ELECTRICAL AND ELECTRONICS ENGINEERING
COURSE STRUCTURE

SEMESTER-I (I-I)

S. No.	Course Code	Course Title	L	T	P	C
THEORY						
1	23SH1T03	Chemistry	3	0	0	3
2	23SH1T04	Linear Algebra and Calculus	3	0	0	3
3	23ME1T01	Engineering Graphics	3	0	0	3
4	23EE1T01	Basic Electrical and Electronics Engineering	2	0	2	3
5	23IT1T01	Introduction to Programming	3	0	0	3
PRACTICAL						
6	23SH1L03	Chemistry Lab	0	0	3	1.5
7	23EE1L01	Electrical and Electronics Engineering Workshop	0	0	3	1.5
8	23IT1L01	Computer Programming Lab	0	0	3	1.5
9	23IT1L02	IT Workshop	0	0	2	1
10	23PC1P01	Health and Wellness, Yoga and Sports	0	0	1	0.5
					Total Credits	**21**

SEMESTER-II (I-II)

S. No.	Course Code	Course Title	L	T	P	C
THEORY						
1	23SH2T01	Communicative English	2	0	0	2
2	23EE2T03	Electrical circuit Analysis-I	3	0	0	3
3	23SH2T02	Engineering Physics	3	0	0	3
4	23SH2T05	Differential equations and Vector Calculus	3	0	0	3
5	20ME2T02	Basic Civil & Mechanical Engineering	3	0	0	3
PRACTICAL						
6	23ME2L01	Engineering Workshop	0	0	3	1.5
7	23SH2L01	Communicative English Lab	0	0	2	1
8	23SH2L02	Engineering Physics Lab	0	0	2	1
9	23EE2L03	Electrical Circuits – I Lab	0	0	3	1.5
10	23PC2P01	NCC / NSS / Scouts & Guides / Community service	0	0	1	0.5
					Total Credits	**19.5**

ELECTRICAL AND ELECTRONICS ENGINEERING
COURSE STRUCTURE
(SEMESTER-III II-I)

S.No.	Course Code	Course Title	L	T	P	C
THEORY						
1	23SH3T01	Complex Variables & Numerical Methods	3	0	0	3
2	23EC3T05	Analog Electronics	3	0	0	3
3	23EE3T01	Electromagnetic Field Theory	3	0	0	3
4	23EE3T02	Electrical Circuit Analysis-II	3	0	0	3
5	23EE3T03	Electrical Machines-I	3	0	0	3
6	23GE3M01	Human Values	2	0	0	---
PRACTICAL						
8	23EE3L01	Electrical Circuits -II and Simulation Lab	0	0	3	1.5
9	23EE3L02	Electrical Machines-I Lab	0	0	3	1.5
10	23EE3S01	Introduction to MATLAB	0	1	2	2
					Total Credits	**20**

SEMESTER-IV (II-II)

S.No.	Course Code	Course Title	L	T	P	C
THEORY						
1	23MC4T03	Principles of Economics & Management	2	0	0	2
2	23IT4T05	Data Structures	3	0	0	3
3	23EC4T05	Digital Electronics	3	0	0	3
4	23EE4T01	Electrical Machines-II	3	0	0	3
5	23EE4T02	Control Systems	3	0	0	3
6	23SH4M01	Environmental Science	2	0	0	---
PRACTICAL						
6	23EE4L01	Electrical Machines Lab-II	0	0	3	1.5
7	23EC4L03	Analog & Digital Electronics Lab	0	0	3	1.5
8	23SH4M02	Design Thinking & Innovation	1	0	2	1
9	23IT4S01	Data Structures Lab	0	1	2	2
					Total Credits	**20**

Programme: EEE					**I B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23SH1T03	**CHEMISTRY**	3	0	0	3

COURSE OUTCOMES:

At the end of the Course, Student will be able to:

CO 1: Introduce the Basic concept of structure and bonding of Molecules

CO 2: Understand the principle of Band theory and application of conductors and semiconductors.

CO3: Compare the materials of construction for battery and Electrochemical Sensors.

CO 4: Explain the preparation, properties, and applications of thermoplastics & thermosetting & Elastomers conducting polymers.

CO 5: Explain the principles of spectrometry, HPLC in separation of solid and liquid mixtures.

UNIT–I: Structure and Bonding Models:

Fundamentals of Quantum mechanics (De broglie & Heisenberg principles), Schrodinger Wave equation (Derivation not required), significance of Ψ and Ψ2.

Molecular Orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O2 and CO. π-molecular orbital of butadiene and benzene, calculation of bond order.

UNIT–II: Modern Engineering materials:

Semiconductors – Introduction, basic concept (Band theory & classification), applications (rectifier & transistor).

Super conductors – Introduction, basic concept (Classification) applications.

Super capacitors: Introduction, Basic Concept (Classification), Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and applications of Graphine nanoparticles.

UNIT–III: Electrochemistry and Applications:

Electrochemical cell, Nernst equation (Derivation not required), Electro Chemical Series and Significance, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions;

Fuel cells- hydrogen-oxygen fuel 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 (free radical & zeigler-natta) 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 – classification, polyacetylene– 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.

Chromatography-Basic Principle, Classification, HPLC: Principle, Instrumentation and Applications.

Text Books:

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.

Reference Books:

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

Programme: EEE					**I B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23SH1T04	**LINEAR ALGEBRA AND CALCULUS**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Develop and use of matrix algebra techniques that are needed by engineers for practical applications

CO2 : Utilize mean value theorems to real life problems

CO3 : Familiarize with functions of several variables which is useful in optimization

CO4 : Learn important tools of calculus in higher dimensions

CO5 : 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.

