SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
(AUTONOMOUS)

Bachelor of Technology

Department of Electrical and Electronics Engineering

INDUCTION PROGRAMME

S.No.	Course Name	Category	L-T-P-C
1	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counselling	MC	2-0-2-0
3	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

B. Tech. – I Year I Semester

S.No.	Course Code	Subject	L/D	T	P	C
1.	23HS0840	Engineering Physics	3	0	0	3
2.	23HS0830	Linear Algebra & Calculus	3	0	0	3
3.	23EE0201	Basic Electrical & Electronics Engineering	3	0	0	3
4.	23ME0302	Engineering Graphics	1	0	4	3
5.	23CS0501	Introduction to Programming	3	0	0	3
6.	23CS0503	IT Workshop	0	0	2	1
7.	23HS0841	Engineering Physics Lab	0	0	2	1
8.	23EE0202	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9.	23CS0502	Computer Programming Lab	0	0	3	1.5
10.	23HS0812	NSS/NCC/Scouts & Guides/Community Service	0	0	1	0.5
		Total	**13**	**0**	**15**	**20.5**

B. Tech. – I Year II Semester

S.No.	Course Code	Subject	L/D	T	P	C
1.	23HS0810	Communicative English	2	0	0	2
2.	23HS0801	Chemistry	3	0	0	3
3.	23HS0831	Differential Equations & Vector Calculus	3	0	0	3
4.	23CE0101	Basic Civil & Mechanical Engineering	3	0	0	3
5.	23EE0203	Electrical Circuit Analysis-I	3	0	0	3
6.	23HS0811	Communicative English Lab	0	0	2	1
7.	23HS0802	Chemistry Lab	0	0	2	1
8.	23ME0301	Engineering Workshop	0	0	3	1.5
9.	23EE0204	Electrical Circuit Analysis-I Lab	0	0	3	1.5
10.	23HS0813	Health and wellness, Yoga and Sports	0	0	1	0.5
		Total	**14**	**0**	**11**	**19.5**

B.Tech.II Year-I Semester

S.No.	Course code	Title	L	T	P	C
1	23HS0833	Complex Variables & Numerical Methods	3	0	0	3
2	23HS0814	Universal Human Values– Understanding Harmony and Ethical Human Conduct	2	1	0	3
3	23EE0207	Electromagnetic Field Theory	3	0	0	3
4	23EE0208	Electrical Circuit Analysis-II	3	0	0	3
5	23EE0209	DC Machines & Transformers	3	0	0	3
6	23EE0210	Electrical Circuit Analysis-II and Simulation Lab	0	0	3	1.5
7	23EE0211	DC Machines & Transformers Lab	0	0	3	1.5
8	23CS0553	Data Structures	0	1	2	2
9	23HS0805	Environmental Science	2	0	0	0
		Total	**16**	**2**	**8**	**20**

B.Tech. II Year-II Semester

S.No.	Category	Title	L	T	P	C
1	23HS0848 23HS0850 23HS0851	Managerial Economics and Financial Analysis Organizational Behavior Business Environment	2	0	0	2
2	23EC0459	Analog Circuits	3	0	0	3
3	23EE0213	Power Systems-I	3	0	0	3
4	23EE0214	Induction and Synchronous Machines	3	0	0	3
5	23EE0215	Control Systems	3	0	0	3
6	23EE0216	Induction and Synchronous Machines Lab	0	0	3	1.5
7	23EE0217	Control Systems Lab	0	0	3	1.5
8	23CS0549	Python Programming	0	1	2	2
9	23HS0815	Design Thinking & Innovation	1	0	2	2
		Total	**15**	**1**	**10**	**21**
Mandatory Community Service / Internship Project of 08 weeks duration during summer vacation					

NOTE: L-Lecture, T- Tutorial, P-Practical, Drg-Drawing, C-Credit

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I B.Tech – I Sem.   L   T   P   C
                                                           3   0   0   3

(23HS0840) ENGINEERING PHYSICS
(Common to All Branches of Engineering)

COURSE OBJECTIVES

The objectives of this course

To bridge the gap between the Physics in school at 10+2 level and UG level engineering coursesby identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

COURSE OUTCOMES (COs)

After the completion of the course student should be able to

1. *Analyze* the intensity variation of light due to polarization, interference and diffraction.
2. *Familiarize* with the basics of crystals and their structures.
3. *Summarize* various types of polarization of dielectrics.
4. *Classify* the magneticmaterials and understand the concept of Hysteresis curve.
5. *Explain* fundamentals of quantum mechanics and apply it to one dimensional motion of Particles and understand the behaviour of free electrons in solids.
6. *Identify* the type of semiconductor using Hall effect.

UNIT – I   Wave Optics

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.

   Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II   Crystallography and X-ray diffraction

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X- ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination byLaue's and powder methods

UNIT III Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of

polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials.

UNIT IV Quantum Mechanics and Free electron Theory

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependentwave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy

UNIT V   Semiconductors

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effectand its applications

TEXTBOOKS

1. M. N. Avadhanulu, P.G.Kshirsagar & TVS ArunMurthy, *A Text book of Engineering Physics,* S. Chand Publications, 11th Edition 2019..

2. D.K.Bhattacharya and Poonam Tandon*, Engineering Physics,* Oxford press (2015)..

REFERENCES

1. B.K. Pandey and S. Chaturvedi, *Engineering Physics,* Cengage Learning 2021.

2. Shatendra Sharma, Jyotsna Sharma, *Engineering Physics,* Pearson Education, 2018.

3. M.R. Srinivasan, *Engineering Physics,* New Age international publishers (2009).

Web Resources: https://www.loc.gov/rr/scitech/selected-internet/physics.html

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	L	T	P	C
I B. Tech. – I Sem.	3	0	0	3

(23HS0830) LINEAR ALGEBRA & CALCULUS
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Develop and use of matrix algebra techniques that are needed by engineers for practical applications.*
2. *Identify different matrix techniques to find the inverse and powers of the matrix.*
3. *Understanding the concepts of continuity and differentiability of functions defined on intervals*
4. *Estimate the series expansions of algebraic and transcendental functions.*
5. *Analyze the functions of several variables which is useful in optimization.*
6. *Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.*

UNIT-I
Matrices
Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II
Eigenvalues, Eigenvectors and Orthogonal Transformation
Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III
Calculus
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV

Partial differentiation and Applications (Multi variable calculus)
Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobian, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT-V
Multiple Integrals (Multi variable Calculus)
Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS

1. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 2017, 44th Edition
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley & Sons, 2018, 10th Edition.

REFERENCES

1. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas, *Calculus,* PearsonPublishers, 2018, 14th Edition.
2. R. K. Jain and S. R. K. Iyengar, *Advanced Engineering Mathematics*, Alpha ScienceInternational Ltd., 2021 5th Edition(9th reprint).
3. Glyn James, *Advanced Modern Engineering Mathematics*, Pearson publishers, 2018, 5th Edition.
4. Micheael Greenberg, *Advanced Engineering Mathematics*, Pearson publishers, 9th edition
5. H. K Das, Er. Rajnish Verma, *Higher Engineering Mathematics*, S. Chand Publications,2014, Third Edition (Reprint 2021)

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		L	**T**	**P**	**C**
I B. Tech. – I Sem.		**3**	**0**	**0**	**3**

(23EE0201) BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

1. *To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.*
2. *This course provides the student with the fundamental skills to understand the principles of digital electronics, basics of semiconductor devices like diodes & transistors, characteristics and its applications.*

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.*
2. *Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations. working of diodes, transistors, and their applications, working mechanism of different combinational, sequential circuits and their role in the digital systems.*
3. *Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.*
4. *Analyze different electrical and electronic circuits, performance of machines and measuring instruments.*
5. *Evaluate different circuit configurations, Machine performance and Power systems operation.*
6. *Familiarize with the number systems, codes, Boolean algebra and logic gates.*

PART A: BASIC ELECTRICAL ENGINEERING
UNIT-I
DC & AC Circuits
DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.
AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance,

Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT-II
Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT-III
Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

TEXTBOOKS
1. D. C. Kulshreshtha, *Basic Electrical Engineering*, Tata McGraw Hill, 2019, First Edition.
2. P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, *Power System Engineering*, Dhanpat Rai & Co, 2013.
3. Rajendra Prasad, *Fundamentals of Electrical Engineering,* PHI publishers, 2014, Third Edition.

REFERENCES
1. D. P. Kothari and I. J. Nagrath, *Basic Electrical Engineering*, Mc Graw Hill, 2019, Fourth Edition
2. V.K. Mehta, *Principles of Power Systems*, S.Chand Technical Publishers, 2020
3. T. K. Nagsarkar and M. S. Sukhija, *Basic Electrical Engineering*, Oxford University Press, 2017
4. S. K. Bhatacharya, *Basic Electrical and Electronics Engineering*, Person Publications, 2018, Second Edition.

WEB RESOURCES:
1. https://nptel.ac.in/courses/108105053.
2. https://nptel.ac.in/courses/108108076.

PART B: BASIC ELECTRONICS ENGINEERING

UNIT-I

Semiconductor Devices

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

UNIT-II

Basic Electronic Circuits and Instrumenttaion

Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator.
Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT-III

Digital Electronics

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adder, Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

TEXTBOOKS
1. R. L. Boylestad & Louis Nashlesky, *Electronic Devices & Circuit Theory*, Pearson Education, 2021.
2. R. P. Jain, *Modern Digital Electronics*, 4th Edition, Tata Mc Graw Hill, 2009.

REFERENCES
1. R. S. Sedha, *A Textbook of Electronic Devices and Circuits*, S. Chand & Co, 2010.
2. Santiram Kal, *Basic Electronics- Devices, Circuits and IT Fundamentals*, Prentice Hall, India, 2002.
3. R. T. Paynter, *Introductory Electronic Devices & Circuits* – Conventional Flow Version, Pearson Education,2009.

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	L	T	P	C
I B. Tech. – I Sem.	1	0	4	3

(23ME0302) ENGINEERING GRAPHICS
(Common to All Branches of Engineering)

COURSE OBJECTIVES

The objectives of this course is to

1. *Enable the students with various concepts like dimensioning, conventions andstandards related to Engineering Drawing*
2. *Impart knowledge on the projection of points, lines and plane surfaces*
3. *Improve the visualization skills for better understanding of projection of solids*
4. *Develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.*
5. *Make the students understand the viewing perception of a solid object in Isometricand Perspective projections.*

COURSE OUTCOMES

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

1. *Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.*
2. *Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.*
3. *Understand and draw projection of solids in various positions in first quadrant.*
4. *Elucidate the basic principles of sections of solids and true shapes*
5. *Explain principles behind development of surfaces.*
6. *Prepare isometric and perspective sections of simple solids.*

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods. Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves. Scales: Plain scales, diagonal scales and vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane,Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes

Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III
Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solidsin **simple positions:** Axis perpendicular to horizontal plane, Axis perpendicular to vertical planeand Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV
Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shapeof section, Sections of solids in simple position only.
Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT V
Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.
Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformationsusing Auto CAD (*Not for end examination*).

TEXTBOOK
1. N. D. Bhatt, *Engineering Drawing,* Charotar Publishing House, 2016.
2. K.L. Narayana and P. Kannaiah, *Engineering Drawing*, Tata McGraw Hill, 2013.
3. Dhananjay Jolhe, *Engineering Drawing with an Introduction to AutoCAD,* TataMcGraw Hill, 2017.

REFERENCES
1. M.B.Shah and B.C. Rana, *Engineering Drawing*, Pearson Education Inc,2009.

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I B.Tech – I Sem.   L   T   P   C
                                                     3   0   0   3

(23CS0501) INTRODUCTION TO PROGRAMMING
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

1. *To introduce students to the fundamentals of computer programming.*
2. *To provide hands-on experience with coding and debugging.*
3. *To foster logical thinking and problem-solving skills using programming.*
4. *To familiarize students with programming concepts such as data types, control structures, functions, and arrays.*
5. *To encourage collaborative learning and teamwork in coding projects.*

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Understand basics of computers, the concept of algorithm and algorithmic thinking.*
2. *Analyse a problem and develop an algorithm using control structures & arrays*
3. *Analyse a problem and develop an algorithm to solve it using strings*
4. *Understand and implement the problems using pointers*
5. *Apply modular approach for solving the problem*
6. *Design and implement problem-solving using structures, unions and files.*

UNIT - I
Introduction to Programming and Problem Solving: History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer ProgramAlgorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting. Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT - II
Control Structures: Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, dowhile) Break and Continue.

