understand the design and development process of a complete web application

1. Design the following static web pages required for an online book store web site.

1) HOME PAGE:

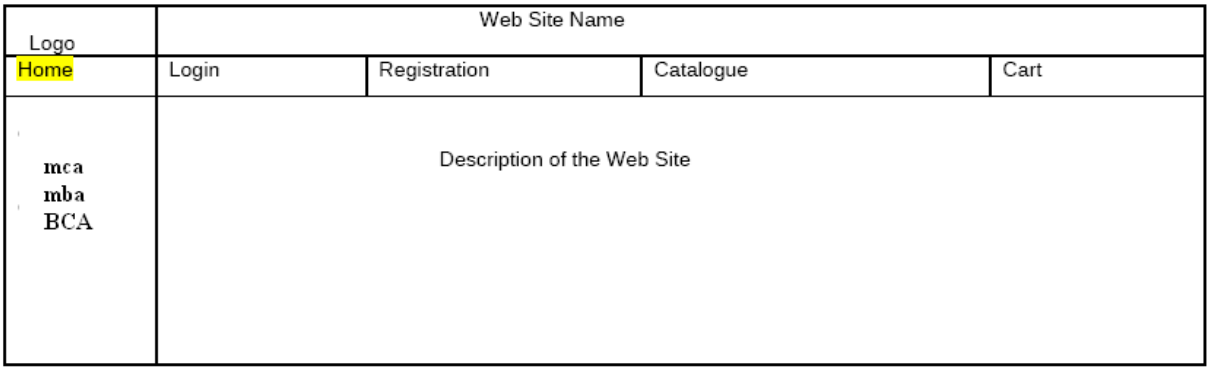
The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.



2)LOGIN PAGE

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA BCA	Login : 11a51f0003 Password: ******** Submit Reset			

3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	Add to cart
BCA		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam	$ 50	Add to cart

4. REGISTRATION PAGE:
Create a "*registration form* "with the following fields
1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

5. DESIGN A WEB PAGE USING CSS (Cascading **S**tyle **S**heets**)** which includes the following:
1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles

6. WRITE AN XML file which will display the Book information which includes the following:
1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price
Write a Document Type Definition (DTD) to validate the above XML file.

7. Write Ruby program reads a number and calculates the factorial value of it and prints the Same.

8. Write a Ruby program which counts number of lines in a text files using its regular Expressions facility.

9. Write a Ruby program that uses iterator to find out the length of a string.

10. Write simple Ruby programs that uses arrays in Ruby.

11. Write programs which uses associative arrays concept of Ruby.

12. Write Ruby program which uses Math module to find area of a triangle.

13. Write Ruby program which uses tk module to display a window

14. Define complex class in Ruby and do write methods to carry operations on complex objects.

15. Write a program which illustrates the use of associative arrays in perl.

16. Write perl program takes set names along the command line and prints whether they are regular files or special files

17. Write a perl program to implement UNIX `passed' program

18. An example perl program to connect to a MySQl database table and executing simple commands.
19. Example PHP program for cotactus page.
20. User Authentication:
    Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.
    1. Create a Cookie and add these four user id's and passwords to this Cookie.
    2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.
    If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ''.
    Use init-parameters to do this.

21. Example PHP program for registering users of a website and login.

22. Install a database (Mysql or Oracle).
Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).
Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

23. Write a PHP which does the following job:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

24. Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

25. **HTTP** is a stateless protocol. Session is required to maintain the state.
The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of local host). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session. Invalidate ().
Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

OUTCOMES:

- Students will be able to develop static web sites using XHTML and Java Scripts
- To implement XML and XSLT for web applications
- Develop Dynamic web content using Java Servlets and JSP
- To develop JDBC connections and implement a complete Dynamic web Application

III Year - II Semester

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SOFTWARE TESTING LAB

OBJECTIVES:

- Demonstrate the UML diagrams with ATM system descriptions.
- Demonstrate the working of software testing tools with c language.
- Study of testing tools- win runner, selenium etc.
- Writing test cases for various applications

1 Write programs in 'C' Language to demonstrate the working ofthe following constructs:

i) do...while

ii) while….do

iii) if…else

iv) switch

v) for

2 "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

3 Take any system (e.g. ATM system) and study its system specifications and report the various bugs.

4 Write the test cases for any known application (e.g. Banking application)

5 Create a test plan document for any application (e.g. Library Management System)

6 Study of Win Runner Testing Tool and its implementation

a) Win runner Testing Process and Win runner User Interface.
b) How Win Runner identifies GUI(Graphical User Interface) objects in an application and describes the two modes for organizing GUI map files.
c) How to record a test script and explains the basics of Test Script Language (TSL).
d) How to synchronize a test when the application responds slowly.
e) How to create a test that checks GUI objects and compare the behaviour of GUI objects in different versions of the sample application.

f) How to create and run a test that checks bitmaps in your application and run the test on different versions of the sample application and examine any differences, pixel by pixel.

g) How to Create Data-Driven Tests which supports to run a single test on several sets of data from a data table.

h) How to read and check text found in GUI objects and bitmaps.

i) How to create a batch test that automatically runs the tests.

j) How to update the GUI object descriptions which in turn supports test scripts as the application changes.

7 Apply Win Runner testing tool implementation in any real time applications.

OUTCOMES:

- Find practical solutions to the problems
- Solve specific problems alone or in teams
- Manage a project from beginning to end
- Work independently as well as in teams
- Define, formulate and analyze a problem

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

IV Year - I Semester

L	T	P	C
4	0	0	3

BIG DATA ANALYTICS

(Elective - 1)

OBJECTIVES:

- Optimize business decisions and create competitive advantage with Big Data analytics
- Introducing Java concepts required for developing map reduce programs
- Derive business benefit from unstructured data
- Imparting the architectural concepts of Hadoop and introducing map reduce paradigm
- To introduce programming tools PIG & HIVE in Hadoop echo system.

UNIT – I:

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT – II:

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT – III:

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT – IV:

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

UNIT – V:

Pig: Hadoop Programming Made Easier

Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

UNIT – VI:

Applying Structure to Hadoop Data with Hive:

Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

OUTCOMES:

- Preparing for data summarization, query, and analysis.
- Applying data modeling techniques to large data sets
- Creating applications for Big Data analytics
- Building a complete business data analytic solution

TEXT BOOKS:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

REFERENCE BOOKS:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne

SOFTWARE LINKS:

1. Hadoop:http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html

IV Year - I Semester

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CLOUD COMPUTING
(Elective-II)

OBJECTIVES:

- The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms.

UNIT -I: Systems modeling, Clustering and virtualization

Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency

UNIT- II: Virtual Machines and Virtualization of Clusters and Data Centers

Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

UNIT- III: Cloud Platform Architecture

Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT -IV: Cloud Programming and Software Environments

Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT- V: Cloud Resource Management and Scheduling

Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

UNIT- VI: Storage Systems

Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore, Amazon Simple Storage Service (S3)

OUTCOMES:

- Understanding the key dimensions of the challenge of Cloud Computing
- Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization
- Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
- Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press

REFERNCE BOOKS:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH

IV Year - I Semester

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CRYPTOGRAPHY AND NETWORK SECURITY

OBJECTIVES:

- Understand security concepts, Ethics in Network Security.
- Understand security threats, and the security services and mechanisms to counter them
- Comprehend and apply relevant cryptographic techniques
- Comprehend security services and mechanisms in the network protocol stack
- Comprehend and apply authentication services and mechanisms
- Comprehend and apply relevant protocol like SSL, SSH etc.
- Comprehend and apply email security services and mechanisms
- Comprehend and apply web security services and mechanisms
- Comprehend computer and network access control

UNIT- I: Basic Principles
Security Goals, Cryptographic Attacks, Services and Mechanisms, Mathematics of Cryptography

UNIT -II: Symmetric Encryption
Mathematics of Symmetric Key Cryptography, Introduction to Modern Symmetric Key Ciphers, Data Encryption Standard, Advanced Encryption Standard.

UNIT- III: Asymmetric Encryption
Mathematics of Asymmetric Key Cryptography, Asymmetric Key Cryptography

UNIT -IV: Data Integrity, Digital Signature Schemes & Key Management
Message Integrity and Message Authentication, Cryptographic Hash Functions, Digital Signature, Key Management.

UNIT-V: Network Security-I
Security at application layer: PGP and S/MIME, Security at the Transport Layer: SSL and TLS

UNIT- VI: Network Security-II
Security at the Network Layer: IPSec, System Security

OUTCOMES:

- To be familiarity with information security awareness and a clear understanding of Its importance.
- To master fundamentals of secret and public cryptography
- To master protocols for security services
- To be familiar with network security threats and countermeasures
- To be familiar with network security designs using available secure solutions (such asPGP, SSL, IPSec, etc)

TEXT BOOKS:

1) Cryptography and Network Security, Behrouz A Forouzan, Debdeep Mukhopadhyay, (3e) Mc Graw Hill.
2) Cryptography and Network Security, William Stallings, (6e) Pearson.
3) Everyday Cryptography, Keith M.Martin, Oxford.

REFERENCE BOOKS:

1) Network Security and Cryptography, Bernard Meneges, Cengage Learning.

IV Year - I Semester

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DATA WAREHOUSING AND BUSINESS INTELLIGENCE

OBJECTIVES:

- Approach business problems data-analytically by identifying opportunities to derive business value from data.
- Know the basics of data mining techniques and how they can be applied to extract relevant Business in

UNIT- I:

Introduction to Data Mining: Motivation for Data Mining, Data Mining-Definition & Functionalities, Classification of DM systems, DM task primitives, Integration of a Data Mining system with a Database or a Data Warehouse, Major issues in Data Mining. **Data Warehousing** (Overview Only): Overview of concepts like star schema, fact and dimension tables, OLAP operations, From OLAP to Data Mining.

UNIT -II:

Data Preprocessing: Why? Descriptive Data Summarization, Data Cleaning: Missing Values, Noisy Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Data Discretization and Concept hierarchy generation for numerical and categorical data.

UNIT- III:

Mining Frequent Patterns, Associations, and Correlations: Market Basket Analysis, Frequent Itemsets, Closed Itemsets, and Association Rules, Frequent Pattern Mining, Efficient and Scalable Frequent Itemset Mining Methods, The Apriori Algorithm for finding Frequent Itemsets Using Candidate Generation, Generating Association Rules from Frequent Itemsets, Improving the Efficiency of Apriori, Frequent Itemsets without Candidate Generation using FP Tree, Mining Multilevel Association Rules, Mining Multidimensional Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT- IV:

Classification & Prediction: What is it? Issues regarding Classification and prediction
Classification methods: Decision tree, Bayesian Classification, Rule based Prediction: Linear and non linear regression, Accuracy and Error measures, Evaluating the accuracy of a Classifier or Predictor.

Cluster Analysis: What is it? Types of Data in cluster analysis, Categories of clustering methods, Partitioning methods ñ K-Means, K-Mediods. Hierarchical Clustering- Agglomerative and Divisive Clustering, BIRCH and ROCK methods, DBSCAN, Outlier Analysis

UNIT- V:

Mining Stream and Sequence Data: What is stream data? Classification, Clustering Association Mining in stream data. Mining Sequence Patterns in Transactional Databases. **Spatial Data and Text Mining:** Spatial Data Cube Construction and Spatial OLAP, Mining Spatial Association and Co-location Patterns, Spatial Clustering Methods, Spatial Classification and Spatial Trend Analysis. Text Mining Text Data Analysis and Information Retrieval, Dimensionality Reduction for Text, Text Mining Approaches.

UNIT- VI:

Web Mining: Web mining introduction, Web Content Mining, Web Structure Mining, Web Usage mining, Automatic Classification of web Documents.

Data Mining for Business Intelligence Applications: Data mining for business Applications like Balanced Scorecard, Fraud Detection, Click stream Mining, Market Segmentation, retail industry, telecommunications industry, banking & finance and CRM etc

OUTCOMES

- Describe the scope and application of business intelligence and decision support;
- Design systems for sourcing and structuring data to provide an integrated, non-volatile collection of data for decision support using data warehouses;
- Design multidimensional data models and implement them using star schemas and relational databases;
- Communicate and foster realistic expectations of the role of OLAP technology and business intelligence systems in management and decision support;
- Explain the need for evolutionary development approaches to developing business intelligence and data warehouse systems;
- Develop a simple business intelligence system using an OLAP tool;
- Apply theories and principles of data visualization to encourage high quality analysis of business information to inform decision making;
- Design governance mechanisms for the development and management of business intelligence and data warehouse systems in an organization.

TEXT BOOKS:

1. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann 2 nd Edition
2. P. N. Tan, M. Steinbach, Vipin Kumar, introduction to Data Miming, Pearson Education

REFERENCE BOOKS:

1. MacLennan Jamie, Tang ZhaoHui and Crivat Bogdan, Data Mining with Microsoft SQL Server 2008î, Wiley India Edition.
2. G. Shmueli, N.R. Patel, P.C. Bruce, ìData Mining for Business Intelligence: Concepts, Techniques and Applications in Microsoft Office Excel with XLMinerî, Wiley India.
3. Michael Berry and Gordon Linoff ìData Mining Techniquesî, 2nd Edition Wiley Publications.
4. Alex Berson and Smith, ìData Mining and Data Warehousing and OLAPî, McGraw Hill Publication.
5. E. G. Mallach, ìDecision Support and Data Warehouse Systems", Tata McGraw Hill.
6. Michael Berry and Gordon Linoff ìMastering Data Mining- Art & science of CRMî, Wiley Student Edition
7. Arijay Chaudhry & P. S. Deshpande, ìMultidimensional Data Analysis and Data Mining Dreamtech Press
8. Vikram Pudi & Radha Krishna, ìData Miningî, Oxford Higher Education.
9. Chakrabarti, S., ìMining the Web: Discovering knowledge from hypertext dataî,
10. M. Jarke, M. Lenzerini, Y. Vassiliou, P. Vassiliadis (ed.), ìFundamentals of Data Warehousesî, Springer-Verlag, 1999.telligence.

DECISION SUPPORT SYSTEMS

Objectives:

1. Increase the effectiveness of the manager's decision-making process.
2. Supports the manager in the decision-making process but does not replace it.
3. Ability to select appropriate modelling techniques for supporting semi-structured business decision making
4. Ability to identify and select appropriate decision support systems for generating innovative business solutions

UNIT – I:

Introduction to Decision Support Systems, How Decision Support Systems Evolved-What is a DSS? Why decision Support Systems Matter – DSS Benefits – Why Study DSS?- The plan of This book.

UNIT – II:

Human Decision –Making Processes what is a Decision? –The Decision Process, Types of Decision, How Business People make Decision, The Impact of Psychological Type on Decision Making, The Impact of culture on Decision Making

UNIT – III:

Systems, Information Quality. And Models- About Systems- Information Systems Data Flow Diagrams – DSS as Information Systems- Information and Information Quality- Models

UNIT – IV:

Types of Decision Support Systems – the DSS Hierarchy – Generalizing the DSS Categories – Matching DSS to the Decision Type.

UNIT – V:

DSS Architecture, Hardware and Operating Systems platform – Defining the DSS Architecture- The Major Options- DSS on the Central Corporate System- DSS and Clint/Server Computing

UNIT – VI:

DSS Software Tools – DSS Software Categories - Standard Packages – Programming Languages DSS, Models in Decision Support Systems- Types of Models- Discrete – Event Simulation Models – Random Numbers, Pseudo-Random Numbers, and Statistical Distribution – Static Simulation Model

Outcomes:

1. Recognize the relationship between business information needs and decision making
2.Appraise the general nature and range of decision support systems
3.Appraise issues related to the development of DSS
4.Select appropriate modelling techniques

TEXT BOOKS:

1. Decision Support and Data Warehouse Systems, Efrem G. Mallach Mc Graw Hill.
2. Decision Support Systems for Business Intelligence,Vicki L. Sauter,Wiley

REFERENCE:

1. Decision Support Systems (2nd Edition) George M. Marakas,Prentice Hall

INFORMATION RETRIEVAL SYSTEMS

OBJECTIVES:

- To provide the foundation knowledge in information retrieval.
- To equip students with sound skills to solve computational search problems.
- To appreciate how to evaluate search engines.
- To appreciate the different applications of information retrieval techniques in the Internet or Web environment.
- To provide hands-on experience in building search engines and/or hands-on experience in evaluating search engines.

UNIT-I:

Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation.
Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms

UNIT-II:

Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

UNIT-III:

Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT-IV:

New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.

UNIT-V:

Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files

UNIT-VI:

Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri

OUTCOMES:

- Identify basic theories in information retrieval systems
- Identify the analysis tools as they apply to information retrieval systems
- Understands the problems solved in current IR systems
- Describes the advantages of current IR systems
- Understand the difficulty of representing and retrieving documents.
- Understand the latest technologies for linking, describing and searching the web.

TEXT BOOKS:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrieval by Yates Pearson Education.
3. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.

REFERENCE BOOKS:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Information retrieval Algorithms and Heuristics, 2ed, Springer

INTERNET OF THINGS

OBJECTIVES:

- Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
- Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
- Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

UNIT- I

Introduction to Internet of Things, Definition & Characteristics of IoT, Physical Design of IoT Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates Domain Specific IoTs: Home, Cities, Environment, Energy systems, Logistics, Agriculture, Health & Lifestyle

UNIT- II

IOT & M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, 1 Need for IoT Systems Management , Simple Network Management Protocol (SNMP) , Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG, NETOPEER

UNIT- III

IoT Platforms Design Methodology IoT Design Methodology, Case Study on IoT System for Weather Monitoring , Motivation for Using Python , IoT Systems - Logical Design using Python ,Installing Python , Python Data Types & Data Structures ,Control Flow , Functions, Modules, Packages , File Handling l, Date/Time Operations , Classes ,Python Packages of Interest for IoT

UNIT -IV

IoT Physical Devices & Endpoints, Raspberry Pi , About the Board , Linux on Raspberry Pi , Raspberry Pi Interfaces , Programming Raspberry Pi with Python , Other IoT Devices, IoT Physical Servers & Cloud Offerings , Introduction to Cloud Storage Models & Communication APIs , WAMP - AutoBahn for IoT , Xively Cloud for IoT , Python Web Application Framework - Django , Designing a RESTful Web API , Amazon Web Services for ,SkyNet IoT Messaging Platform

UNIT -V

Case Studies Illustrating IoT Design, Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications

UNIT -VI

Data Analytics for IoT , Introduction , Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis , Apache Oozie , Apache Spark , Apache Storm , Using Apache Storm for Real-time Data Analysis , Structural Health Monitoring Case Study , Tools for IOT, Chef Case Studies, NETCONF-YANG Case Studies.

OUTCOMES:

- Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
- Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things
- Develop critical thinking skills
- Compare and contrast the threat environment based on industry and/or device type

TEXTBOOKS:

Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERNCE BOOKS:

Fundamentals of Python, K.A.Lambert and B.L.Juneja, Cengage Learning, 2012.

MACHINE LEARNING

OBJECTIVES:

- Familiarity with a set of well-known supervised, unsupervised and semi-supervised
- learning algorithms.
- The ability to implement some basic machine learning algorithms
- Understanding of how machine learning algorithms are evaluated

UNIT- I: The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. **Binary classification and related tasks:** Classification, Scoring and ranking, Class probability estimation

UNIT- II: Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. **Concept learning**: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT- III: Tree models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. **Rule models:** Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT- IV: Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods. **Distance Based Models:** Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.

UNIT- V: Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables. **Features:** Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

UNIT- VI: Dimensionality Reduction: Principal Component Analysis (PCA), Implementation and demonstration. **Artificial Neural Networks:** Introduction, Neural network representation, appropriate problems for neural network learning, Multilayer networks and the back propagation algorithm.

OUTCOMES:

- Recognize the characteristics of machine learning that make it useful to real-world
- Problems.
- Characterize machine learning algorithms as supervised, semi-supervised, and
- Unsupervised.
- Have heard of a few machine learning toolboxes.
- Be able to use support vector machines.
- Be able to use regularized regression algorithms.
- Understand the concept behind neural networks for learning non-linear functions.

TEXT BOOKS:

1) Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2) Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1) Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.
2) Machine Learning in Action, Peter Harington, 2012, Cengage.

IV Year - I Semester

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MOBILE COMPUTING

OBJECTIVE:

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.
- To understand the platforms and protocols used in mobile environment.

UNIT- I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT –II

(Wireless) Medium Access Control (MAC) : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT –III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT- V

Data Dissemination and Synchronization : Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

UNIT- VI

Mobile Ad hoc Networks (MANETs) : Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing : WAP, Bluetooth, XML, J2ME, Java Card, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

OUTCOMES:

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/protocols.
- Able to understand & develop any existing or new protocol related to mobile environment

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

REFERENCE BOOKS:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
2. UWE Hansmann, Lother Merk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer.

MULTIMEDIA PROGRAMMING

UNIT 1:

Multimedia Information Representation:

Introduction, Digitization Principles – Analog Signals, Encoder Design, Decoder Design. Text – Unformatted Text, Formatted Text, Hyper Text. Images- Graphics, Digitized Documents, Digitized Pictures. Audio – PCM Speech, CD – Quality Audio, Synthesized Audio. Video – Broadcast Television, Digital Video, PC Video, Video Content.

UNIT 2:

Text Compression:

Compression Principles – Source Encoder and Destination
Decoder, Lossless and Lossy Compression, Entropy Encoding, Source Encoding. Text Compression – Static and Dynamic Huffman Coding, Arithmetic Coding.

UNIT 3:

Image Compression:

Graphics Interchange Format (GIF), Tagged Image File Format (TIFF), Digitised Documents, JPEG.

UNIT 4:

Audio Compression:

Differential Pulse Coded Modulation (DPCM), Adaptive
Differential PCM (ADPCM), Adaptive Predictive Coding and Linear Predictive Coding,
MPEG Audio Coding.

UNIT 5:

Video Compression:

Principles, H.261 Video Compression, MPEG 1, MPEG 2 and MPEG 4.

UNIT 6:

Multimedia Applications:

Inter- personnel Communication, Interactive Applications over the Internet, Entertainment Applications and Multimedia Conferencing.

TEXT BOOK:

1. Halshall, Fred. “Multimedia Communications – Applications, Networks,
Protocols and Standards”. 2001. Pearson Education.

REFERENCE BOOKS:

1. Chapman, Nigel and Chapman, Jenny. “Digital Multimedia”. 2000. John Wily &Sons.
2. Steinmaetz, Ralf and Nahrstedt, Klara. Multimedia: “Communications and Applications”. 2003. Pearson Education.

SOFTWARE PROJECT MANAGEMENT

OBJECTIVES:

- To study how to plan and manage projects at each stage of the software development life cycle (SDLC)
- To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
- To understand successful software projects that support organization's strategic goals

UNIT -I: Introduction

Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals

Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

UNIT -II: Project Approach

Lifecycle models, Choosing Technology, Prototyping

Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2)

UNIT -III: Effort estimation & activity Planning

Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case-based estimation , Activity Identification Approaches, Network planning models, Critical path analysis

UNIT -IV: Risk Management

Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

UNIT -V: Project Monitoring & Control, Resource Allocation

Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

UNIT -VI: Software Quality

Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality

Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality (Book3)

OUTCOMES:

- To match organizational needs to the most effective software development model
- To understand the basic concepts and issues of software project management
- To effectively Planning the software projects
- To implement the project plans through managing people, communications and change
- To select and employ mechanisms for tracking the software projects
- To conduct activities necessary to successfully complete and close the Software projects
- To develop the skills for tracking and controlling software deliverables
- To create project plans that address real-world management challenges

TEXT BOOKS:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, Pankaj Jalote, Pearson.

REFERENCE BOOKS:

1. Software Project Management, Joel Henry, Pearson Education.

IV Year - I Semester

L	T	P	C
4	0	0	3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to all Branches)

Course Objectives:

- The Learning objectives of this paper is to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting, Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

UNIT-I

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects –Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting, Concept of Supply and Law of Supply.

UNIT – II:

Production and Cost Analyses:

Concept of Production function- Cobb-Douglas Production function- Leontief production function - Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs –Cost – Volume-Profit analysis-Determination of Breakeven point(simple problems)-Managerial significance and limitations of Breakeven point.

UNIT – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Managerial Theories of firm: Marris and Williamson's models – other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing.

UNIT – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms – Business Cycles : Meaning and Features – Phases of a Business Cycle.

UNIT – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow and cash flow statements (Simple Problems)

UNIT – VI:

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods(pay back period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

Course Outcome:

*****The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.

***** One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.

*****The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

TEXT BOOKS

1. Dr. N. AppaRao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House, 2014.
2. V. Maheswari: Managerial Economics, Sultan Chand.2014
3. Suma Damodaran: Managerial Economics, Oxford 2011.
4. VanithaAgarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.
6. Maheswari: Financial Accounting, Vikas Publications.
7. S. A. Siddiqui& A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012
8. Ramesh Singh, Indian Economy, 7th Edn., TMH2015
9. Pankaj Tandon A Text Book of Microeconomic Theory, Sage Publishers, 2015
10. Shailaja Gajjala and Usha Munipalle, Univerties press, 2015

Outcomes:

1. Recognize the relationship between business information needs and decision making
2.Appraise the general nature and range of decision support systems
3.Appraise issues related to the development of DSS
4.Select appropriate modelling techniques

TEXT BOOKS:

1. Decision Support and Data Warehouse Systems, Efrem G. Mallach Mc Graw Hill.
2. Decision Support Systems for Business Intelligence,Vicki L. Sauter,Wiley

REFERENCE:

1. Decision Support Systems (2nd Edition) George M. Marakas,Prentice Hall

IV Year - I Semester

L	T	P	C
0	0	3	2

MOBILE COMPUTING LAB

OBJECTIVES:

- To introduce the characteristics, basic concepts and systems issues in mobile and pervasive computing
- To illustrate architecture and protocols in pervasive computing and to identify the trends and latest development of the technologies in the area
- To give practical experience in the area through the design and execution of a modest
- To design successful mobile and pervasive computing applications and services research project To evaluate critical design tradeoffs associated with different mobile technologies, architectures, interfaces and business models and how they impact the usability, security, privacy and commercial viability of mobile and pervasive computing services and applications
- To discover the characteristics of pervasive computing applications including the major

Programming:

1. Write a J2ME program to show how to change the font size and colour.

2. Write a J2ME program which creates the following kind of menu.

    * cut

    * copy

    * past

    * delete

    * select all

    * unselect all

3. Create a J2ME menu which has the following options (Event Handling):

    · cut - can be on/off

    · copy - can be on/off

    · paste - can be on/off

· delete - can be on/off

· select all - put all 4 options on

· unselect all - put all

4. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int [] array. You can enter four data (integer) values to the input text field.
5. Create an MIDP application which examine, that a phone number, which a user has entered is in the given format (Input checking):

   * Area code should be one of the following: 040, 041, 050, 0400, 044

   * There should 6-8 numbers in telephone number (+ area code)

6. Write a sample program to show how to make a SOCKET Connection from J2ME phone. This J2ME sample program shows how to how to make a SOCKET Connection from a J2ME Phone. Many a times there is a need to connect backend HTTP server from the J2ME application. Show how to make a SOCKET connection from the phone to port 80.

7. Login to HTTP Server from a J2ME Program. This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server. Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server. Note: Use Apache Tomcat Server as Web Server and MySQL as Database Server.

8. The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

   • Students Marks Enquiry

   • Town/City Movie Enquiry

   • Railway/Road/Air (For example PNR) Enquiry/Status

   • Sports (say, Cricket) Update

   • Town/City Weather Update

   • Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry

   Divide Student into Batches and suggest them to design database according to their domains and render information according the requests.

9. Write an Android application program that displays Hello World using Terminal.

10. Write an Android application program that displays Hello World using Eclipse.

11. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse.

12. Write an Android application program that demonstrates the following:

    (i) Linear Layout

    (ii) Relative Layout

    (iii) Table Layout

    (iv) Grid View layout

13. Write an Android application program that converts the temperature in Celsius to Fahrenheit.

14. Write an Android application program that demonstrates intent in mobile application development

OUTCOME:

- To analyze the strengths and limitations of the tools and devices for development of pervasive computing systems
- To explore the characteristics of different types of mobile networks on the performance of a pervasive computing system
- To analyze and compare the performance of different data dissemination techniques and algorithms for mobile real-time applications
- To develop an attitude to propose solutions with comparisons for problems related to pervasive computing system through investigation

IV Year - I Semester

L	T	P	C
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CRYPTOGRAPHY AND NETWORKING SECURITY LAB

Programming:

Breaking the Shift Cipher

Breaking the Mono-alphabetic Substitution Cipher

One-Time Pad and Perfect Secrecy

Message Authentication Codes

Cryptographic Hash Functions and Applications

Symmetric Key Encryption Standards (DES)

Symmetric Key Encryption Standards (AES)

Diffie-Hellman Key Establishment

Public-Key Cryptosystems (PKCSv1.5)

Digital Signatures

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of IT Department

To be leaders in Information Technology through excellence in education, research and community outreach.

Mission of IT Department

- To provide quality education in the core principles of Information Technology.
- To enable the students to apply the core concepts to solve real world problems.
- To amplify their potential through research and continuous learning for high quality career.
- To mould them as professionals with ethics and morals.

Program Educational Objectives(PEOs)

PEO1: To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO2: Graduates will succeed in entry-level engineering positions in IT industry and with government agencies.

PEO3: Graduates will succeed in the pursuit of advanced degrees in engineering or other fields and will have skills for, continued independent, lifelong learning to become experts in their profession.

PEO4: Empower students with effective teamwork, communication skills, leadership skills, ethical values and high integrity to serve the interests of the society and nation.

Program Outcomes(POs) of IT Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of IT Department

1. An ability to demonstrate basic knowledge in databases, programming languages, common business functions and algorithm analysis to design and develop appropriate Information Technology solutions.
2. Ability to organize an IT Infrastructure, manage and monitor resources and secure the data.

ARTIFICIAL NEURAL NETWORKS

OBJECTIVES:

- Understand the role of neural networks in engineering, artificial intelligence, and cognitive modeling.
- Provide knowledge of supervised learning in neural networks
- Provide knowledge of computation and dynamical systems using neural networks
- Provide knowledge of reinforcement learning using neural networks.
- Provide knowledge of unsupervised learning using neural networks.
- Provide hands-on experience in selected applications

UNIT-I: Introduction and ANN Structure.

Biological neurons and artificial neurons. Model of an ANN. Activation functions used in ANNs. Typical classes of network architectures.

UNIT-II

Mathematical Foundations and Learning mechanisms.Re-visiting vector and matrix algebra. State-space concepts. Concepts of optimization. Error-correction learning. Memory-based learning. Hebbian learning. Competitive learning.

UNIT-III

Single layer perceptrons. Structure and learning of perceptrons. Pattern classifier - introduction and Bayes' classifiers. Perceptron as a pattern classifier. Perceptron convergence. Limitations of a perceptrons.

UNIT-IV: Feed forward ANN.

Structures of Multi-layer feed forward networks. Back propagation algorithm. Back propagation - training and convergence. Functional approximation with back propagation. Practical and design issues of back propagation learning.

UNIT-V: Radial Basis Function Networks.

Pattern separability and interpolation. Regularization Theory. Regularization and RBF networks.RBF network design and training. Approximation properties of RBF.

UNIT-VI: Support Vector machines.

Linear separability and optimal hyperplane.Determination of optimal hyperplane. Optimal hyperplane for nonseparable patterns. Design of a SVM.Examples of SVM.

OUTCOMES:

- This course has been designed to offer as a graduate-level/ final year undergraduate level elective subject to the students of any branch of engineering/ science, having basic foundations of matrix algebra, calculus and preferably (not essential) with a basic knowledge of optimization.
- Students and researchers desirous of working on pattern recognition and classification, regression and interpolation from sparse observations; control and optimization are expected to find this course useful. The course covers theories and usage of artificial neural networks (ANN) for problems pertaining to classification (supervised/ unsupervised) and regression.
- The course starts with some mathematical foundations and the structures of artificial neurons, which mimics biological neurons in a grossly scaled down version. It offers mathematical basis of learning mechanisms through ANN. The course introduces perceptrons, discusses its capabilities and limitations as a pattern classifier and later develops concepts of multilayer perceptrons with back propagation learning.

TEXT BOOKS:

1. Simon Haykin, "Neural Networks: A comprehensive foundation", Second Edition, Pearson Education Asia.
2. Satish Kumar, "Neural Networks: A classroom approach", Tata McGraw Hill, 2004.

REFERENCE BOOKS:

1. Robert J. Schalkoff, "Artificial Neural Networks", McGraw-Hill International Editions, 1997.

IV Year - II Semester

L	T	P	C
4	0	0	3

CONCURRENT AND PARALLEL PROGRAMMING

(Elective - III)

OBJECTIVES:

- Improvement of students comprehension of CPP, new programming concepts, paradigms and idioms
- Change of 'mood' regarding Concurrency counter-intuitiveness
- Proactive attitude: theoretical teaching shouldn't be so dull
- Multipath, individually paced, stop–and–replay, personalized learning process
- Frequent assessment of learning advances on the subject

UNIT- 1

Concurrent versus sequential programming. Concurrent programming constructs and race condition. Synchronization primitives.

UNIT-II

Processes and threads. Interprocess communication. Livelock and deadlocks, starvation, and deadlock prevention. Issues and challenges in concurrent programming paradigm and current trends.

UNIT-III

Parallel algorithms – sorting, ranking, searching, traversals, prefix sum etc.,

UNIT- IV

Parallel programming paradigms – Data parallel, Task parallel, Shared memory and message passing, Parallel Architectures, GPGPU, pthreads, STM,

UNIT-V

OpenMP, OpenCL, Cilk++, Intel TBB, CUDA

UNIT-VI

Heterogeneous Computing: C++AMP, OpenCL

OUTCOMES:

- Understanding improvement of CPP concepts presented
- The number of reinforcement–exercises assigned
- The time required for the resolution of exercises
- Compliance level with the new model of theoretical teaching

TEXT BOOKS:

1. Mordechai Ben-Ari. Principles of Concurrent and Distributed Programming, Prentice-Hall international.
2. Greg Andrews. Concurrent Programming: Principles and Practice, Addison Wesley.
3. GadiTaubenfeld. Synchronization Algorithms and Concurrent Programming, Pearson.

REFERENCES:

1. M. Ben-Ari. Principles of Concurrent Programming, Prentice Hall.
2. Fred B. Schneider. On Concurrent Programming, Springer.
3. Brinch Hansen. The Origins of Concurrent Programming: From Semaphor

CYBER SECURITY

OBJECTIVES:

- The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
- Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.

UNIT- I: Introduction to Cybercrime:

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security ,Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens

UNIT -II: Cyber offenses:

How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

UNIT -III: Cybercrime Mobile and Wireless Devices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT -IV: Tools and Methods Used in Cybercrime:

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft)

UNIT -V: Cybercrimes and Cyber security:

Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

UNIT -VI: Understanding Computer Forensics:

Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Ant forensics

OUTCOMES:

- Cyber Security architecture principles
- Identifying System and application security threats and vulnerabilities
- Identifying different classes of attacks
- Cyber Security incidents to apply appropriate response
- Describing risk management processes and practices
- Evaluation of decision making outcomes of Cyber Security scenarios

TEXT BOOKS:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley.
2. Principles of Information Security, Micheal E.Whitman and Herbert J.Mattord, Cengage Learning.

REFERENCES:

1. Information Security, Mark Rhodes, Ousley, MGH.

IV Year - II Semester

L	T	P	C
4	0	0	3

MANAGEMENT INFORMATION SYSTEMS

OBJECTIVES:

- MIS is very useful for efficient and effective planning and control functions of the management. Management is the art of getting things done through others. MIS will be instrumental in getting the things done by providing quick and timely information to the management.

- MIS is helpful in controlling costs by giving information about idle time, labour turnover, wastages and losses and surplus capacity.

- By making comparison of actual performance with the standard and budgeted performance, variances are brought to the notice of the management by MIS which can be corrected by taking remedial steps.

UNIT - I:

Information System And Organization

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

UNIT - II:

Representation And Analysis Of System Structure

Models for Representing Systems: Mathematical, Graphical and Hierarchical organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture – Application of System Representation to Case Studies.

UNIT - III:

Systems, Information and Decision Theory

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty.

UNIT- IV:

Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

UNIT – V:

Information System Application

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

UNIT – VI:

Development And Maintenance Of Information Systems

Systems analysis and design – System development life cycle – Limitation – End user Development – Managing End Users – off– the shelf software packages – Outsourcing – Comparison of different methodologies.

OUTCOMES:

- MIS brings to the notice of the management strength (i.e., strong points) of the organization, to take advantage of the opportunities available.

- MIS reports on production statistics regarding rejection, defective and spoilage and their effect on costs and quality of the products.

TEXT BOOK:

1. Laudon K.C, Laudon J.P, Brabston M.E, "Management Information Systems - Managing the digital firm", Pearson Education, 2004.

REFERENCES:

1. Turban E.F, Potter R.E, "Introduction to Information Technology"; Wiley, 2 004.

2. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, "Modern Systems Analys and Design", Third Edition, Prentice Hall, 2002.

IV Year - II Semester

L	T	P	C
4	0	0	3

MANAGEMENT SCIENCE

Course Objectives:

***To familiarize with the process of management and to provide basic insight into select contemporary management practices**

***To provide conceptual knowledge on functional management and strategic management.**

UNIT I

Introduction to Management: Concept –nature and importance of Management –Generic Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Organizational typology- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure

UNIT II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions. Operationlizing change through performance management.

UNIT IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)

Unit V

Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives. Global strategies, theories of Multinational Companies.

UNIT VI

Contemporary Management Practice: Basic concepts of MIS, MRP, Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management , Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Course Outcome:

***After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior.**

***Will familiarize with the concepts of functional management project management and strategic management.**

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, '*Management Science'* Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, *Management Science'* TMH 2011.

References:

1. Koontz & Weihrich: 'Essentials *of management'* TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011
5. Philip Kotler & Armstrong: Principles of Marketing, Pearson publications
6. Biswajit Patnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Starategic Management, Cengage learning
8. Prem Chadha: Performance Management, Trinity Press(An imprint of Laxmi Publications Pvt. Ltd.) Delhi 2015.
9. Anil Bhat& Arya Kumar : Principles of Management, Oxford University Press, New Delhi, 2015.

SOFTWARE QUALITY ASSURANCE

OBJECTIVES:

- Describe approaches to quality assurance
- Understand quality models
- Evaluate the system based on the chosen quality model

Unit I: Introduction:

The Software Quality Challenge. What is Software Quality?
Software Quality Factors: The Components of the Software Quality Assurance System - Overview **Pre-Project Software Quality Components**

Unit II:

SQA Components in the Project Life Cycle

Integrating Quality Activities in the Project Life Cycle, ReviewsSoftware Testing - Strategies Software Testing –Implementation, Assuring the Quality of Software Maintenance

Unit III: Software Quality Infrastructure Components

Procedures and Work Instructions. Supporting Quality Devices Staff Training, Instructing and Certification. Preventive and Corrective Actions.

Unit IV: Software Quality Management Components

Project Progress Control: Software Quality Metrics, Software Quality Costs

Unit V: Standards, Certification and Assessment

SQA StandardsISO 9001 Certification Software, Process Assessment

Unit VI: Organizing for Quality Assurance

Management and its Role in Quality Assurance, The Software Quality Assurance

OUTCOMES:

Upon Completion of the course, the students will be able to

- Describe different approaches to testing software applications
- Analyze specifications and identify appropriate test generation strategies
- Develop an appropriate test design for a given test object

TEXT BOOKS:

1. Software Quality Assurance, Theory of implementation-Daniel Galin, Pearson
2. MauroPezze and Michal Young, "Software Testing and Analysis. Process, Principles, and Techniques", John Wiley 2008

REFERENCE BOOKS:

1. BorizBeizer, "Software Testing Techniques", 2nd Edition, DreamTech, 2009.
2. Aditya P. Mathur, "Foundations of Software Testing", Pearson, 2008
3. Mauro Pezze and Michal Young, "Software Testing and Analysis. Process, Principles, and Techniques", John Wiley 2008
4. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", 2nd Edition, Pearson, 2003
5. KshirasagarNaik and PriyadarshiTripathy (Eds), "Software Testing and Quality Assurance: Theory and Practice", John Wiley, 2008

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(Autonomous)

Approved by AICTE, Accredited by NAAC-A^{++} , NBA& Affiliated to JNTUK, Kakinada

Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-I Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-I (Linear Algebra & Calculus)

L	T	P	C
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Course Objectives:

To enable the students to

1. know the importance of matrices to solve linear equations using matrices
2. identify and solve various differential equations using corresponding methods
3. apply methods of solving higher order linear differential equations
4. comprehend the theory of maxima and minima of a function of two variables.
5. analyze thetechniques of tracing the curves and evaluate the lengths, areas, volumes of objects using multiple integrals

UNIT –I: Matrices - Linear system of equations

Introduction, Different types of matrices, Rank-Echelon form - Normal form, Solution of a System of Linear Equations – Non-homogeneous and homogeneous equations, Gauss- Jordan method, Gauss – Elimination Method, LU Decomposition,Applications of electric circuits.

UNIT- II: Eigen values - Eigen vectors

Eigen values - Eigen vectors – Properties– Cayley-Hamilton Theorem - finding inverse and power of a matrix by usingCayley-Hamilton theorem, Diagonalization of matrices, Spectral Decomposition,Singular Value Decomposition and Principal Component Analysis.

UNIT –III: Differential Equations

Differential equations of first order and first degree–Exact and Non– exactdifferential equations, Linear and Bernoulli differential equations.Orthogonal trajectories,Newton‘s Law of cooling, Law of natural growth and decay

Higher order homogenous and non - homogenous linear differential equations with constant coefficients - Particular integrals for the functions of type e^{ax}, sin(ax+b),cos(ax+b), Polynomial of x , e^{ax} V(x), L-C-R Circuits.

UNIT – IV: Partial Differentiation

Functions of several variables- Partial derivatives, Total derivative, Chain rule, Change of variables, Jacobians, Functional dependence.Generalized Mean Value theorem –Taylor’s theorem and Maclaurin’s

theorem (without proof) for a function of two variables, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers

UNIT –V: Multiple Integrals and Applications

Review of Curve tracing-Cartesian-Polar and Parametric curves.

Multiple integrals - double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integrationand Evaluation of triple integrals, computing area and volume.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin .Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008.

Course Outcomes:

After completing this course, the students will be able to

1. solvelinear system of equations in engineering problems
2. find Eigen-values and Eigenvectors of a matrix in engineering studies.
3. model engineering problems as differential equations and solve analytically. .
4. find out local /global optimum of functions of several variables.
5. compute areasand volumes by integrals

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common toCSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry

L	T	P	C
3	0	0	3

Course Objectives:

1. To gain the knowledge on Polymer based materials in household appliances, aerospace and automotive industries.
2. To learn the basic principles and applications of Electrochemistry.
3. Advanced Analytical instrumental techniques are introduced for material characterization.With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.
4. Understanding of crystal structures and preparation of semiconductors and insulators.
5. A wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.

UNIT- I: Polymer Chemistry

Introduction to polymers, functionality of monomers, co-polymerization, Stereospecific polymerization with specific examples.

Plastics - Thermoplastics and Thermosettings, Preparation, Properties and Applications of – Bakelite, Urea-Formaldehyde, Nylon-6,6, Carbon fibres.

Elastomers–Buna-S, Buna-N–Preparation, Properties and Applications.

Conducting polymers - polyacetylene, polyaniline, polypyrroles – Mechanism of conduction and Applications.

UNIT -II: Electrochemistry and Applications

Electrodes –Reference electrodes (Hydrogen electrode and Calomel electrode), Electrochemical cell, Nernst equation.Concept of pH, pH meter and applications of pH metry, Potentiometry- Potentiometric titrations (Redox titrations), Concept of Conductivity, Conductivity cell, Conductometric titrations (acid-base titrations), Primary cells – Dry cell - Zinc-air battery, Secondary cells – Lead acid battery, Lithium-ion batteries- working of the batteries including cell reactions, and button cells.

Fuel cells - Hydrogen-Oxygen and Methanol-Oxygen fuel cells – working of the cells.

UNIT - III: Instrumental Methods and Non-Conventional Energy Sources

Part-A: **Instrumental Methods**

Electromagnetic Spectrum. Absorption of radiation: Beer-Lambert's law - Principles of UV-Visible, Infrared (IR) and Nuclear Magnetic Resonance (NMR) spectroscopy.

Basic concepts of Thin Layer Chromatography (TLC), Gas Chromatography (GC) and High-Performance Liquid Chromatography (HPLC), Separation and purification of mixture of compounds.

Part-B: **Non-Conventional Energy Sources**

Introduction – Renewable and Non –Renewable energy sources - Solar Energy- Introduction, Applications of Solar energy – Photovoltaic cell: design, working and its importance. Hydropower includes setup a Hydropower plant (schematic diagram), Geo-Thermal energy: Introduction-schematic diagram of a Geothermal power plant, Tidal power - Introduction- Design and working, Biomass energy.

UNIT- IV: Solid State Chemistry

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel.

Hall Effect and Applications.

Semiconductors:Preparation of pure semiconductors by Zone refining, Distillation and Czochralskicrystal pulling technique, Doping- Epitaxy, Diffusion and Ion-implantation technique- Intrinsic and Extrinsic semiconductors - Applications.

Insulators*:* Electrical Insulators and their Applications.

UNIT -V: Material Chemistry

Nano materials –Introduction- Top-down and Bottom- up approaches, Sol-gel method. Characterization by BET and TEM methods. Carbon nano tubes and fullerenes - Types, Preparation (Arc discharge Laser ablation and ChemicalVapour Deposition methods) Properties and Applications.

Liquid crystals - Introduction – Types – Applications.

Superconductors - Type-I & Type-II, Properties &Applications.

Green chemistry- Principles and Applications.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publication Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

References:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. A text book of Engineering Chemistry bySashiChawla, Dhanpat Rai & Co. 2017

Course Outcomes:

After completing the course,students will be able to

1. Recall the information related to polymers and their application.(Remembering)
2. Distinguish between different parts in electrochemical cell, batteries and fuel cells. (Analyzing)
3. Understand about the different analytical techniques and its applications.(Understanding)
   Design the technologies related to renewable energy sources. (Creating)
4. Understand the conductivity phenomenon and applications of solids. (Understanding)
5. Choose the materials like nano materials, liquid crystals, superconductors, and green synthetic methods to solve the Engineering problems. (Applying)

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I.B.Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	3	0	0	3
Name of the Subject	**Communicative English**				
Branch	All Branches (except CSBS)				

SYLLABUS

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers

Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Methodology:

1. The classes are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.

4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

(R-20 Regulations)
Detailed Textbook:
Infotech English by Maruthi Publications

Non-Detailed Textbook:
Wings of Fire: APJ Abdul Kalam by University Press

Unit 1 (10 periods)

Detailed: A Drawer Full of Happiness
Non-detailed: APJ Abdul Kalam's Wings of Fire 1-5 Chapters

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Writing: Writing **S**entences with proper word order - Basic Sentence Structures

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) Antonyms and Synonyms, Word applications, Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural, pronouns, basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2 (10 periods)
Detailed: Nehru's letter to his daughter Indira on her birthday
Non-detailed: APJ Abdul Kalam's Wings of Fire 6-10 Chapters

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters. .

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) Antonyms and Synonyms, Word applications

Grammar: Use of articles and zero article; prepositions

Unit 3 (10 periods)

Detailed: Stephen Hawking-Positivity 'Benchmark'

Non-detailed: APJ Abdul Kalam's Wings of Fire 10-15 Chapters

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications, Association

Grammar: Verbs - tenses; Subject-verb agreement

Unit 4 (10 periods)

Detailed: Liking a Tree, Unbowed: Wangari Maathai's Biography

Non-detailed: APJ Abdul Kalam's Wings of Fire 16-20 Chapters

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison,

Unit 5 (10 periods)

Detailed: Stay Hungry-Stay foolish from "Infotech English", Maruthi Publications

Non-detailed: APJ Abdul Kalam's Wings of Fire 21-24 Chapters by University Press

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques

Reading for Writing: Letter writing, E mail writing, email etiquette

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) Antonyms and Synonyms, Word applications

Grammar: Direct and indirect speech, reporting verbs for academic purposes, Active Voice- Passive Voice; editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement and conjunctions)

Course Outcomes

At the end of the course, the learners will be able to

- Appreciate a piece of prose; employ suitable strategies for skimming and scanning to get the general idea of a text; recognize paragraph structure and formulate sentences using proper grammatical structures and correct word forms of nouns and pronouns and GRE Words

- ➢ Study a piece of prose; write well structured paragraphs and understand applying cohesive devices and use articles and prepositions accurately and learn good vocabulary

- ➢ Analyze a text in detail and summarize and employ verbs, tenses and subject verb agreement appropriately; apply vocabulary and word associations

- ➢ Understand a text, and learn and apply information transfer and apply the use of adjectives and adverbs and vocabulary

- ➢ Interpret ideas from reading comprehension and write formal letters and emails, use voice and reported speech properly and edit short texts by correcting common errors and learn vocabulary

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

Sample Web Resources

Grammar/Listening/Writing

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary

English Language Learning Online

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/

http://www.nonstopenglish.com/

https://www.vocabulary.com/

BBC Vocabulary Games

Free Rice Vocabulary Game

Reading

https://www.usingenglish.com/comprehension/

https://www.englishclub.com/reading/short-stories.htm

https://www.english-online.at/

Listening

https://learningenglish.voanews.com/z/3613

http://www.englishmedialab.com/listening.html

Speaking

https://www.talkenglish.com/

BBC Learning English – Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills

https://www.englishclub.com/

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries

Cambridge dictionary online

MacMillan dictionary

Oxford learner's dictionaries

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Computational Thinking and Programming				
Branch	CSE,IT,ECE, AI&DS,EEE,CE,ME				

Course Objectives:

1. To teach problem solving through Algorithms and Flowcharts
2. To elucidate problem solving through Python programming language
3. To train in the development of solutions using modular concepts
4. To explain the role of data structures in programming
5. To introduce object oriented programming paradigm through Python

UNIT – I: Knowing the Computer

Definition and Block Diagram of a Computer. Basic parts of a computer (Memory, CPU, Input, and Output), Memory hierarchy, Circuits and Logic, Hardware vs Software, Representation of Data in memory (integer (including negative), floating points etc. to text, images, audio and video), Principle of Abstraction, Operating System, Language Hierarchy - Machine Language to High Level Language, Compiler, Interpreter, The Command Line Interface (basic Linux commands)

UNIT – II: Computational Thinking and Introduction to Python

Simple logic building through flowcharting. Flowchart symbols, conditional and repetition blocks. Computational Thinking, Algorithm, Pseudocode, Time/Space complexity. Only Big O notation.

Basic structure of a Python program, Elements of Python programming Language: token, literals, identifiers, keywords, expression, type conversions, Numbers, Variables, Input/Output statements, basic data types. Operators and their types and precedence, expressions. Control structures in Python - conditionals and loops

UNIT – III: Python Data Structures and Modularization

List and List Operations, Using Lists to represent Matrices, Strings, String operations, Tuples, Dictionaries, Sets, Iterators and generators, comprehensions.

Basic math functions, User defined Functions, parameters to functions, positional, keyword and default arguments, Lambda Functions, recursion. Packages, modules and namespaces.

UNIT-IV: File Handling

Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules

UNIT – V: Object Oriented Programming

Object Oriented Design, Classes and Objects, Polymorphism, Abstraction, Inheritance, Encapsulation, Constructors, Function and operator overloading, Exception Handling.

Course Outcomes: Student should be able to

1. Understand the working principles of various components of a computer

2. Develop computational thinking and be able to use Python constructs to solve basic problems

3. Understand modularization and data structures concepts in Python

4. Apply file handling concepts in problem solving

5. Solve Real world problems by applying Object Oriented Concepts

Text Book:

1. Think Python: How to Think Like a Computer Scientist , Allen B. Downey, 2nd Edition (https://www.greenteapress.com/thinkpython/thinkCSpy.pdf)

Reference Books:

1. Core python programming, W Chun PHI (http://emixam.sevla.free.fr/books/2.PythoProg_softarchive.net.pdf)
2. Python programming a modern approach, Vamsi Kurama, pearson

Web Resources:

1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. https://snakify.org

Branch: CSE, IT, AI&DS & AIML **I Year – I Semester** **Regulation: R20**

Sub. Title: ELEMENTS OF ELECTRICAL & ELECTRONICS ENGINEERING

Sub.Code:

L	T	P	C
3	0	0	3

Preamble:

This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines, electronic components to perform well in their respective fields.

Learning Objectives:

- To learn the basic principles of electrical law's and analysis of DC circuits and AC circuits.
- To understand the principles of operation and characteristics of DC machines.
- To understand the principle of operation of Transformer and Induction motor.
- To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
- To learn the operation of PNP and NPN transistors and various amplifiers.

UNIT - I

DC Circuits: Basic definitions, Electrical circuit elements (R - L and C), Ohm's-Law, Kirchhoff laws, Series and parallel connection of resistances with DC excitation, Mesh Analysis and Nodal Analysis.

AC Circuits: Representation of sinusoidal waveforms, peak and RMS values, phasor representation, real power, reactive power, apparent power, power factor. Introduction to three phase, phase sequence, relation between line and phase voltages and currents.

UNIT - II

DC Machines: Principle and operation of DC Generator, EMF equation, Applications. Principle and operation of DC Motor, Back EMF, Types of DC machines, Speed- Torque Characteristics of DC Motors, Speed control of DC Motors, Applications.

UNIT - III

AC Machines: Classification of AC machines, Principle and operation of 3-phase Induction Motor and 3-phase Synchronous Generator.

Transformers: Principle of operation and construction of Single Phase Transformer, OC and SC test on transformer, efficiency

UNIT IV

Rectifiers & Linear ICs: PN junction diodes, Applications -Half wave and Bridge rectifiers. Characteristics of Operation Amplifiers (OP- AMPs), Applications of OP-AMPs -Inverting, Non-Inverting, Integrator and Differentiator.

UNIT V

Transistors : PNP and NPN junction transistor, transistor as an amplifier, Transistor Configurations-CE,CB,CC configurations, CE Amplifier Characteristics, Application of Transistors.

Course Outcomes:

- Able to analyze the various DC networks and AC circuits.
- Able to understand the operation and Applications of DC Generators and DC Motor.
- Able to analyze the performance of Transformer and Induction motor and Synchronous generator.
- Able to analyze the operation of half wave, full wave rectifiers and OP- AMPs.
- Able to explain the operation of transistors and its applications.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 10th edition, PEI/PHI2006
2. Theory and performance of Electrical Machines ,J.B.Gupta,3rd edition,Kataria.S.K& Sons
3. Electrical Circuit Theory and Technology by John Bird, 6th Edition Routledge Taylor & Francis Group

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications.
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition.
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition.
4. Industrial Electronics by G.K. Mittal, PHI.
5. Electrical Technology by Surinder Pal Bali, Pearson Publications.
6. Principles of Basic Electrical Engineering by T.N. Nagsarkar, M.S. Sukhija, Oxford University Press.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(Common to CSE, IT, EEE, AI & DS)

Course Title:Applied Chemistry Lab

L	T	P	C
0	0	3	1.5

10 Out of 16

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of MnO2 in Pyrolusite.
5. Determination of Copper using standard $K_2Cr_2O_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Vitamin – C.
8. Determination of P^H of the given sample solution using P^H meter.
9. Conductometric titration between strong acid and strong base.
10. Potentiometric titration between strong acid and strong base.
11. Estimation of copper by Colorimetry.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing).
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.
16. Thin layer chromatography.

References:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. JyotsnaCherukuri (2012) Laboratory Manual of Engineering chemistry-II, VGSTechno Series.
3. Chemistry Practical Manual, Lorven Publications.
4. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication.

Outcomes:

The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	0	0	3	1.5
Subject	Computational Thinking and Programming Lab				

Laboratory Experiments

Objectives:

- Get acquainted with fundamentals of writing **Python** scripts.
- Master core **Python** scripting elements by solving more number of problems
- Able to identify right data structure to solve the problem
- Design **Python** functions to facilitate code reuse.
- Gaining familiarity with Python file I/O
- Getting Familiarity with Object Oriented Concepts

Week 1-3

- Design algorithms and flowcharts for given problems
- Python programs on decision and loop control statements
  - Whether the given number is even or odd
  - Maximum of three numbers
  - Sum of digits, Palindrome
  - Factorial of a number,
  - GCD of given numbers
  - Sum of first n natural numbers
  - Evaluate Cosine and Sine Series etc.

Week 4-6

- Exercise programs on lists and functions
  - Finding the sum and average of given numbers using lists.
  - To display elements of list in reverse order.
  - Finding the minimum and maximum elements in the lists.
  - Using functions to calculate power, factorial etc
  - Passing lists as function arguments
  - Pass by object
  - Recursion

Week 7-9

- Exercise programs on Strings.
  - Count the number of characters, number of vowels etc in the given line of text etc
  - Palindrome Check
  - Reverse words in a line of text
  - Finding the occurrences of substring in the main string
- Exercise programs on Tuples, Dictionaries

Week 10-12

- Exercise programs on file handling covering creating file, writing content into the file and updating the file content etc.
- Python programs on Object Oriented Programming concepts:
  - Creating a Class with variables and methods

- Class inheritance
- Constructors
- Exception handling

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Year/Semester	I B. Tech-I Sem	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	**English Communication Skills Lab**				
Branch	All Branches (except CSBS)				

English Language Communication Skills Lab

Course Objectives

1. To sensitize the students nuances of English speech sounds.
2. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
3. To improve the fluency in spoken English in different contexts.
4. To demonstrate the synchronization of verbal and non verbal communication.
5. To speak with clarity and confidence.
6. To enrich the persuasive skills.

MODULE – I

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introduction and introducing others.

Non Verbal Communication

Pronunciation: Introduction to Phonetics-Sounds of English-Phoneme

MODULE – II

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Functional English: Greetings and leave taking, Complaining and Apologizing.

Pronunciation: Vowels and Consonants**,** Past tense markers, Plural markers

MODULE – III

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Functional English: Permissions, Requesting, Inviting.

Pronunciation: Syllable, Word Stress: Weak and Strong forms, Stress in compound words, Contrastive Stress

MODULE– IV

Speaking: Just a Minute **(**JAM)

Functional English Asking for and giving Information/Directions; Suggesting/Opinion giving.

Pronunciation: Rhythm & Intonation

MODULE– V

Functional English: Dialogues/Role Plays

Speaking: Formal oral presentations on topics from Science and Technology - with the use of PPT slides.

Pronunciation: Accent Neutralization

INFRASTRUCTURE:

1. 60 computer systems for a class of 60 students.
2. LAN facility and English Language Software for self-study by learners.
3. Audio System
4. Projector

SYSTEM REQUIREMENT: Hardware Component

5. P – IV Processor
6. Speed – 2.8 GHZ
7. RAM – 512 MB minimum
8. Hard Disk – 80 GB
9. Headphones of high quality

SUGGESTED SOFTWARE

1. Cambridge Advanced Learners‘ English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley
3. Punctuation Made Easy by Darling Kindersley
4. Clarity Pronunciation Power – Part I
5. Clarity Pronunciation Power – part II
6. Oxford Advanced Learner‘s Compass, 7th Edition
7. DELTA‘s key to the Next Generation TOEFL Test: Advanced Skill Practice.
8. MELL - K Van Solutions Software
9. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
10. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
11. English Pronunciation in Use, Cambridge University Press
12. Technical Communication, OUP
13. Communication Skills, OUP

COURSE OUTCOMES

The students will be able to:

- CO1: Understand Non Verbal Communication and Identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

- CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

- CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, Inviting.

- CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

- CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

SUGGESTED READING

1) Infotech English, Maruthi Publications (with Compact Disc).

2) Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.

3) English Pronunciation in use- Mark Hancock, Cambridge University Press.

4) English Phonetics and Phonology-Peter Roach, Cambridge University Press.

5) English Pronunciation in use- Mark Hewings, Cambridge University Press.

6) English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.

7) English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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Department of Basic Science

(R-20 Regulations)

Syllabus: I B.Tech-II Semester

(Common to all Branches except CS&BS)

Course Title: Mathematics-II (Vector Calculus& Transform Calculus)

L	T	P	C
3	0	0	3

Course Objectives:

1. find the vector differentiation and Integration
2. apply the techniques of Laplace transforms in engineering studies
3. learn the Fourier series of periodic functions and expand a function in sine and cosine series
4. solve problems related to engineering applications using integral transform techniques
5. evaluate the problems to engineering applications using Z- transform techniques

UNIT-I: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

UNIT-II: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas,surface areas and volumes.

UNIT-III: Laplace Transforms

Laplace transform-Definition-conditions for existence– Linear Property -Shifting Theorems, Laplace transforms of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function.

Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution,Solving ordinary differential equations with constant coefficients.

UNIT - IV: Fourier Series

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series at the point of discontinuity, Fourier series of even and odd functions, Half-range Fourier Sine and Cosine series.Fourier series in an arbitrary interval.

UNIT- V: Fourier Transforms and Z-Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse Formulae-Properties- Finite Fourier Transforms.

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z – transform - Convolution theorem – solving difference equations by using Z-transforms.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin.Kreyszig,Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes:

After completing this course, the students will be able to

1. understand gradient, divergence, curl and their physical significance
2. compute line, surface and volume integrals and evaluate the work done, flux, potential functions
3. makeuse of Laplace transforms in solving the differential equations with the initial and boundary conditions.
4. compute Fourier series of periodic functions
5. solve problems related to engineering applications using transform techniques

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application and to know the importance of free electron theory for metals.
- Enlightenment of the importance of band theory for crystalline solids and metals. To understand the physics of Semiconductors and their working mechanism.

UNIT –I: Wave Optics

Interference:

Introduction - Principle of Superposition-Coherence-Conditions for Sustained Interference -Interference in thin films (reflected Geometry)-Newton's Rings-Determination of Wavelength and Refractive Index-Applications of Interference.

Diffraction:

Introduction- Fresnel and Fraunhofer diffraction-Fraunhofer Diffraction due to Single slit, Double slit –N – slits (Qualitative)-Diffraction Grating -Determination of Wavelength-Applications of Diffraction.

Polarization:

Introduction- types of polarized light, Polarization by reflection, refraction and double refraction- Nicol's prism-Half wave and Quarter wave plates

UNIT- II: Lasers and Fiber Optics

Lasers:

Introduction-Characteristics of Laser–Spontaneous and Stimulated emissions of radiation-Einstein's coefficients & Relation between them and their significance – population inversion - Ruby laser – Helium Neon laser –Semiconductor diode laser(Qualitative)- Applications of Lasers.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile, modes -Block Diagram of Fiber optic Communication- Applications of optical fibers.

UNIT –III: Magnetic Materials & Dielectric Properties

Magnetic Materials:

Introduction -Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Dielectrics :

Introduction to Dielectrics - Electric polarization - Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations - Electronic and Ionic polarizations with mathematical derivations – Orientational polarization (Qualitative)–Internal field in solids -Claussius -Mosotti equation.

UNIT – IV: Quantum Mechanics and Free Electron Theory of Metals

Quantum Mechanics:

Introduction- Dual nature of matter-Matter waves, de-Broglie wavelength, Properties of wave function- time independent and time dependent Schrödinger's wave equation-Particle in a one dimensional infinite potential well.

Free Electron Theory of Meals:

Classical free electron theory (Qualitative with discussion of merits and demerits)-Quantum free electron theory-Equation for electrical conductivity based on quantum free electron theory-Fermi-Dirac Distribution-density of states (3D) - Fermi Energy.

UNIT –V: Band Theory of Solids and Semiconductors

Band Theory of Solids:

Bloch Theorem - Kronig-Penny Model (Qualitative)-E vs K and v vs K diagram- Origin of energy bands - Classification of solids based on energy bands – Effective Mass of an Electron-Concept of a Hole

Semiconductors:

Introduction– Intrinsic semiconductors - density of charge carriers-Fermi level – extrinsic semiconductors - P-type & N-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature - Drift and Diffusion currents – Einstein's equation - Hall effect- Hall coefficient - Applications of Hall effect.

Text Books:

1.M.N. Avadhanulu, P.G.Kshirsagar "A Text book of Engineering Physics"-S.Chand Publications,2017
2. H.K.Malik & A.K.Singh "Engineering Physics",- McGraw Hill Publishing Company Ltd, 2018
3. P.K. Palanisamy, Applied Physics, SciTech Publications.

References:

1. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata Mc GrawHill.
2. Charles Kittel "Introduction to Solid State Physics",Wiley Publications.
3. S.M.Sze "Semiconductor devices-Physics and Technology"-Wiley.
4. Halliday, Resnick and Walker, "Fundamentals of Physics", John WileySons.
5. M.R. Srinivasan, Engineering Physics, NewAge International Publishers.
6. Ajoy Ghatak "Optics" Tata Mc GrawHill.

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well. Identify the role of classical free electron theory in the study of electrical conductivity.

CO5**:** Explain the concept of quantum free electron theory in the study of electrical conductivity. Classify the energy bands of solids. Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices.

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Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	**Digital Logic Design**				
Branch	CSE,IT, AI&DS				

Course Objectives:

- To study the basic philosophy underlying the various number systems, negative number
- representation, binary arithmetic, theory of Boolean algebra and map method for

  Minimization of switching functions.

- To introduce the basic tools for design of combinational and sequential digital logic.
- To learn simple digital circuits in preparation for computer engineering.

UNIT- I: Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction,4-bit codes: BCD, EXCESS-3, 9's complement.

UNIT -II: Concept of Boolean algebra: Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms.

UNIT- III: Gate level Minimization: Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function

UNIT- IV: Combinational Logic: Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, And Multiplexers.

UNIT- V: Synchronous Sequential Logic: Introduction to Sequential Circuits, Storage Elements: Latches, Flip-Flops: RS,JK, T and D Flip-Flops, Truth and Excitation Tables, Conversion of Flip-Flops. Registers and Counters: Basics of Registers and Counters

Course outcomes:

A student who successfully fulfils the course requirements will have demonstrated:

- An ability to define different number systems, binary addition and subtraction, 2's Complement representation and operations with this representation.
- An ability to understand the different switching algebra theorems and apply them for Logic functions.
- An ability to define the Karnaugh map for a few variables and perform an algorithmicreduction of logic functions.
- Students will be able to design various logic gates starting from simple ordinary gates tocomplex programmable logic devices.
- Students will be able to design various sequential circuits starting from flip-flop to Registers and counters.

Text Books:

1) Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.

2) Fundamentals of Logic Design, 5/e, Roth, Cengage.

Reference Books:

1) Digital Logic and Computer Design, M.Morris Mano, PEA.

2) Digital Logic Design, Leach, Malvino, Saha, TMH.

3) Modern Digital Electronics, R.P. Jain, TMH.

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Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Programming for Problem Solving				
Branch	CSE,IT, AI&DS,EEE				

Course Objectives:

- Formulating algorithmic solutions to problems and implementing algorithms in C.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding arrays, pointers and dynamic memory allocation.
- Understanding Strings and Structures

UNIT-I:

Introduction to C Programming- Identifiers, The main () Function, The printf () Function **Programming Style** - Indentation, Comments, Data Types**,** Arithmetic Operations, Expression Types, Variables and Declarations, Negation, Operator Precedence and Associativity, Declaration Statements, Initialization.

Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT-II:

Control Flow-Relational Expressions - Logical Operators:

Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement.

UNIT-III:

Arrays & Pointers:

Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Two-Dimensional Arrays, Larger Dimensional Arrays- Matrices

Pointers: Concept of a Pointer, Initialisation of pointer variables, passing by address, Dangling memory, address arithmetic, Dynamic memory management functions, command line arguments.

UNIT-IV:

Modular Programming: Function and Parameter Declarations, Returning a Value, Classifications of Functions, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Array as a Function arguments.

Case Study: Recursion - Mathematical Recursion, Recursion versus Iteration

UNIT-V:

Strings & Structures:

Strings: String Fundamentals, String Input and Output, String Processing, Library Functions.

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.

TEXT BOOKS:

1. ANSI C Programming, Gary J. Bronson, Cengage Learning.
2. Let us C Authentic Guide to C Programming Language by yashavant kanetkar.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

REFERENCE BOOKS:

1. C Programming-A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, Bichkar, Universities Press.
3. Programming in C, ReemaThareja, OXFORD.
4. C by Example, Noel Kalicharan, Cambridge.

Course Outcomes:

1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops and functions.
4. Explain the difference between call by value and call by reference
5. Understand the dynamics of memory by the use of pointers
6. Understand the sorting and searching algorithms.

Course Objectives:

The objective of this course is to

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self-paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes:

Students should be able to:

- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, summarize various Linux operating system commands,
- Recognize characters & extract text from scanned images, Create audio files and podcasts

Computer Hardware:

Experiment 1: Identification of peripherals of a PC, Laptop, Server and Smart Phones: Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.

Operating Systems:

Experiment 2: Virtual Machine setup: o Setting up and configuring a new Virtual Machine o Setting up and configuring an existing Virtual Machine o Exporting and packaging an existing Virtual Machine into a portable format

Or

Experiment 2: Operating System installation: o Installing an Operating System such as Linux on Computer hardware.

Experiment 3: Linux Operating System commands: o General command syntax o Basic help commands

- Basic File system commands

- Date and Time

- Basic Filters and Text processing

- Basic File compression commands o Miscellaneous: apt-get, vi editor.

Networking and Internet:

Experiment 4: Networking Commands:

- ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget, route

Experiment 5: Internet Services:

- Web Browser usage and advanced settings like LAN, proxy, content, privacy, security, cookies, extensions/ plugins o Antivirus installation, configuring a firewall, blocking pop-ups
- Email creation and usage, Creating a Digital Profile on LinkedIn.

Productivity Tools:

Experiment 6: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage,

Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices

Office Tools:

Experiment 7: Demonstration and Practice on Text Editors like Notepad++, Sublime Text, Atom, Brackets, Visual code, etc

Experiment 8: Demonstration and practice on Microsoft Word, Power Point, Microsoft Excel

Experiment 9: Demonstration and practice on LaTeX and produce professional pdf documents.

Text Books:

1) Computer Fundamentals, Anita Goel, Pearson Education, 2017 2) PC Hardware Trouble Shooting Made Easy, TMH

References Books:

1) Essential Computer and IT Fundamentals for Engineering and Science Students, Dr.N.B.Vekateswarlu, S.Chand

e-Resources:

1) https://explorersposts.grc.nasa.gov/post631/2006- 2007/computer_basics/ComputerPorts.doc

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Department of Basic Science

Syllabus: I B. Tech-I/II Semester

(R-20 Regulations)

(Common to all circuital branches like ECE, EEE, CSE, IT, AI&DS and AI&ML etc.)

Course Title: Applied Physics Lab

L	T	P	C
0	0	3	1.5

List of Experiments

Conduct 10 out of 15 experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination/ of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume Resonator
9. L C R Series Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics Practical Manual, Lorven Publication

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Advanced Python Programming Lab				
Branch	CSE, AI&DS,IT				

Course objectives: To enable students

- Explore basic workflow of learning from data.
- Apply various NumPy and pandas' concepts to preprocess the data.
- Understand data visualization techniques and create reports
- Calculating simple descriptive statistical measures on datasets.
- Using sklearn to get inference from data.

Laboratory Experiments:

1. Live experiment with The Teachable Machine (https://teachablemachine.withgoogle.com/train/)
2. Three components of AI system (Dataset, learning algorithm, prediction)
3. Introduction to Algorithmic or inductive Bias Experiment on the teachable machine
4. Determining the stakeholders - the ethical bias
5. Various types of machine learning. Exploring live tools
6. Making an AI based Game (brief primer on JavaScript, HTML and CSS)
7. Experimentation on Importance of Data Visualization
8. Experimentation on exploring types of data, and corresponding chart and statistic
9. Experiment - Dashboard in Google Data Studio
10. Practice on Python Numpy Library
    a. Different ways to create NumPy arrays
    b. Add, remove, modify elements in an array.
    c. Arithmetic operations on NumPy array
    d. Slicing and iterating of NumPy arrays
    e. Matrix operations on NumPy arrays

11. Practice on Python Pandas Library
    a. Create a data Frame manually
    b. Different ways of importing a data frame
    c. Adding, Deleting, Modifying the rows/columns in a dataframe.

d. Apply functions on dataframe.
e. Iterations on dataframe
f. Accessing the elements from a dataframe
g. Different ways to deal with NA's in dataframe
h. Groupby operations on dataframe
i. Merging dataframes

12. Visualization using Python MatplotLib and Seaborn Libraries
    i) Line Graphs ii) Scatter Plots iii) Histograms iv) Subplots v) Join plots vi) Heatmaps

13. Exploratory Data Analysis on a dataset
14. Applying few sklearn functions on the dataset
15. Train test split
16. Evaluation metrics
17. Cross validation

I B.Tech – II Sem **L T P C**

0 0 0 1.5

Programming for Problem Solving Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers Structures.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of functions involving the idea of Modularity.

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math
a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow – I
a)Write a C Program to Find Whether the Given Year is a Leap Year or not.
b)Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow – II
a)Write a C Program to Find Whether the Given Number is
    i) Prime Number
    ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle

Exercise – 5 Functions
a) Write a C Program demonstrating parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise – 6 Control Flow – III
a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions – Continued

Write a C Program to compute the values of sinx and cos x and e^x values using Series expansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a)Write a C Program to Store Information of a Movie Using Structure

b)Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a)Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find the sum of n elements entered by the user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find the sum of n elements entered by the user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations with library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

b) Implementation of string manipulation operations without library function.

- i) copy
- ii) concatenate
- iii) length
- iv) compare

Course Outcomes:

1. Apply and practice logical ability to solve the problem.
2. Understand C programming development environment, compiling, debugging and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs.
4. Understand and apply the inbuilt functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques.

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Department of Basic Science

Syllabus: I B.Tech-II Semester

(R-20 Regulations)

(Common to ECE, CE, ME,AI&DS, CS&BS)

Course Title: Environmental Science

Objectives:

To make the student to get awareness on environment, to understand the important of protecting natural recourses, ecosystems for futures generations and pollution causes due to the day to day activates of human life to save Earth from the inventions by the engineers.

UNIT – I: Multidisciplinary nature of Environmental Science and Ecosystems

Definition, Scope and Importance – Sustainability: Need for public awareness-Human population and Environment.

Ecosystems:Concept of an ecosystem. - Structure and function of an ecosystem. -Types of Ecosystem-Forest, Grassland, Desert and Aquatic Ecosystems– Food chains, food webs and ecological pyramids.

UNIT – II: Natural Resources

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources: Conflicts over water, Dams – benefits and problems

Mineral resources: Use and exploitation, Environmental effects of extracting and using mineral resources.

Energy resources: Growing energy needs, renewable and non-renewable energy sources

Food resources: World food problems.

Land resources: Wasteland reclamation.

Role of an individual in conservation of natural resources.

UNIT – III: Biodiversity and its conservation

Definition, Genetic, species and ecosystem diversity- classification - Value of biodiversity: Consumptive use, Productive use, Social use, Biodiversity at national and local levels. Hot-spots of biodiversity - Threats to biodiversity - Endangered and Endemic species of India – Conservation of biodiversity

UNIT – IV: Environmental Pollution

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. Pollution case studies.

Solid Waste Management: Sources, effects and control measures of urban and industrial solid wastes. Bio medical and e-waste management.

Global Environmental Challenges: Global warming and climate change-Acid rains, Ozone layer depletion.

UNIT – V: Social Issues and Environmental Management

Urban problems related to energy -Water conservation, Rain water harvesting-Resettlement and rehabilitation of people. Environmental Protection Act –Air Act –Water Act - Wildlife Protection Act - Forest Conservation Act-Public awareness.

International protocols: Stockholm and Rio Summit, Kyoto protocol and Montreal Protocol.

Impact Assessment and its significance various stages of EIA, Environmental audit, Ecotourism. The student should Visit an Industry / Ecosystem.

Text Books

1. A Textbook of Environmental Studies, Shashi Chawla, TMH, NewDelhi.
2. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford UniversityPress

References

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers,Vijayawada.
2. Text Book of Environmental Studies, DeekshitaDave& P. Udaya Bhaskar, Cengage Learning.
3. Textbook of Environmental Science and Technology – Dr. Anji Reddy, BS Publications.
4. Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers,2014.
5. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education,Chennai.
6. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, NewDelhi.

Course Outcomes: Students will be able to

1. Articulate the basic structure, functions, and processes of key social systems affecting the Environment.
2. Explain how Natural Recourses should be used.
3. Identify the threats to biodiversity.
4. Understand causes, effects and control measures of Environmental pollution.
5. Gain knowledge about Watershed management and Environmental ethics.Gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.

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Department of Basic Science
Computer Science & Business Systems (CS&BS)
Syllabus: I B.Tech-I Semester
(R 20 Regulations)

Academic Year 2020-21

Course Title: Discrete Mathematics

L	T	P	C
3	0	0	3

Course Objectives: Students are expected to

1. check the validity of arguments by using basic connective and valid rules of inference.
2. observe various properties of sets and relations.
3. impart knowledge on Boolean algebra and their properties.
4. know different algebraic structures and their properties and understand different counting Techniques
5. identify different graphs, isomorphism of graphs, paths, cycles and circuit

Unit-I: Logic:

Propositional calculus - propositions and connectives, syntax; Semantics – truthassignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives; Equivalence and normal forms.

Unit-II: **Abstract Algebra:**

Set, relations and their properties, binary operations, algebraic system, semi group, monoid, groups and their properties, simple examples, ring – definition and example, field – definition and example.

Unit-III: Boolean algebra:

Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.

Unit-IV: Combinatorics:

Basic counting, balls and bins problems, generating functions, recurrence relations, Methods of solving recurrence relations, pigeonhole principle, principle of inclusion-exclusion and related problems.

Unit-V: Graph Theory:

Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs.

Trees:

Trees and their properties; Planargraphs, Euler's formula, dual of a planer graph, chromatic number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

Text Books:

1. *Topics in Algebra,* I. N. Herstein, John Wiley and Sons.
2. *Digital Logic & Computer Design,* M. Morris Mano, Pearson.
3. *Elements of Discrete Mathematics,* (Second Edition) C. L. LiuMcGraw Hill, New Delhi.
4. *Graph Theory with Applications,* J. A. Bondy and U. S. R. Murty, Macmillan Press, London.
5. *Mathematical Logic for Computer Science,*L. Zhongwan, World Scientific, Singapore.

Reference Books:

1. *Introduction to linear algebra.* Gilbert Strang.
2. *Introductory Combinatorics,* R. A. Brualdi, North-Holland, New York.
3. *Graph Theory with Applications to Engineering and Computer Science,* N. Deo, Prentice Hall, Englewood Cliffs.
4. *Introduction to Mathematical Logic,*(Second Edition), E. Mendelsohn, Van-Nostrand, London.

Course Outcomes:

After completion of the course, the student will be able to

1. translate the arguments using propositions and predicates to verify their validity.
2. make use of sets & relations in different functioning proceduresand illustrate the properties of groups, rings, fields
3. utilize Boolean expressions and their simplifications
4. solve different counting problems and recurrence relations
5. apply graph theory concepts to modeling problems in Computer Science using graphs .Apply graph theory concepts to modelling problems in Computer Science using trees

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Department of Basic Science
Computer Science & Business Systems(CS&BS)
Syllabus: I B.Tech-ISemester
(R 20 Regulations)

Course Title: Statistics, Probability and Calculus

L	T	P	C
3	0	0	3

Course Objectives:

1. familiarize the students with the foundations of probability and statistical methods
2. use the probability concepts and statistical methods in various applications in engineering
3. impart the knowledge on basic concepts of differential & integral Calculus

Unit-I: Introduction to Statistics:

Definition, Basic objectives, Applications in various areas with examples.Collection of Data- Internal and External, Primary and secondary, Population and sample, Representative sample.Descriptive Statistics-Classification and tabulation of univariate data, graphical representation, Frequency curves.

Descriptive Measures:Measures of Central tendency (Mean, Median and Mode) and dispersion(Range, SD, MD and QD). Bivariate data - summarization, marginal and conditional frequency distribution.

Unit-II: Probability:

Random experiments, sample space, event, Axioms of Probability, addition and multiplication theorem, Conditional Probability, Baye's Theorem and related problems.

Unit-III: Random Variables

Random Variables- probability functions – distribution- properties - Mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.

Unit-IV: Probability Distributions:

Binomial, Poisson and Normal distributions-related problems,Basic concepts of Geometric, Uniform, Exponential, Chi-square, Student-t, and F- distributions.

UNIT-V: Calculus:

Basic concepts of differential and integral calculus, Evaluation of double integrals (Cartesian and polar form), Change of Variables and evaluation of triple integrals (Cartesian coordinates), and applications of double integrals- Area as double integration in Cartesian coordinates.

Text Books:

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
2. *Fundamentals of Statistics*, vol. I & II, A. Goon, M. Gupta and B. Dasgupta, World Press.
3. *Higher Engineering Mathematics*, B. S. Grewal, Khanna Publication, Delhi.

Reference Books:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. *A first course in Probability,* S.M. Ross, Prentice Hall.
3. *Probability and Statistics for Engineers,* (Fourth Edition), I.R. Miller, J.E. Freund and R. Johnson, PHI.
4. *Introduction to the Theory of Statistics*, A.M. Mood, F.A. Graybilland D.C. Boes,McGraw Hill Education.
5. *Advanced Engineering Mathematics*, (Seventh Edition), Peter V. O'Neil, Thomson Learning.

Course Outcomes:

At the end of the course, the student will be able to

1. summarize the basic concepts of statistics and use appropriate statistical methods in the analysis of sample data sets and analyse the data quantitatively, measure of averages and variability
2. make use of probabilities of events in finite sample spaces and experiments and their applications
3. use various statistical distributions to solve engineering problemsand its applications.
4. understand several well-known distributions, such asBinomial, Poisson and Geometrical distributions
5. employ the tools of double integrals and its applications.

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Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	Fundamentals of Computer Science				
Branch	CSBS				

Unit-I: Introduction to Problem Solving and C Programming

General problem Solving concepts: Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops.

Imperative languages: Introduction to imperative language; syntax and constructs of a specific language (ANSI C)

Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation.

Unit-II: Conditional and Control Statements

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, gotolabels, structured and un- structured programming.

Unit-III: **Functions**

Functions and Program Structure with discussion on standard library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Pre-processor, Standard Library Functions and return types.

Unit-IV: Pointers, Structures and Union

Pointers and Arrays: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialisation of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral structures, Table look up, typedef, unions, Bit-fields.

Unit-V: File I/O & Unix System Interface

Input and Output: Standard I/O, Formatted Output – printf, Formated Input – scanf, Variable length argument list, file access including FILE structure, fopen, stdin, sdtout and stderr

Unix system Interface: File Descriptor, Low level I/O – read and write, open, create, close and unlink

****Programming Method(Not for Evaluation):** Debugging, Macro, User Defined Header, User Defined Library Function, makefile utility.

Text Books:

1. The C Programming Language, (Second Edition) B. W. Kernighan and D. M. Ritchi, PHI.
2. Programming in C, (Second Edition)B. Gottfried, Schaum Outline Series.

Reference Books:

5. C: The Complete Reference,(Fourth Edition), Herbert Schildt, McGraw Hill.
6. Let Us C,YashavantKanetkar, BPB Publications.

Branch: CSBS **I Year – I Semester** **Regulation: R20**

Sub. Title: PRINCIPLES OF ELECTRICAL ENGINEERING

Sub.Code:

L	T	P	C
3	0	0	3

Learning Objectives:

- To learn the basic principles of electrical law's and analysis of networks.
- To understand about DC network analysis using theorems and simplification of networks
- To understand about the R-L, R-C, RLC series & parallel circuit and 3Ø AC balanced circuits.
- To understand the concepts of field, magnetic circuits, Faraday's law, Ampere's law and their applications
- To understand the basic principles of measurements, electrical wiring and Concept of earthing.

Unit-I

Introduction: Concept of potential difference, voltage, current, fundamental linear passive and active elements to their functional current-voltage relation, terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, concept of work, power, energy, and conversion of energy.

Unit-II

DC Circuits: Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series-parallel, Star/Delta transformation. Superposition theorem.

Unit-III

AC Circuits: AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (ƛ-Δ&ƛ-ƛ).

Unit-IV

Electrostatics and Electro-Mechanics: Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

Unit-V

Measurements and Sensors: Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, elementary methods for the measurement of electrical quantities in DC and AC systems(Current & Single-phase power). Electrical Wiring and Illumination system; basic layout of the distribution system, types of wiring system &wiring accessories, necessity of earthing, types of earthing, safety devices & system.

For Further Reading - Principle of batteries, types, construction and application, magnetic material and b-h curve, basic concept of indicating and integrating instruments.

Course Outcomes:

A student who has met the objective of the course will be able to:

- Learn basics of electrical circuits such as Kirchhoff-s laws and its applications
- Understand various network theorems and its applications in electrical circuits.
- Explore the basic principles and concepts involved in AC circuits and analyze power in series and parallel AC circuits.
- Gain knowledge on basic electrostatic field, electric field strength, different Laws and magnetic circuit
- Acquire knowledge on measurements, types of wiring and earthing.

Text Books:

1. *Electric Machinery,*(Sixth Edition) A.E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill.
2. *A Textbook of Electrical Technology*,(vol. I),B. L. Theraja, Chand and Company Ltd., New Delhi.
3. *Basic Electrical Engineering*, V. K. Mehta, S. Chand and Company Ltd., New Delhi.
4. *Theory and problems of Basic Electrical Engineering,* (SecondEdition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. *Basic of Electrical Engineering*, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2011.
2. *Introduction to Electrodynamics*, D. J. Griffiths, (Fourth Edition), Cambridge University Press.
3. *Engineering Circuit Analysis,* William H. Hayt& Jack E. Kemmerly, McGraw-Hill Book Company Inc.
4. *Fundamentals of Electrical and Electronics Engineering,*Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations)

(CS & BS Branch)

Course Title: Physics for Computing Science

L	T	P	C
3	0	0	3

Course Objectives:

- To identify the significance of Laser light and Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications. Study of propagation of light through optical fibers and their implications in optical communications
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application. Enlightenment of the importance of Electromagnetism
- To understand the physics of Semiconductors and their working mechanism and Enlighten the periodic arrangement of atoms in Crystalline solids – Learning the structural analysis through X-ray diffraction.
- Understand the principle and background of oscillations and To facilitate the students with the aid of advanced insight in the applied science.To learn the laws of the thermodynamics and its applications and To motivate the students to understand the Engineering Principles through basic ideas in Physics.

UNIT- I: Lasers and Fiber Optics

Lasers:

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, and CO_2 laser, Properties of laser beams: mono- chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering.

Fiber Optics:

Introduction to Optical Fibers-Total Internal Reflection- Construction of optical fibers -Acceptance angle- Numerical Aperture- Classification of fibers based on Refractive index profile, modes - Propagation of electromagnetic wave through optical fiber - Block Diagram of Fiber optic Communication.

Unit-II Interference Diffraction and Polarization of light

Interference:

Introduction-Theory of interference fringes- types of interference-Newton's rings,

Diffraction:

Introduction-Two kinds of diffraction- Difference between interference and diffraction-Fresnel's half period zone and zone plate- Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence.

Polarization:

Introduction - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction

Unit-III Semiconductor Physics and Basic Idea of

Electromagnetisms Electromagnetisms:

Introduction-Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium(Qualitative).

Quantum Mechanics:

Introduction- Planck's quantum theory-Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box.

Unit-IV Quantum Mechanics and Crystallography

Semiconductor Physics:

Introduction– Intrinsic semiconductors – extrinsic semiconductors – Classification of solids on basis of energy band gap-Conductors, Semiconductors and insulators. Basic concept of band theory - origin of energy band – Bloch theorem (Qualitative).

Crystallography:

Introduction-Space lattice, Basis, Unit Cell and Lattice Parameters-, Bravais lattices,-Crystal Systems(3D)- coordination number-Packing fraction of SC, BCC and FCC structures- Miller indices-Seperation between successive (hkl) planes.

Unit-V Oscillation and Thermodynamics

Oscillation

Periodic motion-simple harmonic motion-characteristics of simple harmonic motion- vibration of simple spring mass system. Resonance-definition., damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators(Qualitative).

Thermodynamics

Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.

Text Books:

1. Concepts of Modern Physics, (Fifth Edition) A Beiser, McGraw Hill International.

2. Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker, Wiley plus.

Reference Books:

1. Optics, (Fifth Edition)AjayGhatak, Tata McGraw Hill.
2. Sears & Zemansky University Physics, Addison-Wesley.
3. Fundamentals of Optics,(Third Edition)Jenkins and White, McGraw-Hill.
4. Engineering Physics, M.N. Avadhanulu and P.G. Kshirasagar, S. Chand Publications.

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical fibers in medical, communication and other fields

CO2: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications. Classify ordinary refracted light and extraordinary refracted rays by their states of polarization

CO3: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well. Enlightenment of the importance of Electromagnetism

CO4: Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices. Interpret various crystal systems and Analyze the characterization of materials by XRD. Identify the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique.

CO5: Understand the principle and background of oscillations and learn the laws of the thermodynamics and its applications.

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DEPARTMENT OF BASIC SCIENCE

Year/Semester	I B.Tech-I Sem.	L	T	P	C
Regulation Year	R-20 2020-21	0	0	3	1.5
Name of the Subject	Business Communication and Value Science I				
Branch	Computer Science and Business Systems				

COURSE OBJECTIVES:

1. To understand what life skills are and their importance in leading a happy and well-adjusted life.

2. To motivate students to look within and create a better version of self.

3. To introduce them to key concepts of values, life skills and business communication.

Unit-I: Life Skills and Values

Self-Introduction, Demonstration of Skills and Values (Through a Presentation), Importance of Business Communication, Self-awareness, Recognizing one's Strengths and Opportunities, Identity, Body Awareness and Stress Management.

Activity: Write a Newspaper Report, A Conversation Between a Celebrity and an Interviewer, etc.

Unit-II: Basic Tenets of Communication

Overview of Communication Skills, Types of Communication, Verbal and Non-verbal Communication,

Barriers of Communication, Effective Communication, Difference between Listening and Hearing, Types of

Listening.

Parts of Speech, Tense, Sentence Formation, Common Errors, Questions and Question Tags.

Activity: Skit (Communication Skills Based), Listening Comprehension, etc.

Unit-III: Verbal Communication

Pronunciation, Clarity of Speech, Art of Questioning, Phrases, Idioms, Significant Abbreviations, GSL &

AWL.

Activity: Create a Podcast, etc.

Unit-IV: Written Communication

Email Writing, Summary Writing, Story Writing, Letter Writing, CV Writing.

Activity: Story Writing, etc.

Unit-V: Realities of Facing Life (ROFL)

Life Skills (understanding and application), Movie Based Learning, Critical Life Skills, Multiple

Intelligence, Embracing Diversity, Leadership, Team Work, Dealing with Ambiguity, Motivating People, Creativity.

Project: Community service –work with an NGO and make a presentation

COURSE OUTCOMES:

After completing the course, students will be able to

1. Recognize the need for life skills and values

2. Understand the basic tenets of communication

3. Apply the life skills to different situations

4. Understand and learn various kinds of written communication

5. Understand and apply life skills learnt

Text Books:

There are no prescribed texts for Semester 1 – there will be handouts and reference links shared.

Reference Books:

1. English vocabulary in use – Alan Mc‟carthy and O‟dell

2. APAART: Speak Well 1 (English language and communication)

3. APAART: Speak Well 2 (Soft Skills)

4. Business Communication – Dr. Saroj Hiremath

Web References:

Train your mind to perform under pressure- Simon sinek

https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-underpressure-capture-your-flag/

Brilliant way one CEO rallied his team in the middle of layoffs

https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-beforenumbers.html

Will Smith's Top Ten rules for success

https://www.youtube.com/watch?v=bBsT9omTeh0

Online Resources:

1. https://www.coursera.org/learn/learning-how-to-learn

2. https://www.coursera.org/specializations/effective-business-communication

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Department of Basic Science

Syllabus: I B.Tech-I Semester

(R-20 Regulations) (CS & BS Branch)

Course Title: Physics Lab for computing science

L	T	P	C
0	0	3	1.5

List of Experiments

1) Magnetic field along the axis of current carrying coil – Stewart and Gee
2) Determination of Hall coefficient of semi-conductor
3) Determination of Plank constant
4) Determination of wave length of light by Laser diffraction method
5) Determination of wave length of light by Newton's Ring method
6) Determination of laser and optical fiber parameters
7) Determination of Stefan's Constant.

I Year - I Semester **L T P C**

0 0 3 2

Fundamentals of Computer Science Lab

Course Objectives: Students are expected to

1. Formulating algorithmic solutions to problems and implementing algorithms in C
2. Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux.
3. Understanding and implementing programs on branching, iteration and data representation using arrays.
4. Modular programming and recursive solution formulation.
5. Understanding and implementing programs on pointers and dynamic memory allocation.
6. Understanding miscellaneous aspects of C.

Course Outcomes:

After completion of the course, the student will be able to

1. Understand the basic terminology used in computer programming
2. Write, compile and debug programs in C language.
3. Use different data types in a computer program.
4. Design programs involving decision structures, loops and functions.
5. Explain the difference between call by value and call by reference
6. Understand Understanding and implementing programs on the dynamics of memory by the use of pointers
7. Use different data structures and Strings.

Exercise - 1 Basics

a) Write an algorithm, flowchart and implement a C program to find whether a given number is even or odd.

b) Write an algorithm, flowchart and implement a C program for finding GCD of 2 numbers.

c) Write an algorithm, flowchart and implement a C program for whether a year is leap year or not.

d) Write an algorithm, flowchart and implement a C program for converting Celsius to Fahrenheit and vice versa.

e) Write an algorithm, flowchart and implement a C program for simulate laws of motion

Exercise - 2 Basic Math

a) Write a C program to implement whether the given number is prime or not.

b) Write a C program to implement whether the given number is Armstrong or not.

c) Write a C program to print Floyd's triangle.

d) Write a C program to implement simple calculator using switch case.

Exercise - 3 Functions

a) Write a C program to implement parameter passing methods (call by value and call by reference).

b) Write a C program to implement Fibonacci series of the given numbers and factorial of the given number without recursion.

Exercise – 4 Recursion

a) Write a C program to implement Fibonacci series of the given numbers using recursion.

b) Write a C program to find factorial of a number using recursion.

Exercise – 5 Arrays

a) Write a C program to find sum of three numbers using pointers (call by reference).

b) Write a C program to find sum of elements in an array.

Exercise – 6 Searching

a) Write a C program for linear search in array.

b) Write a C program for binary search in array

Exercise – 7 Pointers

a) Write a C program to access array elements using pointer

b) Write a C program to find sum of array elements using pointers

Exercise – 8 Arrays-Continued

Demonstration of arrays

a) Write a C program for matrix addition.

b) Write a C program for matrix multiplication.

c) Write a C program for matrix transpose.

Exercises - 9 Files

a) Write a C program to open a pre-existing file.

b) Write a C program to find sum of 2 numbers in a file.

c) Write a C program for basic file operations in different modes.

Exercise - 10 Structures

a) Write a C program to store information of a movie using structures.

b) Write a C program to store information of a movie using union.

c) Write a C program to find sum of two complex numbers using structure to a function.

Exercise – 11 Strings

a) Implementation of string manipulation operations with library function.

i) copy

ii) concatenate

iii) length

iv) compare

b) Implementation of string manipulation operations without library function.

i) copy

ii) concatenate

iii) length

iv) compare

Exercise – 12 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs.

Exercises - 13 User Defined Header File

Write a C program to add and multiply two numbers using user defined header file.

Exercises – 14 Command Line Interface

a) Write a C program for finding Fibonacci using command line.

b) Write a C program for finding result of two numbers by reading the operator from command line(addition/subtraction/multiplication/division)

Exercises – 15 Parser

a) Write a C program for function parses and returns a single expression.

b) Write a C program for modifying parsing grammar to allow assignment statement

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Structure for M. Tech

I M.Tech I-SEMESTER

S.No	Course Title	L	T	P	C
1	Mathematical Foundations of Computer Science	3	-	-	3
2	Advanced Data Structures & Algorithms	3	-	-	3
3	**Elective**-1 Big Data Analytics Advanced Operating Systems Pattern Recognition	3	-	-	3
4	**Elective-2** Internet of Things High Performance Computing Object Oriented Software Engineering	3	-	-	3
5	Research Methodology	2	-	-	2
6	Advanced Data Structures & Algorithms Lab	-	-	4	2
7	Big Data Analytics Lab	-	-	4	2
8	English for Research Paper Writing	2	-	-	0
Total		**16**	**-**	**8**	**18**

I .M.Tech. II- Semester

S.No	Course Title	L	T	P	C
1	Mean Stack Technologies	3	-	-	3
2	Machine Learning	3	-	-	3
3	**Elective-3** Optimization Techniques Cloud Computing Computer Vision	3	-	-	3
4	**Elective-4** Digital Forensics Social Network Analysis Bio Informatics	3	-	-	3
5	Mean Stack Technologies Lab	-	-	4	2
6	Machine Learning Lab	-	-	4	2
7	Pedagogy Studies	2	-	-	0
8	Mini Project with Seminar	2	-	-	2
Total		**16**	**-**	**8**	**18**

II. M.Tech. I- Semester

S.No	Course Title	L	T	P	C
1	**Elective – 5** Block Chain Technologies Mobile Application Development Wireless Sensor Networks	3	-	-	3
2	**Open Elective/MOOCs** . Deep Learning . Digital image processing . Industrial Safety	3	-	-	3
3	Dissertation Phase – I	-	-	20	10
	Total	**6**	-	**20**	**16**

II. M.Tech. II- Semester

S.No	Course Title	L	T	P	C
1	Dissertation Phase – II	-	-	32	16
	Total	**-**	-	32	**16**

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	I M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	-	-	3
Subject	**Mathematical Foundations of Computer Science**				

Course Objectives: This course is aimed at enabling the students to

- To understand the mathematical fundamentals that is prerequisites for variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems bioinformatics, Machine learning.
- To develop the understanding of the mathematical and logical basis to many modern techniques in computer science technology like machine learning, programming language design, and concurrency.
- To study various sampling and classification problems.

Course Outcomes:

After the completion of the course, student will be able to

- To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution.
- Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters.
- To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests.
- Design various ciphers using number theory.
- Apply graph theory for real time problems like network routing problem.

UNIT I: Basic Probability and Random Variables: Random Experiments, Sample Spaces Events, the Concept of Probability the Axioms of Probability, Some Important Theorems on Probability Assignment of Probabilities, Conditional Probability Theorems on Conditional Probability, Independent Events, Bayes Theorem or Rule. Random Variables,

Discrete Probability Distributions, Distribution Functions for Random Variables, Distribution Functions for Discrete Random Variables, Continuous Random Variables

UNIT II: Sampling and Estimation Theory: Population and Sample, Statistical Inference Sampling With and Without Replacement Random Samples, Random Numbers Population Parameters Sample Statistics Sampling Distributions, Frequency Distributions, Relative Frequency Distributions, Computation of Mean, Variance, and Moments for Grouped Data. Unbiased Estimates and Efficient Estimates Point Estimates and Interval Estimates. Reliability Confidence Interval Estimates of Population Parameters, Maximum Likelihood Estimates

UNIT III: Tests of Hypothesis and Significance: Statistical Decisions Statistical Hypotheses. Null Hypotheses Tests of Hypotheses and Significance Type I and Type II Errors Level of Significance Tests Involving the Normal Distribution One-Tailed and Two-Tailed Tests P Value Special Tests of Significance for Large Samples Special Tests of Significance for Small Samples Relationship between Estimation Theory and Hypothesis Testing Operating Characteristic Curves. Power of a Test Quality Control Charts Fitting Theoretical Distributions to Sample Frequency Distributions, The Chi-Square Test for Goodness of Fit Contingency Tables Yates' Correction for Continuity Coefficient of Contingency.

UNIT IV: Algebraic Structures and Number Theory: Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism. Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

UNIT V: Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

Text Books:

1. Foundation Mathematics for Computer Science, John Vince, Springer.
2. Probability & Statistics, 3rd Edition, Murray R. Spiegel, John J. Schiller and R. Alu Srinivasan, Schaum's Outline Series, Tata McGraw-Hill Publishers
3. Probability and Statistics with Reliability, K. Trivedi, Wiley.
4. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7^{th} Edition, H. Rosen, Tata McGraw Hill.

Reference Books:

1. Probability and Computing: Randomized Algorithms and Probabilistic Analysis, M. Mitzenmacher and E. Upfal.
2. Applied Combinatorics, Alan Tucker, Wiley.

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Year/Semester	I M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	-	-	3
Subject	**Advanced Data Structures & Algorithms**				

Course Objectives: From the course the student will learn

- Single Linked, Double Linked Lists, Stacks, Queues, Searching and Sorting techniques, Trees, Binary trees, representation, traversal, Graphs- storage, traversal.
- Dictionaries, ADT for List, Stack, Queue, Hash table representation, Hash functions, Priority queues, Priority queues using heaps, Search trees.
- AVL trees, operations of AVL trees, Red- Black trees, Splay trees, comparison of search trees.

Course Outcomes:

After the completion of the course, student will be able to

- Ability to write and analyze algorithms for algorithm correctness and efficiency
- Master a variety of advanced abstract data type (ADT) and data structures and their Implementation
- Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life
- Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees
- Ability to compare various search trees and find solutions for IT related problems

Unit I: Sorting Methods: Order Statistics: Lower Bound on Complexity for Sorting Methods: Lower Bound on Worst Case Complexity, Lower Bound on Average Case Complexity, Heap Sort, Quick Sort, Radix Sorting, Merge Sort.

Unit II: Dictionaries: Sets, Dictionaries, Hash Tables, Open Hashing, Closed Hashing(Rehashing Methods), Hashing Functions(Division Method, Multiplication Method, Universal Hashing), Analysis of Closed Hashing Result (Unsuccessful Search,

Insertion, Successful Search, Deletion), Hash Table Restructuring, Skip Lists, Analysis of Skip Lists. (Reference 1)

Unit III: Balanced Trees : AVL Trees: Maximum Height of an AVL Tree, Insertions and Deletions. Introduction to Red-Black and Splay Trees, B-Trees, Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

Unit IV: Priority Queues: Binary Heaps : Implementation of Insert and Delete min, Creating Heap. Binomial Queues: Binomial Queue Operations, Binomial Amortized Analysis, Lazy Binomial Queues

Unit V: Graphs: Graph storage Representation- Adjacency matrix, adjacency lists. Operations on Graphs: Vertex insertion, vertex deletion, find vertex, edge addition, Edge deletion, Graph Traversals- Depth First Search and Breadth First Search (Nonrecursive). Minimum-Cost Spanning Trees- Prim's Algorithm, Kruskal'sAlgorithm Shortest Path Algorithms: Dijkstra's Algorithm, All Pairs Shortest Paths Problem: Floyd's Algorithm

Text Books :

1. Data Structures, A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan,Cengage.

2. Fundamentals of DATA STRUCTURES in C: 2nd ed, Horowitz , Sahani, Anderson-freed, Universities Press

3. Data structures and Algorithm Analysis in C, 2nd edition, Mark Allen Weiss, Pearson

Reference Books:

1. Data Structures and Algorithms, 3/e, Adam Drozdek, Cengage
2. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B.Venkateswarulu, E.V.Prasad and S Chand & Co, 2009

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Year/Semester	I M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	-	-	3
Subject	**Big Data Analytics**				

Course Objectives: This course is aimed at enabling the students to

- To provide an overview of an exciting growing field of big data analytics.
- To introduce the tools required to manage and analyze big data like Hadoop, NoSQL, Map Reduce, HIVE, Cassandra, Spark.
- To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To optimize business decisions and create competitive advantage with Big Data analytics

Course Outcomes:

After the completion of the course, student will be able to

- Illustrate on big data and its use cases from selected business domains.
- Interpret and summarize on No SQL, Cassandra
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications Using Hive.
- Make use of Apache Spark, RDDs etc. to work with datasets.
- Assess real time processing with Spark Streaming.

UNIT I: What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics, inter and trans firewall analytics.

UNIT II: Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schema less databases, materialized views, distribution models, sharding, master-slave replication, peer- peer replication, sharding and replication, consistency, relaxing consistency, version stamps, Working with Cassandra ,Table creation, loading and reading data.

UNIT III: Data formats, analyzing data with Hadoop, scaling out, Architecture of Hadoop distributed file system (HDFS), fault tolerance ,with data replication, High availability, Data locality , Map Reduce Architecture, Process flow, Java interface, data flow, Hadoop I/O, data integrity, compression, serialization. Introduction to Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, Logical joins, Window functions, Optimization, Table partitioning, Bucketing, Indexing, Join strategies.

UNIT IV: Apache spark- Advantages over Hadoop, lazy evaluation, In memory processing, DAG, Spark context, Spark Session, RDD, Transformations- Narrow and Wide, Actions, Data frames ,RDD to Data frames, Catalyst optimizer, Data Frame Transformations, Working with Dates and Timestamps, Working with Nulls in Data, Working with Complex Types, Working with JSON, Grouping, Window Functions, Joins, Data Sources, Broadcast Variables,Accumulators, Deploying Spark- On-Premises Cluster Deployments, Cluster Managers-Standalone Mode, Spark on YARN , Spark Logs, The Spark UI- Spark UI History Server, Debugging and Spark First Aid

UNIT V: Spark-Performance Tuning, Stream Processing Fundamentals, Event-Time and State full Processing - Event Time, State full Processing, Windows on Event Time-Tumbling Windows, Handling Late Data with Watermarks, Dropping Duplicates in a Stream, Structured Streaming Basics - Core Concepts, Structured Streaming in Action, Transformations on Streams, Input and Output.

Text Books:

1. Big Data, Big Analytics: Emerging, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj
2. SPARK: The Definitive Guide, Bill Chambers & Matei Zaharia, O'Reilley, 2018 Edition
3. Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013
4. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World Polyglot Persistence", Addison-Wesley Professional, 2012
5. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012

Reference Books:

1. "Hadoop Operations", O'Reilley, Eric Sammer, 2012
2. "Programming Hive", O'Reilley, E. Capriolo, D. Wampler, and J. Rutherglen, 2012
3. "HBase: The Definitive Guide", O'Reilley, Lars George, 2011
4. "Cassandra: The Definitive Guide", O'Reilley, Eben Hewitt, 2010
5. "Programming Pig", O'Reilley, Alan Gates, 2011

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Year/Semester	I M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	-	-	3
Subject	**Internet of Things**				

Course Objectives:

- To Understand Smart Objects and IoT Architectures.
- To learn about various IOT-related protocols
- To build simple IoT Systems using Arduino and Raspberry Pi.
- To understand data analytics and cloud in the context of IoT
- To develop IoT infrastructure for popular applications.

Course Outcomes:

After the completion of the course, student will be able to

- Summarize on the term 'internet of things' in different contexts.
- Analyze various protocols for IoT.
- Design a PoC of an IoT system using Rasperry Pi/Arduino
- Apply data analytics and use cloud offerings related to IoT.
- Analyze applications of IoT in real time scenario

UNIT I: FUNDAMENTALS OF IoT: Evolution of Internet of Things, Enabling Technologies, IoT Architectures,oneM2M, IoT World Forum (IoTWF) and Alternative IoT models, Simplified IoT Architecture and Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II: IoT PROTOCOLS: IT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks, Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks, Application Transport Methods: Supervisory Control and Data Acquisition, Application Layer Protocols: CoAP and MQTT.

UNIT III: DESIGN AND DEVELOPMENT: Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks, Arduino, Board details, IDE programming, Raspberry Pi, Interfaces and Raspberry Pi with Python Programming.

UNIT IV: DATA ANALYTICS AND SUPPORTING SERVICES: Structured Vs Unstructured Data and Data in Motion Vs Data in Rest, Role of Machine Learning – No SQL Databases, Hadoop Ecosystem, Apache Kafka, Apache Spark, Edge Streaming Analytics and Network Analytics, Xively Cloud for IoT, Python Web Application Framework, Django, AWS for IoT, System Management with NETCONF-YANG.

UNIT V: CASE STUDIES/INDUSTRIAL APPLICATIONS: Cisco IoT system, IBM Watson IoT platform, Manufacturing, Converged Plant wide Ethernet Model (CPwE), Power Utility Industry, Grid Blocks Reference Model, Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control.

Text Books:

1.IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017

Reference Books:

1. Internet of Things – A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015

2. The Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit 2).

3. "From Machine-to-Machine to the Internet of Things – Introduction to a New Age of
Intelligence", Jan Ho¨ ller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.

4. Architecting the Internet of Things, Dieter Uckelmann, Mark Harrison, Michahelles and Florian (Eds), Springer, 2011.

5. Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, Michael Margolis,
Arduino Cookbook and O'Reilly Media, 2011.

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Year/Semester	I M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	-	-	3
Subject	**RESEARCH METHODOLOGY**				

UNIT 1:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT 2:

Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

UNIT 3:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT 4:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

UNIT 5:

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

REFERENCES:

(1) Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"

(2) Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
(3) Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
(4) Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
(5) Mayall, "Industrial Design", McGraw Hill, 1992.
(6) Niebel, "Product Design", McGraw Hill, 1974.
(7) Asimov, "Introduction to Design", Prentice Hall, 1962.

(8) Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.

(9) T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

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Year/Semester	I M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	-	-	4	2
Subject	**Advanced Data Structures & Algorithms Lab**				

Course Objectives:

From the course the student will learn

- Knowing about oops concepts for a specific problem.
- Various advanced data structures concepts like arrays, stacks, queues, linked lists, graphs and trees.

Course Outcomes:

After the completion of the course, student will be able to

- Identify classes, objects, members of a class and relationships among them needed for a specific problem.
- Examine algorithms performance using Prior analysis and asymptotic notations.
- Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.)
- Apply and analyze functions of Dictionary

Experiment 1:

Write a java program to perform various operations on single linked list

Experiment 2:

Write a java program for the following

a) Reverse a linked list
b) Sort the data in a linked list
c) Remove duplicates
d) Merge two linked lists

Experiment 3:

Write a java program to perform various operations on doubly linked list.