SYLLABUS

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: Consistency and Inconsistency of System of Homogeneous and Non-Homogeneous equations using ranks and solving 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. Jacobians, 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. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition

REFERENCE BOOKS:

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

Programme: EEE					**I B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23ME1T01	**ENGINEERING GRAPHICS**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections

CO2 : Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views

CO3 : Understand and draw projection of solids in various positions in first quadrant

CO4 : Explain principles behind development of surfaces

CO5 : Prepare isometric and perspective sections of simple solids

SYLLABUS

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 method only, Cycloids, Involutes, Normal and tangent to Curves.

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.

UNIT-III :

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.

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and 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 shape of 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.

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 Transformations using Auto CAD (*Not for end examination*).

TEXT BOOKS:

1.N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016

REFERENCE BOOKS:

1.Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2.Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3.Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, Tata McGraw Hill, 2017.

Programme: EEE					**I B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23EE1T01	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2).

CO2 : Demonstrate the working of electrical machines, measuring instruments and power generation stations (L2).

CO3 : Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines (L3).

CO4 : Calculate electrical load and electricity bill of residential and commercial buildings (L4)

SYLLABUS

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, – Magnetization characteristics of DC shunt generator (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines (vi)Stepper motor

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

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, **Thermal,** Nuclear, Solar & Wind power generation, Batteries & its types.

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.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

REFERENCE BOOKS:

1.Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, FourthEdition
2.Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3.Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press,2017
4.Basic Electrical and Electronics Engineering, S. K. Bhatacharya, 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

Course Objectives:

• To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

After successful completion of this course, students should be able to

CO1 : Explain fundamentals of Semi-Conductor Devices
CO2 : Understand Basic Electronics circuit operation and Instruments
CO3 : Explain Digital Electronics

UNIT-I : SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN JunctionDiode — 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 INSTRUMENTATION

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 Adders. 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

REFERENCE BOOKS:

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.

Programme: EEE					**I B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23IT1T01	**INTRODUCTION TO PROGRAMMING**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2 : Analyse a problem and develop an algorithm to solve it
CO3 : Implement various algorithms using the C programming language.
CO4 : Understand more advanced features of C language
CO5 : Develop problem-solving skills and the ability to debug and optimize the code

SYLLABUS

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 Program-Algorithms, 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

: Control Structures

UNIT-II

Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) 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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Programme: EEE		I B.Tech I Semester			
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23SH1L03	**CHEMISTRY LAB**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Determine the cell constant and conductance of solutions.
CO2 : Prepare advanced polymer Bakelite materials.
CO3 : Determination of redox potentials.
CO4 : Analysis of water quality.
CO5 : Calculate strength of acid in Pb-Acid battery.

List of Experiments

Any 10 of the following experiments are to be conducted:

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 nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry.
13. Estimation of HCl using standard Na2CO3 solution.
14. Estimation of total Hardness of water using standard EDTA solution
15. Estimation of P^H of the given water sample & soil using PH meter.

REFERENCE:

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

Programme: EEE					I B.Tech I Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23EE1L01	**Electrical and Electronics Engineering Workshop**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Measure voltage, current and power in an electrical circuit. (L3)
CO2 : Measure of Resistance using Wheat stone bridge (L4)
CO3 : Discover critical field resistance and critical speed of DC shunt generators. (L4)
CO4 : Investigate the effect of reactive power and power factor in electrical loads. (L5)

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 thestudents.)
3. Components: Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
4. 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

SYLLABUS

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

Reference Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill,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, Third Edition.

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:

- To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

Course Outcomes: At the end of the course, the student will be able to

CO1: Identify & testing of various electronic components.
CO2: Understand the usage of electronic measuring instruments.
CO3: Plot and discuss the characteristics of various electron devices.
CO4: Explain the operation of a digital circuit.

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

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, Pearson Education,2009.

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

Programme: EEE		I B.Tech I Semester			
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23IT1L01	**Computer Programming Lab**	**0**	**0**	**3**	**1.5**

Course Objectives:

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

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Read, understand, and trace the execution of programs written in C language.

CO2 : Select the right control structure for solving the problem.

CO3 : Develop C programs which utilize memory efficiently using programming constructs like pointers.

CO4 : Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

UNIT I

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writingthe 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 withappropriate

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:

Tutorial4: Operators and the precedence and as associativity:
Lab4: 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, null- else, 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 eachof 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: 2 D 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.

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

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.

WEEK14:

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

i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() and fwrite()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third file using command-line arguments.
v) Find no. of lines, words and characters in a file
vi) 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

Reference Books:

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

Programme: EEE		I B.Tech I Semester			
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23IT1L02	**IT WORKSHOP**	**0**	**0**	**2**	**1**

Course Objectives:

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

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Perform Hardware troubleshooting.
CO2 : Understand Hardware components and inter dependencies.
CO3 : Safeguard computer systems from viruses/worms
CO4 : Document/ Presentation preparation.
CO5 : Perform calculations using spreadsheets

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 Spreadsheet 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?'"

Reference Books:

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

Programme: EEE					I B.Tech I Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23PC1P01	**HEALTH AND WELLNESS, YOGA AND SPORTS**	**0**	**0**	**1**	**0.5**

Course Objectives:

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

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Understand the importance of yoga and sports for Physical fitness and sound health.
CO2 : Demonstrate an understanding of health-related fitness components
CO3 : Compare and contrast various activities that help enhance their health
CO4 : Assess current personal fitness levels.
CO5 : Develop Positive Personality

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.

Practicing general and specific warm up, aerobics

ii) Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning,2002
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. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, 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 many as 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, totaling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

Programme: EEE					**I B.Tech II SEM**
Course Code	Course Name	L	T	P	C
23SH2T01	**COMMUNICATIVE ENGLISH**	3	0	0	3

Course Objectives:

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:

After successful completion of this course, students should be able to

CO1 : Understand the context, topic, and pieces of specific information from social or Transactional dialogues

CO2 : Apply grammatical structures to formulate sentences and correct word forms

CO3 : Analyze discourse markers to speak clearly on a specific topic in informal discussions

CO4 : Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.

CO5 : Create a coherent paragraph, essay, and resume.

SYLLABUS

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, Collocations
Vocabulary: Compound words, 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.