UNIT - III
Arrays and Strings: Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT - IV
Pointers & User Defined Data types: Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT - V
Functions & File Handling: Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling.

Note: The syllabus is designed with C Language as the fundamental language of implementation.

TEXTBOOKS
1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language, ,* Prentice Hall, 1988
2. Byron S Gottfried, *Schaum's Outline of Programming with C*, McGraw-Hill Education, 1996

REFERENCES
1. Balagurusamy, E, *Computing fundamentals and C Programming*, McGraw-Hill Education, 2008.
2. Rema Theraja, *Programming in C*, Oxford, 2016, 2nd edition.
3. Forouzan, Gilberg, Prasad, *C Programming, A Problem Solving Approach*, CENGAGE, 3rd edition.

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I B.Tech – I Sem.

L	T	P	C
0	0	2	1

(23CS0503) IT WORKSHOP
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

1. *To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables*
2. *To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS*
3. *To teach basic command line interface commands on Linux.*
4. *To teach the usage of Internet for productivity and self-paced life-long learning*
5. *To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.*

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Perform Hardware troubleshooting.*
2. *Understand Hardware components and inter dependencies.*
3. *Safeguard computer systems from viruses/worms.*
4. *Document/ Presentation preparation.*
5. *Perform calculations using spread sheets.*
6. *Understand and Analyse the concepts of Prompt Engineering, Language Translation and Creative Writing using AI Tools*

LIST OF EXPERIMENTS
PC Hardware & Software Installation
Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual

boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1: Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spread sheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

REFERENCES

1. Vikas Gupta, *Comdex Information Technology course tool kit*, WILEY Dream tech, 2003.
2. Cheryl A Schmidt, *The Complete Computer upgrade and repair book*, WILEY Dream tech, 2013, 3rd edition
3. *Introduction to Information Technology*, ITL Education Solutions limited, Pearson Education, 2012, 2nd edition
4. Kate J. Chase, *PC Hardware - A Handbook*, PHI (Microsoft)
5. Leslie Lamport, *LaTeX Companion*, PHI/Pearson.
6. David Anfins on and Ken Quamme, *IT Essentials PC Hardware and Software Companion Guide*, – CISCO Press, Pearson Education, 3rd edition
7. Patrick Regan, *IT Essentials PC Hardware and Software Labs and Study Guide*, CISCO Press, Pearson Education, 3rd edition.

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I B.Tech – I Sem.

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(23HS0841) ENGINEERING PHYSICS LAB
(Common to All Branches of Engineering)

COURSE OBJECTIVES

The objectives of this course

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

COURSE OUTCOMES (COs)

After the completion of the course student should be able to

1. **Operate** optical instruments like travelling microscope and spectrometer.
2. **Estimate** the wavelengths of different colours using diffraction grating.
3. **Plot** the intensity of the magnetic field of circular coil carrying current with distance.
4. **Evaluate** dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
5. **Calculate** the band gap of a given semiconductor
6. **Identify** the type of semiconductor using Hall effect.

LIST OF EXPERIMENTS

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.

2. Determination of wavelengths of different spectral lines in mercury spectrum usingdiffraction grating in normal incidence configuration.

3. Verification of Brewster's law

4. Determination of dielectric constant using charging and discharging method.

5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).

6. Determination of wavelength of Laser light using diffraction grating.

7. Estimation of Planck's constant using photoelectric effect.

8. Determination of the resistivity of semiconductors by four probe methods.

9. Determination of energy gap of a semiconductor using p-n junction diode.

10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee'sMethod.

11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Halleffect.

12. Determination of temperature coefficients of a thermistor.

13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.

14. Determination of magnetic susceptibility by Kundt's tube method.

15. Determination of rigidity modulus of the material of the given wire using Torsionalpendulum.

16. Sonometer: Verification of laws of stretched string.

17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.

18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Note: Any **TEN** of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

REFERENCES
1. S. Balasubramanian, M.N. Srinivasan, *A Textbook of Practical Physics,* S. Chand Publishers, 2017.

Web Resources
- www.vlab.co.in
- https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

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I B.Tech – I Sem.	L	T	P	C
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(23EE0202) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer.* usage *of electronic measuring instruments.*
2. *Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.*
3. *Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.*
4. *Analyse various characteristics of electrical circuits, electrical machines, measuring instrument and digital circuits.*
5. *Design suitable circuits and methodologies for the measurement of various electrical parameters; Design suitable Household and commercial wiring.*
6. *Plot and discuss the characteristics of various electron devices.*

Activities:
1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.

- Provide some exercises so that hardware tools and instruments are learned to be used by the students.

2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.

- Provide some exercises so that measuring instruments are learned to be used by the students.

3. Components:
- Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.

- Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:
1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

REFERENCES:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition.

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

List of Experiments:
1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers.
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

REFERENCES
1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version,
4. Pearson Education,2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

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I B.Tech – I Sem.

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(23CS0502) COMPUTER PROGRAMMING LAB
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

1. *The course aims to give students hands – on experience and train them on the concepts of the C- programming language.*

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Read, understand, and trace the execution of programs written in C language.*
2. *Select the right control structure for solving the problem.*
3. *Develop C programs which utilize memory efficiently using programming constructs like pointers.*
4. *Develop Debug and Execute programs to demonstrate the applications of arrays in C.*
5. *Develop Debug and Execute programs to demonstrate the applications of functions in C.*
6. *Implement the C programs using File handling Concepts.*

UNIT-I
WEEK 1 - Objective: Getting familiar with the programming environment on the computer and writing the first program.
Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment
   i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
   ii) Exposure to Turbo C, gcc
   iii) Writing simple programs using printf(), scanf()

WEEK 2 - Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.
Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code. Developing the algorithms/flowcharts for the following sample programs
   i) Sum and average of 3 numbers
   ii) Conversion of Fahrenheit to Celsius and vice versa
   iii) Simple interest calculation

WEEK 3 - Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.
Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.
    i)   Finding the square root of a given number
    ii)   Finding compound interest
    iii) Area of a triangle using heron's formulae
    iv) Distance travelled by an object

UNIT-II
WEEK 4 - Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.
Suggested Experiments/Activities:
Tutorial 4: Operators and the precedence and as associativity:
Lab 4: Simple computational problems using the operator' precedence and associativity
    i)   Evaluate the following expressions. a. A+B*C+(D*E) + F*G b. A/B*C-B+A*D/3 c. A+++B---A d. J= (i++) + (++i)
    ii)   Find the maximum of three numbers using conditional operator
    iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5 - Objective: Explore the full scope of different variants of "if construct" namely if-else, nullelse, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".
Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 5: Problems involving if-then-else structures.
    i)   Write a C program to find the max and min of four numbers using if-else.
    ii)   Write a C program to generate electricity bill.
    iii) Find the roots of the quadratic equation.
    iv) Write a C program to simulate a calculator using switch case.
    v)   Write a C program to find the given year is a leap year or not.

WEEK 6 - Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.
Suggested Experiments/Activities:
Tutorial 6: Loops, while and for loops
Lab 6: Iterative problems e.g., the sum of series
    i)   Find the factorial of given number using any loop.
    ii)   Find the given number is a prime or not.
    iii) Compute sine and cos series
    iv) Checking a number palindrome
    v)   Construct a pyramid of numbers.

UNIT-III
WEEK 7 - Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.
Suggested Experiments/Activities:
Tutorial 7: 1 D Arrays: searching.

Lab 7: 1D Array manipulation, linear search
    i)   Find the min and max of a 1-D integer array.
    ii)   Perform linear search on1D array.
    iii) The reverse of a 1D integer array
    iv) Find 2's complement of the given binary number.
    v)   Eliminate duplicate elements in an array.

WEEK 8 - Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.
Suggested Experiments/Activities:
Tutorial 8: 2D arrays, sorting and Strings.
Lab 8: Matrix problems, String operations, Bubble sort
    i)   Addition of two matrices
    ii)   Multiplication two matrices
    iii) Sort array elements using bubble sort
    iv) Concatenate two strings without built-in functions
    v)   Reverse a string using built-in and without built-in string functions

UNIT-IV
WEEK 9 - Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C
Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.
    i)   Write a C program to find the sum of a 1D array using malloc()
    ii)   Write a C program to find the total, average of n students using structures
    iii) Enter n students data using calloc() and display failed students list
    iv) Read student name and marks from the command line and display the student details along with the total.
    v)   Write a C program to implement realloc()

WEEK 10 - Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures
Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10: Bitfields, linked lists Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields
    i)   Create and display a singly linked list using self-referential structure.
    ii)   Demonstrate the differences between structures and unions using a C program.
    iii) Write a C program to shift/rotate using bitfields.
    iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT-V
WEEK 11 - Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration.
Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent.
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.
   i) Write a C function to calculate NCR value.
   ii) Write a C function to find the length of a string.
   iii) Write a C function to transpose of a matrix.
   iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12 - Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.
Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions
   i) Write a recursive function to generate Fibonacci series.
   ii) Write a recursive function to find the LCM of two numbers.
   iii) Write a recursive function to find the factorial of a number.
   iv) Write a C Program to implement Ackermann function using recursion.
   v) Write a recursive function to find the sum of series.

WEEK 13 - Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers
Suggested Experiments/Activities:
Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.
   i) Write a C program to swap two numbers using call by reference.
   ii) Demonstrate Dangling pointer problem using a C program.
   iii) Write a C program to copy one string into another using pointer.
   iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK 14 - Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File operations
   ii) Write a C program to write and read text into a file.
   iii) Write a C program to write and read text into a binary file using fread() and fwrite()
   iv) Copy the contents of one file to another file.
   v) Write a C program to merge two files into the third file using command-line arguments.
   vi) Find no. of lines, words and characters in a file
   vii) Write a C program to print last n characters of a given file.

TEXTBOOKS
1. Ajay Mittal*, Programming in C: A practical approach*, Pearson.
2. Byron Gottfried*, Schaum' s Outline of Programming with C*, McGraw Hill

REFERENCES
1. Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language*, PrenticeHall of India
2. Forouzan, Gilberg, Prasad, *C Programming, A Problem-Solving Approach,* CENGAGE.

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I B.Tech – I Sem.

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(23HS0812) NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE
(Common to All Branches of Engineering)

COURSE OBJECTIVES

The objectives of this course

The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

COURSE OUTCOMES (COs)

On successful completion of this course, studens will be able to

1. *Understand the importance of discipline, character and service motto.*
2. *Solve some societal issues by applying acquired knowledge, facts, and techniques.*
3. *Explore human relationships by analyzing social problems.*
4. *Determine to extend their help for the fellow beings and downtrodden people.*
5. *Develop leadership skills and civic responsibilities.*
6. *Focus on awareness programmes that build community service*

UNIT- I Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, career guidance.

Activities:
i) Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii) Conducting orientations programs for the students –future plans-activities-releasingroad map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT- II Nature & CareActivities:
i) Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT III Community ServiceActivities:

i) Conducting One Day Special Camp in a village contacting village-area leaders- Surveyin the

village, identification of problems- helping them to solve via media- authorities-experts-etc.

ii) Conducting awareness programs on Health-related issues such as General Health,Mental health, Spiritual Health, HIV/AIDS,

iii) Conducting consumer Awareness. Explaining various legal provisions etc.

iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.

v) Any other programmes in collaboration with local charities, NGOs etc.

REFERENCES

1. Nirmalya Kumar Sinha & Surajit Majumder, *A Text Book of National Service Scheme* Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)

2. *Red Book - National Cadet Corps* – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi

3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering",McGraw Hill, New York 4/e 2008

4. Masters G. M., Joseph K. and Nagendran R. "Introduction to EnvironmentalEngineering and Science", Pearson Education, New Delhi. 2/e 2007

5. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

• Evaluated for a total of 100 marks.

