RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I B.Tech. I Sem.

L	T	P	C
3	0	0	3

(A0001231) ENGINEERING PHYSICS

Course Composition	**Basic Science (BS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To identify the importance of the optical phenomenon like interference, diffraction etc,
2. To enlighten the periodic arrangement of atoms in crystalline solids.
3. To illustrate the phenomena of quantum mechanics and derive Schrodinger
4. To introduce novel concepts of dielectric and magnetic materials
5. To develop novel electronic devices with the knowledge on semiconductors.

COURSE OUTCOMES:

1. Analyze the signal interference and diffraction effects
2. Familiarize with the basics of crystals and assess their structures.
3. Classify various types of polarization of dielectrics and magnetic materials.
4. Understand fundamentals of quantum mechanics and apply to the motion of particles in energy bands of solids.
5. Identify the type of semiconductor using Hall effect

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	3 2 1 1		2	1	1							1			
CO2	3	2	1	2	2										
CO3	2	3	1	2	2							1			
CO4	2	3	2	1	2		1								
CO5	2	2	3	2	1							1			

UNIT-I Wave Optics

Interference: introduction - principle of superposition –interference of light – types of interference - interference in thin films (reflection geometry) - its path difference - applications - colors in thin films- newton's rings experiment - 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). Engineering applications of diffraction. Polarization: introduction -types of polarization - polarization by reflection, refraction and double refraction - nicol's prism -half wave and quarter wave plates – applications of polarization.

UNIT-II Crystallography and X-ray diffraction

Crystal and amorphous solids, lattice, space lattice, basis, unit cell and lattice parameters – bravais lattices – crystal systems (3d) – coordination number - packing fraction of sc, bcc & fcc – packing fraction of diamond - calculation of lattice constant. Directions and planes of a crystal - 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

Dielectric materials: introduction - dielectric polarization - dielectric polarizability, susceptibility, dielectric constant and displacement vector – relation between the electric vectors - types of polarizations- electronic (quantitative), ionic (quantitative) and orientation polarizations (qualitative) - lorentz internal field - clausius- mossotti equation - complex dielectric constant – frequency dependence of polarization – dielectric loss - applications of dielectrics. 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 - applications of magnetic materials.

UNIT-IV Quantum Mechanics and Free electron theory

Quantum mechanics: dual nature of matter – de broglie's wavelength - 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 – energies, wave functions and probability densities of the particle. Free electron theory: classical free electron theory (qualitative with discussion of merits and demerits) – quantum free electron theory – electrical conductivity based on quantum free electron theory – sources of electrical resistivity - fermi-dirac distribution - density of states - fermi energy.

UNIT-V Semiconductors

Semiconductors: formation of energy bands – classification of crystalline solids - intrinsic semiconductors: density of charge carriers – electrical conductivity – fermi level – extrinsic semiconductors: density of charge carriers – dependence of fermi energy on carrier concentration and temperature – drift and diffusion currents – einstein's equation - hall effect and its applications. Working principle of a p-n junction diode with its band diagram – working principle of a solar cell.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" AText book of EngineeringPhysics"- S. Chand Publications, 11thEdition 2019.
2. R. K. Gaur and S.C. Gupta, "Engineering Physics", Dhanpat Rai Publications, New Delhi.

REFERENCE BOOKS:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).
5. "Concepts of Modern Physics", Arthus Beiser, Tata Mc Graw Hill Publications, New Delhi.
6. "Physics Volume – II", Resnick, Halliday and Krane, Wiley, New Delhi.

e-Resources and Digital Material:

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(A0002231) LINEAR ALGEBRA & CALCULUS

Course Composition	**Basic Science (BS)**
Course Category	**Employability**
Developmental Needs	**Global**

COURSE OBJECTIVES:

1. To familiarize the concepts of matrices and mean value theorems and their applications in engineering
2. To equip the students to solve various application problems in engineering through evaluation of multiple integrals etc.,
3. To equip the students with standard concepts and tools of mathematics to handle various real-world problems and their applications.

COURSE OUTCOMES:

1. Develop a matrix algebra technique that is needed by engineers for practical applications.
2. Familiarize with functions of several variables which is useful in optimization.
3. Learn important tools of calculus in higher dimensions.
4. Familiarize with double and triple integrals of functions of several variables in two and three dimensions.
5. Identify the applications of advanced calculus & Linear algebra in electro-magnetic theory and in telecommunication engineering

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	2										
CO2	3	1	2	2	1										
CO3	2	2	2	2	1										
CO4	3	2	1	3	2										
CO5	2	3	2	1	2										

UNIT-I MATRICES

Introduction to matrices - elementary transformations - rank of a matrix by echelon form, normal form and paq form - cauchy – binet formulae (without proof) - inverse of non - singular matrices by gauss - jordan method. System of linear equations: solving system of homogeneous and non-homogeneous equations by gauss elimination method (rank test) - gauss seidel iteration method.