Experiment 4:

Write a java program to perform various operations on circular linked list.

Experiment 5:

Write a java program for performing various operations on stack using linked list.

Experiment 6:

Write a java program for performing various operations on queue using linked list.

Experiment 7:

Write a java program for the following using stack

a) Infix to postfix conversion.
b)Expression evaluation.
c) Obtain the binary number for a given decimal number.

Experiment 8:

Write a java program to implement various operations on Binary Search Tree Using Recursive and Non-Recursive methods.

Experiment 9:

Write a java program to implement the following for a graph.

a) BFS b) DFS

Experiment 10:

Write a java program to implement Merge & Heap Sort of given elements.

Experiment 11:

Write a java program to implement Quick Sort of given elements.

Experiment 12:

Write a java program to implement various operations on AVL trees.

Experiment 13:

Write a java program to perform the following operations:

a) Insertion into a B-tree b) Searching in a B-tree

Experiment 14:

Write a java program to implementation of recursive and non-recursive functions to Binary tree Traversals

Experiment 15:

Write a java program to implement all the functions of Dictionary (ADT) using Hashing.

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Year/Semester	II M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	-	-	3
Subject	**Big Data Analytics Lab**				

Course Objectives

1. To implement Map Reduce programs for processing big data
2. To realize storage of big data using H base, Mongo DB
3. To analyse big data using linear models
4. To analyse big data using machine learning techniques such as SVM / Decision tree classification and clustering

LIST OF EXPERIMENTS

Hadoop

1. Install, configure and run Hadoop and HDFS
2. Implement word count / frequency programs using MapReduce
3. Implement an MR program that processes a weather dataset

R

4. Implement Linear and logistic Regression
5. Implement SVM / Decision tree classification techniques
6. Implement clustering techniques
7. Visualize data using any plotting framework
8. Implement an application that stores big data in Hbase / MongoDB / Pig using Hadoop / R.

Course Outcomes

After completion of course, students will be able to

1. Process big data using Hadoop framework
2. Build and apply linear and logistic regression models
3. Perform data analysis with machine learning methods
4. Perform graphical data analysis

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

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Year/Semester	I M. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	MEAN STACK TECHNOLOGIES				

Course Objectives:
From the course the student will learn

- Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
- Writing optimized front end code HTML and JavaScript.
- Monitor the performance of web applications & infrastructure and Troubleshooting web application with a fast and accurate a resolution.
- Design and implementation of Robust and Scalable Front End Applications.

Course Outcomes:
After the completion of the course, student will be able to

- Identify the Basic Concepts of Web & Markup Languages.
- Develop web Applications using Scripting Languages & Frameworks.
- Make use of Express JS and Node JS frameworks
- Illustrate the uses of web services concepts like restful, react js.
- Adapt to Deployment Techniques & Working with cloud platform.

UNIT I: Introduction to Web: Internet and World Wide Web, Domain name service, Protocols: HTTP, FTP, SMTP. **Html5** concepts, **CSS3** , Anatomy of a web page. **XML:** Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches.

UNIT II: JavaScript: The Basic of JavaScript: Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions.
Angular JS: Angular JS Expressions, ARRAY, Objects, $eval, Strings, AngularJS Form Validation & Form Submission, Single Page Application development using AngularJS

UNIT III: Node.js: Introduction, Advantages, Node.js Process Model, Node JS Modules. **Express.js:** Introduction to Express Framework, Introduction to Nodejs , What is Nodejs, Getting Started with Express, Your first Express App, Express Routing, Implementing MVC in Express, Middleware, Using Template Engines, Error Handling , API Handling , Debugging, Developing Template Engines, Using Process Managers, Security & Deployment.

UNIT IV: RESTful Web Services: Using the Uniform Interface, Designing URIs,
Web Linking, Conditional Requests. **React Js:** Welcome to React, Obstacles and Roadblocks, React's Future, Keeping Up with the Changes, Working with the Files, Pure React, Page Setup, TheVirtual DOM, React Elements, ReactDOM, Children, Constructing Elements with Data, React Components, DOM Rendering, Factories

UNIT V: Mongo DB : Introduction, Architecture, Features, Examples, Database Creation & Collection in Mongo DB. Deploying Applications: Web hosting & Domains, Deployment Using Cloud Platforms.

Text Books:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. Pro Mean Stack Development, ELadElrom, Apress
4. Restful Web Services Cookbook, Subbu Allamraju, O'Reilly
5. JavaScript & jQuery the missing manual, David sawyer mcfarland, O'Reilly
6. Web Hosting for Dummies, Peter Pollock, John Wiley Brand

Reference Books:

1. Ruby on Rails up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
5. Express.JS Guide, The Comprehensive Book on Express.js, Azat Mardan, Lean Publishing.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	I M. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	MACHINE LEARNING				

Course Objectives:

Machine Learning course will

- Develop an appreciation for what is involved in learning from data.
- Demonstrate a wide variety of learning algorithms.
- Demonstrate how to apply a variety of learning algorithms to data.
- Demonstrate how to perform evaluation of learning algorithms and model selection.

Course Outcomes:

After the completion of the course, student will be able to

- Domain Knowledge for Productive use of Machine Learning and Diversity of Data.
- Demonstrate on Supervised and Computational Learning
- Analyze on Statistics in learning techniques and Logistic Regression Illustrate on Support Vector Machines and Perception Algorithm
- Design a Multilayer Perception Networks and classification of decision tree

Unit I: Introduction: Towards Intelligent Machines Well posed Problems, Example of Applications in diverse fields, Data Representation, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured / Unstructured, Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.

Unit II: Supervised Learning: Rationale and Basics: Learning from Observations, Bias and Variance. Why Learning Works: Computational Learning Theory, Occam's Razor Principle and Overfitting Avoidance Heuristic Search in inductive Learning, Estimating Generalization Errors, Metrics for assessing regression, Metris for assessing classification.

Unit III: Statistical Learning: Machine Learning and Inferential Statistical Analysis, Descriptive Statistics in learning techniques, Bayesian Reasoning: A probabilistic approach to inference, K-Nearest Neighbor Classifier. Discriminant functions and regression functions, Linear Regression with Least Square Error Criterion, Logistic Regression for Classification Tasks, Fisher's Linear Discriminant and Thresholding for Classification, Minimum Description Length Principle.

Unit IV: Support Vector Machines (SVM): Introduction, Linear Discriminant Functions for Binary Classification, Perceptron Algorithm, Linear Maximal Margin Classifier for linearly separable data, Linear Soft Margin Classifier for Overlapping Classes, Kernel Induced Feature Spaces, Nonlinear Classifier, and Regression by Support vector Machines.

Learning with Neural Networks: Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear neuron and the Widrow-Hoff Learning Rule, The error correction delta rule.

Unit V: Multilayer Perceptron Networks and error back propagation algorithm, Radial Basis Functions Networks. **Decision Tree Learning**: Introduction, Example of classification decision

tree, measures of impurity for evaluating splits in decision trees, ID3, C4.5, and CART decision trees, pruning the tree, strengths and weakness of decision tree approach.

Textbooks:

1. Applied Machine Learning,1st edition, M.Gopal, McGraw Hill Education,2018
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC) 1st Edition-2014

Reference Books:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William WHsieh, Cambridge Univ Press. *1* edition (August 31, 2009)
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley &SonsInc., 2nd Edition-2001

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	I M. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	CLOUD COMPUTING				

Course Objectives:

- To implement Virtualization
- To implement Task Scheduling algorithms.
- Apply Map-Reduce concept to applications.
- To build Private Cloud.
- Broadly educate to know the impact of engineering on legal and societal issues involved.

Course Outcomes: At the end of the course, student will be able to

- Interpret the key dimensions of the challenge of Cloud Computing.
- Examine the economics, financial, and technological implications for selecting cloud computing for own organization.
- Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
- Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas.
- To Illustrate Virtualization for Data-Center Automation.

UNIT I: Introduction: Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing. **Parallel and Distributed Systems:** Introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets.

UNIT II: Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing, **Cloud Computing:** Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research.

UNIT III: Cloud Resource virtualization: Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades, **Cloud Resource Management and Scheduling**: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feedback control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling.

UNIT IV: Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2), **Cloud Security:** Cloud security risks, security – a top concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks.

UNIT V: Cloud Application Development: Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming (Text Book 1), **Google:** Google App Engine, Google Web Toolkit (Text Book 2), **Microsoft:** Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft Dynamics CRM (Text Book 2).

Text Books:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier
2. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

Reference book:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	I M. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	DIGITAL FORENSICS				

UNIT - I

Computer Forensics Fundamentals: What is Computer Forensics? Use of Computer Forensics in Law Enforecement,Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists.

Types of Computer Forensics Technology: Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology.

UNIT - II

Computer Forensics Evidence and capture: Data Recovery Defined, Data Back-up and Recovery, The Role of Back -up in Data Recovery, The Data -Recovery Solution.

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections,Artifacts,Collection Steps, Controlling Contamination: The chain of custody.

UNIT - III

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence processing steps, Legal Aspects of collecting and Preserving Computer forensic Evidence.

Computer image Verification and Authentication: Special needs of Evidential Authentication

Network Forensics: Network forensic overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

UNIT - IV

E-mail investigations: Exploring the role of email in investigations, exploring the role of client and server in email, investigating email crimes and violations, using specialized email forensic tools.

Processing crime at incident scenes: Collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, Preparing for a search, Securing a Digital incident or crime scene, seizing digital evidence at the scene, Storing digital evidence, obtaining a digital hash, Reviewing a case.

UNIT - V

Current Digital Forensic Tools: Evaluating Digital forensic tool needs, Digital forensic software tools, Digital forensic hardware tools, validating and testing forensic software.

TEXT BOOKS:

1. Computer Forensics, Computer Crime Investigation by John R,Vacca, Firewall Media, New Delhi.

2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.

REFERENCE BOOKS:

1. Real Digital Forensics by Keith j.Jones, Richard Bejitlich,Curtis W.Rose ,AddisonWesley Pearson Education

2. Forensic Compiling,A Tractitioneris Guide by Tony Sammes and Brain Jenkinson,Springer International edition.

3. Computer Evidence Collection &Presentation by Chrostopher L.T. Brown,Firewall Media.

4. Homeland Security ,Techniques& Technologies by Jesus Mena,Firewall Media.

5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade ,TMH 2005 6. Windows Forensics by chad Steel,Wiley India Edition

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	I M. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	4	2
Subject	MEAN STACK TECHNOLOGIES LAB				

Course Objectives:
From the course the student will
● Learn the core concepts of both the frontend and backend programming course.
● Get familiar with the latest web development technologies.
● Learn all about SQL and Mongo databases.
● Learn the complete web development process.

Course Outcomes:
At the end of the course, student will be able to
● Identify the Basic Concepts of Web & Markup Languages.
● Develop web Applications using Scripting Languages & Frameworks.
● Creating & Running Applications using JSP libraries.
● Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ngform.
● Working with the Files in React JS and Constructing Elements with Data.

Experiment-1:
Develop static pages (using only HTML) of an online Book store. The pages should resemble: www.amazon.com. The website should consist of the following pages. Home page
● Registration and user Login
● User profile page
● Books catalog
● Shopping cart
● Payment by credit card Order Confirmation

Experiment-2:
Write an HTML page including any required JavaScript that takes a number from a text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

Experiment-3:
Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:
1. Input: Click on Display Date button using on click ( ) function Output: Display date in the textbox
2. Input: A number n obtained using prompt Output: Factorial of n number using alert
3. Input: A number n obtained using prompt Output: A multiplication table of numbers from 1 to 10 of n using alert

4. Input: A number n obtained using prompt and add another number using confirm Output: Sum of the entire n numbers using alert

Experiment-4:
Create a simple visual bean with an area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click.

Experiment-5:
Create an XML document that contains 10 users' information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAX parser

Experiment-6:
Implement the following in BootStrap
1. Implementation in colors, border padding.
2. Implementation button frames tables, navigation bars.

Experiment-7:
Implement the web applications with Database using
1. Servlets
2. JSP.

Experiment-8:
Write a program to design a simple calculator using
1. JavaScript
2. Servlet
3. JSP.

Experiment-9:
Create registration and login forms with validations using JQuery.

Experiment-10:
Write JS Application to authenticate users using firebase database and change profile picture of the user in edit profile tab.

Experiment-11:
Implement the following in React JS
1. Using React Js creating constructs data elements.
2. Using React Js implementations DoM.

Experiment-12:
Implement the following in AngularJS
1. AngularJS data binding.
2. AngularJS directives and Events.
3. Using angular Js fetching data from MySQL.

Experiment-13:
Develop and demonstrate Invoking data using Javascript from MongoDB.

Experiment-14:
Create an Online fee payment form using Javascript and MangoDB.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	I M. Tech/II Sem	L	T	P	C
Regulation Year	2020-21	0	0	4	2
Subject	MACHINE LEARNING LAB				

Experiment-1:
Write a program to solve the following Machine Learning Methods

(a) Linear Regression
(b) Logistic Regression

Experiment-2:
Write a program to implement Support Vector Machine.

Experiment-3:
Write a program to simulate perception network for pattern classification and function approximation.

Experiment-4:
Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use appropriate dataset for loading the decision tree and apply know less to classify a new sample.

Experiment-5:
Build an artificial neural network by implementing the basic propagation algorithm and use the same for appropriate dataset.

Experiment-6:
Assuming a set of documents that need to be classified, use the naive Bayesian classifier model to perform this task. Built-in java class /API can be used to write the program calculate the accuracy, precision values of dataset.

Experiment-7:
Write a program to implement K-nearest neighbour algorithm to classify the iris dataset.

VISION OF THE INSTITUTION

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

MISSION OF THE INSTITUTION

1. To expand the frontiers of knowledge through Quality Education.
2. To provide valued added Research and Development.
3. To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
4. To provide a platform for synergy of Academy, Industry and Community.
5. To inculcate high standards of Ethical and Professional Behavior.

VISION OF CSE DEPARTMENT

To build a strong teaching-learning base with a flair for innovation and research that responds to the dynamic needs of the software industry and the society.

MISSION OF CSE DEPARTMENT

1. To provide strong foundation both in theory and applications of Computer Science & Engineering, so as to solve real-world problems
2. To empower students with state-of-art knowledge and up to date technological skills, making them globally competent
3. To promote research, innovation and entrepreneurship with focus on industry and social outreach
4. To foster civic minded leadership with ethics and values among students

PROGRAM EDUCATIONAL OBJECTIVES OF CSE DEPARTMENT

1. Graduates will have knowledge of mathematics, science, engineering fundamentals, and in-depth studies in Computer Science Engineering, and will be able to apply them for formulating, analysing and solving real world problems.
2. Graduates will succeed in earning coveted entry level positions in leading Computer Software and Hardware Firms in India and abroad.
3. Graduates will succeed in the pursuit of advanced degrees and research in engineering or other fields and will have skills for continued, independent, lifelong learning and professional development throughout life.
4. Graduates will have good communication skills, leadership qualities, ethical values and will be able to work in teams with due attention to their social responsibilities.

PROGRAM OUTCOMES OF CSE DEPARTMENT

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES OF CSE DEPARTMENT

1. An ability to demonstrate basic knowledge in databases, programming languages and algorithm analysis in the development of software applications.

2. An ability to design and develop projects using open source tools and efficient data structures.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	II M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	DEEP LEARNING				

Course Objectives:
At the end of the course, the students will be expected to:

- Learn deep learning methods for working with sequential data
- Learn deep recurrent and memory neural networks
- Apply deep learning mechanisms to various learning problems
- Know the open issues in deep learning, and have a grasp of the current research directions

Course Outcomes:
After the completion of the course, student will be able to

- Demonstrate the basic concepts of fundamental learning techniques and layers
- Discuss the Neural Network training, various random models
- Explain different types of deep learning network models
- Classify the Probabilistic Neural Networks
- Implement tools on Deep Learning techniques

UNIT I:
Introduction: Various paradigms of learning problems, Perspectives and Issues in deep learning framework, review of fundamental learning techniques. Feed forward neural network: Artificial Neural Network, activation function, multi-layer neural network.

UNIT II:
Training Neural Network: Risk minimization, loss function, back propagation, regularization, model selection, and optimization.
Conditional Random Fields: Linear chain, partition function, Markov network, Belief propagation, Training CRFs, Hidden Markov Model, Entropy.

UNIT III:
Deep Learning: Deep Feed Forward network, regularizations, training deep models, dropouts, Convolution Neural Network, Recurrent Neural Network, and Deep Belief Network.

UNIT IV:
Probabilistic Neural Network: Structured probabilistic models for deep learning. Boltzmann machine, RBMs, **Auto encoders** – Regularized autoencoders, Stochastic Encoders and Decoders, Denoising, Applications.

UNIT V:
Applications: Object recognition, sparse coding, computer vision, natural language processing. **Introduction to Deep Learning Tools**: Keras, Torch.

Text Books:

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016..
2. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

Reference Books:

1. Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009.
2. Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013.
3. Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-Hill Education, 2004.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Year/Semester	II M. Tech/I Sem	L	T	P	C
Regulation Year	2020-21	3	0	0	3
Subject	WIRELESS SENSOR NETWORKS				

Course Objectives:
• Architect sensor networks for various application setups.
• Devise appropriate data dissemination protocols and model links cost.
• Understandings of the fundamental concepts of wireless sensor networks and have a basic knowledge of the various protocols at various layers
• Evaluate the performance of sensor networks and identify bottlenecks

Course Outcomes:
After the completion of the course, student will be able to
• Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks
• Discuss the MAC protocol issues of ad hoc networks
• Enumerate the concept of routing protocols for ad hoc wireless networks with respect to TCP design issues
• Analyze & Specify the concepts of network architecture and MAC layer protocol for WSN
• Discuss the WSN routing issues by considering QoS measurements

UNIT I:
Introduction : Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, Radio propagation Mechanisms ,Characteristics of the Wireless channel ,**Mobile ad hoc networks (MANETs) and Wireless Sensor Networks (WSNs):** concepts and architectures, Applications of Ad Hoc and Sensor Networks, Design Challenges in Ad hoc and Sensor Networks.

UNIT II:
MAC Protocols For Ad Hoc Wireless Networks: Issues in designing a MAC Protocol, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks, Design Goals of a MAC Protocol for Ad Hoc Wireless Networks, Classification of MAC Protocols, Contention based protocols, Contention based protocols with Reservation Mechanisms, Contention based protocols with Scheduling Mechanisms, Multi channel MAC - IEEE 802.11.

UNIT III:
Routing Protocols And Transport Layer In Ad Hoc Wireless Networks: Routing Protocol: Issues in designing a routing protocol for Ad hoc networks, Classification, proactive routing, reactive routing (on-demand), hybrid routing, Transport Layer protocol for Ad hoc networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer solutionsTCP over Ad hoc wireless, Network Security, Security in Ad Hoc Wireless Networks, Network Security Requirements.

UNIT IV:
Wireless Sensor Networks (WSNS) And Mac Protocols: Single node architecture - hardware and software components of a sensor node, **WSN Network architecture:** typical

network architectures, data relaying and aggregation strategies, **MAC layer protocols:** selforganizing, Hybrid TDMA/FDMA and CSMA based MAC -IEEE 802.15.4.

UNIT V:

WSN Routing, Localization & Qos: Issues in WSN routing, OLSR, Localization, Indoor and Sensor Network Localization, absolute and relative localization, triangulation, QOS in WSN, Energy Efficient Design, Synchronization.

Text Books:

1. "Ad Hoc Wireless Networks: Architectures and Protocols ", C. Siva Ram Murthy, and B. S. Manoj, Pearson Education, 2008
2. “Wireless Adhoc and Sensor Networks”, Labiod. H, Wiley, 2008
3. “Wireless ad -hoc and sensor Networks: theory and applications”, Li, X, Cambridge University Press, 2008.

Reference Books:

1. “Ad Hoc & Sensor Networks: Theory and Applications”, 2nd edition, Carlos De Morais Cordeiro, Dharma Prakash Agrawal ,World Scientific Publishing Company, 2011
2. "Wireless Sensor Networks", Feng Zhao and Leonides Guibas,Elsevier Publication.
3. “Protocols and Architectures for Wireless Sensor Networks”, Holger Karl and Andreas Willig,Wiley, 2005 (soft copy available)
4. “Wireless Sensor Networks Technology, Protocols, and Applications”, Kazem Sohraby, Daniel Minoli, & TaiebZnati, John Wiley, 2007. (soft copy available)

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

VISHNU INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE, New Delhi Permanently Affiliated to JNTUK, Kakinada, Accredited by NBA and NAAC),
Vishnupur, Bhimavaram-534202, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE
For
MASTER OF TECHNOLOGY
in
DIGITAL ELECTRONICS AND COMMUNICATION SYSTEMS

VISHNU INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

I SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	**Core I:** Digital System Design	3	-	3	40	60
2.	**Core II:** Detection & Estimation Theory	3	-	3	40	60
3.	**Program Specific Elective I**					
	Advanced Digital Signal Processing	3	-	3	40	60
	Optical Communication Technology					
	Transform Techniques					
4.	**Program Specific Elective II**					
	Digital Data Communications	3	-	3	40	60
	Statistical Signal Processing					
	Internet of Things					
5.	Lab1: System Design and Data Communications Lab	-	4	2	40	60
6.	Lab2: Advanced Digital Signal Processing Lab	-	4	2	40	60
7.	Research Methodology	2	-	2	50	-
8.	**Audit Course I**	2	-	-	-	-
	English for Research Paper Writing					
	Total	**16**	**8**	**18**	**290**	**360**
					650	

II SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	**Core III:** Wireless Communications	3	-	3	40	60
2.	**Core IV:** Coding Theory & Applications	3	-	3	40	60
3.	**Programme Specific Elective III**					
	Radar Signal Processing	3	-	3	40	60
	Spread- Spectrum Techniques					
	Soft Computing Techniques					
4.	**Programme Specific Elective IV**					
	Image and Video Processing	3	-	3	40	60
	VLSI Technology & Design					
	Embedded System Design					
5.	Lab1: Advanced Communications Lab	-	4	2	40	60
6.	Lab2:Advanced Image Processing Lab	-	4	2	40	60
7.	Mini Project	-	4	2	50	-
8.	**Audit Course II**	2	-	-	-	-
	Pedagogy Studies					
	Total	**14**	**12**	**18**	**290**	**360**
					650	

III SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	**Program Specific Elective V**					
	DSP Processors and Architectures	3	-	3	40	60
	EMI / EMC					
	CMOS Analog & Digital IC Design					
2.	**Open Elective**					
	Reliability Engineering	3	-	3	40	60
	MEMS and its Applications					
	Real Time Operating Systems					
3.	Dissertation Phase – I	-	20	10	-	-
	Total	**`6**	**20**	**16**	**80**	**120**
					200	

IV SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	Dissertation Phase – II	-	32	16	-	**Grade**
	Total	**-**	**32**	**16**	**-**	**Grade**

I SEMESTER

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

R19 M.Tech.(DECS) SYLLABUS

Course Name	DIGITAL SYSTEM DESIGN			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT-I: Minimization Procedures

Minimization of switching functions using k-map, tabular methods or QM algorithm. Introduction to cube based algorithms, Determination of selected cubes are wholly within the given switching function or not.

UNIT-II: CAMP Algorithm

CAMP-I algorithm, Phase-I: Determination of Adjacencies, DA, CSC, SSMs and EPCs, CAMP-algorithm, Phase-II: Passport checking, Determination of SPC. CAMP-II algorithm: Determination of solution cube, Cube based operations,

UNIT -III: PLA Design, Minimization and Folding Algorithms

Introduction and Block diagram of PLA, size of PLA, PLA design aspects, PLA minimization algorithm (IISc algorithm), PLA folding algorithm (COMPACT algorithm) with suitable examples.

UNIT-IV: Fault Diagnosis in Combinational Circuits

Faults classes and models, fault diagnosis and testing, fault detection test, test generation, testing process, obtaining a minimal complete test set, circuit under test methods - Path sensitization method, Boolean difference method, Kohavi algorithm, faults in PLAs.

UNIT-V: Fault Diagnosis in Sequential Circuits

Fault detection and location in sequential circuits, circuit test approach, initial state identification, Haming experiments, synchronizing experiments, machine identification, distinguishing experiment, adaptive distinguishing experiments.

TEXT BOOKS:

1. Logic Design Theory-N. N. Biswas, PHI
2. Switching and Finite Automata Theory-Z. Kohavi , 2nd Edition, 2001, TMH
3. Digital system Design using PLDs - Lala

REFERENCE BOOKS:

1. Fundamentals of Logic Design – Charles H. Roth, 5th Ed., Cengage Learning.
2. Digital Systems Testing and Testable Design – Miron Abramovici, Melvin A. Breuer and Arthur D. Friedman- John Wiley & Sons Inc.

Course Name	DETECTION AND ESTIMATION THEORY			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Random Processes

Discrete Linear Models, Markov Sequences and Processes, Point Processes, and Gaussian Processes.

UNIT –II: Detection Theory

Basic Detection Problem, Maximum A posteriori Decision Rule, Minimum Probability of Error Classifier, Bayes Decision Rule, Neyman-Pearson Classifier, General Calculation of Probability of Error, Detection with Multiple observation and unknown parameters.

UNIT –III: Linear Minimum Mean-Square Error Filtering

Linear Minimum Mean Squared Error Estimators, Nonlinear Minimum Mean Squared Error Estimators, Kalman Filters, Wiener Filters.

UNIT –IV: Statistics-I

Measurements, Nonparametric Estimators of Probability Distribution and Density Functions, Point Estimators of Parameters, Measures of the Quality of Estimators, Tests of Hypotheses, Simple Linear Regression, Multiple Linear Regression.

UNIT –V: Statistics-II

Distribution of Estimators – Binomial distribution, Poisson Distribution, Normal Distribution, Students t-distribution, Chi-square distribution, Goodness of fit test

TEXT BOOKS:

1. Random Signals: Detection, Estimation and Data Analysis - K. Sam Shanmugan & A.M. Breipohl, Wiley India Pvt. Ltd, 2011.
2. Random Processes: Filtering, Estimation and Detection - Lonnie C. Ludeman, Wiley India Pvt. Ltd., 2010.
3. Probability and Statistics for Engineers and Scientists - Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying E. Ye, Pearson, 9th Edition, 2012

REFERENCE BOOKS:

1. Fundamentals of Statistical Signal Processing: Volume I Estimation Theory– Steven. M. Kay, Prentice Hall, USA, 1998.
2. Fundamentals of Statistical Signal Processing: Volume I Detection Theory– Steven.M. Kay, Prentice Hall, USA, 1998.
3. Introduction to Statistical Signal Processing with Applications - Srinath, Rajasekaran, Viswanathan, 2003, PHI.
4. Statistical Signal Processing: Detection, Estimation and Time Series Analysis – Louis L. Scharf, 1991, Addison Wesley.

5. Detection, Estimation and Modulation Theory: Part – I – Harry L. Van Trees, 2001, John Wiley & Sons, USA.
6. Signal Processing: Discrete Spectral Analysis – Detection & Estimation – Mischa Schwartz, Leonard Shaw, 1975, Mc Graw Hill.

Course Name	ADVANCED DIGITAL SIGNAL PROCESSING (Program Elective I)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Digital Filters

Introduction to DFT, FFT, IIR Filters and FIR Filters with applications.

UNIT –II: Multi Rate Signal Processing

Introduction, Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Multistage Implementation of Sampling Rate Conversion, Filter design & Implementation for sampling rate conversion.

UNIT –III: Applications of Multi Rate Signal Processing

Design of Phase Shifters, Interfacing of Digital Systems with Different Sampling Rates, Implementation of Narrow Band Low Pass Filters, Implementation of Digital Filter Banks, Sub-band Coding of Speech Signals, Quadrature Mirror Filters, Trans-multiplexers, Over Sampling A/D and D/A Conversion.

UNIT -IV: Non-Parametric Methods of Power Spectral Estimation

Estimation of spectra from finite duration observation of signals, Non-parametric Methods: Bartlett, Welch & Blackman-Tukey methods, Comparison of all Non-Parametric methods

UNIT –V: Implementation of Digital Filters

Introduction to filter structures (IIR & FIR), Frequency sampling structures of FIR, Lattice structures, Forward prediction error, Back ward prediction error, Reflection coefficients for lattice realization, Implementation of lattice structures for IIR filters, Advantages of lattice structures.

TEXT BOOKS:

1. Digital Signal Processing: Principles, Algorithms & Applications - J.G.Proakis & D. G. Manolakis, 4th Ed., PHI.
2. Discrete Time Signal Processing - Alan V Oppenheim & R. W Schaffer, PHI.
3. DSP – A Practical Approach – Emmanuel C. Ifeacher, Barrie. W. Jervis, 2 Ed., Pearson Education.

REFERENCE BOOKS:

1. Modern Spectral Estimation: Theory & Application – S. M .Kay, 1988, PHI.
2. Multi Rate Systems and Filter Banks – P.P.Vaidyanathan – Pearson Education.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya, 2000,TMH
4. Digital Spectral Analysis – Jr. Marple

Course Name	OPTICAL COMMUNICATIONS TECHNOLOGY (Program Elective I)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Signal propagation in Optical Fibers

Geometrical Optics approach and Wave Theory approach, Loss and Bandwidth, Chromatic Dispersion, Non Linear effects- Stimulated Brillouin and Stimulated Raman Scattering, Propagation in a Non-Linear Medium.

UNIT –II: Fiber Optic Components for Communication

Couplers, Isolators and Circulators, Multiplexers, Bragg Gratings, Fabry-Perot Filters, Mach Zender Interferometers, Arrayed Waveguide Grating, Tunable Filters, High Channel Count Multiplexer Architectures, Optical Amplifiers, Direct and External Modulation Transmitters, Pump Sources for Amplifiers, Optical Switches and Wavelength Converters.

UNIT –III: Modulation and Demodulation

Signal formats for Modulation, Subcarrier Modulation and Multiplexing, Optical Modulations – Duobinary, Single Side Band and Multilevel Schemes, Ideal and Practical receivers for Demodulation.

UNIT -IV: Transmission System Engineering

System Model, Power Penalty in Transmitter and Receiver, Optical Amplifiers, Crosstalk and Reduction of Crosstalk, Cascaded Filters, Dispersion Limitations and Compensation Techniques.

UNIT –V: Fiber Non-linearities and System Design Considerations

Limitation in High Speed and WDM Systems due to Non-linearities in Fibers, Wavelength Stabilization against Temperature Variations, Overall System Design considerations – Fiber Dispersion, Modulation, Non-Linear Effects, Wavelengths, All Optical Networks.

TEXT BOOKS:

1. Optical Networks: A Practical Perspective - Rajiv Ramaswami and Kumar N.Sivarajan, 2nd Ed., 2004, Elsevier Morgan Kaufmann Publishers (An Imprint of Elsevier).
2. Optical Fiber Communications – Gerd Keiser, 3rdEd., 2000, McGraw Hill.

REFERENCE BOOKS:

1.Optical Fiber Communications: Principles and Practice – John.M.Senior, 2nd Ed., 2000, PE.
2.Fiber Optics Communication – Harold Kolimbris, 2nd Ed., 2004, PEI
3.Optical Networks: Third Generation Transport Systems – Uyless Black, 2nd Ed., 2009, PEI
4.Optical Fiber Communications – Govind Agarwal, 2nd Ed., 2004, TMH.
5.Optical Fiber Communications and Its Applications – S.C.Gupta, 2004, PHI.

Course Name	TRANSFORM TECHNIQUES (Program Elective I)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT -I: Fourier Analysis

Fourier series, Examples, Fourier Transform, Properties of Fourier Transform, Examples of Fourier transform, sampling theorem, Partial sum and Gibbs phenomenon, Fourier analysis of Discrete time Signals, Discrete Fourier Transform.

UNIT –II: Time – Frequency Analysis

Window function, Short Time Fourier Transform, Discrete Short Time Fourier Transform, Continuous wavelet transform, Discrete wavelet transform, wavelet series, Interpretations of the Time-Frequency plot.

UNIT -III: Transforms

Walsh, Hadamard, Haar and Slant Transforms, DCT, DST, KLT, Singular value Decomposition – definition, properties and applications

UNIT -IV: Continuous Wavelet Transform (CWT)

Short comings of STFT, Need for wavelets, Wavelet Basis- Concept of Scale and its relation with frequency, Continuous time wavelet Transform Equation- Series Expansion using Wavelets- CWT- Tiling of time scale plane for CWT. Important Wavelets: Haar, Mexican Hat, Meyer, Shannon, Daubechies.

UNIT -V: Multi Rate Analysis and DWT

Need for Scaling function – Multi Resolution Analysis, Two-Channel Filter Banks, Perfect Reconstruction Condition, Relationship between Filter Banks and Wavelet Basis, DWT, Structure of DWT Filter Banks, Daubechies Wavelet Function, Applications of DWT.

TEXT BOOKS:

1. A Wavelet Tour of Signal Processing theory and applications -RaghuveerM.Rao and Ajit S. Bopardikar, Pearson Edu, Asia, New Delhi, 2003.
2. K.P.Soman and K.I Ramachandran, " Insight into Wavelets – from theory to practice" PHI, Second edition,2008

REFERENCE BOOKS:

1. Fundamentals of Wavelets- Theory, Algorithms and Applications -Jaideva C Goswami, Andrew K Chan, John Wiley & Sons, Inc, Singapore, 1999.
2. Jaideva C. Goswami and Andrew K.Chan, " Fundamentals of Wavelets" Wiley publishers, 2006
3. A Wavelet Tour of Signal Processing-Stephen G. Mallat, Academic Press, 2 Ed
4. Digital Image Processing – S.Jayaraman, S.Esakkirajan, T.Veera Kumar – TMH,2009

Course Name	DIGITAL DATA COMMUNICATIONS (Program Elective II)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT -I: Digital Modulation Schemes

BPSK, QPSK, 8PSK, 16PSK, 8QAM, 16QAM, DPSK – Methods, Band Width Efficiency, Carrier Recovery, Clock Recovery.

UNIT -II: Basic Concepts of Data Communications and Interfaces

Data Communication Networks, Protocols and Standards, UART, USB, Line Configuration, Topology, Transmission Modes, Digital Data Transmission, DTE-DCE interface.

UNIT -III: Data Link Control and Data Link Protocols

Line Discipline, Flow Control, Error Control. Asynchronous Protocols, Synchronous Protocols, Character Oriented Protocols, Bit-Oriented Protocol, and Link Access Procedures.

UNIT -IV: Local Area Networks, Metropolitan Area Networks, Switching, and Networking and Interfacing Devices

Ethernet, Other Ether Networks, Token Bus, Token Ring, FDDI.IEEE 802.6, SMDS. Circuit Switching, Packet Switching, Message Switching. Repeaters, Bridges, Routers, Gateway, Other Devices.

UNIT -V: Multiple Access Techniques

Frequency- Division Multiple Access (FDMA), Time - Division Multiple Access (TDMA), Code - Division Multiple Access (CDMA), OFDM and OFDMA. Random Access, Aloha- Carrier Sense Multiple Access (CSMA) - Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), Controlled Access- Reservation- Polling- Token Passing, Channelization.

TEXT BOOKS:

1. Data Communication and Computer Networking - B. A.Forouzan, 2nd Ed., 2003, TMH.
2. Advanced Electronic Communication Systems - W. Tomasi, 5th Ed., 2008, PEI.

REFERENCE BOOKS:

1. Data Communications and Computer Networks - Prakash C. Gupta, 2006, PHI.
2. Data and Computer Communications - William Stallings, 8th Ed., 2007, PHI.
3. Data Communication and Tele Processing Systems -T. Housely, 2nd Ed, 2008, BSP.
4. Data Communications and Computer Networks- Brijendra Singh, 2nd Ed., 2005, PHI.

Course Name	STATISTICAL SIGNAL PROCESSING (Program Elective II)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT I: Signal models and characterization

Types and properties of statistical models for signals and how they relate to signal processing, Common second-order methods of characterizing signals including auto correlation, partial correlation, cross-correlation, power spectral density and cross-power spectral density.

UNIT II: Spectral estimation

Nonparametric methods for estimation of power spectral density, autocorrelation, cross-correlation, transfer functions, and coherence form finite signal samples.

UNIT III: Review of signal processing and Statistical parameter estimation

A review on random processes, A review on filtering random processes, Examples: Maximum like hood estimation, maximum a posterior estimation, Cramer-Rao bound.

UNIT IV: Eigen structure based frequency estimation and Spectrum estimation

Pisarenko, MUSIC, ESPRIT their application sensor array direction finding. Moving average (MA), Auto Regressive (AR), Auto Regressive Moving Average (ARMA), various non-parametric approaches.

UNIT V: Wiener filtering

The finite impulse case, causal and non-causal infinite impulse responses cases, Least mean squares adaptation, recursive least squares adaptation, Kalman filtering.

TEXT BOOKS:

1. Steven M.Kay, fundamentals of statistical signal processing: estimation Theory, Pretice-Hall, 1993.
2. Monsoon H. Hayes, Stastical digital signal processing and modeling, USA, Wiley, 1996.

REFERENCE BOOKS:

1.Dimitris G. Manolakis, Vinay K. Ingle, and Stephen M. Kogon, Statistical and adaptive signal processing, Artech House, Inc,2005.

Course Name	INTERNET OF THINGS (Program Elective II)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT I

Introduction & Concepts: Introduction to Internet of Things, Physical Design of IOT, Logical Design of IOT, IOT Enabling Technologies, IOT Levels.

UNIT II

Domain Specific IOTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

UNIT III

M2M & System Management with NETCONF-YANG: M2M, Difference between IOT and M2M, SDN and NFV for IOT, Software-defined Networking, Network Function Virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IOT Systems management with NETCONF-YANG.

UNIT IV

Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages.

UNIT V

IOT Physical Devices & Endpoints: What is an IOT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, and Programming & IOT Devices.

TEXT BOOKS:

1. Vijay Madisetti, ArshdeepBahga," Internet of Things A Hands-On- Approach",2014,

REFERENCE BOOKS:

1. Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013
2. Daniel Kellmereit, "The Silent Intelligence: The Internet of Things". 2013.

Course Name	RESEARCH METHODOLOGY			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	2	0	2

UNIT I

Research Foundation: Motivation and objectives – Research methods, Methodology. Types of research, Defining and formulating the research problem, Hypothesis – Qualities of a good Hypothesis, Hypothesis Testing – Logic & Importance

UNIT II

Literature Review: primary and secondary sources, Effective literature studies approaches, analysis, identifying gap areas from literature and research database.

UNIT III

Data Collection And Analysis: Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), hypothesis testing.

UNIT IV

Research Ethics: Plagiarism, Research ethics, IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, reproducibility and accountability.

UNIT V

Interpretation and Report Writing: Significance of Report Writing, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

REFERENCES

1.Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
2.Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing.
3. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
4. Stuart Melville and Wayne Goddard, 1996. Research methodology: an introduction for science

& engineering students, Kenwyn, South Africa : Juta & Co. Ltd.,
5. T. Ramappa, 2008, Intellectual Property Rights Under WTO, S. Chand.

ADDITIONAL READING

1.Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
2.Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
4. Day, R.A., 1992. How to Write and Publish a Scientific Paper, Cambridge University Press.
5. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
6. Ranjit Kumar, 2 nd Edition, "Research Methodology: A Step by Step Guide for beginners"

Course Name	ENGLISH FOR RESEARCH PAPER WRITING (Audit Course I)			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	2	0	0

UNIT I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT 2

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

UNIT 3

Review of the Literature, Methods, Results, Discussion, Conclusions, the Final Check.

UNIT 4

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature.

UNIT 5

Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the conclusions.

UNIT 6

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

REFERENCES:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman‟s book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Course Name	SYSTEMS DESIGN AND DATA COMMUNICATIONS LAB			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	0	4	2

Part-A: Systems Design Lab

Any 6 experiments are simulated and synthesized using XILINX

List of experiments:

1. Realization of Logic Gates
2. 3 TO 8 Decoder Design
3. Multiplexer Design
4. RAM Design
5. ROM Design
6. Implementation of Bus Using Registers
7. Implementation of Bus Using Multiplexers
8. Control Unit and Data Processor Logic Design
9. Kohavi algorithm.
10. Hamming experiments.

Part-B: Data Communications Lab

Any 4 experiments are simulated using ST 5001 Software/ NS2 Software

1. Study of serial interface RS – 232
2. Study of pc to pc communication using parallel port
3. To establish pc-pc communication using LAN
4. Study of LAN using star topology, bus topology and tree topology
5. To configure a hub/switch
6. To study the interconnections of cables for data communication
7. Study of a wireless communication system

Course Name	ADVANCED DIGITAL SIGNAL PROCESSING LAB			
Semester	M. Tech / I Sem	L	P	C
Regulation Year	2020-21	0	4	2

Any 12 experiments simulated using MATLAB

List of Experiments:

1. Basic Signal Representation
2. Correlation Auto And Cross
3. Stability Using Hurwitz Routh Criteria
4. Sampling FFT of Input Sequence
5. Butterworth Low pass And High pass Filter Design
6. Chebychev Type I, II Filter
7. State Space Matrix from Differential Equation
8. Normal Equation Using Levinson Durbin
9. Decimation and Interpolation Using Rationale Factors
10. Maximally Decimated Analysis DFT Filter
11. Cascade Digital IIR Filter Realization
12. Convolution and M Fold Decimation &PSD Estimator
13. Estimation of PSD
14. Inverse Z Transform
15. Group Delay Calculation
16. Separation of T/F
17. Parallel Realization of IIR filter

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

II SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	**Core III:** Wireless Communications	3	-	3	40	60
2.	**Core IV:** Coding Theory & Applications	3	-	3	40	60
3.	**Programme Specific Elective III**					
	Radar Signal Processing	3	-	3	40	60
	Spread- Spectrum Techniques					
	Soft Computing Techniques					
4.	**Programme Specific Elective IV**					
	Image and Video Processing	3	-	3	40	60
	VLSI Technology & Design					
	Embedded System Design					
5.	Lab1: Advanced Communications Lab	-	4	2	40	60
6.	Lab2:Advanced Image Processing Lab	-	4	2	40	60
7.	Mini Project	-	4	2	50	-
8.	**Audit Course II**	2	-	-	-	-
	Pedagogy Studies					
	Total	**14**	**12**	**18**	**290**	**360**
					650	

II SEMESTER

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

R19 M.Tech.(DECS) SYLLABUS

Course Name	WIRELESS COMMUNICATIONS			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT -I: The Cellular Concept and System Design Fundamentals

Introduction, Frequency Reuse, Interference and system capacity – Co channel Interference and system capacity, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Trunking and Grade of Service

UNIT –II: Mobile Radio Propagation (Large-Scale Path Loss)

Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, Basic Propagation Mechanisms, Reflection: Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction: Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models- Longley-Ryce Model, Okumura Model, Hata Model, Log-distance path loss model, Attenuation Factor Model, Signal penetration into buildings, Ray Tracing and Site Specific Modeling.

UNIT –III: Mobile Radio Propagation (Small –Scale Fading and Multipath–I)

Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time.

UNIT –IV: Mobile Radio Propagation (Small –Scale Fading and Multipath–II)

Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke"s model for flat fading, spectral shape due to Doppler spread in Clarke"s model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT -V: Equalization and Diversity

Introduction, Fundamentals of Equalization, Training a Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-linear Equalization. Diversity -Derivation of selection, Diversity improvement, Derivation of Maximal Ratio Combining improvement,

Practical Space Diversity Consideration-Selection Diversity, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

TEXT BOOKS:

1. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002, PHI.
2. Wireless Communications-Andrea Goldsmith, 2005 Cambridge University Press.
3. Mobile Cellular Communication – Gottapu Sasi bhushana Rao, Pearson Education, 2012.

REFERENCE BOOKS:

1. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, 2002, PE
2. Wireless Digital Communications – Kamilo Feher, 1999, PHI.
3. Wireless Communication and Networking – William Stallings, 2003, PHI.
4. Wireless Communication – Upen Dalal, Oxford Univ. Press
5. Wireless Communications and Networking – Vijay K. Gary, Elsevier.

Course Name	CODING THEORY AND APPLICATIONS			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Coding for Reliable Digital Transmission and Storage

Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

UNIT –II: Linear Block Codes

Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT –III: Cyclic Codes

Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding ,Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT –IV: Convolutional Codes

Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT –V: Burst –Error-Correcting Codes and BCH – Codes:

Decoding of Single-Burst error Correcting Cyclic codes, Single-Burst-Error-Correcting Cyclic codes, Burst-Error-Correcting Convolutional Codes, Bounds on Burst Error-Correcting Capability, Interleaved Cyclic and Convolutional Codes, Phased-Burst –Error-Correcting Cyclic and Convolutional codes. BCH code- Definition, Minimum distance and BCH Bounds, Decoding Procedure for BCH Codes- Syndrome Computation and Iterative Algorithms, Error Location Polynomials and Numbers for single and double error correction

TEXT BOOKS:

1. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello, Jr, Prentice Hall, Inc.
2. Error Correcting Coding Theory-Man Young Rhee- 1989, McGraw-Hill Publishing.

REFERENCE BOOKS:

1. Digital Communications-Fundamental and Application - Bernard Sklar, PE.
2. Digital Communications- John G. Proakis, 5th Ed., 2008, TMH.
3. Introduction to Error Control Codes-Salvatore Gravano-oxford
4. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, Wiley India.
5. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Ed, 2009, TMH.

Course Name	RADAR SIGNAL PROCESSING (Program Elective III)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT -I:

Introduction: Radar Block Diagram, Bistatic Radar, Monostatic Radar, Radar Equation, Information Available from Radar Echo. Review of Radar Range Performance– General Radar Range Equation, Radar Detection with Noise Jamming, MTI and Pulse Doppler Radar. Matched Filter Receiver – Impulse Response, Frequency Response Characteristics and its Derivation, Cross Correlation Receiver, Matched Filter for Non-White Noise.

UNIT -II:

Detection of Radar Signals in Noise: Detection Criteria – Neyman-Pearson Observer, Likelihood-Ratio Receiver, Inverse Probability Receiver, Sequential Observer, Detectors– Envelope Detector, Logarithmic Detector, I/Q Detector. Automatic Detection-CFAR Receiver, Cell Averaging CFAR Receiver, CFAR Loss, CFAR Uses in Radar. Radar Signal Management– Schematics, Component Parts, Resources and Constraints.

UNIT -III:

Waveform Selection: Radar Ambiguity Function and Ambiguity Diagram – Principles and Properties; Specific Cases – Ideal Case, Single Pulse of Sine Wave, Periodic Pulse Train, Single Linear FM Pulse, Noise Like Waveforms, Waveform Design Requirements, Optimum Waveforms for Detection in Clutter.

UNIT -IV:

Pulse Compression in Radar Signals: Introduction, Significance, Types, Linear FM Pulse Compression – Block Diagram, Characteristics, Reduction of Time Side lobes, Stretch Techniques, Generation and Decoding of FM Waveforms – Block Schematic and Characteristics of Passive System, Digital Compression, SAW Pulse Compression.

UNIT V:

Phase Coding Techniques: Principles, Binary Phase Coding, Barker Codes, Maximal Length Sequences (MLS/LRS/PN). Poly Phase Codes : Frank Codes, Costas Codes, Non-Linear FM Pulse Compression, Doppler Tolerant PC Waveforms – Short Pulse, Linear Period Modulation (LPM/HFM), Side lobe Reduction for Phase Coded PC Signals.

TEXT BOOKS:

1. Radar Handbook - M.I. Skolnik, 2nd Ed., 1991, McGraw Hill.

2. Radar Design Principles: Signal Processing and the Environment - Fred E. Nathanson, 2nd Ed., 1999, PHI.
3. Introduction to Radar Systems - M.I. Skolnik, 3rd Ed., 2001, TMH.

REFERENCE BOOKS:

1. Radar Principles - Peyton Z. Peebles, Jr., 2004, John Wiley.
2. Radar Signal Processing and Adaptive Systems - R. Nitzberg, 1999, Artech House.

Course Name	SPREAD SPECTRUM TECHNIQUES (Program Elective III)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT -I: INTRODUCTION TO SPREAD SPECTRUM SYSTEMS

Communication in the presence of pulse noise jamming - Low probability detection scheme - Direct sequence spread spectrum methods - Frequency Hop spread spectrum methods - Hybrid DS/FH spread spectrum - Complex envelope representation of spread spectrum systems - examples of Spread Spectrum Systems

UNIT -II: MULTICARRIER SPREAD SPECTRUM SYSTEMS

Amalgamating DS-CDMA and OFDM - Multi-Carrier CDMA techniques – MC CDMA – MC DS CDMA – MT CDMA

UNIT -III: BINARY SHIFT REGISTER SEQUENCES FOR SPREAD SPECTRUM SYSTEMS

Definition - PN sequence generator fundamentals - Maximal length sequences - Properties, Power spectrum and Polynomial tables for maximal length sequences - Gold codes - Rapid Acquisition systems - Non-linear code generators.

UNIT -IV: SYNCHRONIZATION OF SPREAD SPECTRUM SYSTEMS:

Optimal tracking of wideband signals - Early-late tracking loops - Code tracking loops for FHSS - Optimum synchronization techniques - Multiple dwell and sequential detectors - Synchronization using a matched filter - Synchronization by estimating the received spreading code.

UNIT -V: PERFORMANCE OF SPREAD SPECTRUM SYSTEM

SS Systems communications models - Performance without coding under AWGN and different jamming environments - spread spectrum systems performances with forward error correction - Block coding - Convolutional coding and specific error correcting codes - Inter leaving - Random coding bounds.

TEXT BOOKS:

1. Rodger E Ziemer, Roger L. Peterson and David E Borth, “Introduction to Spread Spectrum Communication”, Pearson, 1st Edition, 1995.
2. Mosa Ali Abu-Rgheff – “Introduction to CDMA Wireless Communications”, Elsevier Publications, 2008.

3. Hanzo L and Keller T, “OFDM and MC-CDMA: A Primer”, John Wiley and sons Ltd., 2006.
4. Dixon R C, “Spread Spectrum Systems with Commercial Applications”, John Wiley & Sons, 1994.
5. Holms J K, "Coherent Spread Spectrum Systems", Wiley Inderscience, 1982.

REFERENCE BOOKS:

1. George R. Cooper, Clare D. Mc Gillem, “Modern Communication and Spread Spectrum”, McGraw Hill, 1986.
2. Andrew j. Viterbi – “CDMA: Principles of spread spectrum communication”, Pearson Education, 1st Edition, 1995.
3. Kamilo Feher, “Wireless Digital Communications”, PHI, 2009.
4. Ziemer R E and Peterson R L, "Digital Communication and Spread Spectrum Systems", Macmillan Publishing Co., 1985.
5. Andrew Richardson, “WCDMA Design Handbook”, Cambridge University Press, 2005.
6. Steve Lee, “Spread Spectrum CDMA”, McGraw Hill, 2002.

Course Name	SOFT COMPUTING TECHNIQUES (Program Elective III)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Introduction

Approaches to intelligent control, Architecture for intelligent control, Symbolic reasoning system, Rule-based systems, the AI approach, and Knowledge representation - Expert systems.

UNIT –II: Artificial Neural Networks

Concept of Artificial Neural Networks and its basic mathematical model, McCulloch-Pitts neuron model, simple perceptron, Adaline and Madaline, Feed-forward Multilayer Perceptron, Learning and Training the neural network, Data Processing: Scaling, Fourier transformation, principal-component analysis and wavelet transformations, Hopfield network, Self-organizing network and Recurrent network, Neural Network based controller.

UNIT –III: Fuzzy Logic System

Introduction to crisp sets and fuzzy sets, basic fuzzy set operation and approximate reasoning, Introduction to fuzzy logic modeling and control, Fuzzification, inferencing and defuzzification, Fuzzy knowledge and rule bases, Fuzzy modeling and control schemes for nonlinear systems, Self-organizing fuzzy logic control, Fuzzy logic control for nonlinear time delay system.

UNIT –IV: Genetic Algorithm

Basic concept of Genetic algorithm and detail algorithmic steps, Adjustment of free parameters, Solution of typical control problems using genetic algorithm, Concept on some other search techniques like Tabu search and an D-colony search techniques for solving optimization problems.

UNIT –V: Applications

GA application to power system optimization problem, Case studies: Identification and control of linear and nonlinear dynamic systems using MATLAB-Neural Network toolbox, Stability analysis of Neural-Network interconnection systems, Implementation of fuzzy logic controller using MATLAB fuzzy-logic toolbox, Stability analysis of fuzzy control systems.

TEXT BOOKS:

1. Introduction to Artificial Neural Systems - Jacek. M. Zurada, Jaico Publishing House, 1999.
2. Neural Networks and Fuzzy Systems - Kosko, B., Prentice-Hall of India Pvt. Ltd., 1994.

REFERENCE BOOKS:

1. Fuzzy Sets, Uncertainty and Information - Klir G.J. &Folger T.A., Prentice-Hall of India Pvt. Ltd., 1993.
2. Fuzzy Set Theory and Its Applications - Zimmerman H.J. Kluwer Academic Publishers, 1994.
3. Introduction to Fuzzy Control - Driankov, Hellendroon, Narosa Publishers.
4. Artificial Neural Networks - Dr. B. Yagananarayana, 1999, PHI, New Delhi.
5. Elements of Artificial Neural Networks – Kishan Mehrotra, Chelkuri K. Mohan, Sanjay Ranka, Penram International.
6. Artificial Neural Network –Simon Haykin, 2nd Ed., Pearson Education.
7. Introduction Neural Networks Using MATLAB 6.0 - S.N. Shivanandam, S. Sumati, S. N. Deepa,1/e, TMH, New Delhi.

Course Name	IMAGE AND VIDEO PROCESSING (Program Elective IV)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Fundamentals of Image Processing and Image Transforms

Introduction, Image file formats, Elements of image processing system, Applications of Digital image processing. Need for transform, image transforms, Fourier transform, 2 D Discrete Fourier transform, Walsh transform, Hadamard transform, Haar transform, slant transform Discrete cosine transform, KL transform, singular value decomposition, Hough transform.

UNIT –II: Image Enhancementand Restoration

Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.
Introduction to Image restoration, Image degradation, Types of image blur, Classification of image restoration techniques, Image restoration model, Linear and Nonlinear image restoration techniques, Blind deconvolution

UNIT –III: Image Segmentation and Compression

Introduction to image segmentation, Point, Line and Edge Detection, Region based segmentation.
Introduction, Need for image compression, Redundancy in images, Classification of redundancy in images, image compression schemes - Arithmetic coding, Predictive coding, Transformed based compression, Image compression standard.

UNIT -IV: Basic Steps of Video Processing

Analog Video, Digital Video. Time-Varying Image Formation models: Three-Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, filtering operations.

UNIT –V: 2-D Motion Estimation

Optical flow, General Methodologies, Pixel Based Motion Estimation, Block- Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multi resolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Video coding.