• A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.

• A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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I B.Tech – II Sem.	L	T	P	C
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(23HS0810) COMMUNICATIVE ENGLISH
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

The main objective of introducing this course, Communicative English, is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Understand the context, topic, and pieces of specific information from social or Transactional dialogues.*
2. *Apply grammatical structures to formulate sentences and correct word forms.*
3. *Analyze discourse markers to speak clearly on a specific topic in informal discussions.*
4. *Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.*
5. *Create a coherent paragraph, essay, and resume.*
6. *Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.*

UNIT-I
Lesson: HUMAN VALUES: Gift of Magi **(Short Story)**

Listening:	Identifying the topic, the context and specific pieces of information by listeningto short audio texts and answering a series of questions.
Speaking:	Asking and answering general questions on familiar topics such as home,family, work, studies and interests; introducing oneself and others.
Reading:	Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing:	Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar:	Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary:	Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT – II
Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening:	Answering a series of questions about main ideas and supporting ideas afterlistening to audio texts.
Speaking:	Discussion in pairs/small groups on specific topics followed by short structuretalks.
Reading:	Identifying sequence of ideas; recognizing verbal techniques that help to linkthe ideas

in a paragraph together.

Writing: Structure of a paragraph - Paragraph writing (specific topics)

Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.

Vocabulary: Homonyms, Homophones, Homographs.

UNIT – III

Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

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

Writing: Summarizing, Note-making, paraphrasing

Grammar: Verbs - tenses; subject-verb agreement; Compound words,

Vocabulary: Collocations

UNIT – IV

Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.

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

Writing: Letter Writing: Official Letters, Resumes.

Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice

Vocabulary: Words often confused, Jargons

UNIT – V

Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.

Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Vocabulary: Technical Jargons

TEXTBOOKS

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, OrientBlack Swan, 2023 (Units 1,2 & 3).
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5).

REFERENCES

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020.
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge,2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge UniversityPress, 2019.

4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building aSuperior Vocabulary. Anchor, 2014.

WEB RESOURCES:

GRAMMAR:

1. www.bbc.co.uk/learningenglish.
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

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(23HS0801) CHEMISTRY
(Common to CSM, CAD, CAI, CCC, CIC CSE, CSIT, ECE & EEE branches)

COURSE OBJECTIVES
The objectives of this course
  1. *To familiarize engineering chemistry and its applications*
  2. *To train the students on the principles and applications of electrochemistry andpolymers*

  3. *To introduce instrumental methods, molecular machines and switches.*

COURSE OUTCOMES (COs)
After the completion of the course student should be able to

  1. *Acquire the knowledge on the behaviour and interactions between matter and energy at both the atomic and molecular levels.*
  2. *Analyze and demonstrate the applications of modern engineering materials in real world.*
  3. *Impart the knowledge on the essential aspects of electrochemical cells, emf and applications of emf measurements*
  4. *Gain the knowledge about construction and applications of batteries and sensors,*
  5. *Impart knowledge on the essential aspects of Principles and comprehend idea about the synthesis and engineering applications of polymers.*
  6. *Analyse the molecular transitions of Electromagnetic radiation (EMR) with matter in various spectroscopic techniques.*

UNIT – I Structure and Bonding Models:

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT- II Modern Engineering Materials

Semiconductors – Introduction, basic concept, application.
Super Conductors - Introduction basic concept, applications.
Super Capacitors - Introduction, Basic Concept , Classification – Applications.
Nano Materials - Introduction, classification, properties and applications of Fullerenes, Carbon nano tubes and Graphines nanoparticles.

UNIT- III Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Electrochemical sensors – potentiometric sensors with examples, amperoetric sensors with examples.
Primary cells – Zinc-air battery, Secondary cells – lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell– working of the cells. Polymer

Electrolyte Membrane Fuel cells (PEMFC).

UNIT - IV Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.
Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.
Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting Polymers – polyacetylene, polyaniline, – mechanism of conduction and applications.
Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT - V Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. High pressure Liquid Chromatography (HPLC) Classification, Principle, Instrumentation and Applications.

TEXTBOOKS
  1. Jain and Jain, *Engineering Chemistry*, 16/e, DhanpatRai, 2013.
  2.Peter Atkins, Julio de Paula and James Keeler, *Atkins' Physical Chemistry*, 10/e, Oxford University Press, 2010.

REFERENCES
  1. Skoog and West, *Principles of Instrumental Analysis*, 6/e, Thomson, 2007.
  2. J.D. Lee, *Concise Inorganic Chemistry*, 5th Edition, Wiley Publications, Feb.2008

  3. Fred W. Billmayer Jr, *Textbook of Polymer Science*, 3rd Edition

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I B. Tech. – II Sem.

L	T	P	C
3	0	0	3

(23HS0831) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

1. *To enlighten the learners in the concept of differential equations and multivariable calculus.*
2. *To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.*

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Solve the differential equations related to various engineering fields.*
2. *Create basic application problems described by second order linear differential equations with constant coefficients.*
3. *Understand basic properties of standard partial differential equations.*
4. *Identify solution methods for partial differential equations that model physical processes.*
5. *Interpret the physical meaning of different operators such as gradient, curl and divergence.*
6. *Estimate the work done against a field, circulation and flux using vector calculus.*

UNIT-I
Differential equations of first order and first degree
Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT-II
Linear differential equations of higher order (Constant Coefficients)
Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral with R.H.S term of the types eax ,sinax, cosax, polynomials in xn ,eax V(x), Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III
Partial Differential Equations
Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT-IV
Vector differentiation
Scalar and vector point functions, vector operator Del, Del applies to scalar point functions- Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.
UNIT-V

Vector integration

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

TEXTBOOKS

1. B. S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 2017, 44th Edition.
2. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley & Sons, 2018, 10th Edition.

REFERENCES

1. George B. Thomas, Maurice D. Weir and Joel Hass, *Thomas Calculus*, PearsonPublishers, 2018, 14th Edition.
2. Dennis G. Zill and Warren S. Wright, Jones and Bartlett, *Advanced Engineering Mathematics*, 2018.
3. Glyn James, *Advanced Modern Engineering Mathematics*, Pearson publishers, 2018, 5th Edition.
4. R. K. Jain and S. R. K. Iyengar, *Advanced Engineering Mathematics*, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. B. V. Ramana, *Higher Engineering Mathematics*, McGraw Hill Education, 2017.

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I B.Tech – II Sem.   **L   T   P   C**
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(23CE0101) BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to All Branches of Engineering)

PART A: BASIC CIVIL ENGINEERING

COURSE OBJECTIVES

The objectives of this course is to

1. Get familiarized with the scope and importance of Civil Engineering sub-divisions.

2. Introduce the preliminary concepts of surveying.

3. Acquire preliminary knowledge on Transportation and its importance in nation's economy.

4. Get familiarized with the importance of quality, conveyance and storage of water

5. Introduction to basic civil engineering materials and construction techniques.

COURSE OUTCOMES

After the completion of the course, student should be able to

1. Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.

2. Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.

3. Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation and understand the process of water storage and its supply to the public.

UNIT I

Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering, Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate -Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II

Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements- Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.

UNIT III

Transportation Engineering Importance of Transportation in Nation's economic development-Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

  TEXTBOOKS

1. M.S.Palanisamy, *Basic Civil Engineering*, Tata Mcgraw Hill publications (India) Pvt.Ltd. Fourth Edition.
2. S.S. Bhavikatti, *Introduction to Civil Engineering*, New Age International Publishers.First Edition, 2022.
3. Satheesh Gopi, *Basic Civil Engineering,* Pearson Publications, First Edition.2009.

REFERENCES

1. S.K. Duggal, *Surveying, Vol- I and Vol-II,* Tata McGraw Hill Publishers 2019. FifthEdition.
2. Santosh Kumar Garg, *Hydrology and Water Resources Engineering,* KhannaPublishers, Delhi. 2016
3. Santosh Kumar Garg, *Irrigation Engineering and Hydraulic Structures*, KhannaPublishers, Delhi 38th Edition, 2023.
4. S.K.Khanna, C.E.G. Justo and Veeraraghavan, *Highway Engineering,* Nemchand and Brothers Publications 10th Edition, 2019.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

COURSE OBJECTIVES

The objectives of this course is to

1. *Get familiarized with the scope and importance of Mechanical Engineering in differentsectors and industries.*
2. *Explain different engineering materials and different manufacturing processes.*
3. *Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.*

COURSE OUTCOMES:

After the completion of the course student should be able to

1. *Understand the role of mechanical engineering and materials in the manufacturing and automotive industries*
2. *Explain the basics of manufacturing processes and thermal engineering and itsapplications.*
3. *Describe the working of different powerplants. Mechanical power transmission systems and the applications of robotics in industrial sector.*

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries andSociety-Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants.
Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.
Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(**Note:** The subject covers only the basic principles of Civil and Mechanical Engineeringsystems. The evaluation shall be intended to test only the fundamentals of the subject)

TEXTBOOKS
1. V.Ganesan, *Internal Combustion Engines*, Tata McGraw Hill publications (India)Pvt. Ltd.
2. G. Shanmugam and M.S.Palanisamy, *Basic Civil and the Mechanical Engineering*, Tata McGraw Hill publications (India) Pvt. Ltd.
3. Jonathan Wicker and Kemper Lewis, *An introduction to Mechanical Engineering,* Cengage learning India Pvt. Ltd.

REFERENCES
1. Appuu Kuttan KK, *Robotics*, I.K. International Publishing House Pvt. Ltd. Volume-I
2. L. Jyothish Kumar, Pulak MPandey,*3D printing & Additive Manufacturing Technology*, Springer publications
3. Mahesh M Rathore,*Thermal Engineering*, Tata McGraw Hill publications (India) Pvt.Ltd.
4. S.S. Rattan, *A Tear book of Theory of Machines* Tata McGraw Hill Publications,(India) Pvt. Ltd.

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I B.Tech – II Sem.   **L   T   P   C**

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(23EE0203)   ELECTRICAL CIRCUIT ANALYSIS -I

COURSE OBJECTIVES
   The objectives of this course is to

To develop an understanding of the fundamental laws, elements of electrical circuits and to apply circuit analysis to DC and AC circuits.

COURSE OUTCOMES:
   After the completion of the course student should be able to

CO1: Remembering the basic electrical elements and different fundamental laws.

CO2: Understand the network reduction techniques, transformations, concept of self- inductance and mutual inductance, phasor diagrams, resonance and network theorems.

CO3: Apply the concepts to obtain various mathematical and graphical representations.

CO4: Analyse nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).

CO5: Evaluation of Network theorems,

CO6: Evaluation of electrical, magnetic and single-phase circuits.

UNIT I INTRODUCTION TO ELECTRICAL CIRCUITS

Basic Concepts of passive elements of R, L, C and their V-I relations, Sources (dependent and independent), Kirchoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis to DC networks with dependent and independent voltage and current sources, node and mesh analysis.

UNIT II MAGNETIC CIRCUITS

Basic definition of MMF, flux and reluctance, analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction –   concept of self and mutual inductance, Dot convention–coefficient of coupling and composite magnetic circuit, analysis of series and parallel magnetic circuits.

UNIT III SINGLE PHASE CIRCUITS

Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, node and mesh analysis. Steady state analysis of R, L and C circuits to sinusoidal excitations-response of pure resistance, inductance, capacitance, series RL circuit, series RC circuit, series RLC circuit, parallel RL circuit, parallel RC circuit.

UNIT IV RESONANCE AND LOCUS DIAGRAMS

Series Resonance: Characteristics of a series resonant circuit, Q-factor, selectivity and bandwidth, expression for half power frequencies; Parallel resonance: Q-factor, selectivity and bandwidth; Locus diagram: RL, RC, RLC with R, L and C variables.

UNIT V NETWORK THEOREMS (DC & AC EXCITATIONS)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman's theorem and compensation theorem

TEXTBOOKS

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.