UNIT-II LINEAR TRANSFORMATION AND ORTHOGONAL TRANSFORMATION

Eigenvalues- eigenvectors and their properties-diagonalization of a matrix- cayley-hamilton theorem (without proof) - finding inverse and powers of a matrix by cayley-hamilton theorem. Quadratic forms and nature of the quadratic forms- reduction of quadratic form to canonical form - similar transformation and orthogonal transformation.

UNIT-III CALCULUS

Mean value theorems: rolle's theorem- lagrange's mean value theorem with their geometrical interpretation – inequalities by using lagrange's mean value theorem-problems on the above theorems. Cauchy's mean value theorem - taylor's and maclaurin's theorems with remainders (without proof) - simple examples of taylor's and maclaurin's series.

UNIT-IV PARTIAL DIFFERENTIATION AND APPLICATIONS (MULTI VARIABLE CALCULUS)

Functions of several variables - partial derivatives- total derivatives-chain rule-change of variables- taylor's and maclaurin's series expansion of functions of two variables. Jacobians-maxima and minima of functions of two variables- lagrange method of multipliers with three variables only.

UNIT-V MULTIPLE INTEGRALS (MULTI VARIABLE CALCULUS)

Double integrals-evaluation of double integrals (cartesian and polar) - change of order of integration-evaluation of triple integrals-change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
3. T.K.V. Iyengar, B. Krishna Gandhi, Mathematical Methods, S. Chand & Company.

REFERENCE BOOKS:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
3. Glyn James, Advanced Modern Engineering Mathematics, 5/e, Pearson publishers, 2018.
4. Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn.
5. H. K Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand, 2021.
6. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

e-Resources and Digital Material:

1. https://onlinecourses.swayam2.ac.in/aic22_ts31/preview
2. https://onlinecourses.nptel.ac.in/noc23_ma88/preview

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(A0201231) BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

1. Understand the basic electrical circuits, AC and DC machines.
2. Analyze different electrical circuits, performance of AC and DC machines.
3. Explain the theory, construction, and operation of electronic devices.
4. Apply the concept of science and mathematics to explain the working of diodes, transistors, and their applications.
5. Analyze small signal amplifier circuits to find the amplifier parameters.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3
CO1			3		2				2			2	3	2	
CO2	3		3			2					2		3	2	
CO3	3	2					3						3	2	
CO4		3					2						3	2	
CO5	3	3	2			2	3						3	2	

UNIT-I DC & AC Circuits

Dc circuits: electrical circuit elements (r, l and c), classification of electrical sources (independent and dependent sources) ohm's law and its limitations, kcl & kvl, series, parallel, series-parallel circuits, voltage division and current division rule ,super position theorem, simple numerical problems. Ac circuits: a. C. Fundamentals: equation of ac voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, rms value, form factor, peak factor, voltage and current relationship with phasor diagrams in r, l, and c circuits, concept of impedance, active power, reactive power and apparent power, concept of power factor (simple numerical problems).

UNIT-II Machines and Measuring Instruments

Machines: construction, principle and operation of (i) dc motor, (ii) dc generator, (iii) single phase transformer, (iv) production of rotating magnetic field, three phase induction motor and (v) alternator, applications of electrical machines. Important laws:- right hand thumb rule, fleming's right hand rule, fleming's left hand rule, lenz's law measuring instruments: construction and working principle of permanent magnet moving coil (pmmc), moving iron (mi) instruments and wheat stone bridge.

UNIT-III Energy Resources, Electricity Bill & Safety Measures

Energy resources: conventional and non-conventional energy resources; layout and operation of various power generation systems: hydel, nuclear, solar & wind power generation, phospheric acid fuel cell. 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.

UNIT-IV SEMICONDUCTOR DEVICES

Introduction - evolution of electronics - vacuum tubes to nano electronics - types of semiconductors (intrensic, extrensic-p type, n-type) characteristics of pn junction diode - zener effect - zener diode and its characteristics. Bipolar junction transistor - cb, ce, cc configurations and characteristics, definitions of α, β and γ, necessity of biasing and biasing techniques - elementary - treatment of small signal amplifier.

UNIT-V BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and power supplies: block diagram description of a dc power supply, working of half wave rectifier, center tap full wave rectifier, working of a full wave bridge rectifier, capacitor filter, inductor filter, l-section and π-section filters (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, concept of voltage divider biasing. Electronic instrumentation: block diagram of an electronic instrumentation system.