TEXT BOOKS:

1. Digital Image Processing – Gonzaleze and Woods, 3rd Ed., Pearson.

2. Video Processing and Communication – Yao Wang, Joem Ostermann and Yaquin Zhang. 1st Ed., PH Int.
3. S.Jayaraman, S.Esakkirajan and T.Veera Kumar, "Digital Image processing, Tata McGraw Hill publishers, 2009

REFRENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with CVIP Tools – Scotte Umbaugh, 2nd Ed, CRC Press, 2011.
2. Digital Video Processing – M. Tekalp, Prentice Hall International.
3. Digital Image Processing – S.Jayaraman, S.Esakkirajan, T.Veera Kumar – TMH, 2009.
4. Multi dimentional Signal, Image and Video Processing and Coding – John Woods, 2nd Ed, Elsevier.
5. Digital Image Processing with MATLAB and Labview – Vipula Singh, Elsevier.
6. Video Demystified – A Hand Book for the Digital Engineer – Keith Jack, 5th Ed., Elsevier.

Course Name	VLSI TECHNOLOGY AND DESIGN (Program Elective IV)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT-I: VLSI Technology and VLSI Design

Fundamentals and applications, semiconductor processes, design rules and process parameters, layout techniques and process parameters. Electronic design automation concept, ASIC and FPGA design flows, SOC designs, design technologies: combinational design techniques, sequential design techniques, state machine logic design techniques and design issues.

UNIT-II: CMOS VLSI Design, Building Blocks of a VLSI circuit, and VLSI Design Issues

MOS Technology and fabrication process of pMOS, nMOS, CMOS and BiCMOS technologies**,** comparison of different processes. Computer architecture, memory architectures, communication interfaces, mixed signal interfaces. Design process, design for testability, technology options, power calculations, package selection, clock mechanisms, mixed signal design.

UNIT-III:

Basic electrical properties of MOS and BiCMOS circuits, MOS and BiCMOS circuit design processes, Basic circuit concepts, scaling of MOS circuits-qualitative and quantitative analysis with proper illustrations and necessary derivations of expressions.

UNIT-IV: Subsystem Design and Layout and Subsystem Design Processes

Some architectural issues switch logic, gate logic, examples of structured design (combinational logic), some clocked sequential circuits, other system considerations. Some general considerations and an illustration of design processes, design of an ALU subsystem.

UNIT-V: Floor Planning, Architecture Design, and Chip Design

Introduction**,** Floor planning methods, off-chip connections. Register-Transfer design, high-level synthesis, architectures for low power, architecture testing, and Design methodologies.

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems, K. Eshraghian, Douglas A. Pucknell, Sholeh Eshraghian, 2005, PHI Publications.
2. Modern VLSI Design-Wayne Wolf, 3rd Ed., 1997, Pearson Education.
3. VLSI Design-Dr.K.V.K.K.Prasad, KattulaShyamala, Kogent Learning Solutions Inc., 2012.

REFERENCE BOOKS:

1. VLSI Design Technologies for Analog and Digital Circuits, Randall L.Geiger, Phillip E.Allen, Noel R.Strader, TMH Publications, 2010.
2. Introduction to VLSI Systems: A Logic, Circuit and System Perspective- Ming-BO Lin, CRC Press, 2011.
3. Principals of CMOS VLSI Design-N.H.E Weste, K. Eshraghian, 2nd Edition, Addison Wesley.

Course Name	EMBEDDED SYSTEM DESIGN (Program Elective IV)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT-I: Introduction to Embedded Systems

Definition of Embedded System Embedded Systems vs. General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT-II: Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT-III: Embedded Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT-IV: RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT-V: Task Communication

Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1. Shibu K. V, "Introduction to Embedded Systems", McGraw Hill, 2013.

REFERENCE BOOKS:

1. Raj Kamal, "Embedded Systems", TMH.
2. Frank Vahid, Tony Givargis, John Wiley, "Embedded System Design".
3. Lyla, "Embedded Systems", Pearson, 2013.
4. David E. Simon, "An Embedded Software Primer", Pearson Education

Course Name	PEDAGOGY STUDIES (Audit Course II)			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	2	0	0

UNITS I

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology. Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.** Overview of methodology and Searching.

UNITS II

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

UNITS III

Evidence on the effectiveness of pedagogical practices. Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers‟ attitudes and beliefs and Pedagogic strategies.

UNITS IV

Professional development: alignment with classroom practices and follow-up support. Peer support. Support from the head teacher and the community. Curriculum and assessment. Barriers to learning: limited resources and large class sizes.

UNITS V

Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

REFERENCES:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.

4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, „learning to read" campaign.

Course Name	ADVANCED COMMUNICATIONS LAB			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	0	4	2

All experiments simulated using MATLAB

List of Experiments:

1. Measurement of Bit Error Rate using Binary Data
2. Verification of minimum distance in Hamming code
3. Determination of output of Convolutional Encoder for a given sequence
4. Determination of output of Convolutional Decoder for a given sequence
5. Efficiency of DS Spread- Spectrum Technique
6. Simulation of Frequency Hopping (FH) system
7. Effect of Sampling and Quantization of Digital Image
8. Verification of Various Transforms (FT / DCT/ Walsh / Hadamard) on a given Image (Finding Transform and Inverse Transform)
9. Point, Line and Edge detection techniques using derivative operators.
10. Implementation of FIR and IIR filter using DSP Trainer Kit (C-Code/ Assembly code).

Course Name	ADVANCED IMAGE PROCESSING LAB			
Semester	M. Tech / II Sem	L	P	C
Regulation Year	2020-21	0	4	2

All experiments simulated using MATLAB

List of experiments:

1. Perform basic operations on images like addition, subtraction etc.
2. Plot the histogram of an image and perform histogram equalization
3. Implement segmentation algorithms
4. Perform video enhancement
5. Perform video segmentation
6. Perform image compression using lossy technique
7. Perform image compression using lossless technique
8. Perform image restoration
9. Convert a colour model into another
10. Calculate boundary features of an image
11. Calculate regional features of an image
12. Detect an object in an image/video using template matching/Bayes classifier

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

III SEMESTER						
S. No	**Course Name**	**L**	**P**	**C**	**I**	**E**
1.	**Program Specific Elective V**					
	DSP Processors and Architectures	3	-	3	40	60
	EMI / EMC					
	CMOS Analog & Digital IC Design					
2.	**Open Elective**					
	Reliability Engineering	3	-	3	40	60
	MEMS and its Applications					
	Real Time Operating Systems					
3.	Dissertation Phase – I	-	20	10	-	-
	Total	**`6**	**20**	**16**	**80**	**120**
					200	

III SEMESTER

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

R19 M.Tech.(DECS) SYLLABUS

Course Name	DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES (Program Elective V)			
Semester	M. Tech / III Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT –I: Introduction to Digital Signal Processing and Computational Accuracy in DSP Implementations

Introduction, Digital signal-processing system, the sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.
Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II: Architectures for Programmable DSP Devices

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III: Programmable Digital Signal Processors

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors.

UNIT –IV: Analog Devices Family of DSP Devices

Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.
Introduction to Black fin Processor - The Black fin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V: Interfacing Memory and I/O Peripherals to Programmable DSP Devices

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach to Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. EmbeddedSignalProcessingwiththeMicroSignalArchitecturePublisher: Woon-SengGan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing –Jonatham Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI
5. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D.,California Technical Publishing, ISBN 0-9660176-3-3, 1997
6. Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices,Newnes , ISBN 0750679123, 2005

Course Name	ELECTROMAGNETIC INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY (EMI / EMC) (Program Elective V)			
Semester	**M. Tech / III Sem**	**L**	**P**	**C**
Regulation Year	**2020-21**	**3**	**-**	**3**

UNIT -I: Introduction, Natural and Nuclear Sources of EMI / EMC

Electromagnetic environment, History, Concepts, Practical experiences and concerns, frequency spectrum conservations, An overview of EMI / EMC, Natural and Nuclear sources of EMI.

UNIT -II: EMI from Apparatus, Circuits and Open Area Test Sites

Electromagnetic emissions, Noise from relays and switches, Non-linearities in circuits, passive intermodulation, Cross talk in transmission lines, Transients in power supply lines, Electromagnetic interference (EMI), Open area test sites and measurements.

UNIT -III: Radiated and Conducted Interference Measurements and ESD

Anechoic chamber, TEM cell, GH TEM Cell, Characterization of conduction currents / voltages, Conducted EM noise on power lines, Conducted EMI from equipment, Immunity to conducted EMI detectors and measurements, ESD, Electrical fast transients / bursts, Electrical surges.

UNIT -IV: Grounding, Shielding, Bonding and EMI filters

Principles and types of grounding, Shielding and bonding, Characterization of filters, Power lines filter design.

UNIT –V: Cables, Connectors, Components and EMC Standards

EMI suppression cables, EMC connectors, EMC gaskets, Isolation transformers, optoisolators, National / International EMC standards.

TEXT BOOKS:

1. Engineering Electromagnetic Compatibility - Dr. V.P. Kodali, IEEE Publication, Printed in India by S. Chand & Co. Ltd., New Delhi, 2000.
2. Electromagnetic Interference and Compatibility IMPACT series, IIT – Delhi, Modules 19.

REFERENCE BOOKS:

1. Introduction to Electromagnetic Compatibility - Ny, John Wiley, 1992, by C.R. Pal.

Course Name	CMOS ANALOG AND DIGITAL IC DESIGN (Program Elective V)			
Semester	M. Tech / III Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT-I: CMOS Device Modeling and Analog CMOS Sub-Circuits

Simple MOS Large-Signal Model, Other Model Parameters, Small-Signal Model for the MOS Transistor, Computer Simulation Models, and Sub-threshold MOS Model. Current Sinks and Sources, Current Mirrors-Current mirror with Beta Helper, Degeneration, Cascode current Mirror and Wilson Current Mirror, Current and Voltage References, Band gap Reference.

UNIT-II: CMOS Amplifiers

Inverters, Differential Amplifiers, Cascode Amplifiers, Current Amplifiers, Output Amplifiers, High Gain Amplifiers Architectures.

UNIT -III: CMOS Operational Amplifiers

Design of CMOS Op Amps, Compensation of Op Amps, Design of Two-Stage Op Amps, Power- Supply Rejection Ratio of Two-Stage Op Amps, Cascode Op Amps, Measurement Techniques of OP Amp.

UNIT -IV: MOS Design and Combinational MOS Logic Circuits:

Pseudo NMOS Logic – Inverter, Inverter threshold voltage, Output high voltage, Output Low voltage, Gain at gate threshold voltage, Pseudo NMOS logic gates, Transistor equivalency, CMOS Inverter logic.
MOS logic circuits with depletion NMOS loads, CMOS logic circuits – NOR & NAND gate, Complex Logic circuits – Realizing Boolean expressions using NMOS gates and CMOS gates , AOI and OIA gates, CMOS full adder, CMOS transmission gates – Designing with Transmission gates, Complementary Pass-transistor Logic (CPL).

UNIT-V: Sequential MOS Logic Circuits and Dynamic Logic Circuits

Behavior of bistable elements, SR Latch, Clocked latch and flip flop circuits, CMOS D latch and edge triggered flip-flop.
Basic principle, Voltage Bootstrapping, Synchronous dynamic pass transistor circuits, Dynamic CMOS transmission gate logic, High performance Dynamic CMOS circuits

TEXT BOOKS:

1. Design of Analog CMOS Integrated Circuits- Behzad Razavi, TMH Edition.
2. Digital Integrated Circuit Design – Ken Martin, Oxford University Press, 2011.

3. CMOS Digital Integrated Circuits Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 3rd Ed., 2011.
4. CMOS Analog Circuit Design - Philip E. Allen and Douglas R. Holberg, Oxford University Press, International Second Edition/Indian Edition, 2010.
5. Analysis and Design of Analog Integrated Circuits- Paul R. Gray, Paul J. Hurst, S. Lewis and R. G. Meyer, Wiley India, Fifth Edition, 2010.

REFERENCE BOOKS:

1. Analog Integrated Circuit Design- David A. Johns, Ken Martin, Wiley Student Edn, 2016.
2. CMOS: Circuit Design, Layout and Simulation- Baker, Li and Boyce, PHI.
3. Digital Integrated Circuits – A Design Perspective, Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic, 2nd Ed., PHI.

Course Name	MEMS AND ITS APPLICATIONS (Open Elective)			
Semester	M. Tech / III Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT - I

Introduction Basic structures of MEM devices – (Canti-Levers, Fixed Beams diaphragms). Broad Response of Micro electromechanical systems (MEMS) to Mechanical (Force, pressure etc.) Thermal, Electrical, optical and magnetic stimuli, compatibility of MEMS from the point of power dissipation, leakage etc.

UNIT – II

Review of mechanical concepts like stress, strain, bending moment, deflection curve. Differential equations describing the deflection under concentrated force, Distributed force, distributed force, Deflection curves for canti-levers- fixed beam.

UNIT – III

Electrostatic excitation – columbic force between the fixed and moving electrodes. Deflection with voltage in C.L, Deflection vs. Voltage curve, critical fringe field – field calculations using Laplace equation. Discussion on the approximate solutions – Transient response of the MEMS.

UNIT-IV

Types Two terminal MEMS - capacitance vs. voltage Curve – Variable capacitor. Applications of variable capacitors. Two terminal MEM structures. Three terminal MEM structures – Controlled variable capacitors – MEM as a switch and possible applications.

UNIT-V

MEM Circuits & Structures MEM circuits & structures for simple GATES- AND, OR, NAND, NOR, Exclusive OR, simple MEM configurations for flip-flops triggering applications to counters, converters. Applications for analog circuits like frequency converters, wave shaping. RF Switches for modulation. MEM Transducers for pressure, force temperature. Optical MEMS.

UNIT-VI

MEM Technologies Silicon based MEMS- Process flow – Brief account of various processes and layers like fixed layer, moving layers spacers etc., and etching technologies. Metal Based MEMS: Thin and thick film technologies for MEMS. Process flow and description of the processes, Status of MEMS in the current electronics scenario.

TEXT BOOKS:

1. MEMS Theory, Design and Technology - GABRIEL. M.Review, R.F., 2003, John wiley& Sons. .
2. Strength of Materials –ThimoShenko, 2000, CBS publishers & Distributors.
3. MEMS and NEMS, Systems Devices; and Structures - ServeyE.Lyshevski, 2002, CRC Press.

REFERENCE BOOKS:

1. Sensor Technology and Devices - Ristic L. (Ed), 1994, Artech House, London.

Course Name	RELIABILITY ENGINEERING (Open Elective)			
Semester	M. Tech / III Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT-I: Reliability Concepts

Reliability Engineering- Introduction, reliability, maintainability, availability and quality, reliability vs quality, Reliability Function, Mean Time to Failure, Hazard rate function, Bath-tub curve, conditional reliability.

UNIT -II: Reliability Mathematics

Probability theory: Properties, theorems and Axioms, Random variables, Probability density function (pdf), cumulative density function (CDF), relationship between pdf and cdf, Joint Probability Distribution, mean life, median life, modal life, Bayes" Theorem.
Statistical Distributions: Discrete – Uniform, Bernoulli, Binomial, Geometric, Poisson, Continuous: Normal, Exponential, Weibull, Lognormal.

UNIT -III: Basic Reliability Models

Constant Failure rate model: Exponential reliability model, Failure modes, Two parameter Exponential distribution, Poisson process and redundancy.
Time-dependent failure rate model: The Weibull distribution, Three parameter Weibull distribution, Normal Distribution, Lognormal distribution

Unit IV: Reliability of Systems

System Reliability Modelling and Evaluation Techniques-I: Series, Parallel, Series-Parallel, Parallel-Series, *k*-out-of-*m*, Standby model.
Evaluation Techniques II: Event Space, Decomposition, Minimal Path sets and Cut sets, Common Mode Failures and Three State Devices.

UNIT-V: Data Analysis and Reliability Estimation

Point Estimation and Interval Estimation, Goodness-of-Fit test, Moment Estimation, Maximum Likelihood Estimator, Least Square Estimates.

UNIT-VI: Parametric Reliability Estimations and Models

Estimation Methods: Method of Moments, Likelihood functions, Method of Least Square.
Reliability Models: Historical data, Operational life testing, Burn-in testing, Accelerated Life testing, Types of Censoring, Exponential distribution, Rayleigh Distribution, Weibull Distribution, Lognormal distribution

TEXT BOOKS:

1. Elsayed A. Elsayed, Reliability Engineering, John Wiley, 2nd Ed, 2012
2. Charles E. Ebling, Reliability and Maintainability Engineering, TMH, 9th Reprint, 2008.
3. V. N. A. Naikan, Reliability Engineering and Life Testing, PHI, 2008

REFERENCE BOOKS:

1.K. C. Kapur and L. R. Lamberson, Reliability in Engineering Design, Wiley India, 2009.
2.K. K. Agrawal, Reliability Engineering, Springer-Science+Business Media, 1993.

Course Name	REAL TIME OPERATING SYSTEMS (Open Elective)			
Semester	M. Tech / III Sem	L	P	C
Regulation Year	2020-21	3	-	3

UNIT I: Introduction to UNIX

Overview of Commands, File I/O. (Open, Create, Close, Lseek, Read, Write), Process Control (Fork, Vfork, Exit, Wait, Waitpid, Exec), Signals, Inter Process Communication (Pipes, FIFOs, Message Queues, Semaphores, Shared Memory).

UNIT II: Real Time Systems

Typical Real Time Application, Hard Vs. Soft Real Time Systems, a Reference Model of Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency Functional Parameters, Resource Parameters of Jobs and Parameters of Resources.

UNIT III: Approaches to Real Time Scheduling

Clock Driven, Weighted Round Robin, Priority Driven, Dynamic Vs. State Systems, Effective Release Times and Dead Lines, Offline Vs. Online Scheduling.

UNIT IV: Operating Systems

Overview, Time Services and Scheduling Mechanisms, other Basic Operating System Function, Processor Reserves and Resource Kernel. Capabilities of Commercial Real Time Operating Systems.

UNIT V: Case Studies-VX Works

Memory Managements Task State Transition Diagram, Pre-Emptive Priority, Scheduling, Context Switches – Semaphore – Binary Mutex, Counting: Watch Dugs, I/O System

UNIT VI: RT Linux

Process Management, Scheduling, Interrupt Management, and Synchronization.

TEXT BOOKS:

1. Richard Stevens, “Advanced Unix Programming”.
2. Jane W.S. Liu, “Real Time Systems”, Pearson Education.
3. C.M.Krishna, KANG G. Shin, “Real Time Systems”, McGraw.Hill

REFERENCES:

1. VxWorks Programmers Guide
2. www.tidp.org
3. www.kernel.org
4. http://www.xml.com/ldd/chapter/book

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

VISHNU INSTITUTE OF TECHNOLOGY::BHIMAVARAM
(AUTONOMOUS)

Department of Mechanical Engineering

Course Structure

M.Tech (Advanced Manufacturing Systems)

I Semester

S.No.	Subject	L	P	C
1	Automation in Manufacturing	3	--	3
2	Special Manufacturing Processes	3	--	3
3	**ProgrammeElective I** IndustrialRobotics Intelligent Manufacturing Systems Total QualityManagement	3	--	3
4	**ProgrammeElective II** AdvancedCAD Mechatronics PrecisionEngineering	3	--	3
5	Research Methodology	2	--	2
6	Advanced CAD/CAM Lab	--	4	2
7	Robotics Lab	--	4	2
8	English for Research Paper Writing	2	--	0
	Total	16	8	**18**

II Semester

S.No.	Subject	L	P	C
1	Modeling and Simulation of Manufacturing Systems	3	--	3
2	ProductDesign	3	--	3
3	**ProgrammeElective III** Finite Element Methods Concurrent Engineering Design and Manufacturing of MEMS and Microsystems	3	--	3
4	**ProgrammeElective IV** Production and Operations Management Materials Technology Computational Fluid Dynamics	3	--	3
5	Manufacturing Simulation and Precision Engg. Lab	--	4	2
6	Product Design Lab	--	4	2
7	Pedagogy Studies	2	--	0
8	Mini Project	--	4	2
	Total	14	12	**18**

III Semester

S.No.	Subject	L	P	C
1	**Programme Elective V** Advances in CNC Technologies Design for Manufacturing and Assembly Advanced Materials	3	--	3
2	**Open Elective** Quality Engineering in Manufacturing ReliabilityEngineering Design of Experiments	3	--	3
3	Dissertation Phase – I	--	20	10
	Total	6	20	**16**

IV Semester

S.No.	Subject	L	P	C
1	Dissertation Phase – II	--	32	16
	Total	--	32	**16**

I Semester

	AUTOMATION IN MANUFACTURING	L	P	C
		3	0	3

UNIT – I

OVER VIEW OF MANUFACTURING AND AUTOMATION: Production systems, Automation in production systems, Automation principles and strategies, Manufacturing operations, production facilities. Basic elements of an automated system, levels of automation; Hardware components for automation and process control, programmable logic controllers and personal computers.

UNIT – II

MATERIAL HANDLING AND IDENTIFICATION TECHNOLOGIES: Material handling, equipment, Analysis. Storage systems, performance and location strategies, automated storage systems, AS/RS, types.Automatic identification methods, Barcode technology, RFID.

UNIT – III

MANUFACTURING SYSTEMS AND AUTOMATED PRODUCTION LINES: Manufacturing systems: components of a manufacturing system, Single station manufacturing cells; Manual Assembly lines, line balancing Algorithms, Mixed model Assembly lines, Alternative Assembly systems. Automated production lines, Applications, Analysis of transfer lines.

UNIT – IV

AUTOMATED ASSEMBLY SYSTEMS: Fundamentals, Analysis of Assembly systems.Cellular manufacturing, part families, cooling, production flow analysis. Group Technology and flexible Manufacturing systems, Quantitative Analysis.

UNIT – V

QUALITY CONTROL AND SUPPORT SYSTEMS: Quality in Design and manufacturing, inspection principles and strategies, Automated inspection, contact Vs non-contact, CMM. Manufacturing support systems. Quality function deployment, computer aided process planning, concurrent engineering, shop floor control, just in time and lean production.

TEXT BOOK:

1. Automation, production systems and computer integrated manufacturing/ Mikell.PGroover/PHI/3rd edition/2012,

REFERENCES:

1. CAD/CAM/CIM/ P. Radha Krishnan & S. Subrahamanian and Raju/New Age International Publishers/2003.
2. System Approach to Computer Integrated Design and Manufacturing/ Singh/John Wiley/96.
3. Computer Aided Manufacturing/Tien-Chien Chang, Richard A. Wysk and Hsu-Pin Wang/ Pearson/ 2009
4. Manufacturing and Automation Technology / R Thomas Wright and Michael Berkeihiser / Good Heart/WillcoxPublishers

I Semester

	SPECIAL MANUFACTURINGPROCESSES	L	P	C
		3	0	3

UNIT-I

SURFACE TREATMENT: Scope, Cleaners, Methods of cleaning, Surface coating types, and ceramic and organic methods of coating, economics of coating.Electro forming, Chemical vapor deposition, thermal spraying, Ion implantation, diffusion coating, Diamond coating and cladding.

UNIT- II

PROCESSING OF CERAMICS: Characteristics of Ceramics, classification, Processing of particulate ceramics, Powder preparations, consolidation, Drying, sintering, Hot compaction, finishing of ceramics, Applications.

PROCESSING OF COMPOSITES: Composite Layers, Particulate and fiber reinforced composites, Elastomers, Reinforced plastics, MMC, CMC, Polymer matrix composites.

UNIT- III

FABRICATION OF MICROELECTRONIC DEVICES:

Crystal growth and wafer preparation, Film Deposition oxidation, lithography, bonding and packaging, reliability and yield, Printed Circuit boards, computer aided design in microelectronics, surface mount technology, Integrated circuit economics.

UNIT - IV

ADVANCED MACHINING PROCESSES: AJM, EBM, ECM, EDM, Wire EDM, LBM, USM, WJM – Working Principle, Equipment, Material Removal Rate, Process Parameters, Advantages, Limitations and Applications.

UNIT -V

RAPID PROTOTYPING: Introduction, Methods - Stereo Lithography, Selective Laser Sintering, Fused Deposition Method, Laminated Object Manufacturing - Working Principles, Applications, Advantages and Limitations

TEXT BOOKS:

1. Manufacturing Engineering and Technology *I* Kalpakijian / Adisson Wesley,1995.
2. Process and Materials of Manufacturing / R. A. Lindburg / 1th edition, PHI1990.

REFERENCES:

1. Microelectronic packaging handbook / Rao. R. Thummala and Eugene,J. Rymaszewski / Van NostrandRenihold.
2. MEMS & Micro Systems Design and manufacture / Tai — Run Hsu /TMGH
3. Advanced Machining Processes / V.K.Jain / Allied Publications.
4. Introduction to Manufacturing Processes / John A Schey*I*McGrawHill.

I Semester

	INDUSTRIAL ROBOTICS (PROGRAMME ELECTIVE – I)	L	P	C
		3	0	3

UNIT - I

INTRODUCTION: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation scheme, work volume, robot drive systems, control systems and dynamic performance, precision of movement.

CONTROL SYSTEM AND COMPONENTS: basic concepts and motion controllers, control system analysis, robot actuation and feedback components, Positions sensors, velocity sensors, actuators, power transmission systems, robot joint control design.

UNIT – II

MOTION ANALYSIS AND CONTROL: Manipulator kinematics, position representation, forward and inverse transformations, homogeneous transformations. Trajectory Planning: Joint interpolation, task space interpolation, executing user specified tasks.

END EFFECTORS: Grippers-types, operation, mechanism, force analysis for various basic gripper systems including Mechanical, Hydraulic and Pneumatic systems.

UNIT – III

SENSORS: Sensor devices, Types of sensors - contact, position and displacement sensors, force and torque sensors - Proximity and range sensors - acoustic sensors.

MACHINE VISION: Functions, Sensing and Digitizing-imaging devices, Lighting techniques, Analog to digital single conversion.

Image storage: Image processing and Analysis-image data reduction, Segmentation, feature extraction, Object recognition. Training the vision system.

UNIT – IV

ROBOT PROGRAMMING: Lead through programming, Robot program as a path in space, Motion interpolation, WAIT, SIGNAL AND DELAY commands, Branching, capabilities and Limitations of lead through methods.

ROBOT LANGUAGES: Textual robot Languages, Generations of robot programming languages, Robot language structures, Elements and function.

UNIT - V

ROBOT CELL: DESGIN AND CONTROL: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detection, Work cell controller.

ROBOT APPLICATION: Material transfer, Machine loading/unloading, Processing operation, Assembly and Inspection, Future Application.

TEXT BOOKS:

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Introduction to Robotic Mechanics and Control by JJ Craig, Pearson, 3rd edition.

REFERENCES:

1 Robotics / Fu K S/ McGraw Hill.
2 Robotic Engineering / Richard D. Klafter, Prentice Hall
3 Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.
4 Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley
5 Introduction to Robotics by SK Saha, TheMcGrah Hill Company, 6th,
6 Robotics and Control / Mittal R K &Nagrath I J /

I Semester

	INTELLIGENT MANUFACTURING SYSTEMS (PROGRAMME ELECTIVE – I)	L	P	C
		3	0	3

UNIT I:

COMPUTER INTEGRATED MANUFACTURING SYSTEMS: structure and functional areas of CIM system- CAD, CAPP, CAM, CAQC, ASRS. Advantages of CIM. Manufacturing Communication Systems - MAP/TOP, OSI Model, Data Redundancy, Top-down and Bottom-up Approach, Volume of Information. Intelligent Manufacturing System Components, System Architecture and Data Flow, System Operation.

UNIT II:

COMPONENTS OF KNOWLEDGE BASED SYSTEMS - Basic Components of Knowledge Based Systems, Knowledge Representation, Comparison of Knowledge Representation Schemes, Interference Engine, Knowledge Acquisition.

UNIT III:

MACHINE LEARNING - Concept of Artificial Intelligence, Conceptual Learning, Artificial Neural Networks - Biological Neuron, Artificial Neuron, Types of Neural Networks, Applications in Manufacturing.

UNIT IV:

AUTOMATED PROCESS PLANNING - Variant Approach, Generative Approach, Expert Systems for Process Planning, Feature Recognition, Phases of Process planning. Knowledge Based System For Equipment Selection (KBSES) - Manufacturing system design. Equipment Selection Problem, Modelling the Manufacturing Equipment Selection Problem, Problem Solving approaches in KBSES, Structure of the KRSES.

UNIT V:

GROUP TECHNOLOGY: Models and Algorithms Visual Method, Coding Method, Cluster Analysis Method, Matrix Formation - Similarity Coefficient Method, Sorting-based Algorithms, Bond Energy Algorithm, Cost Based method, Cluster Identification Method, Extended CI Method. Knowledge Based Group Technology - Group Technology in Automated Manufacturing System. Structure of Knowledge based system for group technology (KBSCIT) — Data Base, Knowledge Base, Clustering Algorithm.

TEXT BOOKS:

1. Intelligent Manufacturing Systems/ Andrew Kusiak/Prentice Hall.
2. Artificial Neural Networks/ YagnaNarayana/PHI/2006
3. Automation, Production Systems and CIM / Groover M.P./PHI/2007

I Semester

	TOTAL QUALITY MANAGEMENT (PROGRAMME ELECTIVE – I)	L	P	C
		3	0	3

UNIT –I:

INTRODUCTION: The concept of TQM, Quality and Business performance, attitude and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs, Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT – II:

CUSTOMER FOCUS AND SATISFACTION: The importance of customer satisfaction and loyalty- Crating satisfied customers, Understanding the customer needs, Process Vs. Customer, internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marketing: Evolution of Bench Marketing, meaning of Bench marketing, benefits of bench marketing, the bench marketing process, pitfalls of bench marketing.

UNIT – III:

ORGANIZING FOR TQM: The systems approach, Organizing for quality implementation, making the transition from a traditional to a TQM organizing, Quality Circles. Productivity, Quality and Reengineering: The leverage of Productivity and Quality, Management systems Vs. Technology, Measuring Productivity, Improving Productivity Re-engineering.

UNIT – IV:

THE COST OF QUALITY: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost Information, Accounting Systems and Quality Management.

UNIT – V:

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQCQ-
90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing thesystem.

TEXT BOOKS:

1. Total Quality Management / Joel E.Ross/Taylor and FranscisLimited
2. Total QualityManagement/P.N.Mukherjee/PHI

REFERENCES:

1 Beyond TQM / RobertL.Flood
2 Statistical Quality Control / E.L. Grant / McGrawHill.
3 Total Quality Management- A Practical Approach/H. Lal
4 Quality Management/KanishkaBedi/Oxford UniversityPress/2011
5 Total Engineering Quality Management/SunilSharma/Macmillan

I Semester

	ADVANCED CAD (PROGRAMME ELECTIVE – II)	L	P	C
		3	0	3

UNIT- I:
PRINCIPLES OF COMPUTER GRAPHICS : Introduction, graphic primitives, point plotting, lines, Bresenham's circle algorithm, ellipse, transformation in graphics, coordinate systems, view port, 2D and 3D transformation, hidden surface removal, reflection, shading and generation of characters.

UNIT- II:
CAD TOOLS: Definition of CAD Tools, Types of system, CAD/CAM system evaluation criteria, brief treatment of input and output devices. Graphics standard, functional areas of CAD, Modeling and viewing, software documentation, efficient use of CAD software.
GEOMETRICMODELLING: Types of mathematical representation of curves, wire frame models wire frame entities parametric representation of synthetic curves her mite cubic splines Bezier curves B-splines rational curves.

UNIT- III:
SURFACE MODELING: Mathematical representation surfaces, Surface model, Surface entities surface representation, parametric representation of surfaces, plane surface, rule surface, surface of revolution, Tabulated Cylinder.

UNIT- IV:
PARAMETRIC REPRESENTATION OF SYNTHETIC SURFACES: HermiteBicubic surface, **Bezier** surface, **B-** Spline surface, COONs surface, Blending surface Sculptured surface, Surface manipulation — Displaying, Segmentation, Trimming, Intersection, Transformations (both 2D and 3D)

UNIT-V:
GEOMETRICMODELLING-3D: Solid modeling, Solid Representation, Boundary Representation (B-rep), Constructive Solid Geometry (CSG). **CAD/CAM Exchange**: Evaluation of data - exchange format, IGES data representations and structure, STEP Architecture, implementation, ACIS & DXF. Design Applications: Mechanical tolerances, Mass property calculations, Finite Element Modeling and Analysis and Mechanical Assembly.
Collaborative Engineering: Collaborative Design, Principles, Approaches, Tools, Design Systems.

TEXT BOOKS:
1. Mastering CAD/CAM / IbrhimZeid / McGraw Hill International.
2. CAD/CAM Principles and Applications/ P.N.Rao/TMH/3rd Edition

REFERENCES:
1. CAD/CAM /Groover M.P./ Pearson education
2. CAD/CAM Concepts and Applications/ Alavala/ PHI
3. CAD / CAM / CIM, Radhakrishnan and Subramanian/ New Age
4. Principles of Computer Aided Design and Manufacturing/ FaridAmirouche/ Pearson

I Semester

	MECHATRONICS (PROGRAMME ELECTIVE – II)	L	P	C
		3	0	3

UNIT-I

Mechatronics systems, elements, levels of mechatronics system, Mechatronics design process, system, measurement systems, control systems, microprocessor-based controllers, advantages and disadvantages of mechatronics systems. Sensors and transducers, types, displacement, position, proximity, velocity, motion , force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and lightsensors.

UNIT-II

Solid state electronic devices, PN junction diode, BJT, FET, DIA and TRIAC.Analog signal conditioning, amplifiers, filtering.Introduction to MEMS & typical applications.

UNIT-III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems:
Mechanical actuating systems and electrical actuating systems.

UNIT-IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT-V

System and interfacing and data acquisition, DAQS , SCADA, A to D and D to A conversions; Dynamic models and analogies, System response. Design of mechatronics systems & future trends.

TEXT BOOKS:

1. MECHATRONICS Integrated Mechanical Electronics Systems/KP Ramachandran& GK VijayaRaghavan/WILEY IndiaEdition/2008
2. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition,2005.

REFERENCES:

1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / AnuradhaAgenciesPublishers.
3. Mechatronics System Design / Devdasshetty/Richard/Thomson.
4. Mechatronics/M.D.Singh/J.G.Joshi/PHI.
5. Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg. 4th Edition, Pearson, 2012 W. Bolton
6. Mechatronics – Principles and Application Godfrey C. Onwubolu, Wlsevier, 2006 Indian print

I Semester

	PRECISION ENGINEERING (PROGRAMME ELECTIVE – II)	L	P	C
		3	0	3

UNIT I:

CONCEPTS OF ACCURACY: Introduction – Concept of Accuracy of Machine Tools – Spindle and Displacement Accuracies – Accuracy of numerical Control Systems – Errors due to Numerical Interpolation Displacement Measurement System and Velocity lags.

UNIT II:

GEOMETIC DEIMENSIONING AND TOLERANCING: Tolerance Zone Conversions – Surfaces, Features, Features of Size, Datum Features – Datum Oddly Configured and Curved Surfaces as Datum Features, Equalizing Datums – Datum Feature of Representation – Form controls, Orientation Controls – Logical Approach to Tolerancing.

UNIT III:

DATUM SYSTEMS: Design of freedom, Grouped Datum Systems – different types, two and three mutually perpendicular grouped datum planes; Grouped datum system with spigot and recess, pin and hole; Grouped Datum system with spigot and recess pair and tongue – slot pair – Computation of Transnational and rotational accuracy, Geometric analysis and application.

UNIT IV:

TOLERANCE ANALYSIS: Process Capability, Mean, Variance, Skewness, Kurtosis, Process Capability Metrics, Cp, Cpk, Cost aspects, Feature Tolerances, Geometric Tolerances. Surface finish, Review of relationship between attainable tolerance grades and different machining process, Cumulative effect of tolerances sure fit law, normal law and truncated normal law.

UNIT V:

TOLERANCE CHARTING TECHNIQUES: Operation Sequence for typical shaft type of components, Preparation of Process drawings for different operations, Tolerance worksheets and centrally analysis, Examples, Design features to facilitate machining; Datum Features – functional and manufacturing Components design – Machining Considerations, Redesign for manufactured, Examples.

TEXT BOOKS:

1. Precision Engineering in Manufacturing/Murthy R.L./New Age International (P) limited, 1996.
2. Geometric Dimensioning and Tolerancing / James D. Meadows / Marcel Dekker inc. 1995.

REFERENCES:

1. Engineering Design – A systematic Approach / Matousek / Blackie & Son Ltd.,London
2. Precision Engineering/VC Venkatesh& S Izman/TMH

I Semester

	RESEARCH METHODOLOGY	L	P	C
		2	0	2

UNIT-I: RESEARCH FOUNDATION: Motivation and objectives – Research methods, Methodology. Types of research, Defining and formulating the research problem, Hypothesis – Qualities of a good Hypothesis, Hypothesis Testing – Logic & Importance

UNIT-II: LITERATURE REVIEW: primary and secondary sources, Effective literature studies approaches, analysis, identifying gap areas from literature and research database.

UNIT III: DATA COLLECTION AND ANALYSIS: Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools,data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), hypothesis testing.

UNIT IV: RESEARCH ETHICS: Plagiarism, Research ethics, IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, reproducibility and accountability.

UNIT V: INTERPRETATION AND REPORT WRITING: Significance of Report Writing, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal,Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

REFERENCES:

1. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
2. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing.
3. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
4. Stuart Melville and Wayne Goddard, 1996. Research methodology: an introduction for science & engineering students, Kenwyn, South Africa : Juta& Co. Ltd.,
5. T. Ramappa, 2008, Intellectual Property Rights Under WTO, S. Chand.

ADDITIONAL READING:

1. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, EssEss Publications. 2 volumes.
2. Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
4. Day, R.A., 1992.How to Write and Publish a Scientific Paper, Cambridge University Press.
5. Wayne Goddard and Stuart Melville, ‒Research Methodology: An Introduction‖
6. Ranjit Kumar, 2 nd Edition, ‒Research Methodology: A Step by Step Guide for beginners‖

I Semester

	ADVANCED CAD/CAM LAB	L	P	C
		0	4	2

1. Features and selection of CNC turning and millingcenters.
2. Practice in part programming and operation of CNC turning machines, subroutine techniques and use ofcycles
3. Practice in part programming and operating a machining center, tool panning and selection of sequences of operations, tool setting on machine, practice in APT based NC programming.
4. Practice in Robot programming and its languages.
5. Robotic simulation using software.
6. Robo path control, preparation of various reports and route sheets,Simulation of manufacturing system using CAM software, controller operating systemcommands.

I Semester

	ROBOTICS LAB	L	P	C
		0	4	2

1. Introduction to robot programming
2. Determination of maximum and minimum position of links.
3. Verification of transformation (position and orientation) with respect to gripper and world coordinate system
4. Robot programming and simulation for pick and placing the object using manual mode
5. Pick and placing the object programming mode
6. Pick and placing objects using sub routines
7. Robot programming and simulation for machining
8. Introduction to robot studio
9. Creating paths using virtual flex pendant in robot studio
10. Pick and place objects in manual mode in robot studio

I Semester

	ENGLISH FOR RESEARCH PAPER WRITING	L	P	C
		2	0	0

Course objectives:

Students will be able to:

1. Understand that how to improve your writing skills and level of readability

2. Learn about what to write in each section

3. Understand the skills needed when writing a Title

Ensure the good quality of paper at very first-time submission

UNI-I: Planning and Preparation, Word Order, Breaking up longsentences, Structuring Paragraphs and Sentences, Being Conciseand Removing Redundancy, Avoiding Ambiguity and Vagueness

UNI-II: Clarifying Who Did What, Highlighting Your Findings, Hedgingand Criticising, Paraphrasing and Plagiarism, Sections of a Paper,Abstracts. Introduction

UNI-III: Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNI-IV: key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

UNI-V: skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

UNI-VI: useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Suggested Studies:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

S.No	Subject	L	P	C
1	Modeling and Simulation of Manufacturing Systems	3	--	3
2	ProductDesign	3	--	3
3	**ProgrammeElective III** Finite Element Methods Concurrent Engineering Design and Manufacturing of MEMS and Microsystems	3	--	3
4	**ProgrammeElective IV** Production and Operations Management Materials Technology Computational Fluid Dynamics	3	--	3
5	Manufacturing Simulation and Precision Engg. Lab	--	4	2
6	Product Design Lab	--	4	2
7	Pedagogy Studies	2	--	0
8	Mini Project	--	4	2
	Total	14	12	**18**

II Semester

	MODELLING AND SIMULATION OF MANUFACTURING SYSTEMS	L	P	C
		3	0	3

UNIT - I:

System – ways to analyze the system – Model - types of models – Simulation – Definition – Types of simulation models – steps involved in simulation – Advantages & Disadvantages.

Parameter estimation – estimator – properties – estimate – point estimate – confidence interval. Estimates – independent – dependent – hypothesis – types of hypothesis- steps – types 1& 2 errors.

UNIT - II:

Building of Simulation model – validation – verification – credibility – their timing – principles of valid simulation Modeling – Techniques for verification – statistical procedures for developing credible model.

Review of statistics and probability – Types of discrete and continuous probability distributions such as Geometric – Poisson – Uniform – Geometric distribution with examples – Normal – Exponential distribution with examples.

UNIT - III:

Random numbers – Need for RNs – Technique for Random number generation such as Mid product method, Mid square method, and Linear congruential method with examples – Test for Random numbers – Uniformity - Chi square test or Kolmogorov Smirnov test – Independency- Auto correlation test – Random Variate generation – Technique for Random variate generation such as Inverse transforms technique or Rejection method

UNIT - IV:

Simulation languages – comparison of simulation languages with general purpose languages – Simulation languages vs Simulators – software features – comparison of simulation languages.

Output data analysis – Types of Simulation with respect to output data analysis – warm up period Welch algorithm – Approaches for Steady State Analysis – replication – Batch means methods – comparisons

UNIT –V:

Applications of Simulation – flow shop system – job shop system – M/M/1 queues with infinite and finite capacities – Simple fixed period inventory system – New boy paper problem.

TEXT BOOKS:

1. Simulation Modeling and Analysis by Law, A.M. &Kelton, McGraw Hill, 2nd Edition, New York, 1991.
2. Discrete Event System Simulation by Banks J. & Carson J.S., PH, Englewood Cliffs, NJ, 1984.

REFERENCE BOOKS:

1. Simulation of Manufacturing Systems by Carrie A., Wiley, NY, 1990.
2. A Course in Simulation by Ross, S.M., McMillan, NY, 1990.
3. Simulation Modeling and SIMNET by Taha H.A., PH, Englewood Cliffs, NJ, 1987

II Semester

	PRODUCT DESIGN	L	P	C
		3	0	3

UNIT- I

Introduction -Need for IPPD – strategic importance of product development – integration of customer, designer, material supplier and process planner, Competitor and costumer – behavior analysis. Understanding customer – promoting customer understanding – involve customer in development and managing requirements – Organization – process management and improvement – Plan and establish product specification.

UNIT - II

CONCEPT GENERATION AND SELECTION: Task – Structured approaches – Clarification– Search – Externally and internally – explore systematically – reflect on the solutions and process – concept selection – methodology – benefits.

PRODUCT ARCHETECTURE: Implications – Product change – variety componentstandardization – product performance – manufacturability.

UNIT - III

PRODUCT DEVELOPMENT MANAGEMENT: Establishing the architecture – creation – clustering – geometric layout development – fundamental and incidental interactions – related system level design issues – secondary systems – architecture of the chunks – creating detailed interface specifications.

INDUSTRIAL DESIGN: Integrate process design – Managing costs – Robust design – Integrating CAE, CAD, CAM tools – simulating product performance and manufacturing processing electronically – Need for industrial design – impact – design process.

UNIT - IV

Investigation of customer needs – conceptualization – refinement – management of the industrial design process – technology driven products – user – driven products – assessing the quality of industrial design.

UNIT - V

DESIGN FOR MANUFACTURING AND PRODUCTY DEVELOPMENT: Definition –

Estimation of manufacturing cost – reducing the component costs and assembly costs – Minimize system complexity. Prototype basics – Principles of prototyping – planning for prototypes – Economics analysis – Understanding and representing tasks – baseline project planning – accelerating the projectexecution.

TEXT BOOKS:

1. Product Design and Development / Kari T. Ulrich and Steven D. Eppinger / McGraw Hill

International Edns.1999.

2. Concurrent Engg/integrated Product development / Kemnneth Crow / DRM Associates, 26/3, Via Olivera, Palos Verdes, CA 90274(310)377-569, Workshop Book.

REFERENCES:

1 Effective Product Design and Development / Stephen Rosenthal / Business One Orwin, Homewood, 1992, ISBN,1-55623-603-4.

2 Tool Design–Integrated Methods for Successful Product Engineering / Staurt Pugh / Addsion Wesley Publishing, Neyourk, NY, 1991, ISBN0-202-41369-5.

3. Production and OperationsManagement/Chase/TMH

II Semester

	FINITE ELEMENT METHODS (PROGRAMME ELECTIVE – III)	L	P	C
		3	0	3

UNIT - I

FORMULATION TECHNIQUES: Methodology, Engineering problems and governing differential equations, finite elements., Variational methods-potential energy method, Raleigh-Ritz method, strong and weak forms, Galerkin and weighted residual methods, calculus of variations, Essential and natural boundary conditions.

UNIT – II

ONE-DIMENSIONAL ELEMENTS: Bar, trusses, beams and frames, displacements, stresses and temperature effects.

UNIT – III

TWO DIMENSIONAL PROBLEMS: CST, LST, four noded and eight nodded rectangular elements, Lagrange basis for triangles and rectangles, serendipity interpolation functions. Axisymmetric Problems: Axisymmetric formulations, Element matrices, boundary conditions.

Heat Transfer problems: Conduction and convection, examples: - two-dimensional fin.

UNIT – IV

ISOPARAMETRIC FORMULATION: Concepts, sub parametric, super parametric elements, numerical integration, Requirements for convergence, h-refinement and p-refinement, complete and incomplete interpolation functions, Pascal's triangle, Patch test.

UNIT – V

FINITE ELEMENTS IN STRUCTURAL ANALYSIS: Static and dynamic analysis, eigen value problems, and their solution methods, case studies using commercial finite element packages.

TEXT BOOK:

1. Finite element methods by Chandrubatla&Belagondu, PHI, 2011, 4th Edition

REFERENCES:

1. J.N. Reddy, Finite element method in Heat transfer and fluid dynamics, CRC press, 1994
2. Zienckiwicz O.C. & R. L. Taylor, Finite Element Method, McGraw-Hill,1983.
3. K. J. Bathe, Finite element procedures, Prentice-Hall, 1996

II Semester

	CONCURRENT ENGINEERING (PROGRAMME ELECTIVE – III)	L	P	C
		3	0	3

UNIT I:

INTRODUCTION, Extensive definition of CE - CE design methodologies - Organizing for CE USE OF INFORMATION TECHNOLOGY IT SUPPORT - Solid modeling - Collaborative product development - Artificial Intelligence - Expert systems - Software hardware co-design.

UNIT II:

DESIGN STAGE Life-cycle design of products –Necessary technological development - Automated analysis idealization control - Concurrent engineering in optimal structural design - Real time constraints.

UNIT III:

MANUFACTURING CONCEPTS AND ANALYSIS Manufacturing competitiveness - Checking the design process - conceptual design mechanism – Qualitative, physical approach - An intelligent design for manufacturing system –

UNIT IV:

JIT system - low inventory - computer based assembly planning - Design of Automated manufacturing. PROJECT MANAGEMENT Life Cycle semi realization - design for economics - evaluation of design for manufacturing cost

UNIT V:

Concurrent mechanical design - decomposition in concurrent design - negotiation in concurrent engineering design studies - product realization taxonomy - plan for Project Management on new product development – bottleneck technology development.

TEXT BOOKS:

1. Integrated Product Development / Anderson MM and Hein, L. Berlin, Springer, 1987.
2. Concurrent Engineering: Automation Tools and Technology / Andrew Kusaik, John Wiley.

REFERENCES:

1. Design for Concurrent Engineering / Cleetus, J, Concurrent Engg. Research Centre, Morgantown, WV, 1992.
2. Concurrent Engineering Fundamentals: Integrated Product Development/ Prasad, Prentice Hall, 1996. 3. Successful Implementation of Concurrent Product and Process / Sammy G Sinha, Wiley, John and Sons Inc., 1998.

II Semester

	DESIGN AND MANUFACTURING OF MEMS AND MICRO SYSTEMS (PROGRAMME ELECTIVE – III)	L	P	C
		3	0	3

UNIT I:

OVERVIEW AND WORKING PRINCIPLES OF MEMS AND MICROSYSTEMS

MEMS & Microsystems, Evolution of Micro fabrication, Microsystems & Microelectronics, Microsystems & Miniaturization, Applications of MEMS in Industries, Micro sensors, Micro actuation, MEMS with Micro actuators Micro accelerometers, Micro fluidics.

UNIT II:

ENGINEERING SCIENCE FOR MICROSYSTEMS DESIGN AND FABRICATION:

Atomic structure of Matter, Ions and Ionization, Molecular Theory of Mater and Intermolecular Force, Doping of Semiconductors, The diffusion Process, Plasma Physics, Electrochemistry, Quantum Physics

UNIT III:

ENGINEERING MECHANICS FOR MICROSYSTEMS DESIGN:

Static Bending of thin Plates, Mechanical Vibration, Thermo mechanics Fracture Mechanics, Thin-Film Mechanics, Overview of Finite Element Stress Analysis

UNIT IV:

THERMO FLUID ENGINEERING & MICROSYSTEMS DESIGN:

Overview of Basics of Fluid Mechanics in Macro and Meso scales, Basic equations in Continuum Fluid dynamics, Laminar Fluid Flow in Circular Conduits, Computational Fluid Dynamics, Incompressible Fluid Flow in Micro conduits, Fluid Flow in Sub micrometer and Nano scale, Overview of Heat conduction in Solids, Heat Conduction in Multilayered Thin films and in solids in sub micrometer scale, Design Considerations, Process Design

MechanicalDesign, Mechanical Design using FEM, Design of a Silicon Die for a Micro pressure Sensor.

UNIT V:

MATERIALS FOR MEMS & MICROSYSTEMS AND THEIR FABRICATION:

Substrates and Wafers, Active substrate materials, Silicon as a substrate material, Silicon Compounds, Silicon Piezoresistors, Gallium Arsenide, Quartz, Piezoelectric Crystals and Polymers, Photolithography, Ion implantation, Diffusion and oxidation, chemical and physical vapor deposition, Etching, Bulk micro manufacturing, Surface Micromachining, The LIGA Process

TEXT BOOKS:

1. MEMs & Microsystems: Design & Manufacture/ Tai-Ran Hsu/Tata Mc-Graw Hill., ed./2002
2. An Introduction to Micro electro mechanical Systems Engineering/ Maluf, M./ Artech House, Boston, 2000

REFERENCES:

1. Micro robots and Micromechanical Systems/ Trimmer, W.S.N/ Sensors & Actuators, vol19, no.1989.
2. Applied Partial Differential Equations/ Trim, D.W/ PWS-Kent Publishing/ Boston 1990.
3. Fundamentals of Microfabrication.Madou, M/ CRC Press, Boca Raton, 1997.
4. The Finite Element Method in Thermomechanics/ Hsu, T.R / Alien &Unwin, London

II Semester

	PRODUCTION AND OPERATIONS MANAGEMENT (PROGRAMME ELECTIVE – IV)	L	P	C
		3	0	3

UNIT - I

OPERATION MANAGEMENT: Definition – Objectives – Types of production systems – historical development of operations management – Current issues in operation management. Product design – Requirements of good product design – product development – approaches – concepts in product development – standardization – simplification – Speed to market – Introduction to concurrent engineering.

UNIT – II

VALUE ENGINEERING: objective – types of values – function & cost – product life cycle-steps in value engineering – methodology in value engineers – FAST Diagram – Matrix Method. Location – Facility location and layout – Factors considerations in Plant location- Comparative Study of rural and urban sites – Methods of selection plant layout – objective of good layout – Principles – Types of layout – line balancing.

UNIT - III

AGGREGATE PLANNING: definition – Different Strategies – Various models of AggregatePlanning.Advance inventory control systems push systems – Material Requirement – Terminology – types of demands – inputs to MRP- techniques of MRP – Lot sizing methods – benefits and drawbacks of MRP –Manufacturing Resources Planning (MRP –II), Pull systems – Vs Push system – Just in time (JIT) philosophy Kanban System – Calculation of number of Kanbans Requirements for implementation JIT – JIT Production process – benefits of JIT.

UNIT - IV

PROJECT MANAGEMENT: Programming Evaluation Review Techniques (PERT) – threetimes estimation – critical path – probability of completion of project – critical path method – crashing of simple nature.

UNIT – V

SUPPLY CHAIN MANAGEMENT: Concepts, process of SCM, selection of channel strategy,core operations capabilities, SCM decisions, SCM models.

TEXT BOOKS:

1. Operations Management/ E.S. BuffA/ John Wiley & Sons / 2007
2. Production and Operations Management/ Chary/ McGraw Hill/2004

REFERENCES:

1 Operations Management Theory and Problems/ Joseph G. Monks / Macmillan / McGraw Hill / 3rd Edition.

2 Production and Operations Management - Theory and Practice by Dipak Kumar Battacharyya, Universities Press Pvt Ltd, 2012.

3 Production Systems Management/ James I. Riggs / John Wiley & Sons.

4 Operations Management/ Richard Chase/ McGraw Hill/2006

5 Production and Operation Management / PannerSelvam / PHI.

6 Production and Operation Analysis/ Nahima/ McGraw Hill/2004

II Semester

	MATERIALS TECHNOLOGY (PROGRAMME ELECTIVE – IV)	L	P	C
		3	0	3

UNIT I:

Elasticity in metals, mechanism of plastic deformation, slip and twinning, role of dislocations, yield stress, shear strength of perfect and real crystals, strengthening mechanism, workhardening, solid solution, grain boundary strengthening. Poly phase mixture, precipitation,particle, fiber and dispersion strengthening, effect of temperature, strain and strain rate on plasticbehavior, super plasticity, Yield criteria: Von-mises and Tresca criteria.

UNIT II:

Griffth's Theory, stress intensity factor and fracture Toughness, Toughening Mechanisms,Ductile and Brittle transition in steel, High Temperature Fracture, Creep, Larson – Millerparameter, Deformation and Fracture mechanism maps.

UNIT III:

Fatigue, fatigue limit, features of fatigue fracture,Low and High cycle fatigue test, CrackInitiation and Propagation mechanism and paris Law, Effect of surface and metallurgicalparameters on Fatigue, Fracture of non-metallic materials, fatigue analysis, Sources of failure,procedure of failure analysis. Motivation for selection, cost basis and service requirements,Selection for Mechanical Properties, Strength, Toughness, Fatigue and Creep.

UNIT IV:

MODERN METALLIC MATERIALS: Dual Steels, Micro alloyed, High Strength Low alloy(HSLA) Steel, Transformation induced plasticity (TRIP) Steel, Maraging Steel, Inter metallics,Ni and Ti Aluminides. Processing and applications of Smart Materials, Shape Memory alloys,Metallic Glass Quasi Crystal and Nano Crystalline Materials.