2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third Edition

REFERENCES

1. Fundamentals of Electrical Circuits, Charles K. Alexander and Mathew N.O. Sadiku, Mc Graw Hill Education (India), 2013, Fifth Edition

2. Electric Circuits (Schaum's outline Series), Mahmood Nahvi, Joseph Edminister, and

   K. Rao, Mc Graw Hill Education, 2017, Fifth Edition.
3. Electric Circuits, David A. Bell, Oxford University Press, 2009, Seventh Edition.

4. Introductory Circuit Analysis, Robert L Boylestad, Pearson Publications, 2023, Fourteenth Edition.

5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, Seventh Revised Edition.

Web Resources:

1. https://onlinecourses.nptel.ac.in/noc23_ee81/preview

2. https://nptel.ac.in/courses/108104139

3. https://nptel.ac.in/courses/108106172

4. https://nptel.ac.in/courses/117106108

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(23HS0811) COMMUNICATIVE ENGLISH LAB
(Common to All Branches of Engineering)

COURSE OBJECTIVES
The objectives of this course

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. *Understand the different aspects of the English language proficiency with emphasison LSRW skills.*
2. *Apply communication skills through various language learning activities.*
3. *Analyze the English speech sounds, stress, rhythm, intonation and syllable divisionfor better listening and speaking comprehension.*
4. *Evaluate and exhibit professionalism in participating in debates and group discussions.*
5. *Become active participants in the learning process and acquire proficiency in spoken English.*
6. *Speak with clarity and confidence thereby enhances employability skills.*

List of Topics:
1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:
- Walden Infotech
- Young India Films

REFERENCES
1. Raman Meenakshi, Sangeeta-Sharma, *Technical Communication*. Oxford Press.2018.
2. Taylor Grant, *English Conversation Practice*, Tata McGraw-Hill Education India,2016.
3. Hewing's, Martin. Cambridge, *Academic English* (B2), CUP, 2012.
4. J. Sethi & P.V. Dhamija, *A Course in Phonetics and Spoken English*, (2nd Ed),Kindle, 2013.

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I B.Tech – II Sem.   L   T   P   C
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(23HS0802) CHEMISTRY LAB
(**Common to CSM, CAD, CAI, CCC, CIC CSE, CSIT, ECE & EEE branches**)

COURSE OBJECTIVES

The objectives of this course

1. Verify the fundamental concepts with experiments.

COURSE OUTCOMES (COs)

After the completion of the course student should be able to

 1. *Determine the cell constant and conductance of solutions.*

 2. *Prepare advanced polymer Bakelite materials.*

 3. *Measure the strength of an acid present in secondary batteries.*

 4. *Analyse the IR spectra of some organic compounds.*

 5. *Able to understand about the fundamental concepts of analytical instruments*

 6. *Calculate strength of acid in Pb-Acid battery.*

LIST OF EXPERIMENTS

1. Measurement of 10Dq by spectrophotometric method.

2. Conductometric titration of strong acid vs. strong base.

3. Conductometric titration of weak acid vs. strong base.

4. Determination of cell constant and conductance of solutions.

5. Potentiometry - determination of redox potentials and emfs.

6. Determination of Strength of an acid in Pb-Acid battery.

7. Preparation of a Bakelite.

8. Verify Lambert-Beer's law.

9. Wavelength measurement of sample through UV-Visible Spectroscopy.

10. Identification of simple organic compounds by IR.

11. Preparation of nanomaterial's by precipitation method.

12.   Estimation of Ferrous Iron by Dichrometry.

Any Ten experiments may be conducted.

REFERENCES

1. J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar *"Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition"* Pearson Publications.

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I B.Tech – II Sem.

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(23ME0301) ENGINEERING WORKSHOP
(Common to All Branches of Engineering)

COURSE OBJECTIVES

The objectives of this course is to

1. *Familiarize with the different types of wood and carpentry joints.*
2. *Develop Tapered Tray and Conical funnel using sheet metal.*
3. *Acquire practical knowledge on different types of fittings.*
4. *Provides hands-on training in the trades of House-Wiring .*
5. *Overview of metal cutting processes, foundry, Welding and plumbing, is provided through live demonstrations.*
6. *Acquire practical skills by performing the experiments in different shops of workshop.*

COURSE OUTCOMES

On successful completion of the course, the students will be able to

1. *Describe the different types of wood and carpentry joints.*
2. *Produce Tapered Tray and Conical funnel using sheet metal.*
3. *Understands about Fitting and their types.*
4. *Explain the method of preparation of various House-Wiring .*
5. *Apply basic techniques in foundry, Welding and plumbing.*
6. *Estimate the amount of material required for various models.*

SYLLABUS

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **Wood Working:** Familiarity with different types of woods and tools used in woodworking and make following joints.
   a) Half – Lap joint   b) Mortise and Tenon joint   c) Corner Dovetail joint or Bridlejoint
3. **Sheet Metal Working**: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray   b) Conical funnel   c) Elbow pipe   d) Brazing
4. **Fitting:** Familiarity with different types of tools used in fitting and do the followingfitting exercises.
   a) V-fit   b) Dovetail fit   c) Semi-circular fit   d) Bicycle tire puncture and change of two-wheeler tyre
5. **Electrical Wiring**: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series   b) Two-way switch   c) Godown lighting
   d) Tube light   e) Three phase motor   f) Soldering of wires
6. **Foundry Trade:** Demonstration and practice on Moulding tools and processes,Preparation of Green Sand Moulds for given Patterns.

7. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding.Preparation of Lap joint and Butt joint.
8. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe jointswith coupling for same diameter and with reducer for different diameters

TEXTBOOKS

1. Felix W.; *Basic Workshop Technology: Manufacturing Process*, Independently Published,2019.
2. Bruce J. Black *Workshop Processes, Practices and Materials*, Routledge publishers, 5th Edn. 2015.
3. B.S. Raghuwanshi, *A Course in Workshop Technology Vol I. & II,* Dhanpath Rai & Co., 2015 & 2017.

REFERENCES

1. S. K. Hajra Choudhury & Others, *Elements of Workshop Technology, Vol. I*, MediaPromoters and Publishers, Mumbai., 14th edition,2007
2. H. S. Bawa, *Workshop Practice*, Tata-McGraw Hill, 2004.
3. Soni P.M. & Upadhyay P.A.; AtulPrakashan, *Wiring Estimating, Costing and Contracting;* 2021-22.

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I B.Tech ‑ II Sem.

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(23EE0204) ELECTRICAL CIRCUIT ANALYSIS-I LAB

COURSE OBJECTIVES
The objectives of this course is to

To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics. It also gives practical exposure to the usage of different circuits with different conditions.

COURSE OUTCOMES
On successful completion of the course, the students will be able to
CO1: *Understand the concepts of network theorems, node and mesh network.*
CO2: *Understand series and parallel resonance and Locus diagrams.*
CO3: *Apply various theorems to compare practical results obtained with theoretical calculations.*
CO4: *Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.*
CO5: *Analyse different circuit characteristics with the help of fundamental laws and various configurations.*
CO6: *Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.*

LIST OF EXPERIMENTS

1. Verification of Kirchhoff's circuit laws.

2. Verification of node and mesh analysis.

3. Verification of network reduction techniques.

4. Determination of cold and hot resistance of an electric lamp

5. Determination of Parameters of a choke coil.

6. Determination of self, mutual inductances, and coefficient of coupling

7. Series and parallel resonance

8. Locus diagrams of R-L (LVariable) and R-C (CVariable) series circuits

9. Verification of Superposition theorem

10. Verification of Thevenin's and Norton's Theorems

11. Verification of Maximum power transfer theorem

12. Verification of Compensation theorem

13. Verification of Reciprocity and Milliman's Theorems

REFERENCES

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, Tata Mc Graw Hill Education, 2005, sixth edition.

2. Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019, Revised Third edition

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I B.Tech – II Sem.

L	T	P	C
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(23HS0813) HEALTH AND WELLNESS, YOGA AND SPORTS
(Common to All branches of Engineering)

COURSE OBJECTIVES
The objectives of this course is to

The main objective of introducing this course is to make the students maintain their mental andphysical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

COURSE OUTCOMES (COs)
On successful completion of this course, studens will be able to

1. Understand the importance of yoga and sports for Physical fitness and sound health
2. Demonstrate an understanding of health-related fitness components.
3. Compare and contrast various activities that help enhance their health.
4. Assess current personal fitness levels.
5. Develop Positive Personality.
6. Apply various activities for holistic development.

UNIT-I
Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index(BMI) of all age groups.
Activities:
  i)   Organizing health awareness programmes in community
  ii) Preparation of health profile
  iii) Preparation of chart for balance diet for all age groups

UNIT- II
Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities:
Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT- III
Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

i)   Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.

ii)   Practicing general and specific warm up, aerobics
Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

REFERENCES
1. Gordon Edlin, Eric Golanty, *Health and Wellness*, 14th Edn. Jones & Bartlett Learning,2022
2. T.K.V.Desikachar, *The Heart of Yoga: Developing a Personal Practice.*
3. Archie J.Bahm, *Yoga Sutras of Patanjali*, Jain Publishing Company, 1993.
4. Wiseman, John Lofty, *SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere*, Third Edition, William Morrow Paperbacks, 2014.
5. Thomas Hanlon, *The Sports Rules Book/ Human Kinetics,* 3rd ed. HumanKinetics, Inc.2014.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as manyas Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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II B. Tech. – I Sem.

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(23HS0833) COMPLEX VARIABLES AND NUMERICAL METHODS

COURSE OBJECTIVES

The objectives of this course

1. *To study the techniques of complex variables and functions together with their derivatives, Contour integration and transformations.*
2. *To introduce the tools of differentiation and integration of functions of numerical methods that is used in various techniques dealing engineering problems*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Analyze limit, continuity and differentiation of functions of complex variables and Understand Cauchy-Riemann equations, analytic functions and various properties of analytic functions.*
2. *Understand Cauchy theorem, Cauchy integral formulas and apply these to evaluate complex contour integrals. Classify singularities and poles; find residues and evaluate complex integrals using the residue theorem.*
3. *Apply numerical methods to solve algebraic and transcendental equations*
4. *Develop the mathematical skills of the students in the areas of numerical methods.*
5. *Derive interpolating polynomials using interpolation formulae*
6. *Solve differential and integral equations numerically*

UNIT I
Complex Variable – Differentiation
Introduction to functions of complex variable-concept of Limit & continuity- Differentiation, Cauchy-Riemann equations, analytic functions harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method.

UNIT II
Complex Variable – Integration
Line integral-Contour integration, Cauchy's integral theorem (Simple Case), Cauchy Integral formula, Power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series, Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

UNIT III
Solution of Algebraic & Transcendental Equations
Introduction-Bisection Method-Iterative method, Regula-falsi method and Newton Raphson method
System of Algebraic equations: Jacobi and Gauss Siedal method.

UNIT IV
Interpolation
Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Curve fitting: Fitting of straight line, second-degree and Exponential curve by method of least square

UNIT V

Solution of Initial value problems to Ordinary differential equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's and modified Euler's methods-Runge-Kutta methods (second and fourth order).

TEXT BOOKS:

1. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2017, 44th Edition
2. S S Sastry, Introductory Methods of Numerical Analysis, PHI Learning PrivateLimited.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2018, 10thEdition.
2. B.V.Ramana, Higher Engineering Mathematics, by Mc Graw Hill publishers
3. R.K.Jainand, S.R.K.Iyengar, Advanced Engineering Mathematics, Alpha Science International Ltd., 2021 5th Edition (9th reprint).

ONLINE LEARNING RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc17_ma14/preview
2. https://onlinecourses.nptel.ac.in/noc20_ma50/preview
3. http://nptel.ac.in/courses/111105090

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II B. Tech. – I Sem.