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

REFERENCE BOOKS:

1. 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 University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior 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

Programme: EEE					**I B.Tech II SEM**
Course Code	Course Name	L	T	P	C
23EE2T03	**ELECTRICAL CIRCUIT ANALYSIS-I**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students 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, electrical, magnetic and single-phase circuits.

SYLLABUS

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 AC CIRCUITS

Characteristics of periodic functions, Average value, R.M.S. value, form factor, representation of a sine function, concept of phasor, phasor diagrams, 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. Nodal and Mesh analysis.

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 ,C and frequency 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

TEXT BOOKS:

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.

REFERENCE BOOKS:

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

Programme: EEE					**I B.Tech II SEM**
Course Code	Course Name	L	T	P	C
23SH2T02	**ENGINEERING PHYSICS**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Explain the need of coherent sources and the conditions for sustained interference
CO2 : Understand the basic concepts of Crystal Structures & X-ray Diffraction Sources.
CO3 : Apply the concept of magnetism to magnetic devices
CO4 : Analyze the physical significance of wave function.
CO5 : Identify the type of semiconductor using Hall effect.

SYLLABUS

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 by Laue's and powder methods.

UNIT-III : Dielectrics 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 dependent wave 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

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 effect and its applications.

TEXT BOOKS:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019
2. Engineering Physics - D.K.Bhattacharya and Poonam Tandon, Oxford press (2015)

REFERENCE BOOKS:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press. 2010.
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources:

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

Programme: EEE					**I B.Tech II SEM**
Course Code	Course Name	L	T	P	C
23SH2T05	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	3	0	0	3

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- 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:

After successful completion of this course, students should be able to

CO1 : Solve the differential equations related to various engineering fields
CO2 : Identify solution methods for partial differential equations that model physical processes
CO3 : Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO4 : Estimate self and mutual inductances and the energy stored in the magnetic field
CO5 : Estimate the work done against a field, circulation and flux using vector calculus.

SYLLABUS

UNIT-I : Differential equations of first order and first degree

Introduction -Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Orthogonal Trajectories-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, 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

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

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, Scalar and Vector del operators applied to vector point functions-Divergence and Curl vector identities – Laplacian operator.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Programme: EEE					**I B.Tech II SEM**
Course Code	Course Name	L	T	P	C
20ME2T02	**BASIC CIVIL & MECHANICAL ENGINEERING**	3	0	0	3

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions
- Introduce the preliminary concepts of surveying
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

After successful completion of this course, students should be able to

CO1 : Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.

CO2 : Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.

CO3 : Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.

CO4 : Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated

CO5 : Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

SYLLABUS

PART A: BASIC CIVIL ENGINEERING

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, Water Resources and Environmental Engineering

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).

TEXT BOOKS:

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

REFERENCE BOOKS:

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

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

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

Course Outcomes: On completion of the course, the student should be able to

CO1: Understand the different manufacturing processes.
CO2: Explain the basics of thermal engineering and its applications.
CO3: Describe the working of different mechanical power transmission systems and power plants.
CO4: Describe the basics of robotics and its applications.

UNIT-I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- 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 Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

TEXT BOOKS:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India)Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications,(India) Pvt. Ltd
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengagelearning India Pvt. Ltd.

REFERENCE BOOKS:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
3. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering,Tata McGraw Hill publications (India) Pvt. Ltd.

Programme: EEE					I B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23ME2L01	**ENGINEERING WORKSHOP**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Identify workshop tools and their operational capabilities.

CO2 : Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding

CO3 : Apply fitting operations in various applications

CO4 : Apply basic electrical engineering knowledge for House Wiring Practice.

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 wood working and make following joints.
   a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint
3. **Sheet Metal Working/Tin smithy**: Familiarity with different types of tools used in sheet metalworking, 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 following fitting 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 joints with coupling for same diameter and with reducer for different diameters.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Programme: EEE					I B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23SH2L01	**COMMUNICATIVE ENGLISH LAB**	**0**	**0**	**2**	**1**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO2 : Apply communication skills through various language learning activities.

CO3 : Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.

CO4 : Evaluate and exhibit professionalism in participating in debates and group discussions.

CO5 : Create effective Course Objectives.

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

REFERENCE BOOKS:

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.

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

Programme: EEE					I B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23SH2L02	**ENGINEERING PHYSICS LAB**	**0**	**0**	**2**	**1**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : **Memorize** the conditions for sustained Interference and Diffraction
CO2 : **Understand** the basic concepts of LASER
CO3 : Identify the properties of various materials.
CO4 : Apply the concept of dielectrics on the materials.
CO5 : Analyze the acoustic properties of sound.

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 using diffraction 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's Method.
11.Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
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
15.Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
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 10 of the following experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

REFERENCE:

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

WEB RESOURCES:

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

Programme: EEE					I B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23EE2L03	**ELECTRICAL CIRCUITS – I LAB**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams.

CO2 : Apply various theorems to compare practical results obtained with theoretical calculations.

CO3 : Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.

CO4 : Analyse different circuit characteristics with the help of fundamental laws and various configurations.

CO5 : Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.

List of Experiments

Any 10 of the following experiments are to be conducted:

1. Verification of node and mesh analysis.
2. Verification of network reduction techniques.
3. Determination of cold and hot resistance of an electric lamp
4. Determination of Parameters of a choke coil.
5. Determination of self, mutual inductances, and coefficient of coupling
6. Series and parallel resonance
7. Locus diagrams of R-L (L Variable) , R-C (C Variable), RLC (frequency variable) series circuits
8. Verification of Thevenin's Theorem
9. Verification of Norton's Theorem
10. Verification of Maximum power transfer theorem
11. Verification of Compensation theorem
12. Verification of Reciprocity and Millman's Theorems

REFERENCE BOOKS:

1. Engineering Circuits Analysis, Jack Kemmerly, William Hayt and Steven Durbin, TataMc Graw Hill Education, 2005, sixth edition.
2.Network Analysis, M. E. Van Valkenburg, Pearson Education, 2019

Programme: EEE					I B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23PC2P01	**NCC / NSS / SCOUTS & GUIDES / COMMUNITY SERVICE**	**0**	**0**	**1**	**0.5**

COURSE OBJECTIVES:

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:

After successful completion of this course, students should be able to

CO1 : Understand the importance of discipline, character and service motto.
CO2 : Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3 : Explore human relationships by analyzing social problems.
CO4 : Determine to extend their help for the fellow beings and downtrodden people.
CO5 : Develop leadership skills and civic responsibilities.