UNIT V:

NONMETALLIC MATERIALS: Polymeric materials and their molecular structures,Production Techniques for Fibers, Foams, Adhesives and Coatings, structure, Properties andApplications of Engineering Polymers, Advanced Structural Ceramics WC, TiC, TaC, A12O3,SiC, Si3N4, CBN and Diamond – properties, Processing and applications.

TEXT BOOKS:

1. Mechanical Behavior of Materials/Thomas H. Courtney/ McGraw Hill/2 nd Edition/2000
2. Mechanical Metallurgy/George E. Dicter/McGraw Hill, 1998.

REFERENCES:

1 Selection and use of Engineering Materials 3e/Charles J.A/Butterworth Heiremann.
2 Engineering Materials Technology/James A Jacob Thomas F Kilduff/Pearson
3 Material Science and Engineering/William D Callister/John Wiley and Sons
4 Plasticity and plastic deformation by Aritzur.
5 Introduction to Ceramics, 2nd Edition by W. David Kingery, H. K. Bowen, Donald R. Uhlmann

II Semester

	COMPUTATIONAL FLUID DYNAMICS (PROGRAMME ELECTIVE – IV)	L	P	C
		3	0	3

UNIT - I

INTRODUCTION: Finite difference method, finite volume method, finite element method, governing equations and boundary conditions, Derivation of finite difference equations.

Solution methods: Solution methods of elliptical equations — finite difference formulations, interactive solution methods, direct method with Gaussian elimination. Parabolic equations explicit schemes and Von Neumann stability analysis, implicit schemes, alternating direction implicit schemes, approximate factorization, fractional step methods, direct method with tri-diagonal matrix algorithm.

UNIT – II

HYPERBOLIC EQUATIONS: Explicit schemes and Von Neumann stability analysis, implicit schemes, multi step methods, nonlinear problems, second order one-dimensional wave equations. Burgers equations: Explicit and implicit schemes, Runge-Kutta method.

UNIT – III:

FORMULATIONS OF INCOMPRESSIBLE VISCOUS FLOWS: Formulations of incompressible viscous flows by finite difference methods, pressure correction methods, vortex methods.

Treatment of compressible flows: potential equation, Euler equations, Navier-stokes system ofequations, flow field-dependent variation methods, boundary conditions, example problems.

UNIT – IV

FINITE VOLUME METHOD: Finite volume method via finite difference method, formulations for two and three-dimensional problems.

UNIT – V:

STANDARD VARIATIONAL METHODS: Linear fluid flow problems, steady state problems, Transient problems.

TEXT BOOKS:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar/ Hemashava Publishers corporation&McGraw Hill.
2. Computational Fluid Dynamics: Basics with applications/John D. Anderson/ McGraw Hill.

REFERENCES:

1 Computational fluid dynamics/ T. J.C'hung/ Cambridge University press,2002.
2 Text book of fluid dynamics/ Frank Choriton/ CBS Publishers & distributors, 1985
3 Computational Fluid Flow and Heat Transfer/ Muralidaran/ Narosa Publications
4 Fundamentals of Computational Fluid Dynamics/Tapan K. Sengupta / Universities Press.
5 Introduction to Theoretical and Computational Fluid Dynamics/C. Pozrikidis /Oxford University Press/2nd Edition

II Semester

	MANUFACTURING SIMULATION & PRECISION ENGINEERING LAB	L	P	C
		0	4	2

A. MANUFACTURINGSIMULATION

The students will be given training on the use and application of the following software to manufacturing problems:

1. Auto MOD Software.
2. PROMOD
3. SLAM-II
4. CAFIMS
5. Flexsim

They also learn how to write sub routines in C-language and interlinking with the above packages.

Problems for modeling and simulation experiments:

1. AGV Planning
2. ASRS simulation and performanceevaluation
3. Machines, AGVs and AS/RS integratedproblems
4. JITsystem
5. Kanban flow
6. Material handlingsystems
7. M.R.P.Problems
8. Shop floor scheduling etc.

B. PRECISIONENGINEERING

1. Hydraulic and Pneumaticcircuits
2. Closed loop controlsystems
3. Study of the chip formation in turningprocess
4. Study of operation of tool and cutter grinder, twist drill grinder, Centrelessgrinder
5. Determination of cutting forces inturning
6. Experiments in unconventional manufacturing processes-AJM and study of USM, EDM, Laser Machining and Plasmaspraying
7. Inspection of parts using tool makers microscope, roughness and formtester
8. Study of micro-controllers, programming on various CNC machine tools and also controllers
9. Studies on PLCprogramming
10. Study and programming ofrobots

11. Condition monitoring in machining process using acoustic emission.

II Semester

	PRODUCT DESIGN LAB	L	P	C
		0	4	2

1. Estimate what fraction of price of a pocket calculator is required to cover the cost of developing the product. To do this you might start by estimating the information needed to fill out to exhibit 1-3 for pocket calculator?
2. Create a set of scatter charts by plotting each of the rows in Exhibit 1-3 against the development cost row. For each one, explain why there is or is not any correlation?
3. Diagram a process for planning and cooking a family dinner. Does your process resemble the generic product development process? Is cooking dinner is analogous into a market-pull, technology push, platform process-intensive, customization, high-risk, quick-build, or complex system process?
4. Sketch the organization (in some appropriate graphical representation) of a consulting firm that develops new products for clients on a project by project basis. Assume that the individuals in the firm represent all of the different functions required to develop a new product. Would this organization most likely to be aligned with functions, be aligned by projects, or be a hybrid?
5. Conduct a search using the Internet or published corporate annual reports to identify the corporate strategy of a company in which you might be interested in investing. Learn about the firm's product lines and its newest products. How do these products support the corporate strategy what types of products would you expect to see in the product plan?
6. Create a product technology road-map illustrating the availability of technologies for a class of products you understand well, such as personal computers?
7. How can the concept selection methods be used to benchmark or evaluate existing products? Perform such an evaluation for five automobiles you might consider purchasing.
8. Perform concept screening for the four pencil holder concepts shown below. Assume the pencil holders are for a member of a product development team who is continually moving from site to site.
9. Repeat exercise 3, but use concept scoring.
10. Prepare a PERT chart for the given task ?
    Task : Preparing Dinner with the following things

    i. Wash and cut the vegetables for the salad (15 minutes)
    ii. Toss the salad (2 minutes)
    iii. Set the table (8 minutes)
    iv. Start the rice cooking (2 minutes)
    v. Cook rice (25 minutes)

vi. Place the rice in a serving dish (1 minute)
vii. Mix casserole ingredients (10 minutes)
viii. Bake the casserole (25 minutes)

How fast can one person prepare this dinner? What if there were two people?

II Semester

	PEDAGOGY STUDIES	L	P	C
		2	0	0

UNIT-I:

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning, Curriculum, Teacher education.Conceptual framework, Research questions**.**Overview of methodology and Searching.

UNIT-II:

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

UNIT-III:

Evidence on the effectiveness of pedagogical practices Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?Theory of change.Strength and nature of the body of evidence for effective pedagogicalpractices.Pedagogic theory and pedagogical approaches.Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT-IV: Professional development: alignment with classroom practices and follow-up

Support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barriers to learning: limited resources and large class sizes

UNIT-V:

Research gaps and future directions- Research design**,** Contexts**,** Pedagogy**,** Teacher education**,** Curriculum and assessment**,** Dissemination and research impact.

Suggested reading

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools,Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal ofCurriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teachereducation research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learningof basic maths and reading in Africa: Does teacher preparation count? InternationalJournal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primaryeducation. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

II Semester

	MINI PROJECT	L	P	C
		0	4	2

Students can take up small problems in the field of design engineering as mini project. It can be related to solution to an engineering problem, verification and analysis of experimental data available, conducting experiments on various engineering subjects, material characterization, studying a software tool for the solution of an engineering problem etc.

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Mechanical Engineering Department

To foster prosperity through technological development by means of education, innovation and collaborative research.

Mission of Mechanical Engineering Department

- To produce effective and responsible graduate and post-graduate engineers for global requirements by imparting quality education.
- To improve the Department's infrastructure to facilitate research productivity and success.
- To integrate teaching and research for preservation and effective application of knowledge and skills.
- To strengthen and expand collaboration and partnerships with industry and other organizations.
- To provide consultancy to the neighborhood and inculcate a spirit of entrepreneurship.
- To serve society through innovation and excellence in teaching and research.

Program Educational Objectives(PEOs)

PEO1: Graduates apply a deep working knowledge of technical fundamentals in areas such as Design, Thermal, Production, Industrial and related fields to address needs of the customer and society.

PEO2: Graduates pursue advanced education, Research and Development in Engineering, Technology and other professional careers.

PEO3: Perform themselves in a responsible, professional and ethical manner.

PEO4: Graduates participate as leaders in their fields of specialization and in activities that contribute to service and overall economic development of society.

Program Outcomes(POs) of Mechanical Engineering Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

PSO1: Able to apply the knowledge learned as a part of the curriculum to provide solutions for problems related to Mechanical Engineering.

PS**O**2: Think innovatively, design and develop products with modern CAD/CAM tools and with optimized manufacturing processes.

S.No.	Subject	L	P	C
1	**Programme Elective V** Advances in CNC Technologies Design for Manufacturing and Assembly Advanced Materials	3	--	3
2	**Open Elective** Quality Engineering in Manufacturing ReliabilityEngineering Design of Experiments	3	--	3
3	Dissertation Phase – I	--	20	10
	Total	6	20	**16**

III Semester

	ADVANCES IN CNC TECHNOLOGIES (PROGRAMME ELECTIVE – V)	L	P	C
		3	0	3

UNIT I

Features of NC Machines Fundamentals of numerical control, advantage of NC systems, classification of NC systems, point to point, NC and CNC, incremental and absolute, open and closed loop systems, Features of NC Machine Tools, design consideration of NC machine tool, methods of improving machine accuracy. Systems Drives and Devices: Hydraulic motors, DC motors, stepping motors and AC motors, feedback devices, encoders, Induction tachometers.

UNIT II

NC Part Programming: Manual programming- Basic concepts, Point to Point contour programming, canned cycles, parametric programming. Computer-Aided Programming: General information, APT programming, Examples APT programming problems (2D machining only). NC programming on CAD/CAM systems,

UNIT III

Post Processors: Introduction to post processors, necessity of post processors, general structure of a post processor, functions of a post processor. Automatic tool path generation.

Interpolators: DDA integrator, hardware interpolators for linear and circular interpolator, CNC software interpolators, the reference pulse technique, sample- data technique.

UNIT IV

Tooling for CNC machines: Inter changeable tooling system, preset and qualified tools, coolant fed tooling system, modular fixturing, quick change tooling system, automatic head changers. DNC SYSTEMS AND Adaptive Control: Introduction, type of DNC systems, advantages and disadvantages of DNC, adaptive control with optimization, Adaptive control with constraints, Adaptive control of machining processes like turning, grinding

UNIT V

Micro Controllers: Introduction, Hardware components, I/O pins, ports, external memory, counters, timers and serial data I/O interrupts. Programmable Logic Controllers (PLC's): Introduction, Hardware components of PLC, System, basic structure, principle of operations, Applications of PLC are in CNC Machines.

Text Books:

1. Computer Control of Manufacturing Systems / YoramKoren / McGraw Hill Int.1983.
2. Machining Tools Hand Book Vol 3, (Automation & Control)/ Manfred Weck / John Wiley and Sons,1984.

III Semester

	DESIGN FOR MANUFACTURING AND ASSEMBLY (PROGRAMME ELECTIVE – V)	L	P	C
		3	0	3

UNIT - I

Introduction to DFM, DFMA: How Does DFMA Work? Reasons for Not Implementing DFMA, What Are the Advantages of Applying DFMA During Product Design?Typical DFMA Case Studies, Overall Impact of DFMA on Industry.

Design for Manual Assembly: General Design Guidelines for Manual Assembly, Development Of the Systematic DFA Methodology, Assembly Efficiency, and Effect of Part Symmetry, Thickness, and Weight on Handling Time, Effects of Combinations of Factors, Application of the DFA Methodology.

UNIT - II

Design for machining: Introduction to machining, Recommended materials for machinability, Design recommendations, Design for tuning operation: Process description, Typical characteristics and applications, Suitable materials, Design recommendations, Parts produced by milling: Process description, Characteristics and applications of parts produced on milling machines, Design recommendations for milling, Dimensional factors and tolerances, Parts produced by planning, shaping and slotting: Process description, Design recommendation planning, Design for broached parts: Process description, Typical characteristics of broached parts, Suitable materials for broaching, Design recommendations.

UNIT - III

Metal casting: Appraisal of various casting processes, selection of casting process,-general design considerations for casting-casting tolerance-use of solidification, simulation in casting design-product design rules for sand casting.

Extrusion & Sheet metal work: Design guide lines extruded sections-design principles for punching, blanking, bending, and deep drawing-Keeler Goodman forging line diagram – component design for blanking.

Design for powder metal processing: Introduction to powder metal processing, typical characteristics and applications, Limitations, Design recommendations.

UNIT - IV

Metal joining: Appraisal of various welding process factors in design of weldments – general design guidelines-pre and post treatment of welds-effects of thermal stresses in weld joints-design of brazed joints.

Forging: Design factors for forging – closed die forging design – parting lines of dies – drop forging die design – general design recommendations.

UNIT – V

Design for Assembly Automation: Fundamentals of automated assembly systems, System configurations, parts delivery system at workstations, various escapement and placement devices used in automated assembly systems, Quantitative analysis of Assembly systems, Multi station assembly systems, and single station assembly lines.

Design for Fasteners: Introduction, Design recommendation for fasteners.

TEXT BOOKS:

1. Design for manufacture, John cobert, Adisson Wesley. 1995
2. Design for Manufacture by Boothroyd,
3. Design for manufacture, James Bralla

REFERENCES:

1. ASM Hand book Vol.20
2. GeoffreyBoothroyd, Peter Dewhurst and Winston Knight (2002) Product Design for Manufacture and Assembly, Second Edition, CRC press, Taylor & Francis, Florida, USA.
3. GeoffreyBoothroyd (2005) Assembly Automation and Product Design, Second Edition, CRC press, Taylor & Francis, Florida, USA.
4. A.K. Chitale and R.C. Gupta, (1999) Product design and Manufacturing, Prentice Hall of India, New Delhi.

III Semester

	ADVANCED MATERIALS (PROGRAMME ELECTIVE – V)	L	P	C
		3	0	3

UNIT-I

INTRODUCTION TO COMPOSITE MATERIALS: Introduction, classification: polymer matrixcomposites, metal matrix composites, ceramic matrix composites, carbon–carbon composites, fiberreinforcedcomposites and nature-made composites, and applications .

REINFORCEMENTS: Fibres- glass, silica, kevlar, carbon, boron, silicon carbide, and born carbidefibres.

UNIT-II

MANUFACTURING METHODS: Autoclave, tape production, moulding methods, filament winding, handlayup, pultrusion, RTM.

UNIT-III

FUNCTIONALLY GRADED MATERIALS: Types of functionally graded materials-classification-differentsystems-preparation-properties and applications of functionally graded materials.

UNIT-IV

SHAPE MEMORY ALLOYS: Introduction-shape memory effect-classification of shape memory alloyscomposition-properties and applications of shape memory alloys.

UNIT-V

NANO MATERIALS: Introduction-properties at nano scales-advantages & disadvantages-applications incomparison with bulk materials (nano – structure, wires, tubes, composites). state of art nano advanced- topicdelivered by student.

Text Books:

1. Nano material /A.K. Bandyopadyay/New age Publishers
2. Material science and Technology: A comprehensive treatment/Robert W.Cahn,/VCH
3. Engineering Mechanics of Composite Materials / Isaac and M Daniel/Oxford University Press

References:

1. Mechanics of Composite Materials / R. M. Jones/ McGraw Hill Company, New York, 1975.
2. Analysis of Laminated Composite Structures / L. R. Calcote/Van NostrandRainfold,NY 1969
3. Analysis and performance of fibre Composites /B. D. Agarwal and L. J. Broutman /Wiley-Interscience,New York, 1980
4. Mechanics of Composite Materials - Second Edition (Mechanical Engineering) /AutarK.Kaw / CRC Press

III Semester

	QUALITY ENGINEERING IN MANUFACTURING (OPENELECTIVE)	L	P	C
		3	0	3

UNIT - I

QUALITY VALUE AND ENGINEERING: An overall quality system, quality engineering in production design, quality engineering in design of production processes. Loss Function and Quality Level: Derivation and use of quadratile loss function, economic consequences of

tightening tolerances as a means to improve quality, evaluations and types tolerances. (N-type, S-type and L-type)

UNIT II:

TOLERANCE DESIGN AND TOLERANCING: Functional limits, tolerance design for N-type. L-type and S-type characteristics, tolerance allocation fbr multiple components. Parameter and Tolerance Design: Introduction to parameter design, signal to noise ratios, Parameter design strategy, some of the case studies on parameter and tolerance designs.

UNIT – III

ANALYSIS OF VARIANCE (ANOVA): Introduction to ANOVA, Need for ANOVA, NO-way ANOVA, One-way ANOVA, Two-way ANOVA, Critique of F-test, ANOVA for four level factors, multiple level factors.

UNIT - IV

ORTHOGONAL ARRAYS: Typical test strategies, better test strategies, efficient test strategies, steps in designing, conducting and analyzing an experiment. Interpolation of Experimental Results: Interpretation methods, percent contributor, estimating the mean.

UNIT - V

SIX SIGMA AND THE TECHNICAL SYSTEM: Six sigma DMAIC methodology, tools fpr process improvement, six sigma in services and small organizations, statistical foundations, statistical methodology. Taguchi methods for process improvement – six sigma.

REFERENCES:

1. Taguchi Techniques for Quality Engineering / Phillip J. Ross / McGraw Hill/ Intl. II Edition, 1995.
2. Quality Engineering in Production systems *I* G. Taguchi, A. Elsayed et al/Mc.Graw Hill Intl. Edition, 1989**.**
1. Taguchi Methods explained: Practical steps to Robust Design /Papan P. Bagchi*I* Prentice Hall Pvt. Ltd., New Delhi.

III Semester

	RELIABILITY ENGINEERING (OPENELECTIVE)	L	P	C
		3	0	3

UNIT-I: Reliability Concepts

Reliability Engineering- Introduction, reliability, maintainability, availability and quality, reliability vs quality, Reliability Function, Mean Time to Failure, Hazard rate function, Bath-tub curve, conditional reliability.

UNIT -II: Reliability Mathematics

Probability theory: Properties, theorems and Axioms, Random variables, Probability density function (pdf), cumulative density function (CDF), relationship between pdf and CDF, Joint Probability Distribution, mean life, median life, modal life, Bayes' Theorem.

Statistical Distributions: Discrete – Uniform, Bernoulli, Binomial, Geometric, Poisson, Continuous: Normal, Exponential, Weibull, Lognormal.

UNIT -III: Basic Reliability Models

Constant Failure rate model: Exponential reliability model, Failure modes, Two parameter Exponential distribution, Poisson process and redundancy.

Time-dependent failure rate model: The Weibull distribution, Three parameter Weibull distribution, Normal Distribution, Lognormal distribution

UNIT-IV: Reliability of Systems

System Reliability Modelling and Evaluation Techniques-I: Series, Parallel, Series-Parallel, Parallel-Series, *k*-out-of-*m*, Standby model.

Evaluation Techniques II: Event Space, Decomposition, Minimal Path sets and Cut sets, Common Mode Failures and Three State Devices.

UNIT-V: Data Analysis and Reliability Estimation

Point Estimation and Interval Estimation, Goodness-of-Fit test, Moment Estimation, Maximum Likelihood Estimator, Least Square Estimates.Parametric Reliability Estimations and Models Estimation Method of Moments, Likelihood functions, Method of Least Square. Reliability Models: Historical data, Operational life testing, Burn-in testing, Accelerated Life testing, Types of Censoring.

TEXT BOOKS:

1. Elsayed A. Elsayed, Reliability Engineering, John Wiley, 2nd Ed, 2012
2. Charles E. Ebling, Reliability and Maintainability Engineering, TMH, 9th Reprint, 2008.
3. V. N. A. Naikan, Reliability Engineering and Life Testing, PHI, 2008

REFERENCE BOOKS:

1. K. C. Kapur and L. R. Lamberson, Reliability in Engineering Design, Wiley India, 2009.
2. K. K. Agrawal, Reliability Engineering, Springer-Science+Business Media, 1993.

III Semester

	DESIGN OF EXPERIMENTS (OPENELECTIVE)	L	P	C
		3	0	3

UNIT – I: Fundamentals of Experimentation:

Role of experimentation in rapid scientific progress, historical perspective of experimental approaches, Steps in experimentation, principles of experimentation

UNIT – II: Simple comparative experiments:

Basic concepts of probability & statistics, comparison of two means and two variances, comparison of multiple (more than two) means and ANOVA

UNIT – III: Experimental designs:

Factorial designs, fractional factorial designs, orthogonal arrays, standard orthogonal arrays and interaction tables, modifying orthogonal arrays, selection of suitable orthogonal array design, analysis of experimental data

UNIT – IV: Response surface methodology:

Concept, linear model, steepest ascent, second order model, regression.

UNIT – V: Taguchi's Parameter Design:

Concept of robustness, noise factor, objective function & S/N ratios, inner array & outer array design, data analysis

TEXT BOOKS:

1. Design and Analysis of Experiments/Douglas C. Montgomery/John Wiley and sons, 2012.

REFERENCE BOOKS:

1 Statistics for Experimenters: Design, Innovation, and Discovery. /G. E. /Hunter/W.G., Hunter/ J.S./Hunter/W.G./ 2nd Edition/Wiley/2005.

2. Design of Experiments and Taguchi Methods/Krishnaiah K/Shahabudeen P/Applied/PHI/ India/2011.

3. Taguchi Techniques for Quality Engineering Phillip J. Ross/Tata McGraw-Hill/India, 2005.

III Semester

		L	P	C
	DISSERTATION PHASE – I	**0**	**20**	**10**

The Project Work will start in semester III and should preferably be a problem with research potential and should involve scientific research, design, generation/collection and analysis of data, determining solution and must preferably bring out the individual contribution. Seminar should be based on the area in which the candidate has undertaken the dissertation work as per the common instructions for all branches of M. Tech. The examination shall consist of the preparation of report consisting of a detailed problem statement and a literature review. The preliminary results (if available) of the problem may also be discussed in the report. The work has to be presented in front of the examiners panel set by Head and PG coordinator. The candidate has to be in regular contact with his guide and the topic of dissertation must be mutually decided by the guide and student.

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- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

M.Tech. (EPE)
R19 Course Structure

I .M.Tech. I- Semester

S.No	Category	Sub. Code	Course Title	L	T	P	C	I	E	TM
1	PC	EE1T0119	Power System Operation & Control	4	-		3	40	60	100
2	PC	EE1T0219	Analysis of Power Electronics Converters	4	-	-	3	40	60	100
3	PE		**Elective – I**	4	-	-	3	40	60	100
		EE1T0319	i.Electrical DistributionSystems							
		EE1T0419	ii.Power System Deregulation							
		EE1T0519	iii.Renewable EnergySystems							
4	PE		**Elective – II**	4	-	-	3	40	60	100
		EE1T1619	i. Advanced Power System Protection							
		EE1T1719	ii. HVDC Transmission							
		EE1T1819	iii.Power System Reliability							
5		EE1T1919	Research Methodology	2	0	0	2	40	60	100
6		EE1P0119	Electrical Simulation Laboratory	-	-	4	2	40	60	100
7		EE1P0219	Power Systems Laboratory	-	-	4	2	40	60	100
8		EE1T01019	Audit Course-I	2	0	0	0	-	-	-
		Total		**20**	**0**	**8**	**18**	**280**	**420**	**700**

I .M.Tech. II- Semester

S.No	Category	Sub. Code	Course Title	L	T	P	C	I	E	TM
1	PC	EE2T0119	Power System Dynamics and Stability	4	-	-	3	40	60	100
2	PC	EE2T0219	Real Time Control of Power Systems	4	-	-	3	40	60	100
3	PE		**Elective – IIII**	4	-	-	3	40	60	100
		EE2T0319	i.FACTS							
		EE2T0419	ii. Hybrid Electric Vehicles							
		EE2T0519	iii.Modern Control Theory							
4	PE		**Elective – IV**	4	-	-	3	40	60	100
		EE2T0619	i Programmable Logic Controllers and Applications							
		EE2T0719	ii.Generation& Measurement of High Voltage							
		EE2T0819	iii.Smart Grid Technologies							
5		EE2P0119	Power System Simulation Laboratory	-	-	4	2	40	60	100
6		EE2P0219	Power Converters Laboratory	-	-	4	2	40	60	100
7		EE2PJ0119	Mini Project with Seminar			4	2	40	60	100
8		EE2T0919	Audit Course--II	2	0	0	0	-	-	-
		Total		**18**	**0**	**12**	**18**	**280**	**420**	**700**

II. M.Tech. I- Semester

S.No	Category	Sub. Code	Course Title	L	T	P	C	I	E	TM
1	PE		**Elective – V**	4	-	-	3	40	60	100
		EE3T0119	i.Demand side Energy Management							
		EE3T0219	ii.Power Quality and Custom Power Devices							
		EE3T0319	iii.High Voltage Testing Techniques							
2	OE		**Elective – VI**	4	-	-	3	40	60	100
		EE3T0419	i AI Techniques							
		EE3T0519	ii. Reactive Power Compensation&Management							
		EE3T0619	iii.Operations Research							
3		EE3D0119	Dissertation Phase-I	-	-	20	10	40	60	100
		Total		**8**	**0**	**20**	**16**	**120**	**180**	**300**

II. M.Tech. II- Semester

S.No	Sub. Code	Course Title	L	T	P	C	I	E	TM
1	EE4D0119	Dissertation Phase-II	-	-	20	16	40	60	100
	Total		**0**	0	20	**16**	**40**	**60**	**100**

I YEAR I SEMESTER
ELECTRICAL POWER ENGINEERING
R19 SYLLABUS

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0119		L	P	C
COURSE TITLE : POWER SYSTEM OPERATION AND CONTROL		4	0	3

Learning Objectives:

- To study the unit commitment problem for economic load dispatch.
- To study the load frequency control of single area and two area systems with and without control.
- To study the effect of generation with limited energy supply.
- To study the effectiveness of interchange evaluation in interconnected power systems

Unit-1 :
Unit commitment problem and optimal power flow solution : Unit commitment : Constraints in UCP,UC solutions. Methods-priority list method, introduction to Dynamic programming Approach.

Unit-2 :
Single area Load Frequency Control: Necessity of keeping frequency constant. Definition of control area, single area control, Block diagram representation of an isolated Power System, Steady State analysis. Proportional plus Integral control of single area and its block diagram representation, steady state response, load frequency control and Economic dispatch control.

Unit-3 :
Two area Load Frequency Control : Load frequency control of 2-area system : uncontrolled case and controlled case, tie-line bias control. Optimal two-area LF control-steady state representation, performance Index and optimal parameter adjustment.

Unit-4 :
Generation with limited Energy supply : Take-or-pay fuel supply contract, composite generation production cost function. Solution by gradient search techniques, Hard limits and slack variables, Fuel scheduling by linear programming.

Unit-5 :
Interchange Evaluation and Power Pools Economy Interchange, Economy interchange Evaluation, Interchange Evaluation with unit commitment.Multiple Interchange contracts. After-the-fact production costing, Transmission Losses in transaction Evaluation, other types of Interchange, power pools.

Course Outcomes:

After completion of this course the students will be able to:

- Determine the unit commitment problem for economic load dispatch.
- Get the knowledge of load frequency control of single area and two area systems with and without control.
- Know the effect of generation with limited energy supply.
- Determine the interchange evaluation in interconnected power systems.

TEXT BOOKS:

1. Modern Power System Analysis - by I.J.Nagrath&D.P.Kothari, Tata McGraw-Hill Publishing Company ltd, 2nd edition.
2. Power system operation and control PSR Murthy B.S publication.
3. Power Generation, Operation and Control - by A.J.Wood and B.F.Wollen berg, John wiley & sons Inc. 1984.

REFERENCE BOOKS:

1. Electrical Energy Systems Theory - by O.I.Elgerd, Tata McGraw-Hill Publishing Company Ltd, 2nd edition.
2. Reactive Power Control in Electric Systems - by TJE Miller, John Wiley & sons.

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0219		L	P	C
COURSE TITLE: ANALYSIS OF POWER ELECTRONIC CONVERTERS		4	0	3

Learning Objectives:

- To understand the control principle of ac to ac conversion with suitable power semi conductor devices.
- To have the knowledge of ac to dc conversion and different ac to dc converter topologies.
- To understand the effect of operation of controlled rectifiers on p.f. and improvement of p.f. with PFC converters
- To acquire the knowledge on dc-ac converters and to know the different control techniques of dc-ac converters.
- To know multilevel inverter configuration to improve the quality of the inverter output voltage.

Unit-1 : AC voltage Controllers

Single Phase AC Voltage Controllers with RL and RLE loads-ac voltage controller's with PWM control-Effects of source and load inductances –synchronous tap changers –Application-numerical problems

Three Phase AC Voltage controllers-Analysis of Controllers with star and delta connected resistive, resistive –inductive loads-Effects of source and load inductances–Application-numerical problems.

Unit –2: AC-DC converters

Single phase Half controlled and Fully controlled Converters with RL load– Evaluation of input power factor and harmonic factor-Continuous and Discontinuous load current-Power factor improvements-Extinction angle control-symmetrical angle control-PWM single phase sinusoidal PWM-Single phase series converters- numerical problems.

Three Phase ac-dc Converters- Half controlled and fully controlled Converters with RL load– Evaluation of input power factor and harmonic factor-Continuous and Discontinuous load current-three phase dual converters-Power factor improvements-three phase PWM-twelve pulse converters- numerical problems.

Unit-3: Power Factor Correction Converters

Single-phase single stage boost power factor corrected rectifier, power circuit principle of operation, and steady state- analysis, three phase boost PFC converter

Unit –4: PWM Inverters

Principle of operation-Voltage control of single phase inverters - sinusoidal PWM – modified PWM – phase displacement Control – Trapezoidal, staircase, stepped, harmonic injection and delta modulation – numerical problems. Voltage Control of Three-Phase Inverters- Sinusoidal PWM- 60^0 PWM- Third Harmonic PWM- Space Vector Modulation- Comparison of PWM Techniques-current source inverters-Variable dc link inverter - numerical problems

Unit 5: Multi level inverters

Introduction, Multilevel Concept, Types of Multilevel Inverters- Diode-Clamped Multilevel Inverter, Principle of Operation, Features of Diode-Clamped Inverter, Improved Diode-Clamped Inverter- Flying-Capacitors Multilevel Inverter- Principle of Operation, Features of Flying-Capacitors Inverter- Cascaded Multilevel Inverter- Principle of Operation- Features of Cascaded Inverter- Switching Device Currents-DC-Link Capacitor Voltage Balancing- Features of Multilevel Inverters- Comparisons of Multilevel Converters

Course Outcomes:

After completion of this course the students will be able to:

- Have the knowledge on principle of ac voltage controller and their control techniques.
- Convert ac voltage to dc voltage and different control strategies of the converter.
- Control the power factor of single phase and three phase ac to dc converters.
- Understand the conversion of dc to ac and their control strategies.
- Analyze different multilevel inverters to improve the quality of the output voltage of the inverter.

Text Books

1. Power Electronics: Converters, Applications, and Design- Ned Mohan, Tore M. Undeland, William P. Robbins, John Wiley& Sons, 2nd Edition, 2003.
2. Daniel W. Hart - McGraw-Hill,2011.

Reference Books:

1. Elements of Power Electronics – Philip T. Krein, Oxford University press, 2014.
2. Power Electronics: Converters, Applications, and Design- Ned Mohan, Tore M. Undeland, William P. Robbins, John Wiley& Sons, 2nd Edition, 2003.
3. Power Converter Circuits – William Shepherd & Li Zhang-Yes Dee CRC Press, 2004.

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE:EE1T0319		L	P	C
COURSE TITLE: ELECTRICAL DISTRIBUTION SYSTEMS (ELECTIVE-1)		4	0	3

Learning Objectives:

- To learn the importance of economic distribution of electrical energy.
- To analyze the distribution networks for V-drops, PLosscalculations and reactive power.
- To understand the co-ordination of protection devices.
- To impart knowledge of capacitive compensation/voltage control.
- To understand the principles of voltage control.

Unit -1: Objectives of electrical distribution system - factors effecting – present & future electrical distribution system in india, voltage lvels – Loss factor - Load factor - relation between loss factor and load factor.Residential, Commercial, Agricultural and Industrial loads and their characteristics.

Unit -2: Distribution Feeders and Substations : Design consideration of Distribution feeders: Radial and loop types of primary feeders, voltage levels, feeder-loading. Design practice of the secondary distribution system. Location of Substations : Rating of a Distribution Substation, service area with 'n' primary feeders. Benefits derived through optimal location of substations.

Unit -3 : System analysis , Voltage drop and power loss calculations,Derivation for volt-drop and power loss in lines, manual methods of solution for radial networks, three-phase balanced primary lines, non-three-phase primary lines.

Unit -4 : Protective devices and coordination : Objectives of distribution system protection, types of common faults and procedure for fault calculation. Protective Devices: Principle of operation of fuses, circuit reclosers, line sectionalizer and circuit breakers. Coordination of protective devices,general coordination procedure.

Unit -5 : Capacitive compensation for power factor control: Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and switched Capacitors).Power factor correction, capacitor location. Economic justification.Procedure to determine the best capacitor location. Voltage control : Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

Course Outcomes:

- After completion of this course the students will be able to:
- Analyze a distribution system.
- Design equipment for compensation of losses in the distribution system.
- Design protective systems and co-ordinate the devices.
- Get understanding of capacitive compensation.
- Get understanding of voltage control.

Text Books:

1. "Electric Power Distribution System Engineering " by Turan Gonen, McGraw-Hill Book Company,1986.

2. Distribution System Analysis and Automation, by Juan M. Gers, The Institution of Engineering and Technology, UK 2014.

Reference Books:

1. Electric Power Distribution-by A.S.Pabla, Tata McGraw-Hill Publishing Company, 4th edition, 1997.
2. Electrical Distribution V.Kamaraju-McGraw Hill
3. Handbook of Electrical Power Distribution – Gorti Ramamurthy-Universities press

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0419		L	P	C
SUB.TITLE: POWER SYSTEM DEREGULATION (ELECTIVE – I)		4	0	3

Learning Objectives:

- To provide in-depth understanding of operation of deregulated electricity market systems.
- To examine typical issues in electricity markets and how these are handled world –wide in various markets.
- To enable students to analyze various types of electricity market operational and control issues using new mathematical models.

Unit 1

Need and conditions for deregulation. Introduction of Market structure, Market Architecture, Spot market, forward markets and settlements. Review of Concepts marginal cost of generation, least-cost operation, incremental cost of generation. Power System Operation.

Unit 2

Electricity sector structures and Ownership /management, the forms of Ownership and management. Different structure model like Monopoly model, Purchasing agency model, wholesale competition model, Retail competition model.

Unit 3

Framework and methods for the analysis of Bilateral and pool markets, LMP based markets, auction models and price formation, price based unit commitment, country practices

Unit 4

Transmission network and market power. Power wheeling transactions and marginal costing, transmission costing. Congestion management methods- market splitting, counter-trading; Effect of congestion on LMPs- country practices

Unit 5

Ancillary Services and System Security in Deregulation. Classifications and definitions, AS management in various markets- country practices. Technical, economic, & regulatory issues involved in the deregulation of the power industry.

Course Outcomes:

Aftercompletion of this course the students will be able to:

- Understand of operation of deregulated electricity market systems
- Typical issues in electricity markets
- To analyze various types of electricity market operational and control issues using new mathematical models.

Text Books:

1. Power System Economics: Designing markets for electricity - S. Stoft, wiley.
2. Operation of restructured power systems - K. Bhattacharya, M.H.J. Bollen and J.E. Daalder, Springer.

Reference Books:

1. Power generation, operation and control, -J. Wood and B. F. Wollenberg, Wiley.
2. Market operations in electric power systems - M. Shahidehpour, H. Yaminand Z. Li,Wiley.
3. Fundamentals of power system economics - S. Kirschen and G. Strbac, Wiley.
4. Optimization principles: Practical Applications to the Operation and Markets of the Electric Power Industry - N. S. Rau, IEEE Press series on Power Engineeirng.
5. Competition and Choice in Electricity - Sally Hunt and Graham Shuttleworth

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0519		L	P	C
SUB. TITLE: RENEWABLE ENERGY SYSTEMS (ELECTIVE-I)		4	0	3

Learning Objectives:

- To learn the fundamental and basic principle of renewable energy sources.
- To the adoption of solar and wind energy sources for the electric power generation.
- To study the principle and working of ocean energy, tidal, wave, bio and geo-thermal energy
- To the adoption and inter connection of renewable and alternative energy sources to grid.

Unit 1 - Fundamentals of Solar Energy & Thermal Systems:

Energy conservation principle and world energy scenario-various forms of renewable energy. Solar Energy - Availability - Solar radiation data and measurement - Estimation of average solar radiation - Solar water heater types - Heat balance – Flat plate collector efficiency – Efficiency of heat removal. Basics of solar concentrators Solar Energy Applications - Solar air heaters – Solar Chimney - Crop driers - Passive solar system - Active solar systems - Water desalination - Output from solar still – Principle of solar ponds.

Unit 2 - Solar Photovoltaic systems:

Solar PV cell, module array and construction. Efficiency of solar cell-developing technologies, IV-PV characteristics. Equivalent circuit of solar cell- Series & shunt resistance. Balance of system components - System design - Storage sizing - PV system sizing - Maximum power point techniques - Perturb & Observe technique - Incremental conductance method.

Unit 3 - Wind Energy

Wind energy – Nature of wind – Characteristics – Variation with height and time – Power in wind –Aerodynamics of Wind turbine – Aero foils and their characteristics – Wind Energy Conversion System – Siting – Rotor selection – Annual energy output – Horizontal axis wind turbine (HAWT) – Vertical axis wind turbine (VAWT) – Rotor design considerations – Number of blades – Solidity Blade profile – Upwind/Downwind – Yaw system – Tower – Braking system - Synchronous and asynchronous generators and loads – Integration of wind energy converters to electrical networks – Inverters – Control system – Requirement and strategies – Noise Applications of wind energy - Maximum power point techniques – Tip Speed Ratio (TSR)

Unit 4 - Ocean Energy Technologies

Ocean Energy - OTEC Principle - Lambert's law of absorption - Open cycle and closed cycle - heat exchanger calculations – Major problems and operational experience. Tidal Power - Principles of power generation - components of power plant – Single and two basin systems – Turbines for tidal power - Estimation of energy – Maximum and minimum power ranges - tidal power house. Wave Energy – Concept of energy and power from waves – Wave characteristics – period and wave velocities - Different wave energy conservation devices (Saltor duck, oscillating water column and dolphin types) – operational experience.

Unit 5 - Bio mass & Geo Thermal Systems:

Biomass energy - Bio fuel classification – Examples of thermo chemical, Pyrolysis, biochemical and agrochemical systems. Direct combustion for heat – Process heat and electricity – Ethanol production and use – Anaerobic digestion for biogas – Different digesters – Digester sizing – Applications of Biogas. Geo thermal energy-Classification-Dry rock & hot aquifer - Energy analysis - Power generation techniques - Prime mover.

Course Outcomes:

After completion of this course the students will be able to:

- Identify alternate energy sources.
- Classify and analyze different renewable energy systems.
- Adopt different alternate energy sources for power generation.
- Design of solar photovoltaic systems
- Develop MPPT strategies in solar PV and wind energy systems
- Explain the principle behind ocean energy, biomass and geo-thermal energy sources

Text Books

1. Non-conventional Energy Sources by G.D. Rai, Khanna Publishers, 2011 Edition, ISBN 9788174090737
2. Renewable energy sources, John Twidell and Tony Weir, Taylor and Francis – 2nd Edition, 2013.
3. Solar Energy - Principles of thermal collection and storage/ S.P. Sukhatme and J. K. Nayak, TMH, New Delhi, 3rd Edition.

Reference Books

1. Renewable energy – Edited by Godfrey Boyle-Oxford University Press, 3rd Edition, 2013.
2. Renewable Energy Resources Basic Principles and Applications, G. N. Tiwari and M. K. Ghosal / Narosa
3. Solar Energy Thermal Processes, Duffie & Beckman.
4. Wind Energy Handbook, Tony Burton, David Sharpe, Nick Jenkins and Ervin Bossanyi / Wiley Publications, 2nd Edition, 2011.
5. Renewable Energy From the Ocean: A Guide to OTEC Johns Hopkins University Applied Physics Laboratories Series in Science and Engineering, William H. Avery, Chih Wu, Reprint, Oxford University Press, 1994
6. Biogas Technology - A Practical Hand Book, K. Khendelwal & S.S. Mahdi, McGraw-Hill, Vol. 1, 1989.

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0619		L	P	C
SUB.TITLE: ADVANCED POWER SYSTEM PROTECTION (ELECTIVE-II)		4	0	3

Learning Objectives:

- To learn about classification and operation of static relays.
- To understand the basic principles and application of comparators.
- To learn about static version of different types of relays.
- To understand about numerical protection techniques.

Unit 1 : Static Relays classification and Tools : Comparison of Static with Electromagnetic Relays, Basic classification, Level detectors and Amplitude and phase Comparators – Duality – Basic Tools – Schmitt Trigger Circuit, Multivibrators, Square wave Generation – Polarity detector – Zero crossing detector – Thyristor and UJT Triggering Circuits. Phase sequence Filters – Speed and reliability of static relays.

Unit 2 : Amplitude and Phase Comparators (2 Input) : Generalized equations for Amplitude and Phase comparison – Derivation of different characteristics of relays – Rectifier Bridge circulating and opposed voltage type amplitude comparators – Averaging & phase splitting type amplitude comparators – Principle of sampling comparators.
Phase Comparison : Block Spike and phase Splitting Techniques – Transistor Integrating type, phase comparison, Rectifier Bridge Type Comparison – Vector product devices.

Unit 3 : Static over current (OC) relays – Instantaneous, Definite time, Inverse time OC Relays, static distance relays, static directional relays, static differential relays, measurement of sequence impedances in distance relays, multi input comparators, elliptic & hyperbolic characteristics, switched distance schemes, Impedance characteristics during Faults and Power Swings,

Unit 4 : PILOT Relaying schemes: Wire pilot protection: circulating current scheme – balanced voltage scheme – translay scheme – half wave comparison scheme - carrier current protection: phase comparison type – carrier aided distance protection – operational comparison of transfer trip and blocking schemes – optical fibre channels.

Unit 5 : Microprocessor based relays and Numerical Protection: Introduction – over current relays impedance relay – directional relay – reactance relay.Numerical Protection: Introduction - numerical relay - numerical relaying algorithms - mann- morrison technique - Differential equation technique and discrete fourier transform technique - numerical over current protection - numerical distance protection.

Course Outcomes:

After completion of this course the students will be able to:

- Know the classifications and applications of static relays.
- Understand the application of comparators.
- Understand the static version of different types of relays.
- Understand the numerical protection techniques.

Text Books :

1. Power System Protection with Static Relays – by TSM Rao, TMH.
2. Protective Relaying Vol-II Warrington, Springer.
3. Art & Science of Protective Relaying - C R Mason, Willey.

Reference Books:

1. Power System Stability KimbarkVol-II, Willey.
2. Power system protection & switchgear by Badri Ram & D N viswakarma, TMH.
3. Electrical Power System Protection –C.Christopoulos and A.Wright- Springer

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0719		L	P	C
COURSE TITLE: HVDC TRANSMISSION (ELECTIVE-II)		4	0	3

Learning Objectives:

- To learn various schemes of HVDC transmission.
- To learn about the basic HVDC transmission equipment.
- To learn the control of HVDC systems.
- To be exposed to the interaction between HVAC and HVDC system.
- To be exposed to the various protection schemes of HVDC engineering.

Unit -1: Limitation of EHV AC Transmission, Advantages of HVDC Technical economical reliability aspects. HVDC Transmission: General considerations, Power Handling Capabilities of HVDC Lines, Basic Conversion principles, static converter configuration. Types of HVDC links-Apparatus and its purpose.

Unit-2: Static Power Converters: 6-pulse bridge circuit and 12-pulse converters, converter station and Terminal equipment, commutation process, Rectifier and inverter operation, equivalent circuit for converter – special features of converter transformers. Comparison of the perform of diametrical connection with 6-pulse bridge circuit

Unit-3 : Control of HVDC Converters and systems : constant current, constant extinction angle and constant Ignition angle control. Individual phase control and equidistant firing angle control, DC power flow control. Factors responsible for generation of Harmonics voltage and current harmonics effect of variation of α and μ. Filters Harmonic elimination.

Unit-4 : Interaction between HV AC and DC systems – Voltage interaction, Harmonic instability problems and DC power modulation. Development of DC circuit Breakers, Multi-terminal DC links and systems; series, parallel and series parallel systems, their operation and control.

Unit -5 : Transient over voltages in HV DC systems : Over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults.Converter faults and protection in HVDC Systems: Converter faults, over current protection - valve group, and DC line protection, circuit breakers. Over voltage protection of converters, surge arresters.

Course Outcomes:

After completion of this course the students will be able to:

- Understand the various schemes of HVDC transmission.
- Understand the basic HVDC transmission equipment.
- Understand the control of HVDC systems.
- Understand the interaction between HVAC and HVDC system.

- Understand the various protection schemes of HVDC engineering.

TEXT BOOKS:

1. S Kamakshaih and V Kamaraju:HVDC Transmission- MG hill.
2. K.R.Padiyar : High Voltage Direct current Transmission, Wiley Eastern Ltd., New Delhi – 1992.

REFERENCE BOOKS:

1. E.W. Kimbark : Direct current Transmission, Wiley Inter Science – New York.
2. J.Arillaga : H.V.D.C.Transmission Peter Peregrinus ltd., London UK 1983
3. Vijay K Sood :HVDC and FACTS controllers:Applications of static converters in power systems by, Kluwer Academic Press

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0819		L	P	C
SUB.TITLE: POWER SYSTEM RELIABILITY (ELECTIVE – II)		4	0	3

Learning Objectives:

- Will be able to get the basic understanding of network modeling and reliability.
- Markov chains.
- Reliability analysis of generation systems.
- Decomposition techniques.

Unit 1 : Basic probability theory – rules for combining probabilities of events – Bernoulli`s trials- probability density and distribution functions – binomial- distributions – expected value and standard deviation of binomial distribution.

Unit 2 : Network Modelling and Reliability Analysis of Series, Parallel, Series-Parallel networks-complex networks – decomposition method-Reliability functions F(t), F(t), R(t), h(t) and their relationship – exponential distributions – Expected value and standard deviation of exponentional distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution – reliability measures MTTF, MTTR, MTBF

Unit 3 : Markov chains – concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities – Markov processes one component repairable system – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabililties using STPM – two component repairable models – Frequency and duration concept.Evaluation of frequency of encountering state, mean cycletime, for one, two component repairable models – evaluation of cumulative probability and cumulative frequency of encountering merged states

Unit 4 : Generation system reliability analysis-Generation system model – capacity outage probability tables – Recursive relation for capacitive model building – sequential addition method – unit removal – Evaluation of loss of load and energy indices – Examples. Frequency and Duration methods – Evaluation of equivalent transitional rates of identical and non-identical units – Evaluation of cumulative probability and cumulative frequency of non-identical generating units – 2-level daily load representation - merging generation and load models – Examples.

Unit 5 : Composite system reliability analysis decomposition method – distribution system reliability analysis – radial networks – weather effects on transmission lines – Evaluation of load and energy indices.

Course Outcomes:

After completion of this course the students will be able to:

- Understand reliability analysis applied to power systems.
- Understand Markov Chains and application to power systems.
- Perform stability analysis of generation systems.
- Understand decomposition techniques applied to power system.

Text Books:

1. Reliability Evaluation of Engg. System – R.Billinton, R.N.Allan, Plenum Press, New York.
2. Reliability Modeling in Electric Power Systems by J. Endrenyi, John Wiley and Sons 1978
3. An Introduction to Reliability and Maintainability Engineering by Charles Ebeling, TMH Publications.
4. Reliability Engineering: Theory and Practice by Alessandro Birolini, Springer Publications

Reference Books :

1. C. Singh, P. Jirutitijaroen and J. Mitra,Electric Power Grid ReliabilityEvaluation: Models and Methods. Wiley-IEEE Press, Hoboken, NJ: 2019.ISBN: 9781119486275.
2. Reliability Engineering by E. Balaguruswamy, TMH Publications.
3. Reliability Engineering by Elsayed A. Elsayed, Prentice Hall Publications.
4. An Introduction to Reliability and Maintainability Engineering. Sharies E Ebeling, TATA McGraw Hill – Edition.

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T0919		L	P	C
COURSE TITLE: RESEARCH METHODOLOGY		4	0	3

Syllabus Contents:

UNIT 1: RESEARCH FOUNDATION: Motivation and objectives – Research methods, Methodology. Types of research, Defining and formulating the research problem, Hypothesis – Qualities of a good Hypothesis, Hypothesis Testing – Logic & Importance

UNIT 2: LITERATURE REVIEW: Pimary and secondary sources, Effective literature studies approaches, analysis, identifying gap areas from literature and research database.

UNIT 3: DATA COLLECTION AND ANALYSIS: Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), hypothesis testing.

UNIT 4: RESEARCH ETHICS: Plagiarism, Research ethics, IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, reproducibility and accountability.

UNIT 5: INTERPRETATION AND REPORT WRITING: Significance of Report Writing, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

Course Outcomes:

At the end of this course, students will be able to

- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

Text Books:

1. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
2. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing.
3. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
4. Stuart Melville and Wayne Goddard, 1996. Research methodology: an introduction for science & engineering students, Kenwyn, South Africa : Juta& Co. Ltd.,
5. T. Ramappa, 2008, Intellectual Property Rights Under WTO, S. Chand.

Reference Books:

1. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, EssEss Publications. 2 volumes.
2. Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books, New York.
3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
4. Day, R.A., 1992. How to Write and Publish a Scientific Paper, Cambridge University Press.
5. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
6. Ranjit Kumar, 2 nd Edition, "Research Methodology: A Step by Step Guide for beginners"

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1P0119		L	P	C
SUB.TITLE: ELECTRICAL SIMULATION LABORATORY		0	4	2

Learning Objectives:

- To understand the modeling and simulation of various aspects of Power Electronics and control systems in MATLAB/Simulink platform.

List of Experiments

1. Step, ramp and Sinusoidal response of series RLC circuit.
2. 3-phase Bridge Controlled rectifier with R & RL loads.
3. 3-phase Bridge Controlled rectifier with Source inductance.
4. Single phase AC Voltage controller with R & RL-loads.
5. Design a filter for 1-phase Bridge Controlled rectifier with R & RL loads.
6. Design of L & C based on voltage & current ripples of buck and boost converters.
7. FFT Analysis of 1-phase Bridge inverter for R & RL loads & Design a harmonic trap filter.
8. 3-phase PWM Inverter with R & RL Loads
9. Closed loop control of chopper fed DC Drive.
10. VSI fed three-phase Induction Motor.
11. Draw the Bode plot, Nyquist plot and Root locus for the given transfer function.

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1P0219		L	P	C
SUB.TITLE: POWER SYSTEMS LABORATORY		0	4	2

Learning Objectives:

- To apply measurement techniques associated with High voltage power system.
- To determine the sequence impedances of the power system elements and to evaluate the influence of faults on power system.

List of Experiments:

1. Voltage distribution across string insulator.
2. Determination of leakage current of pin insulator.
3. Breakdown characteristics of sphere gap.
4. Sequence impedance of 3ϕ-transformer .
5. Sequence impedance of alternator by fault analysis.
6. Sequence impedance of alternator by direct method.
7. ABCD Parameters of transmission line.
8. Power angle characteristics of alternator .
9. Load flow studies using Gauss-Siedel method.
10. Load frequency control(with and without controllers).

BRANCH : EPE	I YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE1T01019		L	P	C
SUB.TITLE:ENGLISH FOR RESEARCH PAPER WRITING (AUDIT COURSE-I)		2	0	0

Learnings objectives:

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title.
- Ensure the good quality of paper at very first-time submission

Syllabus

Unit 1

Planning and Preparation, Word Order, Breaking up long sentences,Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Unit 2

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts.Introduction

Unit 3

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

Unit 4

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

Unit 5

Skills needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions.Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Suggested Studies:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press Model Curriculum of Engineering & Technology PG Courses [Volume-I] [374]
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

S.No	Category	Sub. Code	Course Title	L	T	P	C	I	E	TM
1	PC	EE2T0119	Power System Dynamics and Stability	4	-	-	3	40	60	100
2	PC	EE2T0219	Real Time Control of Power Systems	4	-	-	3	40	60	100
3	PE		**Elective – IIII**	4	-	-	3	40	60	100
		EE2T0319	i.FACTS							
		EE2T0419	ii. Hybrid Electric Vehicles							
		EE2T0519	iii.Modern Control Theory							
4	PE		**Elective – IV**	4	-	-	3	40	60	100
		EE2T0619	i Programmable Logic Controllers and Applications							
		EE2T0719	ii.Generation& Measurement of High Voltage							
		EE2T0819	iii.Smart Grid Technologies							
5		EE2P0119	Power System Simulation Laboratory	-	-	4	2	40	60	100
6		EE2P0219	Power Converters Laboratory	-	-	4	2	40	60	100
7		EE2PJ0119	Mini Project with Seminar			4	2	40	60	100
8		EE2T0919	Audit Course--II	2	0	0	0	-	-	-
		Total		**18**	**0**	**12**	**18**	**280**	**420**	**700**

I YEAR II SEMESTER ELECTRICAL POWER ENGINEERING
R19 SYLLABUS

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2T0119		L	P	C
SUB.TITLE: POWER SYSTEM DYNAMICS AND STABILITY		4	0	3

Learning Objectives:

- To study the model of synchronous machines.
- To study the stability studies of synchronous machines.
- To study the solution method of transient stability.
- To study the effect of different excitation systems.

Unit 1 : System Dynamics : Synchronous machine model in state space from computer representation for excitation and governor system –modeling of loads and induction machines.

Unit 2: Steady state stability – steady state stability limit – Dynamics Stability limit – Dynamic stability analysis – State space representation of synchronous machine connected to infinite bus-time response – Stability by eigen value approach.

Unit 3: Digital Simulation of Transient Stability : Swing equation machine equations – Representation of loads – Alternate cycle solution method – Direct method of solution.
Solution Techniques : Modified Euler method – RungeKutta method – Concept of multi machine stability

Unit 4: Effect of governor action and excite on power system stability effect of saturation, saliency & automatic voltage regulators on stability.

Unit 5: Excitation Systems : Rotating Self-excited Exciter with direct acting Rheostatic type voltage regulator – Rotating main and Pilot Exciters with Indirect Acting Rheostatic Type Voltage Regulator – Rotating Main Exciter, Rotating Amplifier and Static Voltage Regulator – Static excitation scheme – Brushless excitation system.