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(23HS0814) UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT

COURSE OBJECTIVES
The objectives of this course
1. To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

COURSE OUTCOMES (COs)
On successful completion of this course, students will be able to
1. Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
2. Identify one's self, and one's surroundings (family, society nature) (L1, L2)
3. Apply what they have learnt to their own self in different day-to-day settings in real life (L3)
4. Relate human values with human relationship and human society. (L4)
5. Justify the need for universal human values and harmonious existence (L5)
6. Develop as socially and ecologically responsible engineers (L3, L6)

Course Topics
The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1-hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.
The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I   Introduction to Value Education (6 lectures and 3 tutorials for practice session)
Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture 2: Understanding Value Education

Tutorial 1: Practice Session PS1 Sharing about Oneself
Lecture 3: self-exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – the Basic Human Aspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario

Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II   Harmony in the Human Being (6 lectures and 3 tutorials for practice session)
Lecture 7: Understanding Human being as the Co-existence of the self and the body.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.
Lecture 9: The body as an Instrument of the self
Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III   Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)
Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV   Harmony in the Nature/Existence (4 lectures and 2 tutorials for practicesession)
Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V   Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)
Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management
Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the self
PS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

READINGS:
Textbook and Teachers Manual
a. The Textbook
R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
b. The Teacher's Manual
R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books
1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

Mode of Conduct:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

Online Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf

2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf

3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf

4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%202023.pdf

5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf

6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf

7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%202023-25%20Ethics%20v1.pdf

8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385

9. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

II B.Tech.– I Sem.

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	3	0	0	3

(23EE0207) ELECTROMAGNETIC FIELD THEORY

COURSE OBJECTIVES

The objectives of this course

1. To learn the laws concerning static magnetic fields: Coulomb's law, Gauss's law and the laws concerning static magnetic fields: Biot savart law, Ampere circuital law
2. To learn the equations concerned with static electric fields
3. To learn the equations concerned with static magnetic fields
4. To find the difference between the behaviors of conductors and dielectrics in electric fields
5. To determine the energy stored and energy density in static electric field and magnetic field

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Remember the concepts of vector algebra, vector calculus, Coulomb's law, Gauss's law ,electrostatic fields and Potential Gradient*
2. *Understand the concepts of conductors, behavior of conductor in electric fields, dielectrics, capacitance, Electric Dipole and Polarization*
3. *Apply Ohm's law in point form, Biot-Savart's law, Biot-Savart's law and its applications Ampere's circuital law and Maxwell's third equation*
4. *Evaluate the magnetic force, Lorentz Force Equation , moving charges in a magnetic field*
5. *Analyze self and mutual inductances, self-inductance of different cables, mutual inductance between different wires*
6. *Analyze time varying fields, Faraday's laws, Maxwell's fourth equation, Poynting theorem*

UNIT I

Vector Analysis:

Vector Algebra: Scalars and Vectors, Unit vector, Vector addition and subtraction, Position and distance vectors, Vector multiplication, Components of a vector.

Coordinate Systems: Rectangular, Cylindrical and Spherical coordinate systems.

Vector Calculus: Differential length, Area and Volume.Del operator, Gradient of a scalar, Divergence of a vector and Divergence theorem (definition only). Curl of a vector and Stoke's theorem (definition only), Laplacian of a scalar

Electrostatics:

Coulomb's law and Electric field intensity (EFI) – EFI due to Continuous charge distributions (line and surface charge), Electric flux density, Gauss's law (Maxwell's first equation,$\nabla . \vec{D} = \rho_v$), Applications of Gauss's law, Electric Potential, Work done in moving a point charge in an electrostatic field (second Maxwell's equation for static electric fields,$\nabla \times \vec{E} = 0$), Potential gradient, Laplace's and Poison's equations.

UNIT II
Conductors – Dielectrics and Capacitance:
Behaviour of conductor in Electric field, Electric dipole and dipole moment – Potential and EFI due to an electric dipole, Torque on an Electric dipole placed in an electric field, Current density-conduction and convection current densities, Ohm's law in point form, Behaviour of conductors in an electric field, Polarization, dielectric constant and strength, Continuity equation and relaxation time, Boundary conditions between conductor to dielectric, dielectric to dielectric and conductor to free space, Capacitance of parallel plate, coaxial and spherical capacitors, Energy stored and density in a static electric field, Coupled and decoupled capacitors.

UNIT III
Magneto statics, Ampere's Law and Force in magnetic fields:
Biot-Savart's law and its applications viz. Straight current carrying filament, circular, square, rectangle and solenoid current carrying wire – Magnetic flux density and Maxwell's second Equation , Ampere's circuital law and its applications viz. MFI due to an infinite sheet, long filament, solenoid, toroidal current carrying conductor, point form of Ampere's circuital law, Maxwell's third equation .
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, Magnetic torque, and moment.

UNIT IV
Self and mutual inductance:
Self and mutual inductance – determination of self-inductance of a solenoid, toroid, coaxial cable and mutual inductance between a straight long wire and a square loop wire in the same plane – Energy stored and energy density in a magnetic field.

UNIT V
Time Varying Fields:
Faraday's laws of electromagnetic induction, Maxwell's fourth equation integral and point forms of Maxwell's equations, statically and dynamically induced EMF, Displacement current, Modification of Maxwell's equations for time varying fields, Poynting theorem and Poynting vector.

Textbooks:
1. "Elements of Electromagnetics" by Matthew N O Sadiku, Oxford Publications, 7th edition, 2018.
2. "Engineering Electromagnetics" by William H. Hayt& John. A. Buck Mc. Graw-Hill, 9th Editon.2017.

Reference Books:
1. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 5th edition,2023.
2. "Electromagnetic Field Theory" by Yaduvir Singh, Pearson India, 3rd edition, 2017.
3. "Fundamentals of Engineering Electromagnetics" by Sunil Bhooshan, Oxford University Press, 2012.
4. Schaum's Outline of Electromagneticsby Joseph A. Edminister, MahamoodNavi, 5th Edition,2019.

Web Resources:
1. https://archive.nptel.ac.in/courses/108/106/108106073/
2. https://nptel.ac.in/courses/117103065

SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY:: PUTTUR
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II B.Tech. – I Sem.

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(23EE0208) ELECTRICAL CIRCUIT ANALYSIS-II

COURSE OBJECTIVES

The objectives of this course

1. *To learn three phase balanced and unbalanced circuits.*
2. *To learn Transient response of R-L, R-C and R-L-C circuits.*
3. *To learn the solution using differential equation approach, Laplace transforms approach and Fourier series approach.*
4. *To learn Network Parameters and Interconnection of Two Port networks in various configurations.*
5. *To learn various configurations of filters.*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Understand three phase balanced and unbalanced circuits, different circuit configurations and it's mathematical modeling.*
2. *Remember the concepts of Laplace transforms, formulation of various circuit topologies.*
3. *Apply Laplace transforms to solve various electrical network topologies*
4. *Compute the parameters of a two-port network.*
5. *Analyze three phase circuits, transient response of various network topologies, electric circuits with periodic excitations.*
6. *Design suitable electrical circuits and various filters for different applications*

UNIT I
Analysis of three phase balanced circuits:
Phase sequence, star and delta connection of sources and loads, relation between line and phase quantities, analysis of balanced three phase circuits, measurement of active and reactive power.
Analysis of three phase unbalanced circuits:
Loop method, Star-Delta transformation technique, two-wattmeter method for measurement of three phase power.

UNIT II
Laplace transforms – Definition and Laplace transforms of standard functions– Shifting theorem – Transforms of derivatives and integrals,Inverse Laplace transforms and applications.
Transient Analysis: Transient response of R-L, R-C and R-L-C circuits (Series and parallel combinations) for D.C. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform approach.

UNIT III
Network Parameters: Impedance parameters, Admittance parameters, Hybrid parameters, Transmission (ABCD) parameters, conversion of Parameters from one form to other,

Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations- problems.

UNIT IV
Analysis of Electric Circuits with Periodic Excitation: Fourier series and evaluation of Fourier coefficients, Trigonometric and complex Fourier series for periodic waveforms, Application to Electrical Systems – Effective value and average value of non-sinusoidal periodic waveforms, power factor, effect of harmonics.

UNIT V
Filters: Classification of filters-Low pass, High pass, Band pass and Band Elimination filters, Constant-k filters -Low pass and High Pass, Design of Filters.

Textbooks:
1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition McGraw-Hill, 2013
2. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 7th Edition, Tata McGraw-Hill, 2022

Reference Books:
1. Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI, 2019.
2. Network Theory, N. C. Jagan and C. Lakshminarayana, 3rd Edition, B. S. Publications,2019.
3. Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyam Mohan S. Palli, 5th Edition, Tata McGraw-Hill, 2017.
4. Engineering Network Analysis and Filter Design (Including Synthesis of One Port Networks)- Durgesh C. KulshreshthaGopal G. Bhise, Prem R. Chadha ,Umesh Publications 2012.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, DhanpatRai& Co., 2018, 7th Revised Edition.

Web Resources:
1. https://archive.nptel.ac.in/courses/117/106/117106108/
2. https://archive.nptel.ac.in/courses/108/105/108105159/

SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY:: PUTTUR
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II Year B.Tech. EEE – I Semester

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3	0	0	3

(23EE0209) DC MACHINES & TRANSFORMERS

COURSE OBJECTIVES

The objectives of this course

1. *To learn the construction and principle of operation of DC machines.*
2. *To learn characteristics and testing of different DC machines.*
3. *To learn the construction and principle of operation of single phase transformers.*
4. *To determine the efficiency of transformer by conducting various tests.*
5. *To learn the Polyphase connections of three phase transformers.*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Understand the process of voltage build-up in DC generators and characteristics.*
2. *Understand the process of torque production, starting and speed control of DC motors and illustrate their characteristics.*
3. *Obtain the equivalent circuit of single-phase transformer, auto transformer*
4. *Determine its efficiency & regulation of single phase transformer*
5. *Apply various testing methods for transformers and speed control of DC motors*
6. *Analyze various configurations of three-phase transformers.*

UNIT I
DC Generators:
Construction and principle of operation of DC machines – EMF equation for generator – Excitation techniques– characteristics of DC generators –applications of DC Generators, Back-emf and torque equations of DC motor – Armature reaction and commutation, Applications.

UNIT II
Starting, Speed Control and Testing of DC Machines:
Characteristicsof DC motors – losses andefficiency – applications of DC motors. Necessity of a starter – starting by 3-point and 4-point starters – speed control by armature voltage and field current control – testing of DC machines – brake test, Swinburne's test –Hopkinson's test–Field Test.

UNIT III
Single-phase Transformers:
Introduction to single-phase Transformers (Construction and principle of operation)–emf equation – operation on no-load and on load –lagging, leading and unity power factors loads –phasor diagrams– equivalent circuit –regulation – losses and efficiency – effect of variation of frequency and supply voltage on losses – all day efficiency, Applications.

UNIT IV
Testing of Transformers:
Open Circuit and Short Circuit tests – Sumpner's test – separation of losses— Parallel operation with equal and unequal voltage ratios– auto transformer – equivalent circuit – comparison with two winding transformers.

UNIT V
Three-Phase Transformers:
Poly phase connections- Y/Y, Y/Δ, Δ/Y, Δ/Δ, open Δ and Vector groups – third harmonics in phase voltages– Parallel operation–three winding transformers- transients in switching –off load and on load tap changers–Scott connection.

Textbooks:
1. Electrical Machinery by Dr. P S Bimbhra, Fully Revised Edition 2021 Khanna Publishers.
2. Performance and analysis of AC machines by M.G. Say, CBS, 2002.

Reference Books:
1. Electrical Machines by D. P.Kothari, I .J .Nagarth, McGraw Hill Publications, 5th edition 2017.
2. Electrical Machinery Fundamentals by Stephen J Chapman McGraw Hill education 2011.
3. Generalized Theory of Electrical Machines by Dr. P S Bimbhra, 7th Edition, Khanna Publishers, 2021.
4. Theory & Performance of Electrical Machines by J.B.Gupta, S.K.Kataria& Sons,2007.
5. Electric Machinery by Fitzgerald, A.E.,Kingsley, Jr.,C.,&Umans, S. D, 7th edition, McGraw-Hill Education, 2014.

Web Resources:
1. nptel.ac.in/courses/108/105/108105112
2. nptel.ac.in/courses/108/105/108105155

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II B.Tech. – I Sem.