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-releasing road 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 & Care

Activities:

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 Service

Activities:

Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities- experts-etc.

i) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
ii) Conducting consumer Awareness. Explaining various legal provisions etc.
iii) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
iv) Any other programmes in collaboration with local charities, NGOs etc.

REFERENCE BOOKS:

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 Environmental Engineering 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 viva voce on the subject.

Programme: EEE		**II B.Tech I SEM**			
Course Code	Course Name	L	T	P	C
23SH3T01	**COMPLEX VARIABLES & NUMERICAL METHODS**	3	0	0	3

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Evaluate the approximate roots of polynomial and transcendental equations by different algorithms. Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals.

CO 2: Apply numerical Comprehend mathematical principles and logic.

CO3: Demonstrate knowledge of mathematical modeling and proficiency in using mathematical Software.

CO 4: Manipulate and analyze data numerically and/or graphically using appropriate Software.

CO 5: How to communicate effectively mathematical ideas/results verbally or in writing.

UNIT–I: Functions of a complex variable and Complex integration:

Introduction – Continuity – Differentiability – Analyticity –Cauchy-Riemann equations in Cartesian and polar coordinates – Harmonic and conjugate harmonic functions – Milne – Thompson method. Complex integration: Line integral – Cauchy's integral theorem – Cauchy's integral formula- Generalized Integral Formula (all without proofs) and problems on above theorems.

UNIT–II: Series expansions and Residue Theorem:

Radius of convergence–Expansion of function in Taylor's series, Maclaurin's series and Laurent series. Types of Singularities: Isolated–Essential singularities–Pole of order m–Residues–Residue Theorem (without proof)- Evaluations of real integrals of types $\int_{-\infty}^{\infty} f(x)dx$, $\int_{c}^{c+2\pi} f(\sin\theta, \cos\theta)d\theta$

UNIT–III: Conformal mapping:

Transformation by $e^z, lnz, z^2 z^n$(n positive integer), sin z, cos z, $z + \frac{a}{z}$, Translation, rotation, inversion and bilinear transformation-fixed point-cross ratio-properties-invariance of circles and cross ratio.

UNIT–IV: Iterative Methods:

Introduction – Solutions of algebraic and transcendental equations: Bisection method– Secant Method and Method of False Position-General Iteration method – Newton-Raphson method (Simultaneous Equations)

Interpolation: Newton's forward and backward formulae for Interpolation – With unequal intervals-Lagrange's interpolation formula.

UNIT–V: Numerical integration, Solution of ordinary differential equations with initial **conditions:**

Trapezoidal rule– Simpson's 1/3rd and 3/8th rule– Solution of initial value problems by Taylor's series– Picard's method of successive approximations– Euler's method –Runge- Kutta method (second and fourth order) -Milne's Predictor and Corrector Method

TextBooks:

1. B.S. Grewal, Higher Engineering Mathematics,44th Edition, Khanna Publishers.
2. Micheael Greenberg, Advanced Engineering Mathematics 2nd edition, Pearson edition.

Reference Books:

1. **Erwin Kreyszig,** Advanced Engineering Mathematics,10th Edition, Wiley-India.
2. **Steven C.Chapra,** Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education.
3.**M.K. Jain, S.R.K.Iyengar and R.K.Jain,** Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
4**. J. W. Brown and R. V. Churchill**, Complex Variables and Applications, 9th edition, Mc-Graw Hill, 2013.

Programme: EEE					**II B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23EC3T05	**ANALOG ELECTRONICS**	3	0	0	3

Course Outcomes:

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

CO1**:** Analyze diode clipping and clamping circuits. Understand different types of biasing circuits of a transistor.

CO2**:** Use small signal modeling for transistor circuit analysis and illustrate the operation of feedback amplifiers.

CO3**:** Understand operation of oscillators, operational amplifier and their applications.

CO4**:** Use 555 timers in multi-vibrators, Schmitt Trigger and PLL applications.

CO5**:** Describe the operation of different ADC's and DAC's.

Unit – 1:

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 Modelling 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 A stable 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.

Reference Books:

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, 5thEdition, 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, 2ndEdition, 2010.

Online Learning Resources:

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

Programme: EEE					**II B.Tech I SEM**
Course Code	Course Name	L	T	P	C
23EE3T01	**ELECTROMAGNETIC FIELD THEORY**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Compute electric fields and potentials using Gauss law/ solve Laplace's or Poisson's equations for various electric charge distributions

CO2 : Analyse the behaviour of conductors in electric fields, electric diploe and the capacitance and energy stored in dielectrics

CO3 : Calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law.

CO4 : Estimate self and mutual inductances and the energy stored in the magnetic field

CO5 : Understand the concepts of Faraday's laws, Displacement current, Poynting theorem and Poynting vector.

SYLLABUS

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, Polarization, dielectric constant and strength, Continuity equation and relaxation time, Boundary conditions betweenconductor 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.

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 ($\nabla.\vec{B} = 0$), 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 ($\nabla \times \vec{H} = \vec{J}$).
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$\left(\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}\right)$, integral and point forms ofMaxwell's equations, statically and dynamically induced EMF, Displacement current, Modification of Maxwell's equations for time varying fields, Poynting theorem and Poynting vector.

TEXT BOOKS:

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, 7th Editon, 2006.

