CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

(An Autonomous College under JNTUA, Anantapuramu, Approved by AICTE, Accredited by NBA, Accredited by NAAC with 'A' Grade)

Vidya Nagar, Pallavolu(V), Proddatur–516362(A.P) India

Department of Computer Science & Engineering
(Artificial Intelligence)

First Year B.Tech
Course Structure under R23 Regulations

CSE(ARTIFICIAL INTELLIGENCE)
COURSE STRUCTURE(R23)
I B.Tech–I Semester

Sl. No.	Course Code	Course Title	Contact Periods/week				Credits	Scheme of Examination Max.Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1.	23E00105T	ENGINEERING PHYSICS	3	0	0	3	3	30	70	100
2.	23E00104T	LINEAR ALGEBRA & CALCULUS	3	0	0	3	3	30	70	100
3.	23E02101T	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	0	3	3	30	70	100
4.	23E03101T	ENGINEERING GRAPHICS	1	0	4	5	3	30	70	100
5.	23E31101T	INTRODUCTION TO PROGRAMMING	3	0	0	3	3	30	70	100
6.	23E31102L	IT WORKSHOP	0	0	2	2	1	30	70	100
7.	23E00105L	ENGINEERING PHYSICS LAB	0	0	2	2	1	30	70	100
8.	23E02101L	ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP	0	0	3	3	1.5	30	70	100
9	23E31101L	COMPUTER PROGRAMMING LAB	0	0	3	3	1.5	30	70	100
10	23E00107L	NSS/NCC/SCOUTS & GUIDES/ COMMUNITY SERVICE	0	0	1	1	0.5	100	0	100
		Total:	13	0	15	28	20.5	370	630	1000

I B.Tech–II Semester

Sl. No.	Course Code	Course Title	Contact Periods /week				Credits	Scheme of Examination Max.Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1.	23E00101T	COMMUNICATIVE ENGLISH	2	0	0	2	2	30	70	100
2.	23E00103T	CHEMISTRY	3	0	0	3	3	30	70	100
3.	23E00201T	DIFFERENTIAL EQUATIONS & VECTORCALCULUS	3	0	0	3	3	30	70	100
4.	23E01101T	BASIC CIVIL AND MECHANICAL ENGINEERING	3	0	0	3	3	30	70	100
5.	23E31201T	DATA STRUCTURES	3	0	0	3	3	30	70	100
6.	23E00101L	COMMUNICATIVE ENGLISH LAB	0	0	2	2	1	30	70	100
7.	23E00103L	CHEMISTRY LAB	0	0	2	2	1	30	70	100
8.	23E03102L	ENGINEERING WORKSHOP	0	0	3	3	1.5	30	70	100
9	23E31201L	DATA STRUCTURES LAB	0	0	3	3	1.5	30	70	100
10	23E00106L	HEALTH AND WELLNESS, YOGA AND SPORTS	0	0	1	1	0.5	100	0	100
		Total:	14	0	11	25	19.5	370	630	1000

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B. Tech. – I & II-Semester

(23E00105T) ENGINEERING PHYSICS

(ECE/CSE (AI)/CSE (DS)/CSE (AI&ML)/CE/ME in I-SEM & CSE/EEE in II-SEM)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

PRE-REQUISITES: Basic Concepts in Physics

COURSE OBJECTIVES:

This course will enable the students to

- To bridge the gap between the physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like Interference, Diffractionetc.
- To enlighten the periodic arrangement of atoms in Crystalline Solids and describe the basic concepts of Quantum Mechanics.
- To introduce the novel properties of Dielectric and Magnetic materials, physics of Semiconductors and Superconductors.

COURSE OUTCOMES:

On completion of the course, students will be able to

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Familiarize with the basics of crystals and their structures.
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO4: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
CO5: Illustrate the band theory of solids, Identify the type of semiconductor using Hall effect and the basic principles related to superconductors.

UNIT-I: Wave Optics **(10 Periods)**

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.