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(23EE0210) ELECTRICAL CIRCUIT ANALYSIS-II AND SIMULATION LAB

COURSE OBJECTIVES

The objectives of this course

1. *To study the fundamentals of Kirchhoff's current law and voltage law.*
2. *To learn the measurement of voltage, current, power and impedance of any circuit.*
3. *To learn two port network parameters.*
4. *To learn the transient response of RL, RC and RLC circuits.*
5. *To learn simulation of electrical circuits using software tools.*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Understand the power calculations in three phase circuits.*
2. *Analyze the time response of given network.*
3. *Determination of two port network parameters.*
4. *Simulate and analyze electrical circuits using software tools*
5. *Apply various theorems to solve different electrical networks using simulation tools*
6. *Analysis of transient response of RL, RC and RLC circuits.*
   Verification of self-inductance and mutual inductance

List of Experiments:

Any 10 of the following experiments are to be conducted:

1. Measurement of Active Power and Reactive Power for balanced loads.
2. Measurement of Active Power and Reactive Power for unbalanced loads.
3. Determination of Z and Y parameters.
4. Determination of ABCD and hybrid parameters
5. Verification of Kirchhoff's current law and voltage law using simulation tools.
6. Verification of mesh and nodal analysis using simulation tools.
7. Verification of super position and maximum power transfer theorems usingsimulation tools.
8. Verification of Reciprocity and Compensation theorems using simulation tools.
9. Verification of Thevenin's and Norton's theorems using simulation tools.
10. Verification of series and parallel resonance using simulation tools.
11. Simulation and analysis of transient response of RL, RC and RLC circuits.
12. Verification of self-inductance and mutual inductance by using simulation tool

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II B.Tech. – I Sem.

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	0	0	3	1.5

(23EE0211) DC MACHINES & TRANSFORMERS LAB

COURSE OBJECTIVES

The objectives of this course

1. *To learn starting and speed control methods of DC Machines.*
2. *To learn performance characteristics of DC machines.*
3. *To learn various tests on DC machines.*
4. *To draw the equivalent circuit of transformer.*
5. *To learn predetermined efficiency and regulation of transformer.*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. Demonstrate starting and speed control methods of DC Machines.
2. Apply theoretical concepts to determine the performance characteristics of DC Generators.
3. Apply theoretical concepts to determine the performance characteristics of DC Motors.
4. Analyze the parallel operation of single phase transformers
5. Determine the performance parameters of single-phase transformer.
6. Analyze the performance analysis of transformers using various tests

List of Experiments:

Any 10 of the following experiments are to be conducted:

1. Speed control of DC shunt motor by Field Current and Armature Voltage Control.
2. Brake test on DC shunt motor- Determination of performance curves.
3. Swinburne's test - Predetermination of efficiencies as DC Generator and Motor.
4. Hopkinson's teston DC shunt Machines.
5. Load test on DC compound generator-Determination of characteristics.
6. Load test on DC shunt generator-Determination of characteristics.
7. Fields test on DC series machines-Determination of efficiency.
8. Brake test on DC compound motor-Determination of performance curves.
9. OC & SC tests on single phase transformer.
10. Sumpner's test on single phase transformer.
11. Scott connection of transformers.
12. Parallel operation of Single-phase Transformers.
13. Separation of core losses of a single-phase transformer.

Reference:
1. https://ems-iitr.vlabs.ac.in/List%20of%20experiments.html

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II B.Tech. –I Sem.	L	T	P	C
	3	0	0	3

(23CS0553) DATA STRUCTURES
(Skill Enhancement Course)

COURSE OBJECTIVES

The objectives of this course

1. *To provide the knowledge of basic data structures and their implementations.*
2. *To understand how to assess the choice of data structures and algorithm design methods impacts the performance of programs*
3. *To choose the appropriate data structure and algorithm design method for a specified application.*
4. *To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.*
5. *To efficiently implement the different data structures and solutions for specific problems*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Understand the role of data structures in organizing and accessing data*
2. *Apply the linked lists concepts for dynamic data storage*
3. *Apply the stack mechanism to develop stack applications*
4. *Understand the queue and dynamic data structure techniques*
5. *Analyze the dequeue operations on deques and their applications*
6. *Apply the tree techniques for processing hierarchical data structure*

UNIT-1

Introduction to Data Structures: Definition and importance of Data structures, Abstract data types (ADTs) and its specifications, Arrays: Introduction, 1-D, 2-D Arrays, accessing elements of array, Row Major and Column Major storage of Arrays, Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Quick sort.

Sample experiments:

1. Program to find min & max element in an array.
2. Program to implement matrix multiplication.
3. Find an element in given list of sorted elements in an array using Binary search.
4. Implement Selection and Quick sort techniques.

UNIT-II

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists.

Sample experiments:

1. Write a program to implement the following operations using SLL.
        a. Insert b. Deletion c. Traversal

2. Write a program to store name, roll no, and marks of students in a class using circulardouble linked list.
3. Write a program to perform addition of given two polynomial expressions using linked list.

UNIT-III
Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, backtracking, reversing list etc.

Sample experiments:
1. Implement stack operations using
        a. Arrays b. Linked list
2. Convert given infix expression into post fix expression using stacks.
3. Evaluate given post fix expression using stack.
4. Write a program to reverse given linked list using stack.

UNIT-IV
Queues: Introduction to queues: properties and operations, Circular queues, implementing queues using arrays and linked lists,Applications of queues scheduling, etc.

Deques: Introduction to deques (double-ended queues), Operations on deques and their applications

Sample experiments:
1. Implement Queue operations using
        a. Arrays b. Linked list
2. Implement Circular Queue using
        a. Arrays b. Linked list
 3. Implement Deque using linked list.

UNIT-V
Trees: Introduction to Trees, Binary trees and traversals, Binary Search Tree – Insertion, Deletion & Traversal

Sample experiments:
1. Implement binary tree traversals using linked list.
2. Write program to create binary search tree for given list of integers. Perform in-order traversal of the tree. Implement insertion and deletion operations.

TEXT BOOKS
1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

REFERECE BOOKS
1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5.Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching and Graph Algorithms" by Robert Sedgewick.

SIDDHARTH INSTITUTE OF ENGINEERING &TECHNOLOGY:: PUTTUR
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II B.Tech. – I Sem.

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ENVIRONMENTAL SCIENCE (23HS0805)
(Common to all)

COURSE OBJECTIVES
The objectives of this course

1. *To make the students to get awareness about the environment.*
2. *To understand the importance of protecting natural ecosystems for future.*
3. *To save earth from the inventions by Engineers.*

COURSE OUTCOMES (Cos)
On successful completion of this course, students will be able to
1. *To make the students to get awareness about the environment and its components.*
2. *To understand the importance of protecting natural ecosystems.*
3. *To understand various types of pollutions and their effects.*
4. *To understand the various engineering techniques to protect the environment.*
5. *To make awareness about the social issues and laws of environmental protection.*
6. *To understand the concept of sustainable development and role of Engineering Technology in environment and human health.*

UNIT I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT II
Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:
a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem.
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its Conservation : Introduction, Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III

Environmental Pollution: Definition, Cause, effects and control measures of :
a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes –
Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies –Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT V

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/ mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

Textbooks:

1. Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2. Palaniswamy, "Environmental Studies", Pearson education
3. S. Azeem Unnisa, "Environmental Studies" Academic Publishing Company
4. K. Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses

as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd.

References:

1. Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
2. M.Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice hall of India Private limited
5. G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice hall of India Private limited

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II B. Tech. – II Sem.

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(23HS0848) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Humanities Elective-I)

COURSE OBJECTIVES

The objectives of this course

1. *To inculcate the basic knowledge of microeconomics and financial accounting*
2. *To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost*
3. *To Know the Various types of market structure and pricing methods and strategy*
4. *To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.*
5. *To provide fundamental skills on accounting and to explain the process of preparingfinancial statements.*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Define the concepts related to Managerial Economics, financial accounting and management*
2. *Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets.*
3. *Apply the Concept of Production cost and revenues for effective Business decision*
4. *Analyze how to invest their capital and maximize returns.*
5. *Evaluate the capital budgeting techniques.*
6. *Develop the accounting statements and evaluate the financial performance of businessentity .*

UNIT - I   Managerial Economics

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting-Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT - II   Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT - III   Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT - IV   Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirement

Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT - V   Financial Accounting and Analysis

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbooks:
1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

Reference Books:
1. Ahuja Hl Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

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(23HS0850) ORGANISATIONAL BEHAVIOUR
(Humanities Elective-I)

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COURSE OBJECTIVES
The objectives of this course:
1. To enable student's comprehension of organizational behavior.
2. To offer knowledge to students on self-motivation, leadership and management.
3. To facilitate them to become powerful leaders.
4. To Impart knowledge about group dynamics.
5. To make them understand the importance of change and development.

COURSE OUTCOMES (COs)
On successful completion of this course, students will be able to
1. Define the Organizational Behaviour, its nature and scope.
2. Understand the nature and concept of Organizational behavior.
3. Apply theories of motivation to analyse the performance problems.
4. Analyse the different theories of leadership.
5. Evaluate group dynamics.
6. Develop as powerful leader.

UNIT-I
Introduction to Organizational Behavior - Meaning, definition, nature, scope and functions - Organizing Process –Making organizing effective -Understanding Individual Behaviour –Attitude -Perception -Learning –Personality.

UNIT-II
Motivation and Leading - Theories of Motivation-Maslow's Hierarchy of Needs -Hertzberg's Two Factor Theory -Vroom's theory of expectancy –Mc Cleland's theory of needs–Mc Gregor's theory X and theory Y–Adam's equity theory –Locke's goal setting theory–Alderfer's ERG theory .

UNIT-III
Organizational Culture - Introduction –Meaning, scope, definition, Nature -Organizational Climate -Leadership -Traits Theory–Managerial Grid -Transactional Vs Transformational Leadership -Qualities of good Leader -Conflict Management -Evaluating Leader-Women and Corporate leadership.

UNIT-IV
Group Dynamics - Introduction –Meaning, scope, definition, Nature-Types of groups -Determinants of group behavior -Group process –Group Development -Group norms -Group cohesiveness -Small Groups -Group decision making -Team building -Conflict in the organization–Conflict resolution

UNIT-V
Organizational Change and Development - Introduction –Nature, Meaning, scope, definition and functions-Organizational Culture -Changing the Culture –Change Management –Work Stress

Management -Organizational management –Managerial implications of organization's change and development

Textbooks:
1. Luthans, Fred, Organisational Behaviour, McGraw-Hill, 12 Th edition 2011
2. P Subba Ran, Organisational Behaviour, Himalya Publishing House 2017

Reference Books:
1. *McShane, Organizational Behaviour, TMH 2009*
2. *Nelson, Organisational Behaviour, Thomson, 2009.*
3. *Robbins, P. Stephen, Timothy A. Judge, Organisational Behaviour, Pearson 2009.*
4. *Aswathappa, Organisational Behaviour, Himalaya, 2009*

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(23HS0851) BUSINESS ENVIRONMENT
(Humanities Elective-I)

COURSE OBJECTIVES
The objectives of this course:
1. *To make the student to understand about the business environment.*
2. *To enable them in knowing the importance of fiscal and monitory policy.*
3. *To facilitate them in understanding the export policy of the country.*
4. *To impart knowledge about the functioning and role of WTO.*
5. *To encourage the student in knowing the structure of stock markets.*

COURSE OUTCOMES (COs)
On successful completion of this course, students will be able to
1. *Define Business Environment and its Importance.*
2. *Understand various types of business environment.*
3. *Apply the knowledge of Money markets in future investment.*
4. *Analyse India's Trade Policy.*
5. *Evaluate fiscal and monitory policy.*
6. *Develop a personal synthesis and approach for identifying business opportunities.*

UNIT-I
Overview of Business Environment - meaning Nature, Scope, significance, functions and advantages. Types-Internal &External, Micro and Macro. Competitive structure of industries - Environmental analysis- advantages & limitations of environmental analysis& Characteristics of business.