REFERENCE BOOKS:

1."Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition.
2."Electromagnetic Field Theory" by Yaduvir Singh, Pearson India, 1st edition, 2011.
3."Fundamentals of Engineering Electromagnetics" by Sunil Bhooshan, Oxford University Press, 2012.
4.Schaum's Outline of Electromagnetics, Joseph A. Edminister, Md. Navi,4th Edition, 2014.

Online Learning Resources:

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

Programme: EEE				II B.Tech I Semester	
Course Code	Course Name	L	T	P	C
23EE3T02	**ELECTRICAL CIRCUIT ANALYSIS -II**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Analyse the balanced and unbalanced 3 phase circuits for power calculations.
CO2 : Analyse the transient behaviour of electrical networks in different domains.
CO3 : Estimate various Network parameters.
CO4 : Apply the concept of Fourier series to electrical systems.
CO5 : Analyse the filter circuit for electrical circuits.

SYLLABUS

UNIT-I : ANALYSIS OF THREE PHASE CIRCUITS

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 TRASFORMS AND TRANSIENT ANALYSIS

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 : TWO PORT 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, 3rd Edition, Tata McGraw-Hill, 2019

Reference Books:

1. Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI, 2019.
2. Network Theory, N. C. Jagan and C. Lakshminarayana, 1st Edition, B. S. Publications, 2012.
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. Kulshreshtha Gopal G. Bhise, Prem R. Chadha ,Umesh Publications 2012.
5. Circuit Theory: Analysis and Synthesis, A. Chakrabarti, Dhanpat Rai & Co., 2018, 7th Revised Edition.

Online Learning Resources:

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

Programme: EEE				II B.Tech I Semester	
Course Code	Course Name	L	T	P	C
23EE3T03	**ELECTRICAL MACHINES-I**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Illustrate DC generators performance characteristics
CO2 : Explain the process of torque production, starting and speed control of DC motors
CO3 : Explain the construction and operation of two winding transformer
CO4 : Perform the tests on Transformers
CO5 : Explain the construction and operation of Three phase transformer

SYLLABUS

UNIT-I : INTRODUCTION TO DC MACHINES

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- Characteristics of DC motors-applications of DC motors.

UNIT-II : STARTING, SPEED CONTROL AND TESTING OF DC MACHINES

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-Losses and efficiency

UNIT-III : SINGLE-PHASE TRANSFORMERS

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- single phase offload and on load tapping changers of transformer.

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.

TEXT BOOKS:

1. P. S. Bhimbra, Electrical Machinery, 7th ed., Khanna Publications, 2007.
2. M.G. Say, Performance and analysis of AC machines, CBS, 2002.

REFERENCE BOOKS:

1. Syed A. Nasar, 3000 Solved Problems in Electrical Circuit (Schaum's solved problem series), Tata McGraw-Hill, 2018.
2. D. P.Kothari, I .J .Nagarth, Electrical Machines , McGraw Hill Publications, 5th edition
3. Stephen J Chapman, Electrical Machinery Fundamentals, McGraw Hill education 2011.
4. Dr. P S Bimbhra , Generalized Theory of Electrical Machines, 7th Edition, Khanna Publishers, 2021.
5. J.B.Gupta , Theory & Performance of Electrical Machines, S.K.Kataria & Sons,2007.
6. A.E.,Kingsley, Jr.,C.,& Umans, S. D , Electric Machinery by Fitzgerald, 7th edition, McGraw-Hill Education, 2014.

ONLINE LEARNING RESOURCES:

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

Programme: EEE & ECE		II B.Tech I Semester			
Course Code	Course Name	L	T	P	C
23GE3M01	**HUMAN VALUES -** **UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT**	2	0	0	-

Course Outcomes:

- Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
- Identify one's self, and one's surroundings (family, society nature) (L1, L2)
- Apply what they have learnt to their own self in different day-to-day settings in real life (L3)
- Relate human values with human relationship and human society. (L4)
- Justify the need for universal human values and harmonious existence (L5)
- Develop as socially and ecologically responsible engineers (L3, L6)

Course Topics

UNIT I - Introduction to Value Education

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education), Understanding Value Education, Self-exploration as the Process for Value Education.

UNIT II - Harmony in the Human Being

Understanding Human being as the Co-existence of the self and the body, Distinguishing between the Needs of the self and the body, Harmony of the self with the body, Sanyam and Health; correct appraisal of Physical needs, , Programs to ensure Sanyam and Health.

UNIT III - Harmony in the Family and Society

Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, Understanding the meaning of Respect, Understanding Harmony in the Society.

UNIT IV - Harmony in the Nature/Existence

Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence.

UNIT V - Implications of the Holistic Understanding – a Look at Professional Ethics

Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Production Systems and Management Models.

READINGS:

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, ANagaraj, 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.
- 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.

Online Resources:

1.https://fdpsi.aicteindia.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2.https://fdpsi.aicteindia.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%202Harmony%20in%20the%20Human%20Being.pdf
3.https://fdpsi.aicteindia.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4.https://fdpsi.aicteindia.org/UHV%201%20Teaching%20Material/D3S2%20Respect%20July%2023.pdf
5.https://fdp-si.aicte-india.org/UHV I%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6.https://fdpsi.aicteindia.org/download/FDPTeachingMaterial/3days%20FDPSI%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%2023-25%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

Programme: **EEE**					II B.Tech I Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23EE3L01	**ELECTRICAL CIRCUITS -II AND SIMULATION LAB**	0	0	3	1.5

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Analyse the balanced and unbalanced 3 phase circuits for power calculations.
CO2 : Evaluate the time response of given network.
CO3 : Evaluate two port network parameters.
CO4 : Simulate and analyse electrical circuits using suitable software.
CO5 : Analyse the filter circuit for electrical circuits.