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UNIT II : Crystallography and X-ray diffraction **(08 Periods)**

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: Dielectric and Magnetic Materials **(10 Periods)**

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) andOrientation 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 **(10 Periods)**

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 meritsand demerits) – Quantum free electron theory – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy.

UNIT V: Semiconductors and Superconductors (10 Periods) 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

Superconductors- Introduction – Properties of superconductors – Meissner effect – TypeI and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High Tc superconductors – Applications of superconductors.

Total Periods: 48

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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:

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

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I B. Tech. – I Semester
(23E00104T) LINEAR ALGEBRA & CALCULUS
(Common to CE, ME, EEE, ECE, CSE, CSE (AI&ML), CSE (AI), and CSE (DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

PRE-REQUISITES: Differentiation, Integration.

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

At the end of the course, the student will 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.

UNIT-I: Matrices **(09 Periods)**

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 of linear system of equations. Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II: Eigenvalues,Eigenvectors and Orthogonal Transformation **(10 Periods)**

Eigenvalues, Eigenvectors for real matrices 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 **(10 Periods)**

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. Curvature: Radius of curvature, Centre of curvature.

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UNIT-IV: Partial differentiation and Applications (Multi variable calculus) (09 Periods)
Functions of several variables: Limit,Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative(Limit concept), 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) (10 Periods)
Double integrals, change of order of integration, triple integrals, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Total Periods: 48

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)

WEB RESOURSES:

1. https://elibrary.in.pearson.com
2. http://www.digimat.in/nptel/courses/video/111108098/L42.html
3. https://www.digimat.in/nptel/courses/video/109104124/L14.html
4. https://archive.nptel.ac.in/courses/111/107/111107108/
5. https://www.digimat.in/nptel/courses/video/111105121/L33.html
6. https://archive.nptel.ac.in/courses/111/106/111106051/

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I B.Tech – I & II Semester

(23E02101T) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(CE/ME/ECE/AI/DS/AI&ML in I Sem & EEE/CSE in II Sem)

PART A: BASIC ELECTRICAL ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: General Knowledge in Physics.

COURSE OBJECTIVES:

To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1: Understand the problem solving concepts associated to AC and DC circuits,
CO2: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments
CO3: Apply different types of Energy Resources, Electricity Bill & Safety Measures

DETAILED SYLLABUS:

UNIT I **DC & AC Circuits** **(Periods: 9)**

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** **(Periods: 10)**

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

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

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UNIT III Energy Resources, Electricity Bill & Safety Measures (periods: 10)

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

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

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

TEXT BOOKS:

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, Fourth Edition.
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 RESOURSES:

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

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PART B: BASIC ELECTRONICS ENGINEERING

PRE-REQUISITES: Semi Conductor Physics.

COURSE OBJECTIVES:

This course provides the student with the fundamental skills to understand the principles of digital electronics, basics of semiconductor devices like diodes & transistors, characteristics and its applications.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Apply the concept of science and mathematics to understand the working of diodes, transistors, and their applications.
CO2: Explain the characteristics of diodes and transistors.
CO3: Familiarize with the number systems, codes, Boolean algebra and logic gates.

DETAILED SYLLABUS:

UNIT-I: **(09 Periods)**

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

UNIT-II: **(10 Periods)**

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: **(10 Periods)**

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

Total Periods: 48

TEXT BOOKS:

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

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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.

WEB RESOURSES:

1. https://nptel.ac.in/courses/117107095
2. https://nptel.ac.in/courses/117107095
3. https://onlinecourses.nptel.ac.in/noc22_ee55/

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(23E03101T) ENGINEERING GRAPHICS

(CIVIL/MECH/ECE/CSE (AI)/CSE (AI&ML)/CSE (DS) In I SEM & CSE/EEE In II SEM)

Int. Marks	Ext. Marks	Total Marks	L	T	P/D	C
30	70	100	1	0	4	3

Prerequisites: -

Course Objectives

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing.
- To impart knowledge on the projection of points, lines and plane surfaces.
- To improve the visualization skills for better understanding of projection of solids.
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

COURSE OUTCOMES:

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

DETAILED SYLLABUS:

UNIT-I **(20 Periods)**

Introduction: Lines, Lettering and Dimensioning, Geometrical constructions and Constructing regular polygons by general methods.

Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.

Scales: Plain scales, diagonal scales and vernier scales.

UNIT-II **(10 Periods)**

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

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

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

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UNIT-III **(10 Periods)**

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 other and axes inclined to both the reference planes.

UNIT-IV **(10 Periods)**

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.

UNIT-V **(10 Periods)**

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*).

Total Periods: 60

TEXTBOOK:

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.

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I B. Tech. – I Semester
(23E31101T) INTRODUCTION TO PROGRAMMING
CSE(AI)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

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

Course Outcomes: A student after completion of the course will be able to
CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyze 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.

UNIT I : Introduction to Programming and Problem Solving (10 Periods)

History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Program Development Life Cycle, 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.Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II : Control Structures (08 Periods)
Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, dowhile) Break and Continue. goto statement, Nested Loops.

UNIT III : Arrays and Strings (10 Periods)
Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings. String handling functions, and Command line arguments.

UNIT IV: Pointers & User Defined Data types (10 Periods)
Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, Dynamic Memory Alloca
UNIT V : Functions & File Handling (10 Periods)
Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, Parameter Passing techniques, Recursion, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling.

Total Periods: 48

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

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Text Books:

1. Computer Science: A Structured Programming Approach Using C 3rd Edition byBehrouz A. Forouzan, Richard F. Gilberg)
2. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
3. 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.

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I B. Tech. – I Semester
(23E31102L) IT WORKSHOP
CSE(AI)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	0	0	2	1

- 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:

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: 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: 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: 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: 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 LANproxy settings, bookmarks, search toolbars and pop-up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

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Task 3: Search Engines & Netiquette: Students should know what search engines are and howto 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 TeX and 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 TeXand 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.

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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.

ADOBE PHOTOSHOP

Task 1: Scanning images, editing their resolution and size, learning about bitmap and vector images, creating new images, and placing files are the basic concepts that are covered here.

Task 2: The students learn about the colour modes, colour management, colour mode conversion,colour picker functions, etc., in this module.

Task 3: An exposure to painting tools, brush tools, pencils, erasers, magic erasers, blending modes,etc.

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 sentencesto seehow 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 storyor a description of a scene, and let the model generate the rest of the content. This can be a funway 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 tosee 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, PearsonEducation, 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 KenQuamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCOPress, Pearson Education, 3rd edition.

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B. Tech. – I & II-Semester

(23E00105L) ENGINEERING PHYSICS LAB

(ECE/CSE(AI)/CSE(DS)/CSE(AI&ML)/CE/ME in I-SEM & CSE/EEE in II-SEM)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	0	0	2	1

PRE-REQUISITES: To Know the Formulas on concepts

COURSE OBJECTIVES: This course will enable the students to

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

COURSE OUTCOMES:
On completion of the course, students will be able to

CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials-respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Determine the type of semiconductor using Hall effect.

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum 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.

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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 method.
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 nonuniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

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

References:

- 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,prot

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I B.Tech – I & II Semester

(23E02101L) ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP

(CE/ME/ECE/AI/DS/AI&ML in I Sem & EEE/CSE in II Sem)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PART A: ELECTRICAL ENGINEERING LAB

PRE-REQUISITES: General Knowledge in Physics.

COURSE OBJECTIVES:

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

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and transformer.

CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.

CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor.

CO4: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.

DETAILED SYLLABUS:

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
- Provide some exercises so that hardware tools and instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
- Provide some exercises so that measuring instruments are learned to be used by the students.
3. Components:
- Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.

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- 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

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.

TEXT BOOKS:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

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

Note: Minimum Six Experiments to be performed.

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PART B: ELECTRONICS ENINEERING LAB

PRE-REQUISITES: Basic Knowledge in Semiconductor Physics.