UNIT-II
Fiscal & Monetary Policy - Introduction – Nature, meaning, significance, functions and advantages. Public Revenues - Public Expenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget- Monetary Policy - Demand and Supply of Money –RBI -Objectives of monetary and credit policy - Recent trends- Role of Finance Commission.

UNIT-III
India's Trade Policy - Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -Balance of Payments– Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

UNIT-IV
World Trade Organization - Introduction – Nature, significance, functions and advantages. Organization and Structure - Role and functions of WTO in promoting world trade - GATT - Agreements in the Uruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

UNIT-V

Money Markets and Capital Markets - Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI – Stock Exchanges - Investor protection and role of SEBI, Introduction to international finance.

TEXT BOOKS

1. *Francis Cherunilam (2009), International Business: Text and Cases, Prentice Hall of India.*
2. *K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition.HPH2016*

REFERENCES

1. *K. V. Sivayya, V. B. M Das (2009), Indian Industrial Economy, Sultan Chand Publishers, NewDelhi, India.*
2. *Sundaram, Black (2009), International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.*
3. *Chari. S. N (2009), International Business, Wiley India.*
4. *E. Bhattacharya (2009), International Business, Excel Publications, New Delhi.*

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(23EC0459) ANALOG CIRCUITS

COURSE OBJECTIVES
The objectives of this course
   1. *To understand the applications of P-N junction diode, analyze and design various electronic devices and circuits using BJT.*
   2. *To understand the characteristics of BJT amplifiers at low frequencies, Feedback amplifiers, Oscillators, and Operational Amplifiers.*
   3. *Analyze various circuit characteristics by using timers, Phase locked loops and operational amplifiers.*

COURSE OUTCOMES (COs)
   On successful completion of this course, students will be able to
   1. *Understand the concepts of diode clipping and clamping circuits, different amplifier configurations, operation of oscillator circuits, operational amplifiers, timers, ADC and DAC. (L2)*
   2. *Analyze and design various electronic devices and circuits using BJT (L4)*
   3. *Apply the above concepts for different circuit design.(L3)*
   4. *Analyze various circuit characteristics by using Amplifiers, Transistors, Comparators, Wave form generators, ADC and DAC.(L4)*
   5. *Analyze various circuit characteristics by using timers, Phase locked loops and operational amplifiers. (L4)*
   6. *valuate different system configurations by using various amplifier, transistor and waveform generators.(L5)*

UNIT-I
Diode clipping and clamping circuits: Diode clippers, clipping at two independent levels, Transfer characteristics of clippers, clamping circuit operation.
DC biasing of BJTs: Load lines, Operating Point, Bias Stability, Collector-to-Base Bias, Self-Bias, Stabilization against Variations in V_{BE} and β for the Self-Bias Circuit, Bias Compensation, Thermal Runaway, Thermal Stability.

UNIT-II
Small Signals Modeling of BJT: Analysis of a Transistor Amplifier Circuit using h-parameters, Simplified CE Hybrid Model, Analysis of CE, CC, CB Configuration using Approximate Model, Frequency Response of CE and CC amplifiers.

Feedback Amplifiers: Classification of Amplifiers, the Feedback Concept, General Characteristics of Negative-Feedback Amplifiers, Effect of Negative Feedback upon Output and Input Resistances, Voltage-Series Feedback, Current-Series Feedback, Current-Shunt Feedback, Voltage-Shunt Feedback.

UNIT- III
Oscillator Circuits: Barkhausen Criterion of oscillation, Oscillator operation, R-C phase shift oscillator, Wien bridge Oscillator, Crystal Oscillator.

Operational Amplifiers: Introduction, Basic information of Op-Amp, Ideal Operational Amplifier, Block Diagram Representation of Typical Op-Amp, OP-Amps Characteristics: Introduction, DC and AC characteristics, 741 op-amp & its features.

UNIT-IV
OP-AMPS Applications: Introduction, Basic Op-Amp Applications, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converter, Sample and Hold Circuit, Log and Antilog Amplifier, Multiplier and Divider, Differentiator, integrator.

Comparators and Waveform Generators: Introduction, Comparator, Square Wave Generator, Monostable Multivibrator, Triangular Wave Generator, Sine Wave Generators.

UNIT-V
Timers and Phase Locked Loop: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger, PLL block schematic, principles and description of individual blocks, 565 PLL, Applications of VCO (566).

Digital To Analog And Analog To Digital Converters: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A-D Converters – parallel Comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

TEXTBOOKS
1. Electronic Devices and Circuits- J. Millman, C.Halkias, Tata Mc-Graw Hill, 2nd Edition, 2010.
2. Linear Integrated Circuits – D. Roy Choudhury, New Age International (p) Ltd, 2nd Edition, 2003.

REFERENCES
1. Electronic Devices and Circuit Theory – Robert L.Boylestad and Lowis Nashelsky, Pearson Edition, 2021.
2. Electronic Devices and Circuits–G.K. Mithal, Khanna Publisher, 23rd Edition, 2017.
3. Electronic Devices and Circuits – David Bell, Oxford, 5th Edition, 2008.
4. Electronic Principles–Malvino, Albert Paul, and David J. Bates, McGraw-Hill/Higher Education, 2007.
5. Operational Amplifiers and Linear Integrated Circuits – Gayakwad R.A, Prentice Hall India, 2002.
6. Operational Amplifiers and Linear Integrated Circuits –Sanjay Sharma, Kataria & Sons, 2nd Edition, 2010.
7. Design of Analog CMOS Integrated Circuits - Behzad Razavi

Web Resources:
1. https://nptel.ac.in/courses/122106025.
2. https://nptel.ac.in/courses/108102112.

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(23EE0213) POWER SYSTEMS-I

COURSE OBJECTIVES
The objectives of this course

> 1. To understand Structure, essential components and their layout in thermal power station.
> 2. To understand Selection of site for hydro power generation.
> 3. To learn about Various aspects and issues involved in Nuclear power generation
> 4. To study the working of substations and distribution systems.
> 5. To understand Cost of generation and tariff methods.

COURSE OUTCOMES (COs)

> *On successful completion of this course, students will be able to*
> 1 *Estimate the probable quantity of coal needed to create the number of units produced for the thermal power plant at the cost per kWh generated, and Analyse the quantity of units generated, the cost of production, and the amount of river water needed to produce hydel power.*
> 2 *Recognize the operation and functioning of nuclear power facilities.*
> 3 *To analyse the different substations located throughout distribution networks*
> 4 *To comprehend ideas regarding subsurface cables and insulating materials.*
> 5 *Examine a range of economic factors pertaining to the production and distribution of power.*
> 6 *Evaluation of the tariffs to be charged to consumers.*

UNIT I
Hydroelectric Power Stations:
Selection of site, general layout of a hydroelectric power plant with brief description of major components and principle of operation
Thermal Power Stations:
Selection of site, general layout of a thermal power plant. Brief description of components: boilers, super heaters, economizers and 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 reactorsand brief description of PWR, BWR and FBR. Radiation: radiation hazards and shielding, nuclear waste disposal.

UNIT III
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, constructional aspects of GIS, comparison of air insulated substations and gas insulated substations.

UNIT IV
Distribution Systems:
Classification of Distribution systems, A.C Distribution, Overhead versus Underground system,Connection schemes of Distribution system, Requirements of Distribution system, Design considerations in Distribution system.

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 intersheath grading.

UNIT V
Economic Aspects & 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, plant 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, Time of Day (ToD) tariff and Time of Use (ToU) tariff.

Textbooks:
1. S. N. Singh, Electric Power Generation, Transmission and Distribution, PHI Learning Pvt Ltd, New Delhi, 2nd Edition, 2012
2. J. B. Gupta, Transmission and Distribution of Electrical Power, S. K. Kataria and sons,10th Edition, 2021

Reference Books:
1. I.J.Nagarath& D.P. Kothari, Power System Engineering, McGraw-Hill Education, 3rd Edition, 2019.
2. C.L.Wadhwa,Generation, Distribution and Utilization of Electrical Energy, New Age International Publishers, 6th Edition, 2018.
3. V. K. Mehta and Rohit Mehta, Principles of Power System, S. Chand, 7th Edition, 2021.
4. Turan Gonen, Electric Power Distribution System Engineering, McGraw-Hill, 3rd edition, 2014.
3. Handbook of switchgear, BHEL, McGraw-Hill Education, 2007.

Web Resources:
1. https://nptel.ac.in/courses/108102047

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(23EE0215) CONTROL SYSTEMS

COURSE OBJECTIVES

The objectives of this course

1. *To make the students familiarize various representations of systems.*
2. *To make the students analyze the stability of linear systems in time domain and frequency domain.*
5. *To make the students analyze the stability of linear systems in frequency domain.*
6. *To make the students design compensator based on the time and frequency domain Specifications.*
7. *To develop linear models mainly state variable model and Transfer function model*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1 *Identify open and closed loop control system and Represent simple systems in transfer function and state variable forms*
2 *Analyse simple systems in time domain.*
3 *Analyse simple systems in frequency domain*
4 *Design Compensators for given control systems using Lead, Lag networks*
5 *Infer the stability of systems in time and frequency domain.*
6 *Interpret characteristics of the system through state space approach and find out solution for simple control problems*

UNIT I
CONTROL SYSTEMS CONCEPTS
Open loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback characteristics, Effects of positive and negative feedback, Mathematical models – Differential equations of translational and rotational mechanical systems and electrical systems, Analogous Systems, Block diagram reduction methods – Signal flow graphs - Reduction using Mason's gain formula. Principle of operation of DC and AC Servo motor, Transfer function of DC servo motor - AC servo motor, Synchros.

UNIT II
TIME RESPONSE ANALYSIS
Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, P, PI, PID Controllers.

UNIT III
STABILITY ANALYSIS IN TIME DOMAIN
The concept of stability – Routh's stability criterion – Stability and conditional stability – limitations of Routh's stability. The Root locus concept - construction of root loci,effects of

adding poles and zeros.

UNIT IV
FREQUENCY RESPONSE ANALYSIS
Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Stability Analysis from Bode Plots. Polar Plots-Nyquist Plots- Phase margin and Gain margin-Stability Analysis. Compensation techniques – Lag, Lead, Lag-Lead Compensator design .

UNIT V
STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS
Concepts of state, state variables and state model, state models - differential equations & Transfer function models - Block diagrams. Diagonalization, Transfer function from state model, Solving the Time invariant state Equations- State Transition Matrix and it's Properties. System response through State Space models. The concepts of controllability and observability, Duality between controllability and observability.

Textbooks:
1. Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers, 7th edition, 2021.

Reference Books:
1. Control Systems Principles & Design by M.Gopal, 4th Edition, Mc Graw Hill Education, 2012.
2. Automatic Control Systems by B. C. Kuo and Farid Golnaraghi, John wiley and sons, 9th edition, 2014.
3. Feedback and Control Systems, Joseph J Distefano III, Allen R Stubberud & Ivan J Williams, 2nd Edition, Schaum's outlines, Mc Graw Hill Education, 2013.
4. Control System Design by Graham C. Goodwin, Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. Feedback Control of Dynamic Systems by Gene F. Franklin, J.D. Powell and Abbas Emami-Naeini, 6th Edition, Pearson, 2010.

Web Resources:
1. https://nptel.ac.in/courses/108102043
2. https://nptel.ac.in/courses/108106098.

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(23EE0214) INDUCTION AND SYNCHRONOUS MACHINES

COURSE OBJECTIVES
The objectives of this course

1. *To understand constructional details, principle of operation and the importance of slip ring Induction motors*
2. *To understand various speed control methods of induction motors*
3. *To understand behavior of single-phase induction motors*
4. *The understand the construction and working principal of synchronous machines*
5. *To understand the performance characteristics of synchronous motor*

COURSE OUTCOMES (COs)
On successful completion of this course, students will be able to

1. *To understand constructional details, principle of operation and the performance of Slip ring Induction motors*
2. *To understand different speed control methods of 3-Phase induction motors*
3. *To understand constructional details, principal and operation of single phase motors*

4. *To understand the starting methods of single phase motors and its applications*
5. *To understand constructional details, principal and operation of salient and non salient pole alternators and its applications*
6. *To understand the effect of excitation on current and power factor of Synchronous motors*

UNIT I
1. phase induction motors:

Construction of Squirrel cage and Slipring induction motors– production of rotating magnetic field – principle of operation – rotor emf and rotor frequency – rotor current and power factor at standstill and during running conditions– rotor power input, rotor copper loss and mechanical power developed and their inter-relationship –equivalent circuit – phasor diagram, Applications.