Course Outcomes:

After completion of this course the students will be able to:

- Able to determine the model of synchronous machines.
- Able to know the stability studies of synchronous machines.
- Able to get the knowledge of solution methods of transient stability.
- Able to know the effect of different excitation systems in power systems.

Text Books :

1. Power System Stability by Kimbark Vol. I&II, III, Willey.
2. Power System control and stability by Anderson and Fund, IEEE Press.
3. Power systems stability and control by PRABHA KUNDUR, TMH.

Reference Books:

1. Computer Applications to Power Systems–Glenn.W.Stagg& Ahmed. H.El.Abiad, TMH.
2. Computer Applications to Power Systems – M.A.Pai, TMH.
3. Power Systems Analysis & Stability – S.S.VadheraKhanna Publishers

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2T0219		L	P	C
SUB.TITLE: REAL TIME CONTROL OF POWER SYSTEMS		4	0	3

Learning Objectives:

- To understand the importance of state estimation in power systems.
- To know the importance of security and contingency analysis.
- To understand SCADA, its objectives and its importance in power systems.
- To know the significance of voltage stability analysis.
- To know the applications of AI to power systems problems.

Unit 1 : State Estimation : Different types of State Estimations, Theory of WLS state estimation, sequential and non-sequential methods to process measurements. Bad data Observability, Bad data detection, identification and elimination.

Unit 2 : Security and Contingency Evaluation : Security concept, Security Analysis and monitoring, Contingency Analysis for Generator and line outages by iterative linear power flow method, Fast Decoupled model, and network sensitivity methods.

Unit 3 : Computer Control of Power Systems : Need for real time and computer control of power systems, operating states of a power system.SCADA - Supervisory control and Data Acquisition systems implementation considerations, energy control centres, software requirements for implementing the above functions.

Unit 4 : Voltage Stability, voltage collapse, and voltage security, relation of voltage stability to rotor angle stability. Voltage stability analysis Introduction to voltage stability analysis `P-V' curves and `Q-V' curves, voltage stability in mature power systems, long-term voltage stability, power flow analysis for voltage stability, voltage stability static indices and Research Areas.

Unit 5 : Application of AI and ANN in Power System : Basic concepts and definitions, algorithms for load flow, short term load forecasting, fault diagnosis and state estimation.

Course Outcomes:

Aftercompletion of this course the students will be able to:

- Understand state estimation, security and contingency evaluation.
- Understand about Supervisory control and data acquisition.
- Real time software application to state estimation.
- Understand application of AI in power system.

Text Books:

1. John J.Grainger and William D.Stevenson, Jr. : Power System Analysis, McGraw-

Hill,1994, International Edition.
2. Allen J.Wood and Bruce F.Wollenberg : Power Generation operation and control, John Wiley & Sons, 1984.
3. A.G.Phadka and J.S. Thorp, "Synchronized Phasor Measurements and Their Applications", Springer, 2008

Reference Books:

1. R.N.Dhar : Computer Aided Power Systems Operation and Analysis, Tata McGraw Hill, 1982.
2. L.P.Singh : Advanced Power System Analysis and Dynamics, WileyEastern Ltd. 1986.
3. PrabhaKundur : Power System Stability and Control -, McGraw Hill, 1994.
4. P.D.Wasserman : `Neural Computing : Theory and Practice' Van Nostrand -Feinhold, New York.

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2T0319		L	P	C
SUB.TITLE:FLEXIBLE AC TRANSMISSION SYSTEMS (ELECTIVE-III)		4	0	3

Learning Objectives:

- To study the performance improvements of transmission system with FACTS.
- To study the effect of static shunt compensation.
- To study the effect of static series compensation.
- To study the effect of UPFC.

Unit 1 : FACTS concepts, Transmission interconnections, power flow in an AC System, loading capability limits, Dynamic stability considerations, importance of controllable parameters, basic types of FACTS controllers, benefits from FACTS controllers.

Unit 2 :Basic concept of voltage and current source converters, comparison of current source converters with voltage source converters.
Static shunt compensation : Objectives of shunt compensation, midpoint voltage regulation, voltage instability prevention, improvement of transient stability, Power oscillation damping, methods of controllable var generation, variable impedance type static var generators, switching converter type var generators, hybrid var generators.

Unit 3 :SVC and STATCOM : The regulation and slope transfer function and dynamic performance, transient stability enhancement and power oscillation damping, operating point control and summary of compensation control.

Unit 4 : Static series compensators : Concept of series capacitive compensation, improvement of transient stability, power oscillation damping, functional requirements. GTO thyristor controlled series capacitor (GSC), Thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC), control schemes for GSC, TSSC and TCSC.

Unit 5 :Unified Power Flow Controller: Basic operating principle, conventional transmission control capabilities, independent real and reactive power flow control, comparison of the UPFC to series compensators and phase angle regulators.

Course Outcomes:

After completion of the course, the student will be able to:

- Know the performance improvement of transmission system with FACTS.
- Get the knowledge of effect of static shunt and series compensation.
- Know the effect of UPFC.
- Determine an appropriate FACTS device for different types of applications.

Text Books:

1. "Understanding FACTS Devices" N.G.Hingorani and L.Guygi, IEEE Press. Indian Edition is available:--Standard Publications

Reference Books :

1. Sang.Y.H and John.A.T, "Flexible AC Transmission systems" IEEE Press (2006).
2. HVDC & FACTS Controllers: applications of static converters in power systems- Vijay K.Sood- Springer publishers

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2T0419		L	P	C
SUB.TITLE: HYBRID ELECTRIC VEHICLES (ELECTIVE-III)		4	0	3

Learning Objectives:

- To present a comprehensive overview of Electric and Hybrid Electric Vehicles
- To study the drive-train concept of electric vehicle
- To study the sizing of system components
- To study various communication protocols and technologies used in vehicle networks

Unit-1 Introduction to Hybrid Electric Vehicles:

History of hybrid and electric vehicles, social and environmental importance of hybrid and electric Vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, mathematical models to describe vehicle performance, merits of hybrid EV systems.

Unit 2 Hybrid Electric Drive-trains:

Basic concept of hybrid traction introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis

Unit-3 Electric Propulsion unit:

Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives

Unit-4 Energy Storage and sizing the drive system:

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Hybridization of different energy storage devices. Matching the electric machine and the Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology.

Unit-5

Communications, supporting subsystems: In vehicle networks- CAN, Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies

Course outcome

The students will be able to

- Choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources
- Design and develop basic schemes of electric vehicles and hybrid electric vehicles

- Choose proper energy storage systems for vehicle applications
- Identify various communication protocols and technologies used in vehicle networks

Text Books

1. Electric and Hybrid Vehicles: Design Fundamentals, Iqbal Hussein, 2nd Edition, CRC Press.
2. Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives, Chris Mi, M. Abul Masrur, 2nd Edition, 2017, Wiley Publishers.

Reference Books

1. Electric Vehicle Technology Explained, James Larminie, John Lowry, Wiley 2003.
2. Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design by Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi, Modern Electric, CRC Press, 2004.
3. Electric and Hybrid Vehicles, Tom Denton, Routledge, Taylor and Francis group.

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB.CODE: EE2T0519		L	P	C
SUB. TITLE: MODERN CONTROL THEORY (ELECTIVE-III)		4	0	3

Learning Objectives:

- To facilitate the evolution of state variable approach for the analysis of control systems.
- To examine the importance of controllability and observability in modern control engineering.
- To enable students to analyze various types of nonlinearities & construction of trajectories using describing functions and phase plane analysis.
- To study the analysis of stability and instability of continuous time invariant system

Unit –1: State Variable Analysis

The concept of state – State Equations for Dynamic systems – State diagram - Linear Continuous time model for physical systems – Existence and Uniqueness of Solutions to Continuous – Time State Equations – Solutions – Linear Time Invariant Continuous – Time State Equations – State transition matrix and it's properties

Unit – 2: State Variable Techniques

General concept of Controllability - General concept of Observability Controllability tests for Continuous &Time Invariant systems - Observability tests for Continuous &Time Invariant systems - Controllability and Observability of state model in Jordan Canonical form - Controllability and Observability Canonical forms of State model – State feedback controller design through pole assignment

Unit – 3: Non Linear Systems – I

Introduction – Non Linear Systems – Types of Non – Linearities – Saturation – Dead – Zone – Backlash – Jump Phenomenon etc; - Singular Points .Introduction to Linearization of nonlinear systems, properties of Non Linear Systems – Describing function – describing function analysis of nonlinear systems- Stability analysis of Non – Linear systems through describing functions.

Unit – 4: Non Linear Systems – II

Introduction to phase – plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase – plane analysis of nonlinear control systems.

Unit – 5: Stability Analysis

Stability in the sense of Lyapunov, Lyapunov's stability and Lyapunov's instability theorems – Stability Analysis of the Linear Continuous time invariant systems by Lyapunov second method-Generation of Lyapunov functions – Variable gradient method – Krasooviski's method.

Course Outcomes:

After completion of this course the students will be able to:

- Understanding the state variable approach is suitable for higher order.

- To analyze the concepts of controllability and observability.
- To analyze the various non-linearities through describing functions and phase plane analysis.
- Typical issues of stability and instability of continuous time invariant systems.

TEXT BOOKS:

1. M. Gopal, Modern Control System Theory by – New Age International – 1984.
2. Ogata. K, Modern Control Engineering by– Prentice Hall – 1997.
3. N K Sinha, Control Systems– New Age International – 3rd edition.

Reference Books:

1. Donald E. Kirk, Optimal Control Theory an Introduction, Prentice – Hall Network series – First edition.
2. Nonlinear systems, Hassan K. Klalil, Prentice Hall, 1996
3. Modern control systems, Richard C. Dorf and Robert H. Bishop, 11th Edition, Pearson Edu, India, 2009

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB.CODE: EE2T0619		L	P	C
SUB. TITLE: PROGRAMMABLE LOGIC CONTROLLERS AND APPLICATIONS (ELECTIVE-IV)		4	0	3

Learning Objectives:

- To have knowledge on PLC.
- To acquire the knowledge on programming of PLC.
- To understand different PLC registers and their description.
- To have knowledge on data handling functions of PLC.
- To know how to handle analog signal and converting of A/D in PLC.

Unit 1:

PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming equipment, programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

Unit 2:

PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Digital logic gates, programming in the Boolean algebra system, conversion examples. Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system.

Unit 3:

PLC Registers: Characteristics of Registers, module addressing, holding registers, input registers,output registers. PLC Functions: Timer functions and Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

Unit 4:

Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR and Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two axis and three axis Robots with PLC, Matrix functions.

Unit 5:

Analog PLC operation: Analog modules and systems, Analog signal processing, multi bit data processing, analog output application examples, PID principles, position indicator with PID control, PID modules, PID tuning, PID functions.

Course Outcomes:

After completion of this course the students will be able to:

- Understand the PLCs and their I/O modules.
- Develop control algorithms to PLC using ladder logic etc.
- Manage PLC registers for effective utilization in different applications.
- Handle data functions and control of two axis and their axis robots with PLC.
- Design PID controller with PLC.

Text Books:

1. Programmable Logic Controllers – Principle and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI
2. Programmable Logic Controllers – Programming Method and Applications by JR. Hackworth and F.D Hackworth Jr. – Pearson, 2004.

Reference Books:

1. Introduction to Programmable Logic Controllers- Gary Dunning-Cengage Learning.
2. Programmable Logic Controllers –W.Bolton-Elsevier publisher

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB.CODE: EE2T0719		L	P	C
SUB. TITLE: GENERATION & MEASUREMENTS OF HIGH VOLTAGES (ELECTIVE-IV)		4	0	3

Learning Objectives:

- To study the numerical methods for analyzing electrostatic field problems.
- To study the fundamental principles of generation of high voltage for testing.
- To study the methods for measurement of high AC, DC and transient voltages.
- To Study the measurement techniques for high AC, DC and impulse currents.

Unit 1- Electrostatic fields and field stress control:

Electric fields in homogeneous Isotropic materials and in multi dielectric media-Simple configurations-field stress control. Methods of computing electrostatic fields-conductive analogues-Impedance networks Numerical techniques- finite difference method-finite element method and charge simulation method.

Unit 2-Generation of High AC & DC Voltages:

Direct Voltages: AC to DC conversion methods electrostatic generators-Cascaded Voltage Multipliers. Alternating Voltages: Testing transformers-Resonant circuits and their applications, Tesla coil.

Unit 3-Generation of Impulse Voltages :

Impulse voltage specifications-Impulse generations circuits-Operation, construction and design of Impulse generators-Generation of switching and long duration impulses.

Impulse Currents : Generation of High impulse currents and high current pulse

Unit 4- Measurement of High AC & DC Voltages :

Measurement of High D.C. Voltages : Series resistance meters, voltage dividers and generating voltmeters.

Measurement of High A.C. Voltages : Series impedance meters electrostatic voltmeters potential transformers and CVTS-voltage dividers and their applications.

Unit 5-Measurement of Peak Voltages :

Sphere gaps, uniform field gaps, rod gaps.Chubb- Fortesque methods. Passive and active rectifier circuits for voltage dividers.

Measurement of Impulse Voltages : Voltage dividers and impulse measuring systems-generalized voltage measuring circuits-transfer characteristics of measuring circuits-L.V. Arms for voltage dividers-compensated dividers.

Measurement of Impulse Currents : Resistive shunts-current transformers-Hall Generators and Faraday generators and their applications-Impulse Oscilloscopes.

Course Outcomes:

After completion of this course the students will be able to:

- Understand numerical computation of electrostatic problems.
- Understand the techniques of generation of high AC, DC and transient voltages.
- Measure high AC, DC and transient voltages.
- Measure high AC, DC and transient currents.

Text Books:

1. High Voltage Engineering – by E.Kuffel and W.S.Zaengl. Pergaman press Oxford, 1984.
2. High Voltage Engineering – by M.S.Naidu and V.Kamaraju, Mc.Graw-Hill Books Co., New Delhi, 2nd edition, 1995.

Reference Books :

1. High Voltage Technology – LL Alston, Oxford University Press 1968.
2. High Voltage Measuring Techniques – A. Schwab MIT Press, Cambridge,USA, 1972.
3. Relevant I.S. and IEC Specifications.

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2T0819		L	P	C
SUB.TITLE: SMART GRID TECHNOLOGIES (ELECTIVE –IV)		4	0	3

Learning Objectives:

- To understand concept of smart grid and developments on smart grid.
- To understand smart grid technologies and application of smart grid concept in hybrid electric vehicles etc.
- To have knowledge on smart substations, feeder automation and application for monitoring and protection.
- To have knowledge on micro grids and distributed energy systems.
- To know power quality aspects in smart grid.

Unit 1

Introduction to Smart Grid: Evolution of Electric Grid, Concept of Smart Grid, Definitions, Need of Smart Grid, Functions of Smart Grid, Opportunities & Barriers of Smart Grid, Difference between conventional & smart grid, Concept of Resilient &Self Healing Grid, Present development & International policies on Smart Grid. Case study of Smart Grid.

Unit 2

Smart Grid Technologies: Part 1: Introduction to Smart Meters, Real Time Prizing, Smart Appliances, Automatic Meter Reading(AMR), Outage Management System(OMS), Plug in Hybrid Electric Vehicles(PHEV), Vehicle to Grid, Smart Sensors, Home & Building Automation, Phase Shifting Transformers.

Unit 3

Smart Grid Technologies: Part 2: Smart Substations, Substation Automation, Feeder Automation. Geographic Information System(GIS), Intelligent Electronic Devices(IED) & their application for monitoring & protection, Smart storage like Battery, SMES, Pumped Hydro, Compressed Air Energy Storage, Wide Area Measurement System(WAMS), Phase Measurement Unit(PMU).

Unit 4

Microgrids and Distributed Energy Resources: Concept of micro grid, need & applications of microgrid, formation of microgrid, Issues of interconnection, protection & control of microgrid. Plastic & Organic solar cells, Thin film solar cells, Variable speed wind generators, fuelcells, microturbines, Captive power plants, Integration of renewable energy sources.

Unit 5

Power Quality Management in Smart Grid: Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.

Information and Communication Technology for Smart Grid: Advanced Metering Infrastructure (AMI), Home Area Network (HAN), Neighborhood Area Network (NAN), Wide Area Network (WAN)

Course Outcomes:

After completion of this course the students will be able to:

- Understand smart grids and analyse the smart grid policies and developments in smart grids.
- Develop concepts of smart grid technologies in hybrid electrical vehicles etc.
- Understand smart substations, feeder automation, GIS etc.
- Analyse micro grids and distributed generation systems.
- Analyse the effect of power quality in smart grid and to understand latest developments in ICT for smart grid.

Text Books:

1. Ali Keyhani, Mohammad N. Marwali, Min Dai "Integration of Green and Renewable Energy in Electric Power Systems", Wiley.
2. Clark W. Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response",CRC Press
3. JanakaEkanayake, Nick Jenkins, KithsiriLiyanage, Jianzhong Wu, Akihiko Yokoyama,"Smart Grid: Technology and Applications", Wiley
4. Jean Claude Sabonnadière, NouredineHadjsaïd, "Smart Grids", Wiley Blackwell 19
5. Peter S. Fox Penner, "Smart Power: Climate Changes, the Smart Grid, and the Future of Electric Utilities", Island Press; 1 edition 8 Jun 2010
6. S. Chowdhury, S. P. Chowdhury, P. Crossley, "Microgrids and Active Distribution Networks." Institution of Engineering and Technology, 30 Jun 2009
7. Stuart Borlase, "Smart Grids (Power Engineering)", CRC Press
8. Andres Carvallo, John Cooper, "The Advanced Smart Grid: Edge Power Driving Sustainability: 1", Artech House Publishers July 2011
9. James Northcote, Green, Robert G. Wilson "Control and Automation of Electric Power Distribution Systems (Power Engineering)", CRC Press

Reference Books:

1. MladenKezunovic, Mark G. Adamiak, Alexander P. Apostolov, Jeffrey George Gilbert "Substation Automation (Power Electronics and Power Systems)", Springer.
2. R. C. Dugan, Mark F. McGranghan, Surya Santoso, H. Wayne Beaty, "Electrical Power System Quality", 2nd Edition, McGraw Hill Publication.
3. Yang Xiao, "Communication and Networking in Smart Grids", CRC Press

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2P0119		L	P	C
SUB.TITLE: POWER SYSTEM SIMULATION LABORATORY		0	4	2

Learning Objectives:

- To understand the modeling of various aspects of Power System analysis and develop the MATLAB programming.

List of Experiments:

1. Formation of Y- Bus by Direct-Inspection Method.
2. Load Flow Solution Using Gauss Siedel Method
3. Load Flow Solution Using Newton Raphson Method
4. Load Flow Solution Using Fast Decoupled Method
5. Formation of Z-Bus by Z-bus building algorithm
6. Symmetrical Fault analysis using Z-bus
7. Unsymmetrical Fault analysis using Z-bus
8. Economic Load Dispatch with & without transmission losses
9. Transient Stability Analysis Using Point By Point Method
10. Load Frequency Control of Single Area Control & Two Area Control system with and without controllers.
11. ABCD parameters: Formation for symmetric II/I configuration. Verification of AD-BC=1 Determination of coefficient and regulation.
12. To determine fault currents and voltages in a single transmission line systems with star-delta transformers at a specified location for SLGF, DLGF.
13. Optimal Generator Scheduling for Thermal power plants.

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2P0219		L	P	C
SUB.TITLE: POWER CONVERTERS LABORATORY		0	4	2

Learning Objectives:

- To get hands on experience on various power semiconductor devices, converter circuits and drives through experimentation.
- Design and simulate various power electronic circuits in MATLAB software.

List of Experiments :

1. Time domain response Of Series RLC Circuit with different pulses
2. 3-Phase Bridge converter by considering source inductance with R and RL loads
3. 1-Phase Half And Full Wave Ac Voltage Controller With R Load
4. State Space To Transfer Function
5. Transfer Function To State space
6. Simulate Buck And Boost Converter With Open Loop Operation
7. Simulate Cuk And Fm Back Converter With Open Loop Operation
8. Simulate Z-Source Inverter
9. Simulate 3 Level And 5 Level Multilevel Inverter
10. Simulate Static Voltage Compensator

BRANCH : EPE	I YEAR – II SEMESTER	REGULATION: R19		
SUB. CODE: EE2T0919		L	P	C
SUB.TITLE: PEDAGOGY STUDIES (AUDIT COURSE-II)		2	0	0

Learning Objectives:

Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Syllabus

Unit-1

Introduction and Methodology:

Aims and rationale, Policy background, Conceptual framework and Terminology.Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.**Overview of methodology and Searching

Unit-2

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.Curriculum, Teacher education.

Unit-3

Evidence on the effectiveness of pedagogical practices. Methodology for the in depth stage: quality assessment of included studies.How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
Theory of change.Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

Unit-4

Professional development: alignment with classroom practices and followup Support. Peer support.Support from the head teacher and the community. Curriculum and assessment. Barriers to learning: limited resources and large class sizes

Unit-5

Research gaps and future directions

Research design Contexts Pedagogy Teacher education Curriculum and assessment Dissemination and research impact.

Course Outcomes:

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Suggested Reading:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2):245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education.Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

Vision of our Institution

- To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of MBA Department

The Vision of the department is to become a Centre of Excellence in nurturing young managers to contribute for the betterment of Indian corporate sector.

Mission of MBA Department

- To strive for effective teaching & learning to meet the demands of the corporate.
- To develop entrepreneurial talent among the management graduates
- To expose the students to the various management practices in vogue through institute and industry interface.
- To promote ethical and moral values among the students.

Program Educational Objectives (PEOs)

1. To produce M.B.A. Graduates with sound knowledge in the area of Management.
2. To develop analytical and decision making skills through case studies.
3. To make the students employable in reputed organizations in the area of HRM, Marketing and Finance
4. To promote entrepreneurial qualities among the students.
5. To develop professional and ethical attitude among the students

Program Outcomes (POs) of MBA Department

1. Apply knowledge of management theories and practices to solve business problems.
2. Foster analytical and critical thinking abilities for data-based decision making.
3. Ability to develop value based leadership ability.
4. Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of business.
5. Ability to lead themselves and others in the achievement of organizational goals,
6. Contributing effectively to a team environment.
7. Ability to adapt the business to the continuously changing environment.
8. Ability to sustain in a globally competitive environment.

ACADEMIC REGULATIONS

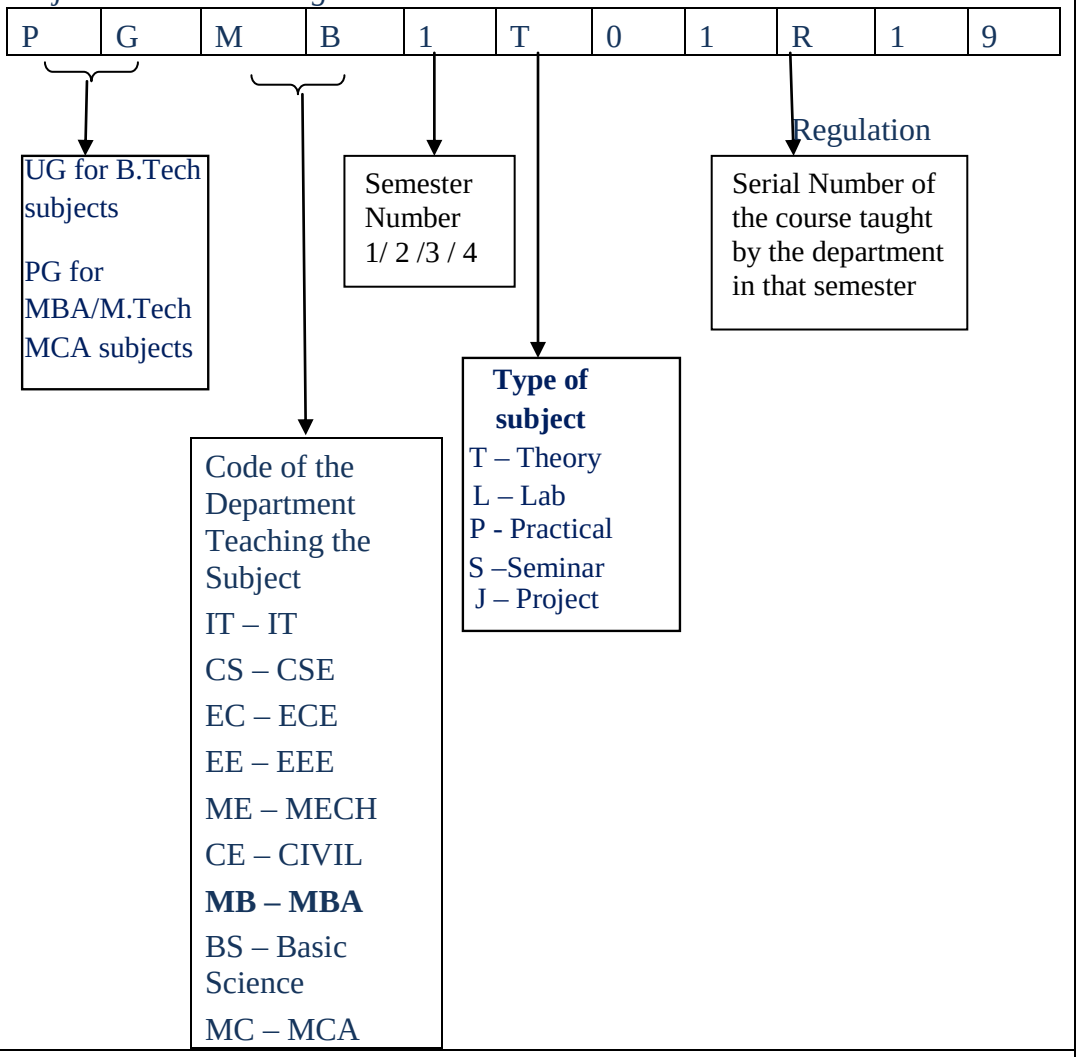
RMBA0.0	**TITLE AND DURATION OF THE COURSE**
	The course shall be called the P.G course in Master of Business Administration abbreviated as MBA.
	The course shall be of Two academic years duration divided into Four semesters, each semester having duration of 16 weeks.
	The calendar of events in respect of the course shall be fixed by the Institute from time to time.
	The examination in all the subjects shall be conducted at the end of each semester.
	A student shall be declared eligible for the award of MBA degree, if he/she pursues the program of study and completes it successfully in two academic years and not more than Four academic years from the year of admission. A Student, who fails to fulfill all the academic requirements for the award of the degree within Four academic years from the year of admission, shall forfeit his/her seat in MBA course.
RMBA1.0	**ELIGIBILITY FOR ADMISSION** – Admissions are done as per the norms prescribed by Govt.
RMBA1.1	The Government orders issued from time to time in this regard shall prevail
RMBA1.2	The Candidate shall be an person of Indian origin.
RMBA1.3	The Candidate should have passed the qualifying examination - a degree or equivalent on the date of admission.
RMBA1.4	Seats are classified into CATEGORY-A (70% of intake), and CATEGORY – B (30% of intake).
	Category 'A' Seats will be filled by the Convener, ICET Admissions. Category 'B' Seats will be filled by the College as per the guidelines of Andhra Pradesh State Council of Higher Education.
RMBA2.0	**AWARD OF MBA DEGREE**
RMBA2.1	A Student shall be declared eligible for the award of the MBA Degree, if he/she completes degree in not less than Two and not more than Four academic years.
RMBA2.2	Each discipline of the MBA Programme is designed to have a total of 96 credits, and the student shall have to complete the courses and earn all credits as per the requirements for award of the degree. The MBA Degree shall be conferred on a candidate who has satisfied the following requirement. A Regular student (two year programme) should register himself/herself for 96 Credits, and has to secure all 96 credits to become eligible for the award of MBA Degree. However, it is mandatory for the students to pass all the laboratory courses.
RMBA3.0	**MINIMUM INSTRUCTION DAYS**
RMBA3.1	The minimum instruction days for each semester shall be 90 working days.
RMBA3.2	Normally about 30 to 35 contact periods per week.
RMBA4.0	**COURSE OF STUDY**
	Branch Code- MB Abbreviation -MB: MBA : Master of Business Administration
RMBA5.0	**DISTRIBUTION AND WEIGHTAGE OF MARKS**
RMBA5.1	The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 for lab marks. The project work shall be evaluated on the basis of Grades.

RMBA5.2	For theory subjects the distribution shall be 40 marks for Internal Evaluation and 60 marks for the End - Examinations.
RMBA5.3	For theory subjects, during the semester there shall be 2 internal examinations. The weightage of internal marks for 40 consists of Descriptive – 20 and presentation - 20. The descriptive examination is for 120 minutes duration. Each descriptive examination question paper contains four questions and ALL questions need to be answered. The average of the two internal examinations will be taken for internal marks. As the syllabus is framed for five units, the First internal examination is conducted in first two or three Units and balance units will be covered in the second internal examination.
RMBA5.4	The semester end examination in each subject is conducted for 60 marks. Question paper contains Eight Questions and a student has to answer five out of Eight Questions out of which Case Study is compulsory. Each question carries 12 marks.
RMBA5.5	For lab examination there shall be continuous evaluation during the semester for 40 internal marks and 60 marks for external examination. Out of the 40 marks for internal20 marks will be awarded for internal laboratory examination and 20 marks for record. The semester end examination shall be conducted by the faculty concerned and external examiner.
RMBA5.6	For Mini project, student shall collect information on a topic given by the faculty and submit a Project Report. The Mini Project carries 100 marks- 50 marks for project report and 50 marks for presentation. There shall be no external examination for Mini project.
RMBA5.6 (a)	For Employability Skills, there shall be continuous evaluation of the student by the faculty based on the student's performance. It is mandatory for each student to participate in a minimum of 5 activities per semester. There shall be no external examination for the Employability skills.
RMBA5.7	Grades will be awarded for main project by the external examiner on completion of viva-voce.
RMBA5.8	Laboratory marks and internal marks awarded by the College are final. The sample laboratory records shall be preserved in the respective departments and internal test papers shall be preserved in the college exam cell as per the University norms and shall be produced to the Committees of the University as and when required.
RMBA6.0	**PROGRAMME STRUCTURE**
RMBA6.1	Basic Science Core Courses — 10%
RMBA6.2	Humanities and Social Science Core Courses — 10%
RMBA6.3	Professional Courses and Electives — 70%
RMBA6.4	Technical Courses — 10%
RMBA7.0	**SCHEME OF INSTRUCTION FOR I,II , III AND IV Semesters**
RMBA7.1	The Scheme of Instruction and syllabi of MBA programme approved by Academic Council & the Board of Studies.
RMBA 8.0	**CLASS HOURS AND CREDITS**

- Lectures : 3 credits (4 hours per week)
- Laboratory : 3 credits (6 hours per week)
- Mini project and viva voce : 4 credits (2 hours per week)
- Employability skills : 2 credits (4 hours per week)
- Main project and viva-voce : 8 credits.

YEAR	FIRST SEMESTER CREDITS	SECOND SEMESTER CREDITS	TOTAL CREDITS
First Year	23	24	47
Second Year	23	26	49
TOTAL NUMBER OF CREDITS			**96**

RMBA8.0	**THEORY** Four lecture hours per week for each course. For certain courses, tutorial periods are prescribed in order to give exercises to the students and to closely monitor their progress.
RMBA8.1	**LABORATORY COURSES** A minimum number of Computer programmes as prescribed by the department have to be performed by the students and have to maintain a record, which will evaluated by the faculty concerned and certified by the Head of the Department at the end of the semester.
RMBA9.0	**MEDIUM OF INSTRUCTION**
	The medium of instruction and examination is English.
RMBA10.0	**ATTENDANCE REQUIREMENTS**
RMBA 10.1	Each semester is considered as a unit and the candidate has to put in a minimum attendance of 75% in each subject with a provision of condonation of 10% of the attendance by the Principal on the specific recommendation of the HOD, in special conditions such as medical grounds, participation in University level sports, cultural activities, seminars, workshops, paper presentation etc.
RMBA 10.2	Shortage of Attendance below 65% in aggregate shall not be condoned.
RMBA 10.3	Students, having shortage of attendance, shall have to pay requisite fee towards condonation.
RMBA 10.4	Student whose shortage of attendance is not condoned in any semester is not eligible to appear for his/her semester end examination.
RMBA 10.5	Rules for calculation of attendance for the re-admitted candidates detained for want of internal marks / attendance or break – in study. a) Number of classes conducted will be counted from the day one of the semester concerned, irrespective of the date of payment of tuition fee. b) They should submit a written request to the Principal of the college, along with a proof of payment of fees paid towards tuition & other fee, for re-admission before the commencement of class-work. c) Student should come to know about the date of commencement of class-work of the semester into which he/she wishes to get re-admission. The information regarding date of commencement of class-work for each semester is available in the college notice board.
RMBA 11.0	**CONDITIONS FOR PASS AND AWARD OF CREDITS FOR A COURSE**
RMBA 11.1	A candidate shall be declared to have passed in individual theory/lab course if he/she secures a minimum of 50% aggregate marks (Internal & external examination marks put together), subject to a minimum of 40% marks in external examination. A candidate shall be declared to have passed in main project if he/she secures Excellent, Good, and Satisfactory. If a student got the **Unsatisfactory** grade, he/she has to resubmit the project work after three months and appear for the Viva Voce on the date fixed by the department.
RMBA 11.2	A Student, who fails to fulfill all the academic requirements for the award of the degree within Four academic years from the year of the admission, shall forfeit his/her seat in MBA program.
RMBA 11.3	A student has to pass the failed course by appearing the supplementary examination as per the requirement for the award of degree.
RMBA 11.4	On passing a course of the programme, a student shall earn assigned credits in that course.
RMBA 12.0	**COURSE CODE AND COURSE NUMBERING SCHEME**
	A list of all the subjects the department has to teach including the subjects of other departments is prepared and codes are allotted as under:

	Each subject code contains 11 characters. The 11 characters for each subject will be filled as per the following guidelines.
	Subject Code Numbering Procedure 
RMBA 13.0	**TRANSITORY REGULATIONS**
RMBA 13.1	A candidate detained or discontinued in the semester, on readmission, shall be required to pass all the courses in the curriculum prescribed for such batch of students in which he / she joins subsequently. However, exemption will be given to those candidates already passed in such courses, in the earlier semester (s) as approved by the Board of Studies and Academic Council.
RMBA 13.2	A student shall be eligible for promotion to next Semester of MBA programme, if he/she satisfies the conditions as stipulated in Regulation R10.0.
RMBA 14.0	**CONSOLIDATED GRADE CARD**
	A consolidated grade card containing credits & grades obtained by the candidates will be issued after completion of the two year MBA Programme
RMBA 15.0	**METHOD OF AWARDING LETTER GRADES AND GRADE POINTS FOR A COURSE.**
RMBA 15.1	A letter grade and grade points will be awarded to a student in each course based on his/her performance as per the grading system given below

	THEORY / LAB / PROJECT	GRADE POINTS	LETTER GRADE
	85-100%	10	O
	75-84%	9	A+
	70-74%	8	A
	65-69%	7	B+
	60-64%	6	B
	55-59%	5	C
	50-54%	4	P
	<50%	0	F (Fail)

RMBA 15.2	**Calculation of Semester Grade Points Average (SGPA)* for semester**
	The performance of a student at the end of the each semester is indicated in terms of SGPA calculated as below: SGPA =∑(CR x GP) (for all courses passed in semester) ∑CR Where CR = Credits of a course GP= Grade points awarded for a course * SGPA is calculated for the candidates who passed all the courses in that semester.
RMBA 15.3	**Calculation of Cumulative Grade Points Average (CGPA) and Award of Division for Entire Programme**
	The CGPA is calculated as below: CGPA =∑(CR x GP) (for entire programme) ∑CR Where CR = Credits of a course GP= Grade points awarded for a course
RMBA 16.0	**REVALUATION**
	As per the notification issued by the Chief Controller of Examination, a student can submit the application for revaluation, along with the fee receipt for revaluation of his/her answer script(s) of theory course(s), if he/she is not satisfied with Grade obtained. The controller of Examination shall arrange for revaluation of those answer script(s). A new external examiner, other than the first examiner, shall reevaluate the answer script(s). Better marks of the two will be awarded.
RMBA 17.0	**SUPPLEMENTARY EXAMINATIONS**
	Supplementary examinations will be conducted along with regular semester end examinations in the subsequent year. Semester end supplementary Examinations shall be conducted in subjects of each semester once a year (i.e MBA -Sem I, MBA -Sem II, MBA -Sem III, MBA -Sem IV, Examinations) under the present regulation. Thereafter supplementary examinations will be conducted in the equivalent courses as prescribed by concerned BOS.
RMBA 18.0	**READMISSION CRITERIA**
	A candidate, who is detained in a semester due to lack of attendance, has to obtain written

<table>
<tr><td></td><td colspan="2">permission from the Principal for readmission in the same semester after duly fulfilling all the required norms and fee stipulated by the college.</td></tr>
<tr><td>RMBA 19.0</td><td colspan="2">BREAK IN STUDY</td></tr>
<tr><td></td><td colspan="2">The student, who discontinued studies for any reason, can get readmission into appropriate semester of MBA programme after break-in study, only with the prior permission of the Principal of the College provided such candidate shall follow the transitory regulations applicable to such batch in which he/she joins. An administrative fee, tuition and special fee has to be paid by the candidate to condone his/her break in study.</td></tr>
<tr><td>RMBA 20.0</td><td colspan="2">AWARD OF DIVISION</td></tr>
<tr><td></td><td colspan="2">The award of division for MBA programme for the candidates admitted in the year 2019-2020 and onwards is shown in the following table.</td></tr>
<tr><td></td><td>CGPA</td><td>DIVISION</td></tr>
<tr><td></td><td>≥8</td><td>First Class with distinction</td></tr>
<tr><td></td><td>≥6.5 - <8</td><td>First Class</td></tr>
<tr><td></td><td>≥5.5 - <6.5</td><td>Second Class</td></tr>
<tr><td></td><td>≥4 - <5.5</td><td>Pass Class</td></tr>
<tr><td></td><td colspan="2">For the purpose of awarding First Class with Distinction, the student must get CGPA within 2 years in case of candidates admitted through ICET & Management Quota.
Detained and break-in study candidates are not eligible for the award of First Class with Distinction.
For the purpose of awarding First, Second and Pass Class, CGPA obtained in the examinations appeared within the maximum period allowed for the completion of course shall be considered.</td></tr>
<tr><td>RMBA 21.0</td><td colspan="2">MALPRACTICES</td></tr>
<tr><td></td><td colspan="2">The Principal shall refer the cases of malpractices in internal examinations and Semester-End Examinations, to a Malpractice Enquiry Committee, constituted by him for the purpose. The Principal will take necessary action, against the erring students based on the recommendations of the committee</td></tr>
<tr><td>RMBA 22.0</td><td colspan="2">The physically challenged candidates who have availed additional examination time and a scribe during their Degree/ICET examinations will be given similar concessions on production of relevant proof of documents.</td></tr>
<tr><td>RMBA 23.0</td><td colspan="2">The students suffering from contagious diseases are not allowed to appear either internal or semester end examinations.</td></tr>
<tr><td>RMBA 24.0</td><td colspan="2">The students who participated in coaching/tournaments held at State/National/International levels through University / Indian Olympic Association during semester end external examination period will be promoted to subsequent semesters till the entire program is completed as per the guidelines of University Grants Commission Letter No.F.1-5/88 (SPE/PES), dated 18-08-1994.</td></tr>
<tr><td>RMBA 25.0</td><td colspan="2">The Principal shall deal with any academic problem, not covered under these rules and regulations, in consultation with the Heads of the Departments in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved in the Heads of the Departments meetings, shall be reported to the academic council for ratification.</td></tr>
<tr><td>RMBA 26.0</td><td colspan="2">The Academic Council may, from time to time, revise, amend or change the regulations, schemes of examination and/or syllabi.</td></tr>
</table>

MALPRACTICES RULES

Disciplinary Action for / Improper Conduct in Examinations

S.NO	Nature of Malpractices / Improper conduct	Punishment
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
1.(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and held with the Institution.
	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat.

3		The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner	Cancellation of the performance in that subject.

	requesting him to award pass marks.	
6	Refuses to obey the orders of the Chief Superintendent/Assistant– Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the Performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared

		including practical examinations and project work of that semester/year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Institution for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)

(i) A show cause notice shall be issued to the college.
(ii) Impose a suitable fine on the college.

(iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

VISHNU INSTITUTE OF TECHNOLOGY::BHIMAVARAM

(Autonomous)

Department of Management Studies

MBA I Semester Proposed Course structure for the Academic Year 2019-2020

S. No	Title of the Course	T	L	P	C	Internal	External	Total
1	Management Theory and Practice	4	-	-	3	40	60	100
2	Managerial Economics	4	-	-	3	40	60	100
3	Accounting for Managers	4	-	-	3	40	60	100
4	Managerial Communication	4	-	-	3	40	60	100
5	Business Environment	4	-	-	3	40	60	100
6	Quantitative Analysis for Business Decisions	4	-	-	3	40	60	100
7	Information Technology-LAB	-	6		3	40	60	100
8	Employability Skills		-	4	2	-	-	-
	Total	**24**	**6**	**4**	**23**	**280**	**420**	**700**

MBA II Semester Proposed Course structure for the Academic Year 2019-2020

S. No	Title of the Course	T	L	P	C	Internal	External	Total
1	Financial Management	4	-	-	3	40	60	100
2	Human Resource Management	4	-	-	3	40	60	100
3	Marketing Management	4	-	-	3	40	60	100
4	Production & Operations Management	4	-	-	3	40	60	100
5	Research Methodology	4	-	-	3	40	60	100
6	Organizational Behavior	4	-	-	3	40	60	100
7	Mini Project Report	2	-	-	2	50	-	50
	Seminar on Mini Project		-	-	2	50	-	50
8	Employability Skills		0	4	2	-	-	-
	Total	**26**	**0**	**4**	**24**	**340**	**360**	**700**

MBA III Semester Proposed Course structure for the Academic Year 2020-2021

S.No	Subject title	T	L	P	C	I	E	T
1	Strategic Management	4	-		3	40	60	100
2	Legal Aspects of Business	4	-		3	40	60	100
3	Business Ethics & Corporate Governance	4	-		3	40	60	100
4	Elective – I	4	-		3	40	60	100
5	Elective – II	4	-		3	40	60	100
6	Elective – III	4	-		3	40	60	100
7	Elective – IV	4	-		3	40	60	100
8	Employability Skills	-	-	4	2	-	-	-
	Total	**28**	**0**	**4**	**23**	**280**	**420**	**700**

The students may choose **ONE** Specialization among the following:

Finance	Marketing	HR
Security Analysis & Portfolio Management	Consumer Behaviour	Leadership Management
Banking & Insurance Management	Retail Marketing	Compensation and Reward Management
Advanced Management Accounting	Customer Relationship Management	Performance Management
Strategic Financial Management	Strategic Marketing Management	Strategic Human Resource Management

MBA IV Semester Proposed Course structure for the Academic Year 2020-2021

S. No	Subject title	T	L	P	C	I	E	T
1	Logistics and Supply Chain Management	4	-	-	3	40	60	100
2	Entrepreneurship Development	4	-	-	3	40	60	100
3	Elective – V	4	-	-	3	40	60	100
4	Elective – VI	4	-	-	3	40	60	100
5	Elective – VII	4	-	-	3	40	60	100
6	Elective – VIII	4	-	-	3	40	60	100
7	Internship/Project and Viva Voce	-	-	-	8	-	-	**Grade**
	Total	**24**	**0**		**26**	**240**	**360**	**600**

The students may choose **ONE** Specialization among the following:

Finance	Marketing	HR
Financial Markets & Services	Services Marketing	Global HRM
Global Financial Management	Promotion & Distribution Management	Organizational Development and Change Management
Financial Risk Management	Global Marketing Management	Labour Welfare Legislation
Tax Management	Product & Brand Management	Management of Industrial Relations

HOD-MBA

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Management Theory and Practice

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective: To impart detailed knowledge regarding management concepts and functions and roles and contemporary issues in management.

UNIT	TOPICS
UNIT I	**Introduction of management:** Management: Definition – Importance – Managerial Roles – Functions of management - Classical theory – Scientific management - Administrative theory – Behavioral Theory – Management science – System theory –Contingency theory.
UNIT II	**Planning and organizing:** Nature and Definition of Planning – Principles of Planning – Objectives of planning – Planning process – Types of plans – Benefits and pitfalls of planning. Principles of organizing – Organization levels – Organizational designs and structure – Line and staff organizations – Approaches – Delegation of authority – Factors affecting delegation of authority – Span of management – Centralization and decentralization of Authority
UNIT III	**Directing:** Leadership behavior and styles – Leadership in cross cultural environment. Decision making: Meaning of decision – types of decisions – process of decision making – challenges and problems in decision making – models of decision making - Business ethics and decision making.
UNIT IV	**Co-coordinating and Controlling**: Definition of Co-ordination – Significance and principles of Coordination–Nature and importance of controlling – Controlling process – Requirements of effective control –Establishing controlling system – Controlling techniques
UNIT V	**Contemporary issues in management**: MBO - Management By Walking Around – Out of the Box Thinking – Balanced Score Card –Time Management –BPOs – Stress Management causes and– JIT – TQM – Six Sigma – CMM levels
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Kumar, Rao, Chhalill: Introduction to Management Science. Cengage Publications, New Delhi
2. Dilip Kumar Battacharya, **Principles of Management**, Pearson, 2012.
3. Harold Koontz, Heinz Weihrich, A.R.Aryasri, **Principles of Management**, TMH, 2010.
4. V.S.P.Rao, Management Text and Cases, Excel, Second Edition, 2012.
5. K.Anbuvelan, **Principles of Management**, University Science Press, 2013.
6. Neeta Baporikar, Case Method – Cases in Management, Himalaya Publishing House (HPH) 2009.
7. Deepak Kumar Bhattacharyya, **Principles of Management**-text and cases, Pearson, 2012.
8. L.M. Prasad, **Principles and Practice of Management –** Sultan Chand & Sons

Course Outcomes:

1. Nature of planning, organizing and span of control, authority Vs responsibility, delegation, centralization Vs decentralization.

2. Provides detailed knowledge of management and contemporary issues in management.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(AUTONOMOUS)

Subject Name: Managerial Economics

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objectives: To understand various concepts like Demand, supply and production analysis, cost theories, pricing practices in various market structures

UNIT	TOPICS
UNIT I	**Introduction to Managerial Economics:** Definition, Nature and Scope, Relationship with other areas in Economics, The role of managerial economist. Concept of opportunity cost, Incremental concept, time Perspective, Discounting Principle , Risk & uncertainty.
UNIT II	**Demand Analysis:** Elasticity of demand, types and significance of Elasticity of Demand - Measurement of price Elasticity of Demand – Need for Demand forecasting, forecasting techniques, law of Supply, Elasticity of Supply.
UNIT III	**Supply and Production Analysis:** Production function, Marginal Rate of Technical Substitution, Production function with one/two variables, Cobb-Douglas Production Function, Returns to Scale and Laws of returns, Economies and Diseconomies of scale.
UNIT IV	**Cost theory and estimation:** Cost concepts, determinants of cost, cost – output relationship in the short run and long run – Modern development in cost theory – Saucer shaped short – run Average cost curves – Average total cost Curve.
UNIT V	**Market Structure and Pricing practices:** Features and Types of different Markets – Price- Output determination in Perfect competition, Monopoly, Monopolistic competition and Oligopoly both in the long run and short run. Pricing methods in practice – Managerial Theories of a firm – Marris & Williams Models.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Paul, Koushil: "**Managerial Economics**", Cengage Learning, New Delhi.
2. Siddiqui S A,Siddiqui A S: "**Managerial Economics**", and Financial Analysis", New Age International Publishers, New Delhi, 2008
3. Vanita Agarwal: "**Managerial Economics**", Pearson, New Delhi, 2013.
4. Dominick Salvatore: "**Managerial Economics**", Oxford University Press, New Delhi,2010.
5. D.L. Ahuja: "**Managerial Economics**", S. Chand & Company ltd,New Delhi-55.
6. O"Sullivan, Sheffrin, Perez "Micro Economics: Principles, Applications and Tools", Pearson Education.
7. Mithani D M: „**'Managerial Economics**", Himalaya Publishing House, Mumbai, 2008.
8. Atmanand: "**Managerial Economics**", Excel Publications. New Delhi, 2012.
9. Varshney, R.L and Maheswari, K L: „**'Managerial Economics**", Sultan Chand and Sons, New Delhi, 2002.
10. Narayanan Nad ar E, Vijayan S: „**'Managerial Economics**", PHI Private Limited, New Delhi, 2009.

Course Outcomes:

1. Provides insight about importance of economics and principles of economics.
2. Provides in depth knowledge in various aspects of Demand and supply.
3. Exposure on various production functions and economies of scale.
4. Provides knowledge on cost concepts and their usage in business.
5. Exposure to different types of market structures and pricing practices.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(AUTONOMOUS)

Subject Name: Accounting for Managers

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective:

1. To understand method of preparing the final accounts for an organization.
2. To develop the knowledge in assessing the financial performance of organizations

UNIT	TOPICS
UNIT I	**Accounting process**: Definition of accounting - Accounting Concepts and conventions – Accounting Cycle - Classification of accounts - Accounting equations – Static and dynamic nature of accounting - Users of accounting information - Books of original entry, ledger -Preparation of Trial balance
UNIT II	**Final Accounts**: Preparation and Presentation of income statement - Balance Sheet with Adjustments - Accounting standards - Preparation and Presentation of Company Final Accounts – Limitations of Financial Statements
UNIT III	**Financial Analysis**: The scope and purpose of financial analysis - financial statement analysis – Common size statement analysis- comparative Statement analysis- Ratio analysis – liquidity, activity, structural, coverage and profitability ratios - Preparation and analysis of cash flow statement.
UNIT IV	**Cost accounting concepts**: Methods of Costing, Techniques of Costing - Role of Cost accounting - Elements of cost - Financial accounting Vs Management Accounting - Basic Cost concepts - Determination of product cost - Preparation of cost sheet- Standard costing-Variance Analysis.
UNIT V	**Cost behavior and Decision making:** Cost & classification of costs-methods for calculation of fixed, variable and semi variable costs - CVP analysis and decision making - Break Even analysis- Key factor distribution & analysis - Optimization of Product mix - Make or Buy decisions – Capacity utilization - Plant shutdown or continue decision, Add or Drop Decisions, CVP under conditions of uncertainty – sensitivity analysis.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. I.M.Pandey "Management Accounting" Vikas publication House,New Delhi.

2. Vijaya Kumar.P, Ravindra P.S., Kiran Kumar V: "**Accounting for Managers**", Himalaya Publishing House, New Delhi, 2013.

3. Ramachandran N, RamKumar Kakani: **Financial Accounting for Management**" McGraw Hill – 2013.

4. Maheashwari and Maheshwari, "**Financial Accounting**", Vikas publishing House, New Delhi,2013

5. Amberish Gupta:"**Financial Accounting for Management**", Pearson Education, 2012.

Course Outcomes:

1. To familiarize the students with financial statements and principles financial accounting.
2. Provides hands on experience in valuation especially using financial analysis.
3. Acquaintance with cost and management accounting mechanics, process and system.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Managerial Communication

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objectives: To equip the students with competencies to manage themselves in organizations with a scientific outlook towards communication and to develop inter personal and intra personal and presentation skills of the student.

UNIT	TOPICS
UNIT I	**Role of Communication in Business:** Objective of Communication – The Process of Human Communication – Media of Communication, Written Communication – Oral Communication - Visual Communication, Audio Visual Communication – Silence Non-verbal communication skills – Cross Cultural Communication – problems and challenges. – Case study.
UNIT II	**Managing Organization Communication:** Formal and Informal Communication -Intrapersonal Communication – Models for Inter Personal Communication - Managing Motivation to Influence Interpersonal Communication – Communication Styles – Gateways to Effective Interpersonal Communication - Case study.
UNIT III	**Business Writing Skills:** Significance of Business Correspondence, Essentials of Effective Business Correspondence, Business Letter and Forms, Meeting, Telephone Communication – Use of Technology in business Communication - Case study.
UNIT IV	**Report Writing:** Meaning and Significance: Structure of Reports - Negative, Persuasive and Special Reporting: Informal Report – Proposals. Formal Reports – Preparation and organization of Press Report - Case study.
UNIT V	**Presentation skills:** Techniques of Presentation – Types of Presentation – Video Conferencing and formats – Interview – formal and informal – Interview Techniques –Preparing of resumes and resume formats - Communication etiquettes - Case study.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Communication Skills, Leena Sen, Prentice Hall of India Pvt. Lte.,New Delhi.

2. Developing Communication Skills, Krishna Mohan, Meera Banerji, Macmillan India Ltd.

3. Technical Report Writing Today 8th Edition, Daniel G Riordan, Steven E.Pauley, Biztantra, New Delhi.

4. Basic Business Communication, 10th Edition, Lesiker and Flatley, Tata McGraw-hill.

5. Business Communication, RK Madhukar, Vikas Publishing House Pvt. Ltd.

6. Meenakshi Rama: "Business Communication", Oxford University Press, New Delhi.

Course Outcomes: Students will be able to

1. Apply the knowledge of overcoming the Barriers of communication.
2. Asses the role played by non-verbal communication and different personality traits.
3. Apply the types of communication which are effective in organizations.
4. Examine the deliverability take part in interviews, presentations, discussions, etc

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Business Environment

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objectives: Student should be able to outline how an entity operates in a business environment.

UNIT	TOPICS
UNIT I	**Business Environment:** Importance at national and international level – problems and challenges– factors both internal and external influencing business environment– new Industrial policy 1991- NITI Ayog.
UNIT II	**Structure of Indian economy:** Nature and significance – Economic systems – structure of Indian industry – Economic reforms in various sectors – nature – challenges – social justice – Sickness in Indian industry, competition Act 2002.
UNIT III	**Fiscal Policy**: Nature and significance – public revenues – expenditure- debt -Balance of Payments - Nature – Structure – major components – Causes for disequilibrium in Balance of Payments – Correction measures.
UNIT IV	**India's Trade Policy**: Nature – Magnitude and direction of Indian international trade – problems –bilateral and multilateral trade agreements. International business environment: Nature – significance– challenges and mechanisms-WTO: Agreements in the Uruguay round including TRIPS, TRIMS and GATS – dumping and antidumping measures.
UNIT V	**Legal Frame**: special features of the SICA (special provisions) 1985, BIFR, Consumer protection act 1986, Environmental laws (pertaining to the control and Prevention of Air and Water pollution) and the Essential Commodities Act 1955.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Aswathappa K:"Essentials of business environment" Himalaya Publishing House, New Delhi,2011.
2. Francis Cherunilam"Business Environment: Text&Cases"HPH, 2012.
3. Shaikh Saleem: "Business Environment", Pearsons, New Delhi.
4. Veena Keshav Pailwar: "Economic Environment of Business", PHI Learning, New Delhi,2012.
5. Vivek Mittal: "Business Environment Text and Cases", Excel Books New Delhi, 2011.
6. Sundaram and Black: "International Business Environment Text and Cases", PHI Private Limited, New Delhi.
7. Avid W Conklin: "Cases in Environment of Business", Sage Publication India Private Ltd,New Delhi.
8. Raj Kumar: "International Business Environment", Excel Publication, New Delhi, 2012.
9. Palle Krishna Rao: "WTO-Text and Cases", Excel Publication, New Delhi.