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 KCL, KVL, mesh and nodal analysis using simulation tools.
6. Verification of Thevenin's and Norton's theorems using simulation tools.
7. Verification of super position and maximum power transfer theorems using simulation tools.
8. Verification of Reciprocity and Compensation theorems using simulation tools.
9. Verification of
   a) Series and parallel resonance using simulation tools.
   b) Self-inductance and mutual inductance by using simulation tools.
10. Simulation and analysis of transient response of RL, RC and RLC circuits.
11. Harmonic analysis of diode rectifier using simulation tools.
12. Measurement of power and power factor using simulation tools.
13. Analysis of filters for electrical circuits using simulation tools.

TEXT BOOKS:

1. Charles K. Alexander, Mathew N.O. Sadiku, Fundamentals of Electric Circuits, 6th ed. Tata McGraw-Hill, 2019.
2.A. Sudhakar and Shyammohan S Palli, Circuits and Networks Analysis & Synthesis, 5th ed. Tata McGraw- Hill, 2017.
3. A. Chakrabarti, Circuit Theory, 7th revised ed. Danapat Rai & Co publisher, 2018.

REFERENCE BOOKS:

1. William Hayt and Jack E.Kemmerley, Engineering Circuit Analysis, 6th ed. (Eighth), Mc Graw Hill Company, 2013.
2. N.C. Jagan, C. Lakshmi Narayana, Network Analysis, 2nd ed. BS publications, 2017.
3. Van Valkenburg, Network Analysis, 3rd ed. Prentice-Hall of India Private Ltd, 2019.
4. Syed A. Nasar, 3000 Solved Problems in Electrical Circuit (Schaum's solved problem series), Tata McGraw-Hill, 2018.

Programme: **EEE**					II B.Tech I Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23EE3L02	**ELECTRICAL MACHINES – I LAB**	0	0	3	1.5

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Determine and predetermine the performance of DC machines
CO2 : Draw magnetizing characteristics of DC generator and control the speed of DC motor.
CO3 : Analyze the performance and losses by testing of the DC machines
CO4 : Determine and predetermine the performance of transformers
CO5 : Realize three-phase to two phase transformation.

LIST OF EXPERIMENTS

1. Magnetization Characteristics of DC Generator (Self Excited)
2. Load Test on DC shunt Generators.
3. Load Test on DC Compound Generators.
4. Speed control of D.C. motors using armature control and field control methods
5. Brake Test on D.C. Shunt Motor
6. Hopkinson test on two identical D.C. machines
7. Swinburne's test - Predetermination of efficiencies as DC Generator and Motor.
8. Field test on D.C. Series machines.
9. Open circuit & Short circuit test on single phase transformer
10. Sumpner's test on two single phase transformers
11. Separation of core losses of a single-phase transformer
12. Parallel operation of Single-Phase Transformers
13. Scott connection of three-phase transformers

Note: Any ten experiments mandate

REFERENCE(S)

1. LaboratoryManual.
2. S.K. Bhattacharya, ElectricalMachines, 3rd ed.,TataMcGraw-HillEducation, 2010.
3. https://ems-iitr.vlabs.ac.in/List%20of%20experiments.html

Programme: **EEE**					II B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23MC4T03	**PRINCIPLES OF ECONOMICS & MANAGEMENT**	**3**	**0**	**0**	**3**

Course Outcomes:

CO 1: To adopts the Managerial Economic concepts for decision making and forward planning. Also know law of demand and its exceptions, to use different forecasting methods for predicting demand for various products and services.

CO 2: To assess the functional relationship between Production and factors of production and list out various costs associated with production and able to compute BEP and significance of BEA.

CO 3: To outline the different types of business organizations and provide a basic insight into National Economic Activities.

CO 4: To familiarize with the concepts of management and to provide basic insight into management practices.

CO :5 To provide conceptual knowledge on functional management.

UNIT-I: INTRODUC TION TO MANAGERIAL ECONOMICS & DEMAND

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Definition-types of demand – Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand.

Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Law of Variable Proportion, Isoquants and Iso-costs, MRTS, Least Cost Combination of Inputs, Laws of Returns.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)- Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA

UNIT-III: BUSINESS ENVIRONMENT

Features of Business Organization, Sole Proprietorship, Partnership and Joint Stock Company, Steps for formation and Registration of the company.

Monetary Economics: Inflation, GDP, Per-capita Income.

UNIT-IV: INTRODUCTION TO MANAGEMENT

Concept –nature and importance of Management –Generic Functions of Management – Evolution of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Organizational typology Leadership – styles.

UNIT – V: FUNCTIONAL MANAGEMENT

Concept of HRM, HRD and PMIR Functions of HR Manager – Job Evaluation and Merit Rating. Marketing Management- Functions of Marketing – Marketing strategies
based on product Life Cycle, Channels of distributions.

Text books:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019.

Reference Books:

1. Ahuja Hl Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
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, 2013.

Online Learning Resources:

1. https://www.slideshare.net/123ps/managerial-economics-ppt
2. https://www.slideshare.net/rossanz/production-and-cost-45827016
3. https://www.slideshare.net/darkyla/business-organizations-19917607
4. https://www.slideshare.net/balarajbl/market-and-classification-of-market
5. https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396
6. https://www.slideshare.net/ashu1983/financial-accounting

Programme: **EEE**					II B.Tech I Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23IT4T05	**DATA STRUCTURES**	**3**	**0**	**0**	**3**

Course Outcomes: At the end of the course, Student will be able to

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between queues and priority queues, and apply them appropriately to solve data management challenges.

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble sort, Selection sort, Insertion Sort, Merge Sort, Quick Sort

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.

UNIT III

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation, back tracking, reversing list etc.

UNIT IV

Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.

Circular Queues: Introduction to circular queues, Operations and their applications.

UNIT V

Trees: Introduction to Trees, Binary Search Tree–Insertion, Deletion & Traversal

Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and opened dressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Text books:

1.Data Structures and algorithm analysis in C,Mark AllenWeiss,Pearson,2ndEdition.

2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Tool box 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, Parts1-5(Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick.