COURSE OBJECTIVES: *This course will enable students to:*

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

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Use of semiconductor devices knowledge to find characteristics.
CO2: Analyze electronic circuits.
CO3: Explain the operation of digital circuits.

LIST OF EXPERIMENTS: (Minimum 6 experiments to be conducted)

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

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

TEXT BOOKS:

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. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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I B. Tech. – I Semester
(23E31101L) COMPUTER PROGRAMMING LAB
CSE(AI)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	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:

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 likepointers.
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., MS-DOS Environment and its commands.
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 offinite 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
iv) Finding area of circle

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with Appropriate values and how arithmetic operators can be used with variables and constants.
Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:
Lab 3: Simple computational problems using arithmetic expressions.
i) Finding the square root of a given number
ii) Finding compound interest
iii) Area of a triangle using heron's formulae

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iv) Distance travelled by an object
v) Find out $e=mc^2$

UNIT II

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants andoperators 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.
vi) Write a C program to find out the given number is even or odd.
vii) Write a C program to find out the given phone number is valid or not.
viii) Write a C program to find out the given number is positive or negative.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.
Suggested Experiments/Activities:
Tutorial 6: Loops, while and for loops
Lab 6: Iterative problems e.g., the sum of series

i) Find the factorial of given number using any loop.
ii) Find the given number is a prime or not.
iii) Compute sine and cos series
iv) Checking a number palindrome
v) Construct a pyramid of numbers.
vi) Find out sum of individual digits of a given positive integer
vii) Find out the given number is strong number or not.

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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.
vi) Find out smallest and biggest element in an 1D Float Array.
vii) Count frequency of each element.

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
vi) String palindrome or not

UNIT IV

WEEK 9:

Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:

Tutorial 9: Pointers, structures and dynamic memory allocation

Lab 9: Pointers and structures, memory dereference.

i) Write a C program to find the sum of a 1D array using malloc()
ii) Write a C program to find the total, average of n students using structures
iii) Enter n students data using calloc() and display failed students list
iv) Read student name and marks from the command line and display the student details along
with the total.
v) Write a C program to implement realloc()
vi) C program to calculate employee gross salary using structures

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WEEK 10:

Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singlylinked lists) and nested structures
Suggested Experiments/Activities:
Tutorial 10: Bit fields, Self-Referential Structures, Linked lists

Lab10 : Bit fields, 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.
v) Demonstrate nested structures using a C program.

UNIT V

WEEK 11:

Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration **Suggested Experiments/Activities:**
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.
Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions

i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the lcm of two numbers.
iii) Write a recursive function to find the factorial of a number.
iv) Write a C Program to implement Ackermann function using recursion.
v) Write a recursive function to find the sum of series.
vi) Write a program in C to calculate the sum of numbers from 1 to n using recursion

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

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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 thedifferences 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.

Text Books:

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 C Programming, A Problem-Solving Approach
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

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I B. Tech. – II Semester
(23E00107L) NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE
(Common to All branches of Engineering)

L	T	P	C
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: At the end of the course, the student will 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.

DETAILED SYLLABUS:

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:

i) 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.

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

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, totaling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

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I B.Tech – I & II Semester

(23E00101T) COMMUNICATIVE ENGLISH

(EEE/CSE in I Sem & CE/ME/ECE/AI/DS/AI&ML in II Sem)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	2	0	0	2

PRE-REQUISITES: - Fundamentals of English Grammar

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 the course, students will 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.

DETAILED SYLLABUS:

UNIT-I: Lesson: HUMAN VALUES: Gift of Magi (Short Story) (8 Periods)

Listening: Identifying the topic, the context and specific pieces of information by listening to 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, Phrasal Verbs.
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

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UNIT-II: Lesson: NATURE:The Brook by Alfred Tennyson (Poem)(8 Periods)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the 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 (8 Periods)

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: INSPIRATION: The Toys of Peace by Saki **(8 Periods)**

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, Idioms.