Course outcomes

1. To understand the overall business environment and evaluate its various components in business decision making.
2. To improve the students ability in recognizing and managing legal risks in business decision making.
3. Expose the students to the career fields in the area of business.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(AUTONOMOUS)

Subject Name: Quantitative Analysis for Business Decisions

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective: To provide basic tools of Quantitative Analysis in solving management problems using mathematical approach for Decision Making.

UNIT	TOPICS
UNIT I	**Statistical Measures:** Measures of Central Tendency, Measures of Dispersion. **Correlation and Regression:** Karl Pearson correlation coefficient, Spearmen's Rank Correlation Coefficient and Regression Lines.
UNIT II	**Probability:** Basic Concepts of Probability – Problems on addition and Multiplication Theorems of Probability. **Decision Analysis:** Introduction - steps involved in decision theory - different environments in which decisions are made - criteria for decision making - decision making under certainty - conditions of risk - utility as a decision criteria - decision trees - graphic display of decision making process - decision making with an active opponent.
UNIT III	**Linear Programming:** Mathematical model of LPP- solution by graphical method - interpretation and significance of elements of simplex table – justification - Simplex method – Artificial variable technique - Big M method - two Phase method.
UNIT IV	**Transportation Problems:** Definition, Meaning and application of Transportation Problem, Initial Basic Feasible Solution by North West Corner Rule Method, Least Cost Method and Vogel's Approximation Method – Solution by MODI Method. **Assignment Problem:** Mathematical model of Assignment Problem – solution by HAM , Travelling Salesmen problem.
UNIT V	**Game Theory:** Introduction - Two person zero sum games - Pure strategies – solution of games with saddle point - Rules of dominance- Mixed strategies – solution of games without saddle point. **PERT and CPM:** Drawing Networks – calculation of EST and LFT- identifying critical path – Floats - Probability of completing the project within given time – Project crashing – optimum duration and cost.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. N.D.Vohra: "Quantitative Techniques in Management", Tata-McGraw Hill Private Limited, New Delhi, 2011.
2. J. K. Sharma, "Operations Research: Theory and Applications", Macmillan Gupta .
3. Anand Sharma: "Quantitative Techniques for Business decision Making", Himalaya Publishers, New Delhi,2012;
4. D P Apte: "Operation Research and Quantitative Techniques", Excel Publication, New Delhi,2013.
5. Hamdy, A.Taha: "Operations Research: An Introduction", Prentice-Hall of India, New Delhi 2003.
6. Anderson: "Quantitative Methods for Business", Cengage Learning, New Delhi 2013.
7. Sancheti, Dc & VK Kapoor, "Business Mathematics", S Chand and Sons, New Delhi.
8. Probability and Statistics by TKV IYENGAR – S.Chand Publications.

Course Outcomes: By the end of the course student is able to:

1. Understand the basic concepts of statistical measurements, correlation and Regression.
2. Understand the probability Concept and decision making under various scenarios.
3. Modeling on LPP and obtaining optimum solutions of fit.
4. Make optimum allocation of right job to right person and make an optimum transportation schedule.
5. Solving a game using optimum strategies and scheduling a plan for completion of project.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(AUTONOMOUS)

Subject Name: Information Technology-LAB

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
-	6	-	3	40	60	100

Course objective: To learn application of Information Technology in the area of Management .

UNIT	TOPICS
UNIT I	**Introduction of various software's used for business**: Significance in the current business environments - Introduction of software MS Office, SQL.
UNIT II	**Financial modeling:** Present value of cash flows, Valuations, Financial ratio analysis, Forecasting, Trend analysis of data, Random input generations.
UNIT III	**Statistics for Management** - correlation and regression analysis data presentation techniques. Spreadsheet showing the monthly payments with changing interest rate over a period of loan. (Using excel)
UNIT IV	**Data Collection and analyzing techniques:** Chats, Flow diagrams TQM methodologies.
UNIT V	**Media For Social Connectivity:** . Using Google+ & Google Docs. 2 Creating Blogs and other academics & Business websites. Networking Surveys, Discussion & Business Information.
	Preparation and presentations of Mini projects assigned for course work of First Semester

References Books:

1. Shelly, Cashman: “Microsoft copies 2007”, Cengage Learning, New Delhi. 2012

Course Outcomes:

1. To understand the basics of business Environment.
2. Students will have to clear idea about the Microsoft office.
3. To create awareness about the foundation of Microsoft access.
4. Students understand the basic idea of database management systems.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Employability Skills

Regulation : R19 **Year/ Sem :** I/I

T	L	P	C	Internal	External	Total
-	-	4	2	-	-	---

Course objective: To develop and harness the employability skills.

UNIT	TOPICS
UNIT I	Business News Update
UNIT II	Business Quiz
UNIT III	Group Discussion
UNIT IV	Just A Minute (JAM)
UNIT V	Role Play
UNIT VI	Topic Presentation
UNIT VII	Face off

Resources:

1. News Papers
2. Business News Papers
3. Journals & Magazines
4. www.google.com

Course Outcomes:

1. Awareness about latest Business developments.
2. Become communicative and Assertive.
3. Ability to go along with teams.
4. Can qualify in competitive examinations.
5. Competent enough to face Interviews

Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of EEE Department

"Centre of Excellence in Education and Research in the field of Electrical and Electronics Engineering and to become the foremost academic department through its education and research programs"

Mission of EEE Department

- To develop innovative, efficient and proficient electrical engineers.
- To keep the curriculum industry friendly, with due regard to the University curriculum.
- To participate in large projects of National and International importance.
- To promote ethical and moral values among the students so as to make them emerge as responsible professionals.

Program Educational Objectives (PEOs)

PEO 1. To produce Electrical and Electronics Engineering graduates who have strong foundation in Mathematics, Sciences and Basic Engineering.

PEO 2. To provide intensive training in problem solving, laboratory skills and design skills to use modern engineering tools through higher education and research.

PEO 3. Ability to seek employment in a variety of engineering (or) engineering technology positions to specialize in specific areas of interest and work successfully in their chosen career aspirations.

PEO 4. To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context through life-long learning.

Program Outcomes(POs) of EEE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of EEE Department

PSO 1: The EEE program must demonstrate knowledge and hands-on competence in the application of electrical and electronics circuits in a rigorous mathematical

environment at or above the level of algebra and trigonometry.

PSO2: The EEE program must demonstrate that graduates can apply interdisciplinary project management techniques to electrical and electronics systems.

PSO 3: The EEE program must demonstrate that graduates can analyze, design and develop hardware and software for control systems, measurements, power electronics and power systems

S.No	Category	Sub. Code	Course Title	L	T	P	C	I	E	TM
1	PE		**Elective – V**	4	-	-	3	40	60	100
		EE3T0119	i.Demand side Energy Management							
		EE3T0219	ii.Power Quality and Custom Power Devices							
		EE3T0319	iii.High Voltage Testing Techniques							
2	OE		**Elective – VI**	4	-	-	3	40	60	100
		EE3T0419	i AI Techniques							
		EE3T0519	ii. Reactive Power Compensation&Management							
		EE3T0619	iii.Operations Research							
3		EE3D0119	Dissertation Phase-I	-	-	20	10	40	60	100
				8	**0**	**20**	**16**	**120**	**180**	**300**

II YEAR I SEMESTER ELECTRICAL POWER ENGINEERING
R19 SYLLABUS

BRANCH : EPE	II YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE3T0119		L	P	C
SUB.TITLE: DEMAND SIDE ENERGY MANAGEMENT (ELECTIVE – V)		4	0	3

Learning Objectives:

- To know the energy audit principles in power system.
- To know the energy economics associated with consumption of energy.
- To know the energy conservation in electric utility and industry.
- To know the lighting schemes and methods to conserve the energy.
- To understand the energy conservation aspect in space heating, ventilation, air Condition etc.

Unit-1 : Energy Audit and Energy management information systems: Energy audit: Definitions- Need-concepts-Types of energy audit; Energy management information systems: Introduction- Need-components-designing-using the system-identifying plant outages

Unit-2 : Energy Economics: Introduction-Cost benefit risk analysis-Payback period-Straight line depreciation-Sinking fund depreciation—Reducing balance depreciation-Net present value method-Internal rate of return method-Profitability index for benefit cost ratio

.

Unit-3 : Energy Conservation in Electric utilities and Industry: Electrical load management: Energy and load management devices-Conservation strategies; conservation in electric utilities and industry: Introduction-Energy conservation in utilities by improving load factor-Utility voltage regulation -Power factor improvement.

Energy –efficient electric motors: construction and technical features- life cycle-direct savings and payback analysis-efficiency factor or efficiency evaluation factor

Unit-4 : Electric Lighting: Introduction-Need for an energy management program-Building analysis-Modification of existing systems-Replacement of existing systems-priorities: Illumination requirement : Task lighting requirements-lighting levels-system modifications-non illumination modifications; System elements: light sources - characteristics of families of lamps-lamp substitution in an existing systems-selection of Higher efficiency lamps for a new system-Luminaries-ballasts-energy conservation in lighting.

Unit-5 : Space Heating ,Ventilation, Air-Conditioning(HVAC) and Water Heating: Introduction- Heating of buildings-Transfer of Heat-Space heating methods-Ventilation and air-conditioning- Insulation-Cooling load-Electric water heating systems-Energy conservation methods. Co-generation and storage: Combined cycle cogeneration-energy storage: pumped hydro schemes-compressed air energy storage(CAES)-storage batteries-superconducting magnetic energy storage (SMES).

Course Outcomes:

After completion of this course the students will be able to:

- Understand the principles and application of energy audit.
- Understand energy economics in utility systems.
- Understand the principle of energy conservation in lightning schemes.
- Apply energy audit principles in heating, ventilation and airconditioning etc.

Text Books :

1. Energy management Hand book by Wayne C.Turner,Johnwiley and sons publications
2. Electric Energy Utilization and Conservation by S C Tripath, TMH publishing company ltd.New Delhi

Reference Books :

1. Energy efficient electric motors selection and application by John C.Andreas
2. Hand book on Energy Audit and Management by AmitkumarTyagi,published by TERI(Tata energy research Institute)
3. Energy management by Paul W.O' Callaghan McGraw hill book company

BRANCH : EPE	II YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE3T0219		L	P	C
SUB.TITLE: POWER QUALITY AND CUSTOM POWER DEVICES (ELECTIVE – V)		4	0	3

Learning Objectives:

- To understand significance of power quality and power quality parameters.
- To know types of transient over voltages and protection of transient voltages.
- To understand harmonics, their effects, harmonic indices and harmonic minimization techniques.
- To understand long duration voltage variation and flicker
- To know power quality aspects in distributed generation.

Unit-1 Introduction

Overview of Power Quality - Concern about the Power Quality - General Classes of Power Quality Problems – Transients -Long-Duration Voltage Variations - Short-Duration Voltage Variations - Voltage Unbalance - Waveform Distortion - Voltage fluctuation - Power Frequency Variations - Power Quality Terms - Voltage Sags and Interruptions - Sources of Sags and Interruptions – Nonlinear loads.

Unit-2 Transient Over Voltages

Source of Transient Over Voltages - Principles of Over Voltage Protection - Devices for Over Voltage Protection - Utility Capacitor Switching Transients - Utility Lightning Protection - Load Switching Transient Problems - Computer Tools for Transient Analysis

Unit-3 Harmonic Distortion and solutions

Voltage vs. Current Distortion - Harmonics vs. Transients - Power System Quantities under Nonsinusoidal Conditions - Harmonic Indices – Sources of harmonics - Locating Sources of Harmonics – System Response Characteristics - Effects of Harmonic Distortion
Interharmonics Harmonic Solutions Harmonic Distortion Evaluation - Devices for Controlling Harmonic Distortion - Harmonic Filter Design - Standards on Harmonics

Unit- 4 Long Duration Voltage Variations

Principles of Regulating the Voltage - Device for Voltage Regulation - Utility Voltage Regulator Application - Capacitor for Voltage Regulation - End-user Capacitor Application - Regulating Utility Voltage with Distributed Resources – Flicker

Unit-5 Distributed Generation and Power Quality

Resurgence of Distributed Generation - DG Technologies - Interface to the Utility System - Power Quality Issues - Operating Conflicts - DG on Low Voltage Distribution Networks - Interconnection standards - Wiring and Grounding - Typical Wiring and Grounding Problems - Solution to Wiring and grounding Problems

Course Outcomes:

After completion of this course the students will be able to:

- Have the knowledge on causes of power quality, power quality parameters.

- Understand sources of transient over voltages and providing protection to transient over voltages.
- Understand effects of harmonics, sources of harmonics and harmonic minimization.
- Analyze long duration voltage variations and regulation of voltage variations.
- Describe power quality aspects in distributed generation and develop solutions to wiring and grounding problems.

Text Books:

1. Electrical Power Systems Quality, Dugan R C, McGranaghan M F, Santoso S, and Beaty H W, Second Edition, McGraw-Hill, 2002.
2. Understanding Power Quality Problems: Voltage Sags and Interruptions, Bollen M H J, First Edition, IEEE Press; 2000.
3. Guidebook on Custom Power Devices, Technical Report, Published by EPRI, Nov 2000.
4. Power Quality Enhancement Using Custom Power Devices – Power Electronics and Power Systems, Gerard Ledwich, ArindamGhosh, Kluwer Academic Publishers, 2002.

Reference Books :

1. Power Quality Primer, Kennedy B W, First Edition, McGraw-Hill, 2000.
2. Power System Harmonics, Arrillaga J and Watson N R, Second Edition, John Wiley & Sons, 2003.
3. Electric Power Quality control Techniques, W. E. Kazibwe and M. H. Sendaula, Van Nostrad Reinhold, New York.
4. Power Quality c.shankaran, CRC Press, 2001.
5. Harmonics and Power Systems –Franciso C.DE LA Rosa-CRC Press (Taylor & Francis).
6. Power Quality in Power systems and Electrical Machines-EwaldF.fuchs, Mohammad A.S. Masoum-Elsevier
7. Power Quality, C. Shankaran, CRC Press, 2001.
8. Instantaneous Power Theory and Application to Power Conditioning, H. Akagiet.al., IEEE Press, 2007.
9. Custom Power Devices - An Introduction, ArindamGhosh and Gerard Ledwich, Springer, 2002.
10. A Review of Compensating Type Custom Power Devices for Power Quality Improvement, Yash Pal et.al., Joint International Conference on Power System Technology and IEEE Power India Conference, 2008. POWERCON 2008.

BRANCH : EPE	II YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE3T0319		L	P	C
SUB.TITLE: HIGH VOLTAGE TESTING TECHNIQUES (ELECTIVE – V)		4	0	3

Learning Objectives:

- To understand non destructive testing methods.
- To understand commercial and technical testing of different HV power applications.

Unit 1 :

Non Destructive Testing Techniques : Measurement of DC Resistivity – Dielectric loss and dielectric constant of insulating materials – Schering bridge method – Transformer ratio arm bridge for high voltage and high current applications – null detectors.

Unit 2 :

High Voltage Testing of Power Apparatus : Need for testing standards – Standards for porcelain/Glass insulators-Classification of porcelain/glass insulator tests – Tests for cap and pin porcelain/Glass insulators.

Unit 3 :

High voltage AC testing methods-Power frequency tests-Over voltage tests on insulators, Isolators, Circuit Breakers and power cables. Artificial Contamination Tests : Contamination flashover phenomena-Contamination Severity-Artificial contamination tests- Laboratory Testing versus in-Service Performance-Case study

Unit 4 :

Impulse Testing : Impulse testing of transformers, insulators, Surge diverters, Bushings, cables,circuit breakers.

Unit 5 :

Partial Discharge Measurement : PD equivalent model-PD currents-PD measuring circuits-Straight and balanced detectors-Location and estimation of PD in power apparatus.PD measurement by non electrical methods-Calibration of PD detectors. RIV Measurements : Radio Interference – RIV – Measurement of RI and RIV in laboratories and in field. Different test arrangements and their limitations.

Course Outcomes:

After completion of this course the students will be able to:

- Understand different testing procedures on electrical a) Insulating materials

b) Insulation Systems. c) Power apparatus.

- Learn the different testing techniques adopted on electrical power apparatus.

Text Books :

1. High Voltage Engineering – by E.KUFFEL and W.S.ZAENGL, Pergamon press, Oxford 1984.
2. High Voltage Engineering – by M.S.Naidu and V.Kamaraju, Tata McGraw Hill Publishing Company Limited, New Delhi – 2001

Reference Books :

1. Discharge Detection in H.V. Equipment – by KREUGER, F.H. Haywood London – 1964.
2. Hyltencavallius. N. High voltage laboratory planning Emile Haefely &Co. Ltd. Based Switzerland 1988.
3. Ryan H.M. and Whiskand: design and operation perspective of British UHV Lab IEE pre 133 H.V. Testing Techniques Halfly.

BRANCH : EPE	II YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE3T0419		L	P	C
SUB. TITLE: ARTIFICIAL INTELLIGENCE TECHNIQUES (ELECTIVE-VI)		4	0	3

Learning Objectives:

- To have knowledge on concept of neural network.
- To know different types of neural networks and training algorithms.
- To understand the concept of genetic algorithm and its application in optimization.
- To have the knowledge on fuzzy logic and design of fuzzy logic controllers.
- To know the applications of AI Techniques in electrical engineering.

Unit – 1: Introduction to Neural Networks

Introduction, Humans and Computers, Biological Neural Networks, Historical development of neural network, Terminology and Topology, Biological and artificial neuron models, Basic learning laws.

Unit- 2:Feed Forward Neural Networks

Introduction, Perceptron models: Discrete, continuous and multi-category, Training algorithms: Discrete and Continuous Perceptron Networks, Perceptron convergence theorem, Limitations and applications of the Perceptron model, Generalized delta learning rule, Feedforward recall and error back propagation training-Radial basis function algorithms-Hope field networks

Unit -3: Genetic algorithms &Modelling-Introduction-encoding-fitness function-reproduction operators-genetic operators-cross over and mutation-generational cycle-convergence of genetic algorithm

UNIT – 4:Classical and Fuzzy Sets

Introduction to classical sets - properties, operations and relations; Fuzzy sets, membership,Uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions.Fuzzy Logic System Components-Fuzzification, Membership value assignment, development of rule base and decision making system, defuzzification to crisp sets, defuzzification methods.

UNIT-5: Application of AI Techniques: Design of PI controller for speed control of DC motor using neural networks and fuzzy logic-PWM Controllers -Selected harmonic elimination PWMSpace vector PWM using neural network.

Course Outcomes:

After completion of this course the students will be able to:

- Understand neural networks and analyze different types of neural networks.
- Design training algorithms for neural networks.
- Develop algorithms using genetic algorithm for optimization.
- Analyze and design fuzzy logic systems.
- Apply AI Techniques in electrical engineering.

Text Books :

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Pai – PHI Publication.

Reference Books:

1. Introduction to Artificial Neural Systems - Jacek M. Zuarda, Jaico Publishing House, 1997.
2. Modern Power Electronics and AC Drives –B.K.Bose-Pearson Publications.
3. Genetic Algorithms- David E Goldberg. Pearson publications.

BRANCH : EPE	II YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE3T0519		L	P	C
COURSE TITLE: REACTIVE POWER COMPENSATION & MANAGEMENT (ELECTIVE-VI)		4	0	3

Learning Objectives:

- To know the basic objectives of reactive power compensation.
- To know the types of compensation and their behavior.
- To know the mathematical modeling of reactive power compensating devices.
- To know the reactive power compensation has to be done at distribution side.
- To know the role of reactive power compensation at electric traction systems and Arc furnaces

Unit-1:Load Compensation

Objectives and specifications – reactive power characteristics – inductive and capacitive approximate biasing – Load compensator as a voltage regulator – phase balancing and power factor correction of unsymmetrical loads- examples.

Unit-2: Reactive power compensation in transmission system:

Steady state -Uncompensated line – types of compensation – Passive shunt and series and dynamic shunt compensation – examples

Transient state - Characteristic time periods – passive shunt compensation – static compensations- series capacitor compensation –compensation using synchronous condensers – examples

Unit -3:Reactive power coordination:

Objective – Mathematical modeling – Operation planning – transmission benefits – Basic concepts of quality of power supply – disturbances- steady –state variations – effects of under voltages – frequency – Harmonics, radio frequency and electromagnetic interferences.

Unit -4:Distribution side Reactive power Management:

System losses –loss reduction methods – examples – Reactive power planning – objectives – Economics Planning capacitor placement – retrofitting of capacitor banks.

User side reactive power management:

KVAR requirements for domestic appliances – Purpose of using capacitors – selection of capacitors – deciding factors – types of available capacitor, characteristics and Limitations

Unit-5: Reactive power management in electric traction systems and are furnaces:

Typical layout of traction systems – reactive power control requirements – distribution transformers- Electric arc furnaces – basic operations- furnaces transformer –filter requirements-remedial measures –power factor of an arc furnace

Course Outcomes:

After completion of this course the students will be able to:

- Learn various load compensations.
- Obtain the mathematical model of reactive power compensating devices.
- Get application of reactive power compensation in electrical traction & arc furnaces.

Text Books:

1. Reactive power control in Electric power systems by T.J.E.Miller, John Wiley and sons, 1982
2. Reactive power Management by D.M.Tagare,Tata McGraw Hill,2004.

Reference Books:

1. Wolfgang Hofmann, Jurgen Schlabbach, Wolfgang Just "Reactive Power Compensation: A Practical Guide, April, 2012, Wiely publication.

BRANCH : EPE	II YEAR – I SEMESTER	REGULATION: R19		
SUB. CODE: EE3T0619		L	P	C
COURSE TITLE: OPERATIONS RESEARCH (ELECTIVE-VI)		4	0	3

Learning Objectives:

- Students should know the dynamic programming to solve problems of discreet and continuous variables.
- Students should know the concept of non-linear programming
- Students should learn sensitivity analysis
- Student should knowl the real world problem and simulate it

Syllabus Contents:

Unit 1:

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

Unit 2

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

Unit 3:

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

Unit 4

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

Unit 5

Competitive Models,Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

Course Outcomes**:**

At the end of the course, the student should be able to

- Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
- Students should able to apply the concept of non-linear programming
- Students should able to carry out sensitivity analysis
- Student should able to model the real world problem and simulate it.

Text Books:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008

Reference Books

1. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
2. Pannerselvam, Operations Research: Prentice Hall of India 2010
3. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

Vision of our Institution

- To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of MBA Department

The Vision of the department is to become a Centre of Excellence in nurturing young managers to contribute for the betterment of Indian corporate sector.

Mission of MBA Department

- To strive for effective teaching & learning to meet the demands of the corporate.
- To develop entrepreneurial talent among the management graduates
- To expose the students to the various management practices in vogue through institute and industry interface.
- To promote ethical and moral values among the students.

Program Educational Objectives (PEOs)

1. To produce M.B.A. Graduates with sound knowledge in the area of Management.
2. To develop analytical and decision making skills through case studies.
3. To make the students employable in reputed organizations in the area of HRM, Marketing and Finance
4. To promote entrepreneurial qualities among the students.
5. To develop professional and ethical attitude among the students.

Program Outcomes (POs) of MBA Department

1. Apply knowledge of management theories and practices to solve businessproblems.

2. Foster analytical and critical thinking abilities for data-based decision making.

3. Ability to develop value based leadership ability.

4. Ability to understand, analyze and communicate global, economic, legal, andethical aspects of business.

5. Ability to lead themselves and others in the achievement of organizationalgoals,

6. Contributing effectively to a team environment.

7. Ability to adapt the business to the continuously changing environment.

8. Ability to sustain in a globally competitive environment.

S. No	Title of the Course	T	L	P	C	Internal	External	Total
1	Financial Management	4	-	-	3	40	60	100
2	Human Resource Management	4	-	-	3	40	60	100
3	Marketing Management	4	-	-	3	40	60	100
4	Production & Operations Management	4	-	-	3	40	60	100
5	Research Methodology	4	-	-	3	40	60	100
6	Organizational Behavior	4	-	-	3	40	60	100
7	Mini Project Report	2	-	-	2	50	-	50
	Seminar on Mini Project		-	-	2	50	-	50
8	Employability Skills		0	4	2	-	-	-
	Total	**26**	**0**	**4**	**24**	**340**	**360**	**700**

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Financial Management

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objectives:

1. To develop the skills in managing the financial resources of an organization efficiently and effectively.

2. To create awareness among the students about tools and techniques in managing the finance department

UNIT	TOPICS
UNIT I	**Financial Management:** Concept - Nature and Scope - Evolution of financial Management - The new role in the contemporary scenario – Goals and objectives of financial Management - Profit maximization Vs. Wealth maximization – Maximization Vs Satisfying - Major decisions of financial manager - Risk- Return trade off, time value of money, present value, future value of money and the basic valuation models
UNIT II	**Financing Decision:** Sources of finance - financial instruments - Concept and financial effects of leverage – Preparation Capital Structure decision - EBIT – EPS analysis, Capital structure theories. Cost of Capital: The concept – Average vs. Marginal Cost of Capital. Measurement of Cost of Capital – Component Costs and weighted Average Cost.
UNIT III	**Investment Decision:** Investment decision process- Developing Cash Flow Data - Evaluation Techniques-Traditional and DCF methods - NPV vs. IRR - Approaches for reconciliation - Capital budgeting decision under conditions of uncertainty - Measurement of Risk – Probability tree approach – Sensitivity analysis.
UNIT IV	**Dividend decision:** Meaning and significance-Major forms of dividends-Theories of Dividends-Determinants of Dividend-Dividends policy and Dividend valuation-Bones Shares-Stock Splits-Dividend policies of Indian Corporate.
UNIT V	**Working Capital Management:** Concepts and characteristics of working capital. Factors determining the working capital - Estimating working capital requirements - Working capital policy. Management of current assets: Cash Management , cash budget, management of receivables, Management of marketable securities, Management of inventory, management of receivables and credit policies
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. P.Vijaya Kumar, P.S. Ravindra, Kiran Kumar, "Financial Management", Himalaya Publishing House PVT Ltd, 2014.
2. Rajiv Srivastava, Anil Misra: "Financial Management", Oxford University Press, New Delhi,2012.
3. Brigham,E.F: "Financial Management Theory and Practice", Cengae Learning, New Delhi, 2013.
4. Prasanna Chandra: "Financial Management Theory and Practice", Tata McGrawHill 2011.
5. I.M. Pandey: "Financial Management", Vikas Publishers, New Delhi, 2013.
6. RM Srivastava, Financial Management, Himalaya Publishing house, 4th edition.
7. Khan and Jain: Financial Management, Tata McGraw Hill, New Delhi,
8. Pradip Kumar Sinha: "Financial Management", Excel Books, New Delhi, 2009.
9. Vyuptakesh Sharan: "Fundamentals Financial Management", Pearson, New Delhi, 2012.
10. Shashi K. Gupta: "Financial Service", Kalyani Publishers, New Delhi, 2012.

Course Outcomes:

1. Students understand the important decisions of financial manager.
2. Learn the tools and techniques for investment decisions.
3. Provides knowledge about how to develop capital structure and implications of dividend policy.
4. Students came to know how to manage current assets and current liabilities for the benefit of organizations.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Human Resource Management

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objectives: To learn various aspects of managing availability of competent work force to provide competitive advantage to the organization

UNIT	TOPICS
UNIT I	**Introduction to HRM**: Evolution of HRM-Definition,-Significance- Functions-Principles - Ethical Aspects Of HRM - Role and position of HR department-HR Policy-Aligning HR strategy with organizational strategy-Emerging trends in HRM.
UNIT II	**Acquisition**: HR Planning-Job Analysis-job Description, job Specification, job Evaluation-job design/Redesign–- Recruitment and Outsourcing-Selection- Tests - Interview Techniques –Induction.
UNIT III	**Development:** Training-Definition -Need-Objectives-Process-On the Job, off-the Job Methods-Training Evaluation-Management Development-- Succession Planning - HRD concepts- Career Development and Counseling.
UNIT IV	**Performance Appraisal**: Definition-Need-Traditional and Modern Methods-Latest Trends in Performance Appraisal-Drawbacks in Performance Appraisal Systems-Transfer-Promotion -Employee Retention-Separation.
UNIT V	**Compensation and welfare:** Compensation- Concepts-Principles-Wage and Salary Administration-Determinants of Payment of wages-Wage Differentials-Incentives-Fringe benefits-Work Life Balance-Employee Welfare-Statutory and Non Statutory Welfare Measures-Work Hazards-Safety at work place-Managing work place stress- HR Audit and Accounting.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Human Resource and Personnel Management" by K Aswathappa, Tata McGraw Hill, New Delhi, 2013.

2. Personnel and Human Resource Management- Text and Cases" by Subba Rao P, Himalaya Publications, Mumbai, 2013.

3. Human Resource Management" by Seema Sanghi,Macmillan Publishers India Ltd.

4. Shashi K.Gupta.Human Resource Management, Kalyani Publishers.

5. N.Sambasiva Rao and Dr. Nirmal Kumar: "Human Resource Management and Industrial Relations", Himalaya Publishing House, Mumbai.

6. Mathis, Jackson,Tripathy:"Human Resource Management:Asouth-Asin Perspective", Cengage Learning, New Delhi, 2013.

7. Madhurima Lall, Sakina Qasim Zasidi: "Human Resource Management", Excel Books,New Delhi, 2010

Course Outcomes:

1. Provides insight into the importance of Human Resource and their effective management in Organizations.
2. Provides in depth knowledge in various aspects of Acquisition of Human Resources like HRP, Recruitment, Selection and Induction.
3. Appropriate use of job description and job Specification and job Evaluation.
4. Application, design and evaluation of Training Programs.
5. Application of various methods of performance appraisal.
6. Provides knowledge in wage and salary administration.
7. Exposure to Employee welfare and legal framework.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Marketing Management

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To assist the students while understanding marketing concepts and marketing mix and Indian marketing environment.

UNIT	TOPICS
UNIT I	**Introduction to Marketing:** Needs, Wants, Demands, Products, Exchange, Transactions, Market, Marketing, Production Concept, Product Concept, Sales Concept, Marketing Concept, Societal Marketing Concept, Indian Marketing Environment. Marketing mix.
UNIT II	**Product and Market Segmentation :** Product : levels of product, New product development- Product life cycle, Market segmentation: Importance and segmentation process – Segmentation basis-Targeting: Selecting Target markets- Positioning strategies.
UNIT III	**Pricing Strategy:** Objectives of Pricing, Methods of Pricing, Selecting the final price, Adopting price, initiating the price cuts, imitating price increases, Responding to Competitor's price changes.
UNIT IV	**Marketing Communication:** The communication process, Communication mix, Managing advertising sales promotion, Public relations and Direct Marketing. Sales force Objectives, Sales force structure and size, Sales force Compensation.
UNIT V	**Emerging Marketing Concepts:** Marketing Information System (MIS), Marketing Research, Digital Marketing, Global Marketing, Green Marketing, Guerilla Marketing, Viral Marketing.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Phillip Kotler: "**Marketing Management** ", Pearson Publishers, New Delhi, 2013.
2. Rajan Sexena: "**Marketing Management**", Tata McGraw Hill, New Delhi, 2012.
3. Paul Baines, Chris Fill, Kelly Page Adapted by Sinha K: "**Marketing**", Oxford University Press, Chenni, 2013.
4. Lamb, Hair, Sharma: "**MKTG**" Cengage Learning , New Delhi, 2013.
5. Tapan K Pand :"Marketing management", Excel Books,New Delhi 2012.
6. R.Srinivasan: Case Studies in Marketing ",PHI Learning,New Delhi,2012.

Course Outcomes:

1. Provides knowledge about the requirements of marketing, Indian marketing environment, Product, market segmentation and targeting positioning strategy.
2. Provides knowledge on pricing strategy, market communication, MIS, Digital Marketing, Global Marketing, Green Marketing, Guerilla Marketing,Viral Marketing.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Production and Operations Management

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To understand the application of operations management policies and techniques to the service sector as well as manufacturing firms.

UNIT	TOPICS
UNIT I	**Introduction:** Overview & Definition of Production and Operations Management-Nature and Scope of Production and Operations Management-Historical Evolution – Role & responsibilities of the production manager - Types of Manufacturing Processes and Product Design.
UNIT II	**Production planning and control:** Stages in PPC – Gantt – PPC in Mass, Batch, and Job Order Manufacturing- Aggregate planning and Master Scheduling, Maintenance management & Industrial Safety. Plant Location & Layout Planning- Factors influencing location - types of layouts, Capacity Planning-Optimal Production Strategies: Scheduling, Sequencing: Johnson's rule for job sequencing, Work Design: Method Study and Work Measurement – Work Sampling.
UNIT III	**Managing of Work Environment:** Automation --Technology Management –Waste Management. Quality Assurance and Quality Circles – Statistical Quality Control – Control Charts for Variables- Average, Range and Control charts for Attributes, MRP.
UNIT IV	**Quality Improvement**: Basic concepts of quality, dimensions of quality, Juran's quality trilogy, Deming's 14 principles, Quality improvement and cost reduction, ISO 9000-2000 clauses & coverage. Six Sigma, Productivity –factors affecting productivity, measurement & improvements in productivity - new product development and design - stages & techniques. Total Productive Maintenance (TPM).
UNIT V	**Stores Management:** Objectives of Stores Management – Requirements for efficient management of Stores – Safety stock Inventory Control - Different Systems of Inventory Control, Costs & Types of Inventory. – ABC,EOQ, VED and FNSD ,JIT,VMI analyses- Value Analysis-Importance in cost reduction-Concepts and Procedures.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Panner Selvem: "Production and Operation Management", Prentice Hall of India,NewDelhi, 2012.
2. K.Aswathappa, K. Shridhara: "Production & Operation Management", Himalaya Publishing House, New Delhi, 2012
3. Ajay K Garg: "Production and Operation Management", TMH, New Delhi,2012
4. Deepak Kumar Bhattacharya: "Production & Operation Management", UniversityPress, New Delhi, 2012
5. AlanMuhlemann, JohnOakland, jasti Katyayani: "Production and OperationManagement", Pearson, New Delhi, 2013.

Course Outcomes:

1. Provides knowledge about history of production and operations management,maufacturing process and product design,ppc,plant location and layout capacity planning.

2. Provides knowledge about work design,managing work environment, inventory control, quality improvement and cost reduction, product development and design, stores management, cost and inventory analysis and value analysis.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Research Methodology

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective:

1. To Enhance the knowledge and skills to carry out research for businesses.
2. To bring awareness of business research methods enabling the participant to critically evaluate research, and become more informed consumers of research.

UNIT	TOPICS
UNIT I	**Introduction:** Nature and importance of research – Role of business research – Aims of social Research – Research Process – Pure, Applied, Qualitative, Quantitative, Exploratory, Descriptive and Exponential Research -Ethical Issues in Business Research
UNIT II	**Database and Scaling :** Discussion on primary and secondary data – Methods of collecting data – sampling design and sampling procedures – Determination of Sample size , appropriate sampling design – Random and Non Random Techniques, Designing of Questionnaire, Measurement and Scaling – Nominal, Ordinal, Interval, Ratio, Likert, Guttman and Schematic Differential scales.
UNIT III	**Survey Research and Data Analysis:** Media used to communicate with respondents - Personal interviews –Telephone Interviews – Self Administered Questionnaire – Selection of appropriate survey research design – Nature of field work – Principles of good interviews and field work management – Editing – Coding – Classification of Data – Tables and graphical representation, preparation and presentation of research report.
UNIT IV	**Statistical interference:** Formulation and Test of hypothesis – Null and Alternative Hypothesis, Parametric and Non Parametric Tests – Procedure for testing hypothesis and significance – large and small samples (Z-test, t-test) – Chi Square Test , F-test , ANOVA – one way and two way classification for complex experimental designs.
UNIT V	**Multivariate Analysis:** Nature of multivariate analysis, classification of multivariate techniques, analysis of dependence and interdependence- Multiple Regression. **Statistical Quality Control:** Control lines – LCL and UCL, Control charts for variables- $\bar{X}$ and $\bar{R}$ charts, Control charts for attributes – p, np and c charts, Industrial applications.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Navdeep and Guptha : "Statistical Techniques & Research Methodology", Kalyani Publishers.
2. Willam G.Zikmund, Adhkari: "Business Research Methods", Cengage Learning, New Delhi, 2013.
3. S.Shajahan: "Research Methods for management", JAICO Publishing House, New Delhi, 2009.
4. UWE FLICK: "Introducing Research Methodology", SAGE, New Delhi,2012.
5. Cooper R.Donald and Schindler S. Pamela: "Business Research Methods", 9/e, Tata MCGraw Hill, New Delhi.
6. M.V.Kulkarni: "Research Methodology" , Everest Publishing House, New Delhi, 2010. 7. Probability and Statistics by TKV IYENGAR – S.Chand Publications

Course Outcomes: By the end of the course the student is able to:

1. Understand the importance and types of research
2. Understand various methods of collecting data and measuring the data using different scales.
3. Students come to know a mechanism of writing a Research Report.
4. Students come to know Testing of data and draw the inferences using various statistical tools.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Organization Behaviour

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objectives: The main objective of Organizational Behavior is to understand the human interactions in an organization, find what is driving it and influence it for getting better results in attaining business goals.

UNIT	TOPICS
UNIT I	**Organization Behaviour :** Introduction Nature, scope & Importance – linkages with other social sciences - Individual Roles and Organizational Goals – Organizational Theories: Classical, Neoclassical, Contemporary Organization its features and limitations - Approach to Organizational behaviour - Models of organizational behaviour - Perspectives of Human Behaviour.
UNIT II	**Perceptual Management:** Nature - Process – selection, organization and interpretation – Influencing factors- Motivation - Concepts - Needs and Motives and theories. Leadership and Motivating people - Leadership Theories – Leadership behaviour and styles- Leadership Skills. Attitudes and Values: formation - types – changes and behavior modification techniques.
UNIT III	**Personality Development:** Personality Development Nature - Stages, Factors, Determinants of Personality, Theories of personality - Johari Window - Transactional Analysis, Exchange Theory-Learning Processes - theories, Creativity and Creative Thinking. Leadership – nature – skills. Decision Making Process: Behavioural Dimensions, Groups and their formation - Group Dynamics, Informal Organizations, Group versus Individual Interaction.
UNIT IV	**Inter-Personal Communication:** Listening, Feedback, Collaborative Processes in Work Groups, Team Building, Team Decision Making, Conflict Resolution in Groups and Problem Solving Techniques.
UNIT V	**Organizations:** Organizations Taxonomy, Elements of Structure, Determinants of Structure, Functional Aspects of Structure, Role Impingement, Stress in Organization. Principles Underlying the Design of Organizations, Organizational Culture, Power and Authority. Organizational Development: Goals, processes, change – resistance to change – Nature of OD - interventions, OD techniques and OD applications.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma: Organizational Behavior", Tata McGraw Hill Education, New Delhi, 2008.
2. K.Aswathappa: "Organizational Behavior-Text, Cases and Games", Himalaya Publishing House, New Delhi, 2008,
3. Jerald Greenberg and Robert A Baron: "Behavior in Organizations", PHI Learning Private Limited, New Delhi, 2009.
4. Pareek Udai: "Understanding Organizational Behavior", Oxford University Press, New Delhi, 2007.
5. Jai B.P.Sinha: "Culture and Organizational Behavior", Sage Publication India Private Limted, New Delhi, 2008.
6. Sharma VS, Veluri: "Organizational Behavior", JAICO Publishing House, New Delhi, 2009.
7. Slocum,n Helireigel: "Fundamentals of Organizational Behavior", Cengage Learning India, New Delhi, 2009.
8. Jennifer M.George and Gareth R. Jones: "Understanding and Managing Organizational Behavior", Pearson Education, New Delhi, 2009.

Course Outcomes: Students will be able to

1. Develop the various number of established theorists, theories and studies relating to organizational behavior.

2. Evaluate the key assumptions on which behavior in organizations is currently managed and assess the effect of these ideas on employee attitudes and actions.

3. Apply problem solving and critical thinking abilities to analyze the kinds of choices available for developing alternative organizational behavior approaches in the workplace.

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM
(AUTONOMOUS)

Subject Name : Employability Skills

Regulation : R19 **Year/ Sem :** I/II

T	L	P	C	Internal	External	Total
-	-	4	2	-	-	---

Course objective: To develop and harness the employability skills.

UNIT	TOPICS
UNIT I	Business News Update
UNIT II	Business Quiz
UNIT III	Group Discussion
UNIT IV	Topic presentation
UNIT V	Face off
UNIT VI	Business plan
UNIT VII	Interview Skills

Resources:

1. News Papers
2. Business News Papers
3. Journals & Magazines
4. www.google.com

Course Outcomes:

1. Awareness about latest Business developments.
2. Become communicative and Assertive.
3. Ability to go along with teams.
4. Can qualify in competitive examinations.
5. Competent enough to face Interviews.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Strategic Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To know the significance of Human Resource in view of the synergetic value it has and fame.

UNIT	TOPICS
.**UNIT I**	Introduction: Concepts in Strategic Management, Strategic Management as a process – Developing a strategic vision, Mission, Objectives, Policies – Factors that shape a company's strategy – Drafting a strategy - Industry and Competitive Analysis.
UNIT II	Environmental Scanning: Methods of Environmental scanning. SWOT Analysis – Strategies and competitive advantages. Strategic Analysis and Choice: Tools and techniques– Porter's Five Force Model, BCG Matrix, GE Model.
UNIT III	Strategy Formulation and Implementation: Porter's Value Chain Analysis, Competitive Advantage of a Firm, - exit and entry barriers - Formulation of strategy at corporate, business and functional levels, Strategy and structure, Strategy and Leadership, 7's framework strategies, Strategies for competing in Globalizing markets – Resource Allocation
UNIT IV	Diversification Strategies: Different methods Turnaround strategy, Strategies for mergers, acquisitions, takeovers and joint ventures. Tailoring strategy to fit specific industry, Types of restructuring and diversification strategies, the concept of core competence, strategies and competitive advantage in diversified companies.
UNIT V	Strategy Evaluation and control – Establishing strategic controls - Measuring performance – appropriate measures- Role of the strategist – using qualitative and quantitative benchmarking to evaluate performance - strategic information systems – problems in measuring performance – Strategic surveillance -strategic audit.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Vijaya Kumar P,. Hitt A: Strategic Management, Cengage learning, New Delhi,2010

2. John A PearceII, Amita Mital: "Strategic Management", TMH, New Delhi, 2012.

3. R. Srinivasan: "Strategic Management", PHI Learning, New Delhi, 2009.

4. U.C. mathur: " Strategic Management", McMillan Publishers, New Delhi, 2009

5. Amita Mital: " Cases in Strategic Management", Tata McGraw Hill, New Delhi, 2008.

Course Outcomes:

1: Students will be able to understand the basic concepts and principles of strategic management analyze the internal and external environment of business.

2: Students can develop and prepare organizational strategies that will be effective for the current business environment

3: Devise strategic approaches to managing a business successfully in a global context

Vision of our Institution

- To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of MBA Department

The Vision of the department is to become a Centre of Excellence in nurturing young managers to contribute for the betterment of Indian corporate sector.

Mission of MBA Department

- To strive for effective teaching & learning to meet the demands of the corporate.
- To develop entrepreneurial talent among the management graduates
- To expose the students to the various management practices in vogue through institute and industry interface.
- To promote ethical and moral values among the students.

Program Educational Objectives (PEOs)

1. To produce M.B.A. Graduates with sound knowledge in the area of Management.
2. To develop analytical and decision making skills through case studies.
3. To make the students employable in reputed organizations in the area of HRM, Marketing and Finance
4. To promote entrepreneurial qualities among the students.
5. To develop professional and ethical attitude among the students.

Program Outcomes (POs) of MBA Department

1. Apply knowledge of management theories and practices to solve businessproblems.

2. Foster analytical and critical thinking abilities for data-based decision making.

3. Ability to develop value based leadership ability.

4. Ability to understand, analyze and communicate global, economic, legal, andethical aspects of business.

5. Ability to lead themselves and others in the achievement of organizationalgoals,

6. Contributing effectively to a team environment.

7. Ability to adapt the business to the continuously changing environment.

8. Ability to sustain in a globally competitive environment.

S.No	Subject title	T	L	P	C	I	E	T
1	Strategic Management	4	-		3	40	60	100
2	Legal Aspects of Business	4	-		3	40	60	100
3	Business Ethics & Corporate Governance	4	-		3	40	60	100
4	Elective – I	4	-		3	40	60	100
5	Elective – II	4	-		3	40	60	100
6	Elective – III	4	-		3	40	60	100
7	Elective – IV	4	-		3	40	60	100
8	Employability Skills	-	-	4	2	-	-	-
	Total	**28**	**0**	**4**	**23**	**280**	**420**	**700**

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Legal Aspects of Business

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To provide basic insight of various aspects of commercial law like Contract Act, Sale of Goods act, Negotiable Instruments act, Indian Partnership Act, Contract of Agency and Companies Act

UNIT	TOPICS
UNIT I	Importance of Commercial Law: The Indian Contracts Act, 1872 – Nature of the Act and Classification of Contracts – Essentials of a Valid Contract – Offer and Acceptance – Capacity – Consideration –Free Consent –Legality of Object –Performance of a Contract – Discharge of a Contract – Breach of a Contract and Remedies.
UNIT II	Sale of Goods Act: Distinction between Sales and Agreement to Sell – Conditions and Warranties – Performance of Contract of Sale –Transfer of Ownership – Rights of an Unpaid Seller. Right to Information Act 2005, Consumer Protection Act, 1986 - Information Technology Act 2000.
UNIT III	Contract of Agency: Kinds of Agents –Creation of Agency- Duties and Rights of Principal and Agents- Principal's Liability for the Acts of the Agent-Liability of Agent –Termination of Agency. Negotiable Instruments Act, 1881- Kinds of a Negotiable Instruments and endorsement-Presentation and discharge of Negotiable Instrument.
UNIT IV	Indian Partnership Act, 1932-Recent Amendments: Meaning and Essentials of Partnership-Registration – Tests of Partnership-Duties and Rights of Partners – Dissolution of Partnership. Limited Liability Partnership Act 2008.
UNIT V	Companies Act 2013: Nature and Types of Companies – Formation – Memorandum of Association-Articles of Association –Kinds of Shares –Duties of Directors-Winding up.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Ravindra Kumar: “Legal Aspects of Business”, Cengage Learning, New Delhi, 2011
2. N.D. Kapoor : “|Business Law”, Sultanchand Publications
3. S.N.Maheshwari, S.K.Maheshwari: “A Manual of Business Laws”, Himalaya Publishing House, 2013.
4. P.K.Padhi: “Legal Aspects of Business”, PHI Learnings, New Delhi, 2013

Course Outcomes

1. Provides knowledge on various Laws like Indian Contract Act, Sale of Goods Act, Contract of Agency, Indian Partnership Act, Company Act, Negotiable Instruments Act, Companies Act, Consumer Protection Act, Right to Information Act and Information Technology Act.
2. Provides in depth knowledge in the above areas with case laws.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Business Ethics & Corporate Governance

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: This course aims at providing the students understanding of ethical issues related to business and good governance necessary for long term survival of business.

UNIT	TOPICS
UNIT I	Importance of Business Ethics: Values and Ethics- Business Ethics and Law – Ethics in Work Place – Ethical Decision Making- Theories of Business Ethics – Management and Ethics- Indian Ethical Traditions.
UNIT II	Impact of Globalization on Indian Business Ethics: Reasons for Unethical Practices among Indian companies – Development of Indian Capital Markets – Various studies on Ethical Attitudes of Managers Major Indian Scams.
UNIT III	Ethics in Marketing, HRM and Finance: Product safety and Pricing-Ethical responsibility in Product Advertising and Target Marketing. Ethics of sales, product placement and Consumer Autonomy. Ethical issues in HRM - Institutional Culture. Frauds in Banks - Measures against Bank Frauds – Frauds in Insurance sector.
UNIT IV	Corporate Governance: An overview – Theory and Practice of Governance- Indian model of Governance - Good Corporate Governance – Land marks in emergence of Governance OECB Principles – Sarbanes-Oxley Act 2002- SEBI Initiatives.
UNIT V	Corporate Governance Indian Scenario: Role of Government in Ensuring Corporate Governance – Governance issues relating to Board of Directors – Duties and responsibilities of Auditors– Role of Media – Corporate Governance in Developing and Transiting Economies.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. S.K.Mandal: “Ethics in Business and Corporate Governance”, TMH, New Delhi, 2012.

2. Marianne M Jennings: “Cases in Business Ethics”, Cengage Learning, New Delhi, 2012.

3. S.Prabhakaran: “Business Ethics and Corporate Governance”, Excel Books, New Delhi, 2011.

4. N.Balasubramanyam: “A Case Book on Corporate Governance and Stewardship”, TMH., New Delhi, 2011.

5. A.C.Fernando: “Business Ethics and Corporate Governance”, Pearson Publishers, New Delhi, 2013.

Course Outcomes:

1. Students will be able to understand the business ethics.
2. The student will be able to analyze corporate social Responsibility.
3. The student will be able to analyze various ethical codes in corporate governance
4. Student will be able to Analyze the Employees conditions and Business Ethics

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Security Analysis & Portfolio Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: The primary objective of this course is to familiaze the student with various tools and techniques to facilitate the managers in managing their portfolio.

UNIT	TOPICS
UNIT I	**Concept of Investment Education:** Investment Vs Speculation, Investment alternatives - Investment Process - Sources of Investment Information – Trading System in Stock Exchanges – Market Indices. Calculation of SENSEX and NIFTY - Return and Risk – Meaning and Measurement of Security Returns. Meaning and Types of Security Risks: Systematic Vs Non-systematic Risk - Measurement of Risk. (Problems).
UNIT II	**Equity and Bond Valuation Models** – Preference Shares and Equity Shares Earning valuation-Cash flow valuation-Asset Valuation-Dividend-discount model; Valuation of Bonds – Bond Returns and Risks -Bond Pricing Theorems convexity, duration, bond immunization. (Problems).
UNIT III	**Investment Analysis:** Fundamental Analysis – Economy, Industry and Company Analysis, Technical Analysis – Dow Theory – Elliot Wave Theory – Trends and Trend Reversals - Efficient Market Theory –Hypothesis- Forms of Market Efficiency.
UNIT IV	**Portfolio Analysis and Selection:** Elements of Portfolio Management, Portfolio Models – Markowitz Model, Efficient Frontier and Selection of Optimal Portfolio. Sharpe Single Index Model and Capital Asset Pricing Model, Arbitrage Pricing Theory. (Problems).
UNIT V	**Portfolio Evaluation and Revision:** Performance Evaluation of Portfolios; Sharpe Model – Jensen's Model for PF Evaluation, Evaluation of Mutual Fund – Portfolio Revision. (Problems).
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. S.Kevin: “Security Analysis and Portfolio Management”, PHI Learning, New Delhi, 2009

2. Punithavathy Pandian: “Security Analysis and Portfolio Management”, Vikas Publishing House, New Delhi, 2009

3. Sudhendra Bhat: “Security Analysis and Portfolio Management”, Excel Books, New Delhi, 2009.

4. Shashi K Gupta: “Security Analysis and Portfolio Management”, Kalyani Publishers, New Delhi,2010

5. Prasanna Chandra, “Investment Analysis and Portfolio Management”, 3/e Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 2003.

Ranganatham : “Investment Analysis and Portfolio Management” Pearson Education

Course Outcomes:

1. Gain the knowledge about capital market and various investment avenues.
2. Know the risk and return associated with different investments.
3. Understand different techniques of evaluating the investments.
4. Familiar the students with the fundamental and technical analysis of the
5. Diverse investment avenues.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Banking & Insurance Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To provide brief insight on functioning of Banks and Insurance companies in India.

UNIT	TOPICS
UNIT I	Introduction to Banking: Introduction to Indian Financial System - Meaning of a Bank and Customer- Bank and customer Relationship - Role of commercial banks in Economic Development - Evolution of Banking in India – origin, nationalization, reforms and Financial Inclusion in India - Financial statements of banks with special focus on Indian banks - Financial statement analysis of banks: CAMEL Approach, Key Performance indicators-Sources of Bank Funds.
UNIT II	Uses of Bank Funds: Features of Bank Credit - types of lending - assessment of credit worthiness of a prospective borrower - management of credit process - different types of loans and their features - Loan Pricing: The basic model, pricing fixed & floating rate loans, cost -benefit loan pricing, Customer Profitability Analysis - Non Performing Assets: - gross and net concept of NPAs, causes, implications & recovery of NPAs.
UNIT III	Regulation and Innovations in Banking System: Regulation of Bank Capital: The need to regulate Bank Capital - Concept of Economic Model - Concept of Regulatory Capital, Basel Accords I,II and III. - Banking Innovations - Core Banking Solution - Retail Banking - Products & Services: Nature, Scope, Future and Strategies - Plastic Money - National Electronic Funds Transfer - ATM - Mobile Phone Banking - Net Banking- Banc- assurance. Changing role of Banks as Financial Intermediaries.
UNIT IV	Introduction to Insurance: Insurance as a Risk Management Tool- Principles of Insurance - Characteristics of Insurance contract - Functions of Insurers: Production, Underwriting, Rate Making, Managing Claims and Losses, Investment & Financing, Accounting & Record Keeping and other miscellaneous functions - Types of Insurers- Concept of Reinsurance, uses and advantages - Marketing channels: Agents & brokers –professionalism, remuneration, responsibilities, classification, criteria for appointment and capital adequacy norms for broker - an overview of IRDA.
UNIT V	Life Insurance and General Insurance: The concept of Life Insurance - types of Life Insurance contracts - Tax treatment of Life Insurance- Life Insurance Products-Classification of Life Insurance - The Actuarial Science- Provisions of Life Insurance contracts - Special Life Insurance forms - Health and General insurance–Overview, Types, Third Party Administrators- Micro Insurance in India
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Peter.S.Rose & Sylvia. C. Hudgins: "Bank Management & Financial Services", Tata McGraw Hill New Delhi, 2010,
2. James S. Trieschmann, Robert E. Hoyt & David. W. Sommer B:"Risk Management & Insurance", Cengage Learning, New Delhi
3. Reddy K S and Rao R N: "Banking & Insurance", Paramount Publishing House 2013.
4. Vasant Desai: "Banks & Institutional Management", Himalaya Publishing House 2010.
5. Harold. D. Skipper & W. Jean Kwon: "Risk Management & Insurance, Perspectives in a Global Economy", Blackwell Publishing New Delhi.
6. NIA: "Life Insurance Principles and Practices", Cengage Learning, New Delhi,2013.
7. Neelam C.Gulati: "Banking and Insurance: Principles and Practice", Excel Books, New Delhi 2011.