Programme: **EEE**					II B.Tech II Semester
Course Code	**Course Name**	**L**	**T**	**P**	**C**
23EC4T05	**Digital Electronics**	**3**	**0**	**0**	**3**

After successful completion of this course, students should be able to

CO1 : Understand the concepts of logic gates and minimization of Boolean equations
CO2 : Identify the appropriate combinational circuit based on its operation for an application and designing a solution
CO3 : design counters and registers that applies to give a solution for a problem.
CO4 : know the diode and transistor switching characteristics
CO5 : understand sampling gates and to design NAND and NOR gates using various logic families.

SYLLABUS

UNIT-I : Logic Gates and Boolean Algebra

Number systems, Conversion of Number Systems, Error detection & correction codes: parity checking, even parity, odd parity, Hamming code. Logic gates, Universal gates, Representation of all gates with universal logic gates, Standard SOP and POS Forms, Boolean theorems Minimization and realization of switching functions using Boolean theorems, K-Map, duality.

UNIT-II: Combinational Logic Circuits Design

Combinations circuit definition, Design process, Adders (half adder, full Adder, 4-bit adder), Subtractor (half subtractor, full subtractor, 4-bit subtractor), Comparator (Single bit, two bit), Decoder(2x4,3x8,4x8with2x4and3x8), encoder, priority encoder, Multiplexer (2x1,4x1, 8x1,8 x1with4 x1and2x1), Seven Segment Decoder.

UNIT-III : Sequential Circuits

Sequential circuit definition, Clock signal, Triggering, latches, flip flops, RS-flip flop, JK- Flip flop, D – Flip flop, T-Flip flop, Conversion from one flip-flop to another flip- flop, Counters, design of synchronous counters and asynchronous counter, Johnson counter, ring counter, Mod-6 Counter and Mod-10 Counter, Registers and shift registers.

UNIT-IV : Switching Characteristics of Devices

Diode as a switch, piece wise linear diode characteristics, Transistor as a switch, break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor switching times.

UNIT-V : Digital Logic Gate Circuits

Digital Logic gate circuits: Sampling gates, Realization of Logic Gates using DTL, TTL, ECL and CMOS logic circuits, Comparison of logic families.

TEXTBOOKS:

1.Switching and finite automata theory Zvi.Kohavi, Niraj.K. Jha3rdEdition, Cambridge UniversityPress,2009

2.Digital Design by M.Morris Mano, Michael D Ciletti,4thedition PHI publication,2008
3.Switching theory and logic design by Hill and Peterson**,** Mc-Graw Hill TMH edition,2012.
4.Pulse, Digital and Switching Waveforms-J.Millmanand H.Taub,McGraw-Hill,1991.
5.Solid State Pulse circuits – David A. Bell, PHI,4thEdn.,2002.

REFERENCES:

1.Fundamentals of Logic Design by Charles H. RothJr, JaicoPublishers,2006
2.Digital electronics by RS Sedha.S. Chand &company limited,2010
3.Switching Theory and Logic Design by A. Anand Kumar, PHI Learning pvt ltd,2016.
4.Digital logic applications and design by John M Yarbough, Cengage learning,2006.
5.. Pulse and Digital Circuits–A.Anand Kumar, PHI, 2005.2.Wave Generation and Shaping-L.Strauss.
6.Pulse, Digital Circuits and Computer Fundamentals- R.Venkataraman

Programme: **EEE**					II B.Tech II Semester
Course Code	Course Name	**L**	**T**	**P**	**C**
23EE4T01	**ELECTRICAL MACHINES -II**	**3**	**0**	**0**	**3**

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : Explain the construction and operation of three-phase induction motor
CO2 : Analyze the performance of three-phase induction motor.
CO3 : Describe the working of single-phase induction motors.
CO4 : Analyse the performance of Synchronous generators
CO5 : Demonstrate the principal operation, characteristics and the phenomenon of synchronous motor

SYLLABUS

UNIT-I : 3-PHASE INDUCTION MOTORS

Construction of Squirrel cage and Slip ring induction motors– production of rotating magnetic field – principle of operation – rotor e.m.f 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

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.

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. D.P. Kothari and I.J. Nagrath, Electrical machines McGraw Hill Education, 2017, Fifth Edition.
2. J.B.Gupta , Theory & Performance of Electrical Machines, S.K.Kataria& Sons, 2007.
3. A.E.Fitzgerald, Charles kingsley, Stephen D.Umans , Electric Machinery, McGraw-Hill, 2020, Seventh edition.

ONLINE LEARNING RESOURCES:

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

Programme: Common to EEE		II B.Tech II Semester			
Course Code	Course Name	L	T	P	C
23EE4T02	**CONTROL SYSTEMS**	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

CO1 : derive the transfer function of physical systems by applying block diagram and signal flow graph techniques.

CO2 : Analyze time response of first and specifications of second order systems using time domain specifications and determine error constants.

CO3 : analyze the stability of system using frequency domain specifications and realize the compensators to improve system performance.

CO4 : analyze absolute and relative stability of LTI systems.

CO5 : Apply state space analysis concepts to represent physical systems as state models, derive transfer function and determine the response and examine the concepts of controllability and observability.

SYLLABUS

UNIT-I : MATHEMATICAL MODELING OF CONTROL SYSTEMS

Introduction- Type of Control Systems -Open Loop and Closed Loop, Classification of Control Systems, Feedback Characteristics, and Transfer Function of Linear Systems, Differential Equations of Electrical Networks, Translational and Rotational Mechanical Systems, transfer function of Armature voltage-controlled DC servo motor, Block Diagram Reduction Techniques, Representation by Signal Flow Graph – Reduction Using Mason's Gain Formula.

UNIT-II : TIME RESPONSE ANALYSIS

Introduction-Standard Test Signals-Time Response of First Order Systems-Time Response of Second Order Systems-Time Domain Specifications, Steady State Errors and Error Constants, Effects of PI, PD and PID Controllers.