UNIT II
Performance of 3-Phase induction motors:

Torque equation – expressions for maximum torque and starting torque – torque-slip characteristics – double cage and deep bar rotors –No load, Brake test and Blocked rotor tests – circle diagram for predetermination of performance- methods of starting –starting current and torque calculations -speed control of induction motor with V/f control method, rotor resistance control and rotor emf injection technique –crawling and cogging – induction generator operation.

UNIT III
Single Phase Motors:

Single phase induction motors – constructional features – double revolving field theory,

Cross field theory – equivalent circuit- starting methods: capacitor start capacitor run, capacitor start induction run, split phase & shaded pole, AC series motor, Applications.

UNIT IV
Synchronous Generator:
Constructional features of non-salient and salient pole type alternators- armature windings – distributed and concentrated windings – distribution& pitch factors – E.M.F equation – armature reaction – voltage regulation by synchronous impedance method – MMF method and Potier triangle method –two reaction analysis of salient pole machines -methods of synchronization- Slip test – Parallel operation of alternators.

UNIT V
Synchronous Motor:
Synchronous motor principle and theory of operation – Effect of excitation on current and power factor– synchronous condenser –expression for power developed –hunting and its suppression – methods of starting, Applications.

Textbooks:
   1. Electrical Machinery, Dr. P.S. Bhimbra, Khanna Publishing, 2021,First Edition.
   2. Performance and analysis of AC machines by M.G. Say, CBS, 2002.

Reference Books:
   1.Electrical machines, D.P. Kothari and I.J. Nagrath, McGraw Hill
      Education, 2017,Fifth Edition.
   2. Theory & Performance of Electrical Machines by J.B.Gupta, S.K.Kataria&
      Sons,15th edition, 2022..
   3. Electric Machinery, A.E.Fitzgerald, Charles kingsley, Stephen
      D.Umans, McGraw-Hill, 2020, Seventh edition.

Web Resources:
         1. https://nptel.ac.in/courses/108/105/108105131
         2. https://nptel.ac.in/courses/108106072

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(23EE0217) CONTROL SYSTEMS LAB
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COURSE OBJECTIVES

The objectives of this course

1. *To study the effects of feedback control on system performance*
2. *To determine the transfer functions of Electrical Machine.*
3. *To design of controllers/compensators to achieve desired specifications.*
4. *To study the characteristics of servo mechanisms used in automatic control applications.*
5. *To learn the MATLAB applications to control systems.*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. *Understand how to use feedback control system to determine transfer function of DC servo motor and any other given circuit with R, L and C components*
2. *Model the systems and able to design the controllers and compensators.*
3. *Get the knowledge about the effect of poles and zeros location on transient and steady state behavior of second order systems and implement through software tools*
4. *Determine the performance and time domain specifications of first and second order systems.*
5. *Understand the stability analysis*
6. *Understand the functioning of PID controllers*

List of Experiments:

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 – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC Machine
6. Effect of P, PD, PI, PID Controller on a second order system
7. Lag and lead compensation – Magnitude and phase plot
8. Temperature controller using PID
9. Characteristics of magnetic amplifiers
10. Characteristics of AC servo motor
11. Linear system analysis (Time domain analysis, Error analysis) using MATLAB.
12. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB
13. State space model for classical transfer function using MATLAB – Verification.

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(23EE0216) INDUCTION AND SYNCHRONOUS MACHINES LAB

COURSE OBJECTIVES
The objectives of this course:

1. To deal with the detailed analysis of poly phase induction motors & Synchronous generators and motors

2. To understand operation, construction and types of single-phase motors and their applications in house hold appliances and control systems.

3. To introduce the concept of parallel operation of synchronous generators.

4. To understand speed control methods in induction motors.

5. To understand the V and Inverted V curves of a three-phase synchronous motors.

COURSE OUTCOMES (COs)
On successful completion of this course, students will be able to

1. Analyze various performance characteristics of 3-phase and 1-phase induction motors
2. Evaluate the performance of 3-phase Induction Motor by obtaining the circle diagram and equivalent circuit of 3-phase Induction Motor and single phase induction motor
3. Adapt the power factor improvement methods for single phase Induction Motor
4. Pre-determine the regulation of 3-phase alternator
5. Determine the synchronous machine reactance of 3-phase alternator
6. Determine the regulation of three-phase alternator by Potier triangle method

List of Experiments:

Any 10 experiments of the following are required to be conducted
1. Brake test on three phase Induction Motor.
2. Circle diagram of three phase induction motor.
3. Speed control of three phase induction motor by V/f method.
4. Equivalent circuit of single-phase induction motor.
5. Power factor improvement of single-phase induction motor by using capacitors.
6. Load test on single phase induction motor.
7. Regulation of a three -phase alternator by synchronous impedance &MMF methods.
8. Regulation of three-phase alternator by Potier triangle method.
9. V and Inverted V curves of a three-phase synchronous motor.
10. Determination of X_d, X_q & Regulation of a salient pole synchronous generator.
11. Determination of efficiency of three phase alternator by loading with three phase induction motor.
12. Parallel operation of three-phase alternator under no-load and load conditions.
13. Determination of efficiency of a single-phase AC series Motor by conducting Brake test.

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(23CS0549) PYTHON PROGRAMMING

COURSE OBJECTIVES

The objectives of this course

1. *Introduce core programming concepts of Python programming language.*
2. *Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries*
3. *Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these*

COURSE OUTCOMES (COs)

On successful completion of this course, students will be able to

1. **Understand** the Basic knowledge of python programming and installation of Anaconda using Jupyter Notebook.
2. **Apply** the functions on libraries, usage of string and list operations.
3. **Apply** the concept of Dictionaries for analyzing the data with key and value.
4. **Apply** the concept of Tuples and Sets to perform operations on sets of data.
5. **Analyze** the file concepts and oops paradigms.
6. **Apply** the concepts of JSON and XML for data processing.

UNTI-I:

History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.

Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.

Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:

1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
 i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators
5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

UNIT-II:

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.

Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

Sample Experiments:
7. Write a program to define a function with multiple return values.
8. Write a program to define a function using default arguments.
9. Write a program to find the length of the string without using any library functions.
10. Write a program to check if the substring is present in a given string or not.
11. Write a program to perform the given operations on a list:
    i. additionii. insertioniii. slicing
12. Write a program to perform any 5 built-in functions by taking any list.

UNIT-III:
Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozenset.

Sample Experiments:
13. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
14. Write a program to count the number of vowels in a string (No control flow allowed).
15. Write a program to check if a given key exists in a dictionary or not.
16. Write a program to add a new key-value pair to an existing dictionary.
17. Write a program to sum all the items in a given dictionary.

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

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

Sample Experiments:
18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Python program to print each line of a file in reverse order.
20. Python program to compute the number of characters, words and lines in a file.
21. Write a program to create, display, append, insert and reverse the order of the items in the array.
22. Write a program to add, transpose and multiply two matrices.

23. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

UNIT-V:
Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

Sample Experiments:
24. Python program to check whether a JSON string contains complex object or not.
25. Python Program to demonstrate NumPy arrays creation using array () function.
26. Python program to demonstrate use of ndim, shape, size, dtype.
27. Python program to demonstrate basic slicing, integer and Boolean indexing.
28. Python program to find min, max, sum, cumulative sum of array
29. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:
    a) Apply head () function to the pandas data frame
    b) Perform various data selection operations on Data Frame
30. Select any two columns from the above data frame, and observe the change in one attribute with respect to other attribute with scatter and plot operations in matplotlib

Reference Books:
1. Gowri shankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

Online Learning Resources/Virtual Labs:
1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. **https://www.coursera.org/learn/python?specialization=python#syllabus**

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(23HS0815) DESIGN THINKING & INNOVATION

COURSE OBJECTIVES
The objectives of this course

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

COURSE OUTCOMES (COs)
On successful completion of this course, students will be able to
1. *Define the concepts related to design thinking.*
2. *Explain the fundamentals of Design Thinking and innovation*
3. *Apply the design thinking techniques for solving problems in various sectors.*
4. *Analyse to work in a multidisciplinary environment*
5. *Evaluate the value of creativity*
6. *Formulate specific problem statements of real time issues*

UNIT I   Introduction to Design Thinking
Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT II   Design Thinking Process
Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT III   Innovation
Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT IV   Product Design
Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies

Activity: Importance of modelling, how to set specifications, Explaining their own product design.

UNIT V   Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs-Design thinking for Startups- Defining and testing Business Models and Business Cases-Developing & testing prototypes.

Activity: How to market our own product, About maintenance, Reliability and plan for startup.

Textbooks:
1. Tim Brown,Change by design, Harper Bollins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

Reference Books:
1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter.
4. Chesbrough.H, The Era of Open Innovation – 2013

Online Learning Resources:
https://nptel.ac.in/courses/110/106/110106124/
https://nptel.ac.in/courses/109/104/109104109/
https://swayam.gov.in/nd1_noc19_mg60/preview

COMMUNITY SERVICE PROJECT
……Experiential learning through community engagement

- *Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.*
- *Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.*
- *Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.*

Objective
Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;
1. *To sensitize the students to the living conditions of the people who are around them,*
2. *To help students to realize the stark realities of society.*
3. *To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability*
4. *To make students aware of their inner strength and help them to find new /out of box solutions to social problems.*
5. *To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.*
6. *To help students to initiate developmental activities in the community in coordination with public and government authorities.*
7. *To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.*

Implementation of Community Service Project
- Every student should put in 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, housewives, etc
- A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty in charge.
- An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.

- The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project reports should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training.

Procedure
- A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, to enable them to commute from their residence and return back by evening or so.
- The Community Service Project is a twofold one –
  - First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
  - Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –
    - Agriculture
    - Health
    - Marketing and Cooperation
    - Animal Husbandry
    - Horticulture
    - Fisheries
    - Sericulture
    - Revenue and Survey
    - Natural Disaster Management
    - Irrigation
    - Law & Order
    - Excise and Prohibition
    - Mines and Geology
    - Energy
    - Internet
    - Free Electricity
    - Drinking Water

EXPECTED OUTCOMES
BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS
Learning Outcomes
- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
- Improved ability to understand complexity and ambiguity

Personal Outcomes

- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes

- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation

Career Development

- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution

- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research.

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

- Improved institutional commitment.
- Improved student retention
- Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

- Satisfaction with student participation
- Valuable human resources needed to achieve community goals.
- New energy, enthusiasm and perspectives applied to community work.
- Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expected to carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students
1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programmes and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilisation of free electricity to farmers and related issues
40. Gender ration in schooling lvel- observation.

Complimenting the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs

Programs for School Children
1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development

4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.

Programs for Women Empowerment
1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps
1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmes
12. Commemoration and Celebration of important days

Programs for Youth Empowerment
1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development

Common Programs
1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –
   i. Agriculture
   ii. Health
   iii. Marketing and Cooperation
   iv. Animal Husbandry
   v. Horticulture
   vi. Fisheries
   vii. Sericulture
   viii. Revenue and Survey
   ix. Natural Disaster Management
   x. Irrigation
   xi. Law & Order
   xii. Excise and Prohibition
   xiii. Mines and Geology
   xiv. Energy

Role of Students:
- Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
- An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity Duration: 8 weeks

1. **Preliminary Survey (One Week)**
- A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secreteriats could be aligned for the survey.

2. **Community Awareness Campaigns (One Week)**
- Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmesto be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. **Community Immersion Programme (Three Weeks)**
   Along with the Community Awareness Programmes, the student batch can also work with any one of the below-listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. **Community Exit Report (One Week)**
   During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks' works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University. Throughout the Community Service Project, a daily logbook need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher- mentor, who is required to periodically visit thestudents and guide them.