UNIT-V: MOTIVATION: The Power of Intrapersonal Communication (An Essay) (08 Periods)

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), Information Transfer.

Vocabulary: Technical Jargons

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Total Periods: 40

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. 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

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I B. Tech. – I & II Semester

(23E00103T) CHEMISTRY

(CSE/EEE in I Sem & CSE (AI)/ CSE (AI&ML)/ CSE (DS) /ECE in II Sem)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

PRE-REQUISITES: - Students should know about fundamentals and basic principles in chemistry

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

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

CO1: Retrieve the knowledge in quantum mechanics.

CO2: Apply the principle of Band diagrams in the application of conductors and semiconductors.

CO3: Compare the materials of construction for battery and electrochemical sensors.

CO4: Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.

CO5: Summarize the concepts of Instrumental methods.

DETAILED SYLLABUS:

UNIT-I: Structure and Bonding Models: (10 Periods)

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2, N_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order

UNIT-II: Modern Engineering materials (10 Periods)

Band diagrams for conductors, semiconductors and insulators
Semiconductors – Introduction, basic concept, application
Super conductors-Introduction basic concept, applications.
Supercapacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNI- III: Electrochemistry and Applications (10 Periods)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

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

Reference electrode-calomel electrode.

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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 CHEMISRY (10 Periods)

Introduction to polymers, functionality of monomers, tacticity of polymers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

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

UNIT-V: Instrumental Methods and Applications (10 Periods)

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, Principle and applications of TLC-HPLC: Principle, Instrumentation and Applications.

Total Periods: 50

TEXT BOOKS:

1. Jain & Jain, Engineering Chemistry, 16/e, Dhanpat Rai 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, Thomson,6/e Thomson, 2007.
2. J.D.Lee, Concise Inorganic Chemistry, Oxford University Press, 5th edition, Wiley Publications, Feb.2008.
3. Text book of Polymer Science, Fred W. Billmayer Jr, 3ed edition.

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Web links:

https://nptel.ac.in/courses/115106066

https://nptel.ac.in/courses/118102003

https://archive.nptel.ac.in/courses/104/106/104106129/

https://nptel.ac.in/courses/113105028

https://onlinecourses.nptel.ac.in/noc20_cy08/preview

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I B. Tech. – II Semester
(23E00201T)DIFFERENTIAL EQUATIONS & VECTOR CALCULUS
(Common to CE, ME, EEE, ECE, CSE, CSE (AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

PRE-REQUISITES: Differentiation, Integration, Vectors.

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

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

CO1: Solve some of the differential equations related to various engineering fields.

CO2: Apply the linear differential equations to real world problems.

CO3: Identify solution methods for some of the partial differential equations that model Physical processes.

CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence.

CO5: Estimate the work done against a field, circulation and flux using vector calculus.

UNIT-I:Differential equations of first order and first degree: (10 Periods)

Exact equations and equations reducible to exact form. Linear differential equations – Bernoulli's equations-. Applications: Orthogonal Trajectories, Newton's Law of cooling – Law of natural growth and decay- Electrical circuits

UNIT-II:Linear differential equations of higher order: (10 Periods)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Cauchy's and Legendre's linear equations. Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III:Partial Differential Equations (10 Periods)

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 (09 Periods)

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.solenoidal, irrotational, vectors,conservative,scalar potential

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UNIT-V:Vector integration **(09 Periods)**

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

Total Periods: 48

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, Dennis G. Zilland 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

WEB RESOURSES:

1. https://elibrary.in.pearson.com
2. https://archive.nptel.ac.in/courses/111/106/111106051/3.https://archive.nptel.ac.in/courses/111/105/111105134/
3. https://www.digimat.in/nptel/courses/video/111105121/L33.html

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I B. Tech. – II Semester

(23E01101T) BASIC CIVIL AND MECHANICAL ENGINEERING

(Common to All branches of Engineering)

PART A: BASIC CIVIL ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

PRE-REQUISITES: Nil

COURSE OBJECTIVES: This course will enable students to:

- 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.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1: Understand various sub-divisions of Civil Engineering and to appreciate theirrole 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.