Course Outcomes:

1. To understand the basic concepts of banking and approaches to evaluate bank performance.
2. To familiarize the various sources, uses of funds and banking regulations.
3. To understand the concepts and types of insurance and norms specified by IRDA

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Advanced Management Accounting

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: The objective of this paper is to make familiarize the student with the Tools and techniques of decision making in management accounting.

UNIT	TOPICS
UNIT I	Introduction: Employment of Management Accounting – Human Resource Accounting – Need for Harmonization of International Accounting Standards – Role of Management Accountant for controller functions – Financial Accounting Control (FACO).
UNIT II	Financial Analysis: Comparative analysis – Common Size Analysis - Funds Flow Analysis – Cash Flow Analysis.-Ratio Analysis – Trend analysis – Deprecation Models.
UNIT III	Budget – Budgetary Control: – Types of Budgets – Financial Vs Operation Budgets – Short Term Vs Long Term Budgets – Preparation of Sales Budgets – Purchase Budgets- Expenditure Budgets for Material, Labour and Overheads – Construction of Cash Budget- Flexible Budget – Master Budget – Management Control and Budgeting – Performance Budgeting and Zero Based Budgeting
UNIT IV	Marginal Costing: Cost Concepts for Decision making – Decision Making Process – Decision Situations -Sales Volume Decisions – Pricing and Special Order Pricing – Make / Buy Decisions– Product Decisions- Addition, Deletion and Alteration of Mix – Plant Shutdown Decision - Profit Planning- introduction of new product – planning of level of activity – Key factor – Foreign market offer.
UNIT V	Standard Costing: Standard Costing and historical costing – Establishment of cost standards –steps involved in standard costing – Variance analysis: Material Variance – Labour Variance – Overhead Variance - Sales Variance.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Charles T. Horn Gaxy L. Sundem.: "Introduction to Management Accounting" Konrk Publishers PVT Ltd, New Delhi.

2. S.P. Gupta: "Management Accounting" Sahitya Bhawan Publications, Agra 2002.

3. Manmohan and Goyal: "Management Accounting" Pearson Education.

4. V. Krishna Kumar: "Management Accounting" Mittal Publications, New Delhi.

5. Dr. Kulsreshtha and Gupta: "Practical Problem in Management Accounting" Tata Mc Graw Hill, New Delhi.

6. S.P. Jain and K.L. Narang: "Advanced Cost and Management ccounting" Kalyani Publishers, New Delhi.

Course Outcomes:

1. By the end of the course students come to know the importance of Management Accounting in the corporate world.
2. Students will have knowledge on various depreciation models in accounting.
3. Provides insight into the various budgetary control and standard costing techniques.
4. Provides knowledge on Marginal costing and Profit Planning.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Strategic Financial Management

Regulation : R19 **Year/ Sem :** II/I

Course Objective: To manage the finance function of an organization in accordance with the strategic objectives of the organization.

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

UNIT	TOPICS
UNIT I	Corporate Policy: Strategic Financial Planning- changing complexion of regulatory framework - Shareholder Value Creation (SCV): Market Value Added (MVA) – Market-to-Book Value (M/BV) – Economic Value Added (EVA) – Managerial Implications of Shareholder Value Creation- Corporate Risk Management – Understanding the firms Strategic Exposure
UNIT II	Corporate Financial Strategies: Capital Structure Planning- EBIT, EPS, ROE analysis- Shareholders' Risk — Financial Options and Value of the Firm – Dividend Policy and Value of the Firm – Growth and External Financing Requirement. (Problems).
UNIT III	Corporate Investment Strategy: Techniques of Investment Appraisal Under Risk and Uncertainty – Risk Adjusted Net Present Value – Risk Adjusted Internal Rate of Return – Capital Rationing – Decision Tree Approach for Investment Decisions – Evaluation of Lease Vs Borrowing Decision- Long term investment plans analysis with risk and return. (Problems).
UNIT IV	Corporate Financial Engineering: Merger Strategy – Theories of Mergers – Horizontal and Conglomerate Mergers – Merger Procedure – Valuation of Firm – Financial Impact of Merger – Merge and Dilution Effect on Earnings Per Share – Merger and Dilution Effect on Business Control. (Problems).
UNIT V	Corporate Restructuring: Takeover Strategy – Types of Takeovers – Negotiated and Hostile Bids – Takeover Procedure – Takeover Defenses – Takeover Regulations of SEBI – Distress Restructuring Strategy – Sell offs – Spin Offs – Leveraged Buyouts- Buy back shares – Alignment of Interest – Corporate Governance . (Problems).
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Coper and Weston: “Financial Theory and Corporate Policy”

2. Braley and Myers: “The Principles of Corporate Finance”. Mc.Graw Hill, N.Y.1993.

3. Prasanna Chandra : “Financial Management” Theory and Practice.

4. I.M. Pandey – “Financial Management” Vikas Publishers, New Delhi.

Course Outcomes:

1. To familiarize the concepts of shareholder value creation and various risks faced by companies.
2. To understand the various financial and investment strategies followed by companies.
3. To understand and familiarize the various corporate reengineering and restructuring strategies followed by companies.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Consumer Behavior

Regulation : R19 **Year/ Sem :** II/I

Course objective: The course deals with the behavioral aspects of marketing management.

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

UNIT	TOPICS
UNIT I	Introduction to Consumer Behavior: Understanding consumers and market segments. Evolution of consumer behavior, Models of Buyer Behavior, Howard Model, Howard- Sheth Model, EKB Model, Webster and Wind Model and Sheth Industrial Buyer Behavior Model.
UNIT II	Psychological Foundations of Consumer Behavior: Consumer Motivation, Perception, Personality and Behavior, Information Processing, Social and Cultural Environment Economic, Demographic Influences, Social Stratification, Reference Groups and Family, Personal influence.
UNIT III	Communication and Consumer Behavior: Components of communications process, Diffusion of Innovations. Consumer Decision Processes High and Low Involvement, Pre -purchase Processes, Post Purchase processes, Brand Loyalty and Repeat Purchase Behavior.
UNIT IV	Consumerism: The roots of consumerism, consumer safety, consumer information, environmental concerns, consumer privacy.
UNIT V	Consumer Protection: Consumer Protection Act 1986, Central consumer protection council, state consumer protection councils, consumer disputes redressal agencies.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Ramneek Kapoor, Nnamdi O Madichie: “Consumer Behavior” Text and Cases”, TMH, New Delhi, 2012.

2. Ramanuj Majumdar: “Consumer Behavior insight from Indian Market”, PHI Learning, New Delhi, 2011

3. M.S.Raju: “Consumer Behavior Concepts, applications and Cases”, Vikas Publishing House, New Delhi, 2013.

4. David L Loudon and Albert J Della Bitta, “Consumer Behavior” 4/e, TMH, New Delhi, 2002.

5. Schiffman, L.G and Kanuk L.L “Consumer Behavior”, 8/e, Pearson Education, New Delhi, 2003.

Course Outcomes:

Upon successful completion students will have the knowledge and skill to

1. Identify the major influences in consumer behavior.
2. Distinguish between different consumer behavior influences and their relationships
3. Establish the relevance of consumer behavior theories and concepts to make marketing decisions.
4. Implement appropriate combinations of theories and concepts

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Retail Marketing

Regulation : R19 **Year/ Sem :** II/I

Course objective: The objective of this course is to understand the decisions of retailers make to satisfy customer needs in a rapidly changing and competitive environment**.**

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

UNIT	TOPICS
UNIT I	Basic concept of retailing: Retail development – types and functions of retailers – multi channel retailing – organized retailing in India – special characteristics of retailing services retailing- legislation for retailing in India.
UNIT II	Retail strategy: market strategy – retail format and target market – building sustainable competitive advantage – growth strategies – strategic retail planning process.
UNIT III	Retail location – Types, location opportunities – selection of location and Site analysis - financial strategy – strategic profit model – setting and measuring performance objectives.
UNIT IV	Store layout and design: Store operations and inventory management- Merchandise planning and control - Buying merchandise – Developing Assortment plan.
UNIT V	Retail Pricing Strategy:, Category Management, Customer services – Retail branding - International retailing – Promotional strategies – advertising, sales promotion, Store atmosphere.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Sheikh and Kaneez Fatima, “Retail Management”, Himalaya Publishing House, Mumbai, 2012
2. A.J. Lamba:“The Art of Retailing”, Tata McGraw Hill Education Pvt. Ltd. New Delhi.2011
3. Sivakumar, A, “Retail Marketing”, Excel Books, New Delhi, 2007
4. Swapna Pradhan, “Retail management”, Tata McGraw Hill Education Pvt. Ltd. New Delhi, 2012
5. Berman Barry, Joel R. Evans and Mini Mathur, “Retail Management-A Strategic Approach”, Pearson Education, New Delhi, 2011.
6. Chetan Bajaj RajnishTuli, Nidhivarma Srivastava:”Retail Management”, Oxford University Press, New Delhi, 2012.

Course Outcomes:

1: Understand the concepts of effective retailing.

2: Know the recent trends in retailing in India

3: Possess the knowledge of various retail formats.

4: Able to understand the retail customer.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Customer Relationship Management

Regulation : R19 **Year/ Sem :** II/I

UNIT	TOPICS
UNIT I	Introduction: Definition of CRM –Elements of CRM – CRM Processes and systems, Importance of CRM, Critical success factors for a winning CRM program – Advantages of CRM – Integrated CRM system –Planning and Managing CRM Programme - Application areas.
UNIT II	CRM as an integrated business strategy: Nature of CRM strategy – Contents of CRM Strategy- Description of Customer – Supplier Relationships, The dynamics of Relationships, The relationship oriented organization.
UNIT III	CRM marketing aspects: Customer knowledge, value of customer knowledge, utilization of data as an asset, multi-channels and communication- Influence of the channels on pricing and the formation of relationships – The relationship policy to improve size, quality and relationship with the customer base.
UNIT IV	Analytical CRM: Relationship data management – Expanding the size of customer database - Data analysis and data mining – Concept of customer loyalty – customer value assessment – Customer Retention strategies – Retention and Cross – sell analyses – effect of marketing activities – Reporting the results.
UNIT V	Operational CRM and CRM implementation: Call center Management – internet and the websites – traffic building – Providing quality during the visit to the website – Process of developing, producing, sending and following – up direct mailings. Causes for disappointing CRM result – The best CRM implementation strategies –Privacy and ethics Consideration in CRM implementation.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Course objective: Students understand components of successful customer care and learn how to build relationship to win in the Business.

Reference Books:

1. Ed Peelen: “Customer Relationship Management” Pearson, Education

2. Roger J Baran, Robert J Galka and Daniel P Strunk: “Customer Relationship Management” Cengage learning

3. S.Shanmuga sundaram: “Customer Relationship Management” Prentice Hall of India.

Course Outcomes:

1. Creates insight and new learning in the area of customer relationship management.
2. Equip students with both a conceptual understanding and the knowledge pertaining to practical application of critical skills necessary for building and managing partnering relationships with customers and suppliers.
3. Learn the conceptual foundations of relationship marketing and its implications for further knowledge development in the field of business.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Strategic Marketing Management

Regulation : R19 **Year/ Sem :** II/I

Course objective: The course examines the development and implementation of marketing strategy by providing a framework from which to identify and evaluate strategic options and programs.

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

UNIT	TOPICS
UNIT I	Introduction : Role of Strategic Marketing - Key Definitions of Strategic Marketing - Role and Importance and concepts- Systematic approach - sequencing and scheduling of activities and integration of activities - Resource Requirements - Processes: Strategic Marketing Planning Process - Strategic Marketing Analysis - marketing strategy objective setting- perceptual mapping - factor analysis, Option Evaluation, Choice – Formulation and Implementation and Control Links to corporate strategy: Mission statement, organizational structure and corporate responsibility and ethics - dynamic strategy.
UNIT II	Strategic Marketing Strategy: Models - Organization, Industry and market environment situation analysis; Porter's Five Forces model - Structure, Conduct and Performance - portfolio analysis techniques -strategic positioning, defining the future position - Marketing Tactics - Product tactics -Price tactics- Promotion tactics - Place tactics-Direct response marketing strategies - Defensive strategies - Customer retention strategies-Personalized marketing; Payne and Ballantyne's Six markets model.
UNIT III	Strategic Marketing Techniques : Setting marketing objectives and marketing strategy - Targeting markets - Segmenting markets - Profiling markets- Positioning segmented markets, Direct or Indirect sales Strategy options - core competences - Competitive advantage - Investment opportunity evaluation - market leadership - Innovation strategies - Market pioneer - close followers, late followers; offensive, defensive and value-based marketing strategies Strategic marketing objectives: marketing mix – 7 Ps.
UNIT IV	Strategic marketing environment : Changes in the external environment: shift from supply to demand environment; fashionisation of markets; micro-markets; rising expectations; technological change; competition; globalization; importance of customer service; commoditization; erosion of brands; new constraints Strengths and weaknesses: focus of marketing objectives, links to corporate strategy.
UNIT V	New Product Developments: Ability to customize - e-marketing position - core focus - target markets, nature and potential of key market segments, partnerships with customers and other stakeholders - Innovation strategies, timescales, resource requirements, budgets, monitoring, review and control mechanisms Strategic marketing responses.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Devid A Aaker and Damien Mc Loughlior: “Strategic Marketing Management”-Global Perspective” Wiley Publications.

2. Jean –Jacques Lambin : “Strategic Marketing Management”, McGraw –Hill,

3. Nag A: “Strategic Marketing”. MacMillons

4. Srinivas R, Lohith C.P.: “Strategic Marketing and Innovation” for Indian MSMEs”, Springer Publication.

5. Graeme Drummond, John Ensor, Ruth Ashfor: “Strategic Marketing Planning and Control”, Elsevier Publication.

6. Kotler P and Keller K L: “A Framework for Marketing Management”, Pearson Education, 2008

Course Outcomes:

1. Analyze marketing opportunities and threats

2. Understand strategic concepts and theories and their application in marketing environments.

3. Identify and resolve well-defined problems reaching substantiated conclusions employing methods of analysis specific to marketing.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Leadership Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: Students learn about theories of leadership and develop leadership quality.

Reference Books:

UNIT	TOPICS
UNIT I	Organizational Leadership: Definition, Components and evaluation of leadership, Situational Leadership Behavior: Meaning, Emerging Leadership Behavior, Transformational, Transactional and Visionary Leadership - Leadership for the new Millennium Organizations, Leadership for Organizational Building.
UNIT II	Leadership Motivation, Culture: Motivation Theories for Leadership: Maslow's, Herzberg, X, Y and Z theories of Motivation -ERG – McClelland- Emerging Challenges in Motivating Employees. Organizational Culture: Meaning, Definitions, Significance, Dimensions, Managing Organizational Culture, Changing organizational Cultural.
UNIT III	Leadership Development: Leadership development: Significance – Continuous Learning: Principles of learning to develop effective leadership –significance of goals for leaders - Leaders vision in organization building– Leadership Attitude: significance – Developing and Maintaining positive attitude for effective leading.
UNIT IV	Strategic Leadership: Leader Self management, significance - Developing self esteem and balancing emotions – Interpersonal Leadership Skills: Praise – Criticize – Communicate – Leadership Assertiveness: Circle of influence and circle of concern – Leadership with Edification: Tools of edification –Leadership and Integrity: Developing character and values.
UNIT V	Leadership in the cross cultural context: Leadership across Globe, Characteristics - Significance – Functions – challenges of leadership in varying culture and values – Leadership in USA – Leadership in Japan – European leadership – Leadership in Arab countries.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

1. Peter G. Northouse, Leadership, 2010, Sage. Publication.

2. Richard L. Daft "Leadership" Cengage Learning 2005.

3. Uday Kumar Haldar "Leadership and Team Building" Oxford Higher Education ,2010

4. Richard L Hughes, Robert C Ginnett, Gordon J Curphy "Leadrship" Tata Mc Graw Hill Education Private Limited 2012.

5. Peter Lornge, Thought leadership Meets Business, 1st edition, 2009, Cambridge.

6. John ADAIR, Inspiring Leadership, 2008, Viva Books.

Course Outcomes:

1. Students will develop critical thinking skills
2. Students will learn to explore and actualize their personal values
3. Students will come to realize that serving as a leader is more than holding a position.
4. Students will become comfortable taking risks

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Compensation and Reward Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To gain knowledge about components of compensation and managing compensation in an organization.

UNIT	TOPICS
UNIT I	Compensation: concept and definition – objectives, types and dimensions of compensation program – factors influencing compensation –Role of compensation and Reward in Modern organizations-Compensation as a Retention strategy- aligning compensation strategy with business strategy .Concept of reward -Reward management process. Managing Compensation: Designing a compensation system – internal and external equity- influence of pay on employee attitude and behavior.
UNIT II	Job evaluation and Compensation Structure: Introduction to Principles and Procedures of job evaluation programs- job evaluation methods. Management compensation –Types of compensation system, compensation surveys-Incentive payments and its objectives.
UNIT III	Wage and Salary administration: Nature and Purpose, Principles and Components of wages-Theory of wages- Wage surveys- Wage differentials in India. Executive compensation plans-Legal frame work for wage and salary administration.
UNIT IV	Control systems for labour costs: Introduction-Direct and Indirect labor, Role of various departments-The personnel department- Industrial engineering department-Types of workers-Payroll department -Process and steps for preparation of payroll.
UNIT V	Pay Structure and Tax Planning: Introduction- Performance based and Pay based structures-Designing pay structures-comparison in evaluation of different types of pay structures-Significance of factors affecting-Tax Planning –Concept of Tax planning-Role of tax planning in compensation benefits-Tax efficient compensation package-Fixation of tax liability salary restructuring.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Dr. Kanchan Bhatia "Compensation Management", Himalaya Publishing House, New Delhi 2012.

2. A.M.Sarma, N.Sambasiva Rao: "Compensation and Performance management", Himalaya Publishing House, Mumbai

3. Dewakar Goel:"Performance Appraisal and Compensation Management", PHI Learning, New Delhi, 2012

4. ER Soni Shyan Singh 'Compensation Management' – Excel Books, New Delhi – 2008.

5 Mousumi S Bhattacharya Nilanjan Sengupta , "Compensation Management" – Excel Books, New Delhi – 2009

6 Tapomoy Deb "Compensation Management" – Excel Books, New Delhi – 2009

Course Outcomes:

1. Recognize how pay decisions help the organization achieve a competitive advantage.

2. Analyze, integrate, and apply the knowledge to solve compensation related problems in organizations.

3. Able to Design rational and contemporary compensation systems in modern organizations.

4. Students learn about a variety of reward systems used to determine individual pay levels.

5. Able to Implement and administer a compensation system according to the firm's policies.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Performance Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To develop the capacity of individuals to meet the organization expectation

UNIT	TOPICS
UNIT I	Introduction: Definition –concerns-scope-Historical developments in performance management-Over view of performance management-Process for managing Importance –Linkage of PM to other HR processes-Performance Audit.
UNIT II	Performance Management Planning: Introduction-Need-Importance-Approaches-The Planning Process—Planning Individual Performance- Strategic Planning –Linkages to strategic planning-Barriers to performance planning-Competency Mapping-steps-Methods.
UNIT III	Management System: objectives – Functions- Phases of Performance Management System-Competency based Performance Management Systems- Reward based Performance Management Systems- Electronic Performance Management Systems- HR Challenges-Appraisal for recognistion and reward-Purpose of Appraising –Methods of Appraising-Appraisal system design-Implementing the Appraisal System-Appraisal and HR decisions.
UNIT IV	Performance Monitoring and Counseling: Supervision- Objectives and Principles of Monitoring-Monitoring Process- Periodic reviews- Problem solving- engendering trust-Role efficiency-Coaching- Counseling and Monitoring- Concepts and Skills
UNIT V	Performance management skills – Operational change through performance management. High Performing Teams: Building and leading High performing teams – team oriented organizations – developing and leading high performing teams- Role of Leadership
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Prem Chadha: "Performance Management", Macmillan India, New Delhi, 2008.

2. Michael Armstrong & Angela Baron, "Performance Management": The New Realities, Jaico Publishing House, New Delhi, 2010.

3. T.V.Rao, "Appraising and Developing Managerial Performance", Excel Books, 2003.

4. David Wade and Ronad Recardo, "Corporate Performance Management", Butter Heinemann, New Delhi, 2002.

5. Dewakar Goel: "Performance Appraisal and Compensation Management", PHI Leaarning, New Delhi, 2009

6. A.M. Sarma "Performance Management Systems" Himalaya Publishing House, New Delhi, 2010.

Course Outcomes:

1. Provides knowledge in performance planning, performance monitoring and counseling
2. Acquires various performance management skills
3. Understand the performance management systems.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Strategic Human Resource Management

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective: To align Human Resource Management with strategic objectives of the organisation

UNIT	TOPICS
UNIT I	Human Resource Strategy: Introduction to Strategic Human Resource Management - Evaluation objectives and Importance of Human Resources Strategy- Strategic fit – A conceptual framework - Human Resources contribution to strategy - Strategy driven role behaviors and practices – Theoretical Perspectives on SHRM approaches - Linking business strategies to HR strategies.
UNIT II	Strategic Human Resource Planning: Objectives, benefits, levels of strategic planning-Activities related to strategic HR Planning-Basic overview of various strategic planning models-Strategic HR Planning model-Components of the strategic plan.
UNIT III	Strategy Implementation: Strategy implementation as a social issue-The role of Human Resource-Work force utilization and employment practices-Resourcing and Retention strategies-Reward and Performance management strategies.
UNIT IV	Strategic Human Resource Development: Concept of Strategic Planning for HRD-Levels in Strategic HRD planning-Training and Development Strategies-HRD effectiveness.
UNIT V	Human Resource Evaluation: Overview of evaluation - Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas - Evaluating Strategic Contribution of Emerging Areas-HR as a Profit centre and HR outsourcing strategy
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Charles R. Greer: “Strategic Human Resource Management” - A General Manager Approach - Pearson Education, Asia

2. Fombrum Charles & Tichy: “Strategic Human Resource Management” - John Wiley Sons, 1984

3. Dr. Anjali Ghanekar “Strategic Human Resource Management” Everest Publishing House, Pune 2009

4. Tanuja Agarwala “Strategic Human Resource Management” Oxford University Press, New Delhi 2014

5. Srinivas R Kandula “Strategic Human Resource Development” PHI Learning PVT Limited, New Delhi 2009

6. Dreher, Dougherty “Human Resource Strategy” Tata Mc Graw Hill Publishing Company Limited, New Delhi 2008.

Course Outcomes:

1. Know how to integrate hrm with various strategies of the firm
2. Understand the strategic human resource development.

VISHNU INSTITUTE OF TECHNOLOGY:
BHIMAVARAM
(AUTONOMOUS)

Subject Name : Employability Skills

Regulation : R19 **Year/ Sem :** II/I

T	L	P	C	Internal	External	Total
-	-	4	2	-	-	-

Course objective: To develop and harness the employability skills.

UNIT	TOPICS
UNIT I	Business News Update
UNIT II	Business Quiz
UNIT III	Group Discussion
UNIT IV	Topic presentation
UNIT V	Face off
UNIT VI	Business plan
UNIT VII	Interview Skills

Resources:

1. News Papers
2. Business News Papers
3. Journals & Magazines
4. www.google.com

Course Outcomes:

1. Awareness about latest Business developments.
2. Become communicative and Assertive.

3. Ability to go along with teams.
4. Can qualify in competitive examinations.
5. Competent enough to face Interviews. s

Vision of our Institution

- To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of MBA Department

The Vision of the department is to become a Centre of Excellence in nurturing young managers to contribute for the betterment of Indian corporate sector.

Mission of MBA Department

- To strive for effective teaching & learning to meet the demands of the corporate.
- To develop entrepreneurial talent among the management graduates
- To expose the students to the various management practices in vogue through institute and industry interface.
- To promote ethical and moral values among the students.

Program Educational Objectives (PEOs)

1. To produce M.B.A. Graduates with sound knowledge in the area of Management.
2. To develop analytical and decision making skills through case studies.
3. To make the students employable in reputed organizations in the area of HRM, Marketing and Finance
4. To promote entrepreneurial qualities among the students.
5. To develop professional and ethical attitude among the students.

Program Outcomes (POs) of MBA Department

1. Apply knowledge of management theories and practices to solve businessproblems.

2. Foster analytical and critical thinking abilities for data-based decision making.

3. Ability to develop value based leadership ability.

4. Ability to understand, analyze and communicate global, economic, legal, andethical aspects of business.

5. Ability to lead themselves and others in the achievement of organizationalgoals,

6. Contributing effectively to a team environment.

7. Ability to adapt the business to the continuously changing environment.

8. Ability to sustain in a globally competitive environment.

S. No	Subject title	T	L	P	C	I	E	T
1	Logistics and Supply Chain Management	4	-	-	3	40	60	100
2	Entrepreneurship Development	4	-	-	3	40	60	100
3	Elective – V	4	-	-	3	40	60	100
4	Elective – VI	4	-	-	3	40	60	100
5	Elective – VII	4	-	-	3	40	60	100
6	Elective – VIII	4	-	-	3	40	60	100
7	Internship/Project and Viva Voce	-	-	-	8	-	-	**Grade**
	Total	**24**	**0**		**26**	**240**	**360**	**600**

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Logistics and Supply Chain Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To develop criteria and standards to achieve improved business performance by intergrating and optimising the total logistics and supply-chain process.

UNIT	TOPICS
UNIT I	**Logistics and Competitive strategy**: Competitive advantage – Gaining Competitive advantage through logistics-Integrated supply chains– Competitive performance - Models in Logistics Management - Logistics to Supply Chain Management – Focus areas in Supply Chain Management.- Customer service and retention- Basic service capability Value added services
UNIT II	**Measuring logistics costs and performance**: The concept of Total Cost analysis – Principles of logistics costing – Logistics and the bottom-line – Impact of Logistics on shareholder value - customer profitability analysis –direct product profitability – cost drivers and activity-based costing.
UNIT III	**Logistics and Supply chain relationships**: Benchmarking the logistics process and SCM operations –Mapping the supply chain processes – Supplier and distributor benchmarking – setting benchmarking priorities –identifying logistics performance indicators –Channel structure– Economics of distribution –channel relationships –logistics service alliances
UNIT IV	**Sourcing, Transporting and Pricing Products**: sourcing decisions and transportation in supply chain – infrastructure suppliers of transport services – transportation economics and pricing – documentation - pricing and revenue management Lack of coordination and Bullwhip Effect - Impact of lack of coordination. - CRM –Internal supply chain management
UNIT V	**Managing global Logistic**: Logistics in a global economy – views of global logistics- global operating levels – interlinked global economy – Global strategy –Global purchasing – Global logistics – Channels in Global logistics –Global alliances
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Donald J.Bowersox and David J.Closs: “Logistical Management” The Integrated Supply Chain Process, TMH, 2011.
2. Edward J Bradi, John J Coyle: “ A Logistics Approch to Supply Chain Management, Cengage Learning, New Delhi, 2012.

Course Outcomes:

1 .Analyze the logistics operations of a firm

2 .Apply pricing, operations planning and models in logistic concepts

3.Apply logistics and purchasing concepts and principles to improve suppl chain operations globally.

4 .Applying different concepts for supply chain process.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM

(AUTONOMOUS)

Subject Name: Entrepreneurship Development

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: he objective of the course is to make students understand the fundamentals of entrepreneurship and make students to take their career in entrepreneurship.

UNIT	TOPICS
UNIT I	**Entrepreneurship:** Importance and growth - Characteristics and Qualities of Entrepreneur- Role of Entrepreneurship, Ethics and Social Responsibilities, entrepreneurial motivation. Women Entrepreneurship: Role & Importance, Problems of Women Entrepreneurs – Intrapreneurship.
UNIT II	**Training**: Designing Appropriate Training Programme to inculcate Entrepreneurial Spirit - Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees. Creativity and Entrepreneurship: Sources and Methods of Ideas Planning and Development of Programmes.
UNIT III	**Planning and Evaluation of Projects**: Growth of Firm – Factors inducing growth- Various growth strategies-Project identification and selection - Project Feasibility Study - Post Planning of Project-Project Planning and Control.
UNIT IV	**Small and Micro Enterprises**: Importance, definitions – policies and their support to MSMEs - – sickness in small business and remedies – small entrepreneurs in International business.
UNIT V	**Institutional Support to Entrepreneur and MSMEs**: Role of Government - Role of IDBI, **SIDBI, NSIC,** NIESBUD, SFC, DIC - Financial Institutions-Commercial Banks, Entrepreneurial Development Institutes, Universities and other Educational Institutions offering Entrepreneurial Development Programme.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Arya Kumar: "Entrepreneurship", Pearson, Publishing House, New Delhi, 2012.

2. VSP Rao, Kuratko: "Entrepreneurship', Cengage Learning, New Delhi,

3. K.Ramachandran: "Entrepreneurship Development", TMH, New Delhi, 2012

4.B.Janakiram, M Rizwana: "Entrepreneurship Development" Excel Books, New Delhi, 2011

5. Rajeev Roy: "Entrepreneurship", Oxford University Press, New Delhi,2012

6. P.C.Shejwalkar: "Entrepreneurship Development", Everest Publishing House, New Delhi, 2011

Course Outcomes:

1. Understand the concept and importance of entrepreneurship in the economy.
2. Know the various means of generating business ideas
3. Students will acquire knowledge on how a project is evaluated.
4. Provides insight into the role of Government in promoting entrepreneurship

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Financial Markets & Services

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: The Course aims at providing the students, basic knowledge about the financial system in india, financial markets and various services provided in those markets. it also gives adequate information about the roles of intermediaries and its regulating bodies.

UNIT	TOPICS
UNIT I	**Structure of Financial System**: Role of Financial System in Economic Development – Financial Markets and Financial Instruments – Capital Markets – Money Markets – Primary Market Operations – Role of SEBI – Secondary Market Operations – Regulation – Functions of Stock Exchanges – Listing – Formalities – Financial Services Sector Problems and Reforms
UNIT II	**Financial Services**: Concept, Nature and Scope of Financial Services – Regulatory Frame Work of Financial Services – Growth of Financial Services in India – Merchant Banking – Meaning-Types – Responsibilities of Merchant Bankers – Role of Merchant Bankers in Issue Management– Regulation of Merchant Banking in India.
UNIT III	**Venture Capital**: Growth of Venture Capital in India – Financing Pattern under Venture Capital– Legal Aspects and Guidelines for Venture Capital, Leasing – types of Leases – Evaluation of Leasing Option Vs. Borrowing.
UNIT IV	**Credit Rating:** Meaning, Functions – Debt Rating System of CRISIL, ICRA and CARE. Factoring, Forfeiting and Bill Discounting – Types of Factoring Arrangements – Factoring in the Indian Context.
UNIT V	**Mutual Funds**: Concept and Objectives, Functions and Portfolio Classification, Organization and Management, Guidelines for Mutual Funds, Working of Public and Private Mutual Funds in India. Debt Securitization – Concept and Application – De-mat Services-need and Operations-role of NSDL and CSDL
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books::

1. Bhole & Mahakud, Financial Institutions and Market, TMH, New Delhi

2. DK Murthy, and Venugopal, Indian Financial System, IK Int Pub House

3. Anthony Saunders and MM Cornett, Fin Markets & Institutions,TMH, ND

4 Edminister R.D., Financial Institution, Markets and Management:

5. Punithavathy Pandian, Financial Markets and Services, Vikas, New Delhi

6. Vasanth Desai, Financial Markets & Financial Services, Himalaya, Mumbai

Course outcomes:

1. Students come to know the structure of financial system in India
2. Students gain knowledge on role and responsibilities of merchant banker in financial system.
3. Students will understand the debt rating system adopted by the credit rating agencies in India
4. Students will have knowledge on Mutual Funds and its structure.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Global Financial Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective: To understand the various aspects of financial management in international scenari**o.**

UNIT	TOPICS
UNIT I	**Introduction to Global Financial Management:** Globalization and MNCs- New Challenges and Opportunities- Importance of Global Factors- Regulatory and Legal Frame Work- Global Organizational Restructuring- Sources of funds for MNCs - International Monitory System- International Monitory Reforms.
UNIT II	**Management of Exchange and Interest Rates Exposure**: Determination of Exchange Rates- Balance of Payments (Equilibrium vs Disequilibrium)- International Trade Flow- Measurement of Politico Economics Risk-Management of International Exchange Exposure.
UNIT III	**Management of Global Business Operations and Practices**: Operational Strategies of MNCs- Management of Global Business Practices - Operations in International Financial Markets- Inter-Corporate Funds Flow- Market for Currency Futures and Currency Options.
UNIT IV	**International Investment Decision** : Foreign Direct Investment- International Capital Budgeting- Evaluation and Management of Political Risk- Global Portfolio Investment- International Global Financial Decisions- Role of Multi Lateral Development Banks- Global Financial Market Instruments- Management of Interest Rate Risk
UNIT V	**Global Indebtedness**: External Resources and Development- Nature and Magnitudes of External Debt- Factors influencing Debt Crisis- Management of external Indebtedness and Challenges- Short -Term Financing
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References:

1. Jeff Madura, " International Financial Management" Cengage Learning Limited, 2008.

2. PG Apte, "International Financial Management" Tata McGraw Hill Limited, 2009.

3. Vyuptakesh Sharan, "International Financial Management" PHI, 2012.

4. V.A. Avadhani, "International Financial Management" Himalaya Publishing House, 2009

Course Outcomes:

1. Able to understand the concepts of Globalization, MNCs and International monetary system

2. To familiarize the impact of exchange exposure on international transactions

3. To understand the various business operations and practices followed by MNCs

4. To know the concept and factors leading MNCs to indebtedness

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Financial Risk Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To understand the empirical and theoretical implications of the financial environment and valuation techniques on financial risk management.

UNIT	TOPICS
UNIT I	**Introduction to Risk Management:** Role of Financial Institutions- Future Trends and Global Issues- Financial Services provided by Intermediaries- Need of Risk Management- What is Risk-Sources of various Risk- Risk Management frame work in Organization- Identification of Risks like Liquidity Risk, Market Risk, Foreign Exchange Risk, Operational Risk etc
UNIT II	**Measurement of Risks:** Measurement of Interest Rate Risk and Market Rate Risk- Measurement of Credit Risk- Measurement of operational and Technology Risk- Measurement of Foreign Exchange and Sovereign Risk- Measurement of Liquidity Risk- Measurement of Off Balance Sheet Risks.
UNIT III	**Management of Risks:** Risk Management Tools- Interest Rate Risk Management- Market Risk Management- Credit Risk Management- Operational Risk Management- Foreign Exchange and Sovereign Risk Management- Liquidity Risk Management- Management of Capital Adequacy- Risk Reporting
UNIT IV	**Regulatory and Other Issues in Risk Management:** Regulatory Frame Work- Revised RBI Risk Management Norms to Banks- Organizational Structure for Market and Credit Risk- SEBI, NHB- Bank for International Settlement- BASEL Committee on Banking Supervision- BASEL Settlement I,II & III- Calculation of Minimum Capital Requirements.
UNIT V	**Important Concepts of Risk Management:** Time Value of Money- Advance Bond Concepts- Calculation of VaR- Balck-Scholes Model- Moody's KMV Portfolio Manager - Derivative Products and its Markets- Margin and Mark-to-Market.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Dr. G. Kotreshwar: “Risk Management”, Himalaya Publishing House, Delhi. 2012
2. Trieschmann, Hoyt, Sommer: “Risk Management and Insurance”, Cengage Learning. 2005,
3. Dhanesh Kumar Khatri: “Derivatives and Risk Management”, Mac Millan, 2012
4. Vivek, P.N. Asthana:“Financial Risk Management”, Himalaya Publishing House, Delhi. 2012
5. Rene M. Stulz. “Risk Management & Derivatives” Cengage Learning. 2003.

Course Outcomes:

1. Able to know the risk management concept.
2. Familiar the various techniques and tools of risk management.
3. Understand the various risk measurement techniques

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Tax Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: The objective of the course is to introduce practical aspects of tax planning as an important managerial decision-making process.

UNIT	TOPICS
UNIT I	**Direct Taxes:** Income Tax Act 1961 – Basic concepts – Income – Agricultural Income – Residential Status – Income exemption from tax – Income from House Property – Computation of Salary Income – Income from Business and Profession – Capital Gain from other sources – Set off and carry forward losses - computation of Total Income.
UNIT II	**Indirect Taxes** : Introduction to GST- Supply, Charge, Exemption from GST – Composite Tax Scheme - Input Goods and Services for CENVAT – Capital Goods for CENVAT – Exempted Final Products / Output Services – Customs Duty – Introduction – Basic Concepts – Scope and Converge of Customs Duty – Nature of Customs Duty – Classification for Customs – Types of Custom Duties – Exemptions from Customs Duty – Valuation for Customs Duty
UNIT III	**Introduction to Tax Planning:** Nature of Tax – Essential components in levy of tax – Legal Principles of taxation laws – Five basic Rules of interpretation of statues – Law Lexicon and Legal Maxims – Concepts of Tax Avoidance, Tax Evasion – Tax Planning and Tax Management
UNIT IV	**Tax Management Decision:** Tax considerations – Management Decisions, such as make / buy-own/lease - export/local sale - Guidelines to Tax planning – Relief's – Concessions – Rebates – Deductions – Incentives (Payment of Advance Tax) – Filing of Returns – Refunds – Penalties for non-compliance
UNIT V	**Multi National Taxation:** Bilateral Tax Treaties-Tax Intensives Organizational Setup of MNCs- Tax Reliefs and Rebates in India- Tax Credits- Tax Havens- Investment Decision on Tax Planning- Global Investment and Tax Incentives
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Vinod K.Singhania and Mounica singhnia, Corporate Tax Planning and business Management, Taxmann Publications.

2. Vinod K.Singhania and Kapil Singhania, Direct Taxes – Law and Practice, Taxmann Publications

3. R.N.Lakhotia, Corporate Tax Planning, vision publications.

4. V.A. Avadhani, "International Financial Managment" Himalaya Publishing House, 2009

5. PG Apte, "International Financial Management" Tata Mc Graw Hill, 2009.

Course Outcomes:

1. To gain the knowledge on Direct and Indirect Taxes.

2. Able to Understand the difference between Tax Evasion and Tax Planning

3. To understand the various reliefs, rebates and deductions in minimizing tax liability

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Services Marketing

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To impart detailed knowledge regarding services marketing and characteristics of service, difference between goods and services ,segmentation and services marketing in health care industry, Education and tourism and insurance sector.

UNIT	TOPICS
UNIT I	**Introduction to Services Marketing**: Scope and Definition- Need for Services Marketing – Role of Services in economy-Reasons for the growth of service sector in India-Differences between Goods and Services- Characteristics of Service - Service Facility Design and Layout- Service Triangle.
UNIT II	**Key Dimensions of Services Marketing**: Introduction- Service Blue Printing- Service Encounter-Demand- Supply Management- Service Quality- Service Quality Gap- Service Quality Audit- Bench Marking-TQM –Services marketing Mix.
UNIT III	**Management of Services Marketing**: The Service Product - Introduction- Developing a Basic Service Package -Components of Promotion Mix- Market Segmentation- Bases for Market Segmentation –Market Segmentation Process - Service Target Segments- Positioning the Services-Customer Relationship Management- Goals – Benefits – The Relationship Enhancement ladder.
UNIT IV	**Service Marketing Practices I**: Marketing of Banking and Insurance Services- Marketing of Hospitality, Travel and Tourism Products- Marketing for Travel and Tourism- Segmentation- Tourism Marketing Strategies- Yield Management- Marketing of Educational, Software and other Professional Services.
UNIT V	**Service Marketing Practices II:** Marketing of Health Care, Cellular and Entertainment Services-Health Care Marketing Strategy- Major Hospital Products- Cellular Promotion Mix- Entertainment Marketing Mix- Emerging Influence of Retailing and Shopping Malls- Internationalization of Services.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Services marketing : K.Rama Mohan Rao ,Second Edition, Pearson Publications.
2. Services marketing – The Indian Perspective : Ravi Shankar,Excel books.
3. Services marketing: Vasanti Venu Gopal, Raghu.V.N, Himalaya Publishing House
4. Dr. S. Shajahan: Services Marketing, Himalaya Publishing House, New Delhi 2009.
5. Rajendra Nargundkar: "Services Marketing", Tata McGraw Hill, New Delhi, 2011.
6. S.M. Jha: Service Management and Marketing, Himalaya Publishing House, New Delhi,2011
7. C. Bhattacharjee: Services Marketing, Excel Books, New Delhi, 2010

Course Outcomes:

1. Know in detail about the service sector and apply the 7P's of service marketing
2. Understand the customer relationship management and TQM.
3. To know about service markets segmentation and positioning strategies.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Promotion & Distribution Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: To familiarize students with the concepts, techniques and the practical aspects of the distribution channel management.

UNIT	TOPICS
UNIT I	**Introduction to Promotional Management:** Sales Display and Sales Promotion- Sales Promotion Objectives-Factors Influencing Sales Promotion- Tools of Sales Promotion- Sales Promotion Strategies- Sales Promotion and Consumer Behavior-Consumers Price Perceptions-Perceived Risk and Attitudes- Types of Promotion.
UNIT II	**Introduction to Distribution Management**: Physical Distribution Management- Customer Service Standards- Strategic Issues in Physical Distribution- Challenges and Opportunities-From Physical Distribution to Marketing Logistics- Major Logistics Functions
UNIT III	**Marketing Channels**: Nature and Importance of Marketing Channels- Types of Marketing Channels- Direct Marketing Channels vs Indirect Marketing Channels- Problems in Distribution- Selection of Distribution Channels- Channel Decisions
UNIT IV	**Channel Institutions and Designing Channel System**: Wholesaling- Agent Wholesaling Middle Man- Patterns in Wholesaling- Channel Design Decisions- Channel Design Comparison Factors- Ideal Channel Structure-Types of Channels.
UNIT V	**Ethical and Social Issues in Distribution Management:** Business Ethics and Sales Management- Ethical Issues facing Sales Managers- Managing Sales Ethics- Modeling Ethical Behavior- International Distribution- Challenges in Managing an International Distribution Strategy.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. K. Shridhara Bhat: "**Sales and Distribution Management**", Himalaya Publishing House, 2011.

2. Dr. Matin Khan: "**Sales and Distribution Management**", Excel Books, New Delhi, 2005

   .

3. Pingali Venugopal: "**Sales and Distribution Managment**", Sage Publications, New Delhi,2008.

4. Dr. S. L. Gupta: "**Sales and Distribution Management**", Excel Books, 2010

Course Outcomes:

1. To understand fundamental marketing concepts
2. To understand the role of marketing as a fundamental organizational policy process
3. To apply the knowledge, concepts, tools necessary to understand challenges and issues of marketing in a growing international and global contact.
4. To analyze the interaction of marketing and environmental forces.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Global Marketing Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective: To understand various marketing practices in the wake of globalization and various export procedures.

UNIT	TOPICS
UNIT I	**Introduction to Global Marketing:** Scope and Significance of global Marketing, - Difference between global and domestic marketing – The growing attractiveness of developing country market – International orientations, Stages of internationalization, Driving and restraining forces of global markets, Participants in international marketing.
UNIT II	**International marketing strategy**: Entry strategies in Global markets – modes of entries in global markets – global market segmentation – international targeting – criteria for targeting, selecting a global target market – Global product positioning strategy. Business Customs in global Market – strategies for FDI and FIIs - Entry Strategies of Indian Firms
UNIT III	**Global Product & Price management**: International product mix – Managing Global Research and Development for product management– Product diffusion and adoption in global markets – International Product Life Cycle – Product and culture – Global brand leadership – : Environmental influences on Pricing Decisions – Grey Market goods – Transfer pricing – Global Pricing – Policy Alternatives – Constraints on global pricing
UNIT IV	**Global Marketing Channels and Promotion for global markets**: channels – Innovations in global channels – Channel strategy for new market entry – Distribution Structures – Global Distribution Patterns - Challenges in Managing An Global Distribution Strategy – Selecting Foreign Country Market intermediaries - Global Advertising and branding - Export Policy Decisions of a firm - Export costing and pricing – EXIM policy of India.
UNIT V	**Export procedures and documents:** Preliminaries: inquiry and offer – confirmation of offer – export license – finance – production /procurement of goods – shipping space – packing and marketing – quality control and pre – shipment inspection – excise clearance – customs formalities – negotiation and documents – standardization and aligned pre-shipment documents – documents related to goods – documents related to shipments.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Francis Cherunilam: International marketing, 11th Edition, Himalaya Publication House,2010
2. Warren J Keegan: Global Marketing Management, 5th Edition, Prentice Hall of India Private Limited.
3. Philip R. Cateora, John L. Graham: International Marketing 11/e, Tata McGraw-Hill Co. Ltd., 2002.
4. R.Srinivasan: International Marketing, Prentice-Hall of India Pvt. Ltd., 2010
5. U.C Mathur: International Marketing Management, Sage Publications, New Delhi

Course Outcomes:

1. Knowledge about the impact of globalization in the area of marketing.
2. .Knowledge about marketing mix decisions at global level.
3. .Knowledge in Export procedures and documentation.

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Product & Brand Management

Regulation :R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: students able to understand basic concepts of product management and importance of brand.

UNIT	TOPICS
UNIT I	**Basic concept of Product:** Product planning – Defining Market strategies for leaders, challengers, Followers. Product life Cycle and market evaluation – product differentiation and deletions. Product Portfolio Analysis.
UNIT II	**New Product Development:** Categories of New Product – New product Development - New Product Launch – product modification – pricing decision – customer and competitor analysis – product forecasting and financial analysis
UNIT III	**Concept of Branding**: Traits of Successful Brands – Brand Positioning – Anatomy of Brand – Leveraging Brands, Brand equity, Brand extension and Brand Building. Model for Global Brand Building.
UNIT IV	**Marketing Organisation**: Market Testing – Launch Management – Marketing Metrics – Public policy Issues – Product liability- Environmental needs – Sale methods- Brand Repositioning - Channel Management – Customer Relationship Management.
UNIT V	**Packaging:** Introduction – Advantages and Importance of Packaging Packaging design – Consumer protection. Product Piracy, Worthy Products - Personal ethics and Residual Issues - Packaging trends in India.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Kevin Lane Keller, Strategic Brand management, Pearson Education
2. Harsha V. Varma, Brand Management, Excel Books, 2008.
3. Ramanuja Majumdar, Product Management in India, Prentice Hall of India, 2008
4. R.K. Srivatsava, Product Management and New Product Management, Excel Books, 2009.

Course Outcomes:

1. Ability to understand the basic concepts of Product
2. Familiar with the various Branding Strategies adopted by the companies
3. Understand the Packaging decisions

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Global HRM

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course Objective: To know cross cultural sensitivities and various practices in managing HR at global level.

UNIT	TOPICS
UNIT I	**Introduction:** A Global HR Perspective in New Economy-Challenges of Globalization - Implications of Managing People and Leveraging Human Resource- - Conflicts - Strategic Role of International HRM – Global HR Planning – Staffing policy – Training and development – performance appraisal –International Labour relations – Industrial democracy– Talent crunch – Indian MNCs and Challenges - Legal content of Global HRM
UNIT II	**Managing International Assignments**: Significance – Selection methods - Positioning Expatriate – Repatriate – factors of consideration - Strategies - International assignments for Women - Problems.
UNIT III	**Cross Culture Management**: Importance – Concepts and issues – theories- considerations - Problems – Skill building methods – Cross Culture Communication and Negotiation – Cross Culture Teams
UNIT IV	**Compensation Management**: Importance – Concepts- Trends - Issues – Methods – Factors of Consideration – Models – incentive methods – global compensation implications on Indian systems - Performance Management.
UNIT V	**Global Strategic Advantages through HRD**: Measures for creating global HRD Climate – Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working Life and Productivity – Challenges in Creation of New Jobs through Globalization- New Corporate Culture
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Subba Rao P: "International Human Resource Management", Himalaya Publishing House, Hyderabad, 2011
2. NilanjanSen Gupta: "International Human Resource Management Text and cases" Excel Books, New Delhi.
3. Tony Edwards :"International Human Resource Management", Pearson Education, New Delhi, 2012
4. Aswathappa K, Sadhana Dash: "International Human Resource Management, TMH, New Delhi,
5. Monir H Tayeb: "International Human Resource Management", Oxford Universities Press, Hyderabad, 2012.

Course Outcomes:

1. Knowledge about the impact of globalization on HRM
2. Application of HRM concepts at global level**.**

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Organizational Development and Change Management

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: Students are capable of managing the behavioural changes of their stakeholders based on their knowledge on human communication and change management.

UNIT	TOPICS
UNIT I	**Basics of Change Management**: Meaning, nature and Types of Change – change programmes – change as transformation – change as turnaround – value based change.
UNIT II	**Mapping change**: The role of diagramming in system investigation – A review of basic flow diagramming techniques –systems relationships – systems diagramming-Systems approach to change: systems autonomy and behavior – the intervention strategy model – total project management model (TPMM). Learning organization: The relevance of a learning organization - strategies to build a learning organization
UNIT III	**Organization Development (OD)**: Meaning, Nature and scope of OD - Dynamics of planned change – Person-focused and role-focused OD interventions –Planning OD Strategy – OD interventions-Challenges to OD Practioners.
UNIT IV	**Negotiated Change**: Change in the labour - management relations in the post-liberalized India collective bargaining strategy - Changes in the legal frame work of collective bargaining - Negotiated flexibility, productivity bargaining, improved work relations, public sector bargaining and social security.
UNIT V	**Team Building**: Nature and Importance of Teams – Team Vs Groups – Types of teams – Team building life cycle – Team building skills – Building team relationships – empowered teams – leadership on teams – Managing cross –cultural diversity in teams – Group think as a decision making process – effective decision making techniques for teams and groups – role of change consultant-– contemporary issues in managing teams.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Cummings: “Theory of Organisation Development and Change”, Cengage Learning, New Delhi, 2013.
2. Robert A Paton: Change Management, Sage Publications, New Delhi, 2011.
3. NilanjanSengupta: Managing Changing Organisations, PHI Learning, New Delhi, 2009
4. Adrian Thornhill: Managing Change, Pearson Education, New Delhi, 2012.
5. Radha R Sharma: Change Management, TMH, New Delhi, 2012

Course Outcomes:

1. Reflect on the need for change in the current economic climate
2. Gain a general understanding of organizational change and development concepts
3. Develop an understanding of possible change instruments and their field of use
4. Reflect on different leadership styles and their importance in a change process
5. Apply change concepts to a real case example and transfer this knowledge to their own working environment

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Labour Welfare & Legislation

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective : To know the development and the judicial setup of labour laws.

UNIT	TOPICS
UNIT I	**Welfare Legislation**: Factories Act 1948, Mines Act 1952, Plantation Labour Act 1951, Contract Labour (Regulation and Abolition) Act 1970 and A.P.Shops and Establishments Act.
UNIT II	**Industrial Relations Legislation**: Industrial Disputes Act 1947; Industrial Employment (standing orders) Act 1946 and Trade Unions Act 1926.
UNIT III	**Wage and Social Security Legislation:** Payment of wages Act 1936 - Minimum wages Act 1948 - Payment of Bonus Act 1966 - Workmen's Compensation Act 1923 - Employees State Insurance Act 1948 - Maternity Benefit Act 1961 and Employees Provident Fund and Miscellaneous Provisions Act 1952
UNIT IV	**Labour Welfare**: Concept, scope and philosophy, principles of labour welfare, Agencies of labour welfare and their role. Impact of ILO on labour welfare in India. Labour problems – Indebtedness, Absenteeism, Alcoholism, Personal and Family Counselling.
UNIT V	**Labour welfare programmes:** Statutory and non-statutory, extra mural and intra mural, Central Board of Workers' Education; Workers' Cooperatives, Welfare Officers' Role, Status and Functions.
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1. Govt. of India (Ministry of Labour, 1969). Report of the Commission on Labour Welfare, New Delhi: Author.

2. Govt. of India (Ministry of Labour, 1983). Report on Royal Commission on Labour in India, New Delhi: Author.

3. Malik, P.L: "Industrial Law", Eastern Book Company. Laknow,1977

5. Moorthy, M.V: "Principles of Labour Welfare", Oxford University Press, New Delhi.

6. Pant, S.C: "Indian Labour Problems", Chaitanya Pub. House. Allahabad.

Course Outcomes:

1. To learn the salient features of welfare and wage legislation.
2. To know the development and the judicial set up of labour laws
3. To understand the laws related to working conditions in different settings
4. To learn the laws relating to industrial relations,social security and working conditions

VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(AUTONOMOUS)

Subject Name: Management of Industrial Relations

Regulation : R19 **Year/ Sem :** II/II

T	L	P	C	Internal	External	Total
4	-	-	3	40	60	100

Course objective: students able to acquire a solid theoretical practical and ethical perspective on many aspects of industrial relations.

UNIT	TOPICS
UNIT I	**Industrial Relations Management**: Concept- Evaluation –Background of industrial Relations in India- Influencing factors of IR in enterprise and the consequences. Economic, Social and Political environments- Employment Structure –Social Partnership-Wider approaches to industrial relations
UNIT II	**Trade Unions:** Introduction-Definition and objectives-growth of Trade Unions in India-trade Unions Act , 1926 and Legal framework-Union recognition-Union Problems-Employees Association-introduction ,Objective Membership
UNIT III	**Quality of Work Life**: Workers' Participation in Management - Worker's Participation in India, shop floor, Plant Level, Board Level- Workers' Welfare in Indian scenario- Collective bargaining concepts & Characteristics –Promoting peace-Issues and Constraints in Wage Determination in India
UNIT IV	**Social Security**: Introduction and types –Social Security in India, Health and Occupational safety programs- Salient features of Workmen Compensation Act and Employees' State Insurance Act relating to social security
UNIT V	**Employee Grievances:** Causes of Grievances –Conciliation, Arbitration and Adjudication procedural aspects for Settlement of Grievances –Standing Orders- Code Discipline. Industrial Disputes: Meaning, nature and scope of industrial disputes - Causes and Consequences of Industrial Disputes –Prevention and Settlement of industrial disputes in India
	Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

References Books:

1. C.S Venkataratnam: "**Industrial Relations**", Oxford University Press, New Delhi, 2011

2. Sinha: "**Industrial Relations, Trade Unions and Labour Legislation**", Pearson Education, New Delhi, 2013

3. Mamoria: "**Dynamics of Industrial Relations**", Himalaya Publishing House, New Delhi, 2010

4. B.D.Singh: "**Industrial Relations**" Excel Books, New Delhi, 2010

5. Arun Monappa: "**Industrial Relations**", TMH, New Delhi. 2012

6. Prof. N.Sambasiva Rao and Dr. Nirmal Kumar: "**Human Resource Management and Industrial Relations**", Himalaya Publishing House, Mumbai

7. Ratna Sen: "**Industrial Relations**", MacMillon Publishers, New Delhi, 2011

Course Outcomes: On successful completion of the course students will be able to:

1.Demonstrate descriptive knowledge of the field of industrial relations.

2. Apply the essential concepts of industrial relations and their interrelationship at the personal, organizational and national levels.

3.Recognize and consider the social, historical and equity issues within industrial relatins.

4. Investigate solutions to industrial relations problems based on research and assessment of current practices.

5. Communicate your knowledge of industrial relations in both written and verbal formats reactive to both audience and purpose.