UNIT-III : FREQUENCY RESPONSE ANALYSIS AND COMPENSATION

Frequency Response: Introduction-Frequency Domain Specifications-Bode Plot-stability analysis using Bode plots (phase margin and gain margin), Polar Plots.

Compensation: Lag, Lead, and Lag-Lead Compensators (Qualitative Only).

UNIT-IV : STABILITY ANALYSIS

The Concept of Stability- Location of Poles on s-Plane for Stability- Routh's Stability Criterion-Limitations of Routh's Stability, Root locus concept – construction of root loci (simple problems), Nyquist Stability Criterion. Effect of addition of Poles and Zeros to the transfer function.

UNIT-V : STATE SPACE ANALYSIS of LTI Systems

Concepts of State, State Variables and State Model - State Space Representation of Transfer Function- diagonalization using linear transformation. State Transitions Matrix and Its Properties - Concept of Controllability and Observability.

TEXT BOOKS:

1. J. J Nagarath and M. Gopal, Control Systems Engineering, 6th ed., New Age International Publishers, 2017.
2. Benjamin C. Kuo, Automatic Control Systems, 9th ed., Wiley, 2014
3. Katsuhiko Ogata, Modern Control Engineering, 5th ed., Pearson Education India, 2015

REFERENCE BOOKS:

1. Richard C. Dorf and R. H Bishop, Modern Control Systems, 12th ed., Pearson Education, 2009.
2. John J. D., Azzo Constantine, H. and HoupisSttuart, N Sheldon, Linear Control System Analysis and Design with MATLAB, 5th ed., CRC Taylor& Francis, 2009.
3. M. Gopal, Control System: Principle and design, 4th ed., McGraw Hill Education, 2012.
4. NPTEL Video Lecture Notes on “Control Engineering” by Prof. S. D. Agashe, IIT Bombay

Programme: **EEE**					II B.Tech II Semester
Course Code	Course Name	**L**	**T**	**P**	**C**
23SH4M01	**ENVIRONMENTAL SCIENCE**	**2**	**0**	**0**	**-**

Course Outcomes:

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

CO1: Grasp multi-disciplinary nature of environmental studies and various renewable and non-renewable resources.

CO2: Understand flow and bio-geo-chemical cycles and ecological pyramids.

CO3: Understand various causes of pollution and solid waste management and related Preventive measures.

CO4: About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.

CO5: Casus of population explosion, value education and welfare programmes.

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 0 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.

Learning outcomes:

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. Text book 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.

Reference Books:

1. Deeksha Dave and E.Sai Baba Reddy, “Textbook of Environmental Science”, Cengage Publications.
2. M. Anji Reddy, “Textbook 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.

Online Learning Resources:

1. https://nptel.ac.in/courses/103107084

Programme: EEE				II B.Tech II Semester	
Course Code	Course Name	L	T	P	C
23EE4L01	**Electrical Machines Lab-II**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:

After Successful Completion of this Course, Students Should be able to

CO1 : draw the operating characteristics of three phase induction machines.
CO2 : determine the equivalent circuit parameters of single-phase induction motor.
CO3 : calculate the regulation of synchronous generator by using different methods.
CO4 : analyze the concepts of power factor improvement on single phase Induction Motor
CO5 : analyze the performance of synchronous motor.

LIST OF EXPERIMENTS

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. Brake test on single-phase induction motor

Note: Minimum 10 experiments mandate

REFERENCE(S)

1. Laboratory Manual.
2. J. J. Nagrath and D.P.Kothari, Electric Machines, 4thed.,McGraw Hill Education, 2010
3. S. K.Bhattacharya, ElectricalMachines,3rded.,TataMcGraw-Hill Education,2010.

Programme: EEE					II B.Tech II Semester
Course Code	Course Name	**L**	**T**	**P**	**C**
23EC4L03	**Analog & Digital Electronics Lab**	**0**	**0**	**3**	**1.5**

COURSE OUTCOMES:

After Successful Completion of this Course, Students Should be able to

CO1 : perform the operation of oscillators and operational amplifier.
CO2 : analyze the applications of operational amplifier.
CO3 : operate IC 555 timer and their applications.
CO4 : perform operations on Multiplexer & De Multiplexer
CO5 : perform operations on Flip – Flop.

LIST OF EXPERIMENTS

AE: ANALOG ELECTRONICS.

1. CC Amplifier.
2. Current shunt feedback amplifier.
3. RC phase shift oscillator.
4. OP-Amplifier Applications- Adder, Subractor.
5. Comparator using IC741.
6. Monostable Multi vibrator using 555IC.

DE: DIGITAL ELECTRONICS.

7. Half Adder, Full Adder, Half subractor, Full Subractor.
8. 3 to 8 Decoder.
9. Multiplexer & De Multiplexer.
10. 4 Bit Ring counter using T Flip - Flop.
11. Mode - 6 Counter using D Flip – Flop.
12. 8 Bit Shift Register using D Flip – Flop.

Note: Minimum 10 experiments (5 from each)

REFERENCE(S)

1. Laboratory Manual.

Programme: EEE					II B.Tech II Semester
Course Code	Course Name	**L**	**T**	**P**	**C**
23SH4M02	**Design Thinking & Innovation**	**1**	**0**	**2**	**2**

Course Objectives: The objectives of the course are to

- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process

Course Outcomes: **After Successful Completion of this Course, Students Should be able to**

CO1 : Define the concepts related to design thinking (L1).
CO2 : Explain the fundamentals of Design Thinking and innovation (L2).
CO3 : Apply the design thinking techniques for solving problems in various sectors (L3).
CO4 : Analyse to work in a multidisciplinary environment (L4).
CO5 : Evaluate the value of creativity (L5).

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 modeling, 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 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**.**

TEXT BOOKS:

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

REFERENCE BOOKS:

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design 2/e, Rockport Publishers, 2010.
4. Chesbrough.H, The era of open innovation, 2003.

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
- https://onlinecourses.nptel.ac.in/noc22_de16/preview