DETAILED SYLLABUS:

UNIT-I: **(10 Periods)**

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. Fundamental loads: compression, tension, shear, bending and torsion. Introduction to Prefabricated construction Techniques.

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UNIT-II: **(09 Periods)**

Surveying: Classification and principles of surveying- accessories and phases of 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: **(10 Periods)**

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

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), Sustainable development goals related to civil engineering- Transforming our world: the 2030 Agenda for Sustainable Development, (UNESCO).

Total Periods: 29

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 Mc Graw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures Santosh Kumar Garg, Khanna Publishers, Delhi 2023.38th Edition.

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4. Highway Engineering, S.K. Khanna, C.E.G. Justo and Veeraraghavan, Nem chand and Brothers Publications2019. 10th Edition.
5. Indian standard DRINKINGWATER—SPECIFICATIONIS10500-2012.

WEB RESOURSES:

1. https://onlinecourses.nptel.ac.in/noc23_ce91/preview
2. https://onlinecourses.nptel.ac.in/noc23_hs155/preview
3. https://onlinecourses.nptel.ac.in/noc23_ce84/preview
4. https://onlinecourses.nptel.ac.in/noc23a_ce42/preview
5. https://onlinecourses.nptel.ac.in/noc23_ce71/preview

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PART B: BASIC MECHANICAL ENGINEERING

PRE-REQUISITES: Engineering Science

COURSE OBJECTIVES: This course will enable students 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: After successful completion of the course, students will 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.

DETAILED SYLLABUS:

UNIT-I: **(08 Periods)**

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: **(08 Periods)**

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.

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UNIT-III: **(08 Periods)**

Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drivesand their applications.

Introduction to Robotics - Joints & links. configurations, and applications ofrobotics.

Total Periods: 24

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, Cengage learning India Pvt. Ltd.

REFERENCE BOOKS:

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

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I B. Tech. – II Semester
(23E31201T) DATA STRUCTURES
CSE(AI)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	0	0	3

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

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 dataefficiently 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, manageprogram states, and solve related problems.

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

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

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

UNIT I **(10 Periods)**

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.

UNIT II **(09 Periods)**

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

UNIT III **(10 Periods)**

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

UNIT IV **(10 Periods)**

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

Deques: Introduction to deques (double-ended queues), Operations on deques and theirapplications.

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

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UNIT V **(09 Periods)**

Graphs: Introduction, Representation to Graphs, Graph Traversals Shortest Path Algorithms.

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

Total Periods: 48

Text Books:

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

Reference Books:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and PeterSanders
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 DavidRanum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest,and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, andGraph Algorithms" by Robert Sedgewick

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I B.Tech – I & II Semester

(23E00101L) COMMUNICATIVE ENGLISH LAB

(EEE/CSE in I Sem & CE/ME/ECE/AI/DS/AI&ML in II Sem)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	0	0	2	1

PRE-REQUISITES: NIL

COURSE OBJECTIVES:

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

COURSE OUTCOMES: *After successful completion of the course, students will 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 Experiments: Minimum ten experiments from the following list are required to be conducted:

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

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Total Labs: 15

SUGGESTED SOFTWARE:

1. Walden InfoTech
2. 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

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I B. Tech. - I & II Semester

(23E00103L) CHEMISTRY LAB

(CSE/EEE in I Sem & CSE (AI)/ CSE (AI&ML)/ CSE (DS) /ECE in II Sem)

Int. Marks	Ext. Marks	Total Marks
30	70	100

L	T	P	C
0	0	2	1

PRE-REQUISITES: - Students should know about experimental principle in chemistry

COURSE OBJECTIVES:

- Verify the fundamental concepts with experiments

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

CO1: Determine the cell constant and conductance of solutions.

CO2: Prepare advanced polymer Bakelite materials.

CO3: Measure the strength of an acid present in secondary batteries.

CO4: Analyse the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb-Acid batter

DETAILED SYLLABUS:

List of Experiments: (Execute any 12 experiments)

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method

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12. Estimation of Ferrous Iron by Dichrometry

13.Analysis of organic mixture (aldehyde and amine) by thin layer chromatography

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.

Web links:

https://www.digimat.in/nptel/courses/video/122106028/L01.html

https://amrita.digimat.in/nptel/courses/video/104106137/L38.html

https://www.scribd.com/doc/199886964/Experiment-5

https://archive.nptel.ac.in/content/storage2/courses/104103071/pdf/mod9.pdf

https://www.mlsu.ac.in/econtents/2560_Lambert-BeerLaw.pdf

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(23E03102L) ENGINEERING WORKSHOP

(CSE/EEE In I SEM & CIVIL/MECH/ECE/CSE (AI)/CSE (AI&ML)/CSE (DS) In II SEM)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	0	0	3	1.5

Prerequisites: -

Course Objectives

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

COURSE OUTCOMES:

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

DETAILED SYLLABUS:

List of Experiments

1. **Demonstration:** **(3 Periods)**
   Safety practices and precautions to be observed in workshop.
2. **Wood Working:** **(6 Periods)**
   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:** **(6 Periods)**
   Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing
4. **Fitting:** **(6 Periods)**
   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:** **(6 Periods)**
   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:** **(6 Periods)**
   Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
7. **Welding Shop:** **(6 Periods)**
   Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. **Plumbing:** **(6 Periods)**
   Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

Total Periods: 39

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Textbooks:

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.

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I B.Tech – II Semester
(23E31201L) DATA STRUCTURES LAB
CSE(AI)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	0	0	3	1.5

The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

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 dataefficiently 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, manageprogram states, and solve related problems.
CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal ingraphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.
CO5: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

List of Experiments:

Exercise 1: Array Manipulation
i) Write a program to reverse an array.
ii) C Programs to implement the Searching Techniques – Linear & Binary Search
iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Exercise 2: Linked List Implementation
i) Implement a singly linked list and perform insertion and deletion operations.
ii) Develop a program to reverse a linked list iteratively and recursively.
iii) Solve problems involving linked list traversal and manipulation.

Exercise 3: Linked List Applications
i) Create a program to detect and remove duplicates from a linked list.
ii) Implement a linked list to represent polynomials and perform addition.
iii) Implement a double-ended queue (deque) with essential operations.

Exercise 4: Double Linked List Implementation
i) Implement a doubly linked list and perform various operations to understand its properties and applications.
ii) Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise 5: Stack Operations
i) Implement a stack using arrays and linked lists.
ii) Write a program to evaluate a postfix expression using a stack.
iii) Implement a program to check for balanced parentheses using a stack.

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Exercise 6: Queue Operations

i) Implement a queue using arrays and linked lists.
ii) Develop a program to simulate a simple printer queue system.
iii) Solve problems involving circular queues.

Exercise 7: Stack and Queue Applications

i) Use a stack to evaluate an infix expression and convert it to postfix.
ii) Create a program to determine whether a given string is a palindrome or not.
iii) Implement a stack or queue to perform comparison and check for symmetry.

Exercise 8: Binary Search Tree

i) Implementing a BST using Linked List.
ii) Traversing of BST.

Exercise 9: Hashing

i) Implement a hash table with collision resolution techniques.
ii) Write a program to implement a simple cache using hashing.

Exercise 10: Graphs

i) Implement adjacency matrix of a given graph
Input:N=5,M=4,arr[][]={{1,2},{2,3},{4,5}{1,5}}..

Text Books:

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

Reference Books:

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

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I B. Tech. – I Semester
(23E00106L) HEALTH AND WELLNESS, YOGA AND SPORTS
(Common to All branches of Engineering)

L	T	P	C
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: At the end of the course, the student will 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

DETAILED SYLLABUS:

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 cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

HEAD, Dept. of English
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1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning, 2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition, William Morrow Paperbacks, 2014
5. 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, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject

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