UNIT-VI DIGITAL ELECTRONICS

Number systems:- binary , decimal and their conversion. 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 integrated circuits (ics). Simple combinational circuits–half and full adders. Introduction to sequential circuits, flip flops, registers and counters

TEXT BOOKS:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.
4. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
6. David A.Bell, Electronic Divices and Circuits, 5th Edition, Oxford Higher Education

REFERENCE BOOKS:

1. Principles of Power Systems by V.K. Mehtha, S.Chand Technical Publishers, 2020.
2. A textbook of Electrical Technology by B.L. Theraja, S. Chand and Company, reprint edition, 2014.
3. S. K. Bhatacharya, Basic Electrical and Electronics Engineering, Second Edition, Person Publications, 2018.
4. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
5. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
6. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

e-Resources and Digital Material:

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1	0	4	3

(A0301231) ENGINEERING GRAPHICS

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

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

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	2	2	2	3			2	2	3	2		3	2	3
CO2	3	2	3	2	3			2	2	3			3	2	2
CO3	3	2	2	1	3			2	2	3		1	1	2	2
CO4	3	2	2	2	3			2	2	3	2		1	2	3
CO5															

UNIT-I 1

Introduction: lines, lettering and dimensioning, geometrical constructions and constructing regular polygons by general methods - semi-circle method and inscribe circle method. Curves: construction of ellipse by general method and concentric circle method, parabola and hyperbola by general method, cycloids, involutes, normal and tangent to curves. Scales: plain scales, diagonal scales and vernier scales.

UNIT-II II

Orthographic projections: reference plane, importance of reference lines or plane, projections of a point situated in any one of the four quadrants. Projections of straight lines: projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of straight line inclined to both the reference planes, finding the true length and true inclination. Projections of planes: regular planes perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT-III III

Projections of solids: types of solids: polyhedra and solids of revolution - practical applications. Projections of solids in simple positions: axis perpendicular to horizontal plane, axis perpendicular to vertical plane and axis parallel to both the reference planes, projection of solids with axis inclined to one reference plane and parallel to another plane.

UNIT-IV IV

Sections of solids: perpendicular and inclined section planes, sectional views and true shape of section, sections of solids in simple position only. Development of surfaces: methods of development: parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone, frustum of cone and pyramid.

UNIT-V V

Conversion of views: conversion of isometric views to orthographic views; conversion of orthographic views to isometric views, isometric scale and isometric projection. Computer graphics: creating 2d & 3d drawings of objects including pcb and transformations using auto cad (not for end examination).

TEXT BOOKS:

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

REFERENCE BOOKS:

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

e-Resources and Digital Material:

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(A0501231) INTRODUCTION TO PROGRAMMING

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

1. Understand basics of computers, the concept of algorithm and algorithmic thinking.
2. Develop the ability to analyze a problem, develop an algorithm to solve it.
3. Proficiently use the C programming language to implement various algorithms.
4. Understand more advanced features of C language.
5. Develop problem-solving skills and the ability to debug and optimize the code.

Mapping COs with POs & PSOs:

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CO1	2	2			1										
CO2	3	3	3	3	2	1	1		2	1	1				
CO3	3	2		1											
CO4	2			2	1										
CO5	3	3	3	2	2			1	2	1	1				

UNIT-I INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

History of computers, basic organization of a computer: alu, input-output units, memory, program counter, introduction to programming languages, basics of a computer program- algorithms, flowcharts (using dia tool), pseudo code. Primitive data types, variables, and constants, basic input and output, operations, type conversion, and casting, operators. Problem solving techniques: algorithmic approach, characteristics of algorithm, problem solving strategies: top-down approach, bottom-up approach, time and space complexities of algorithms.

UNIT-II CONTROL STRUCTURES

Simple sequential programs conditional statements (if, if-else, nested if, else-if ladder, switch). Loops (for, while, do- while) break and continue.

UNIT-III ARRAYS AND STRINGS

Arrays indexing, memory model, programs with array of integers, two dimensional arrays. Introduction to strings, string i/o functions, string handling functions.

UNIT-IV FUNCTIONS

Introduction to functions, function declaration and definition, function call return types and arguments, modifying parameters inside functions using pointers, arrays as parameters, recursion. Scope and lifetime of variables, storage classes.

UNIT-V USER DEFINED DATA TYPES, FILE HANDLING, POINTERS

User-defined data types-structures and unions, pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers. Self-referential structures, dynamic memory allocation functions. Basics of file handling, command line arguments, preprocessor directives

TEXT BOOKS:

1. The C Programming Language-by Brian W. Kernighan and Dennis M. Ritchie
2. Schaum’s Outline of Programming with C by Byron S Gottfried (1996), McGraw-Hill Education (ISBN:978-0070240353)

REFERENCE BOOKS:

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

e-Resources and Digital Material:

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0	0	2	1

(A3271231) IT WORKSHOP

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
2. To teach basic command line interface commands on Linux.
3. To teach the usage of Internet for productivity and self-paced life-long learning
4. To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

COURSE OUTCOMES:

1. Perform Hardware troubleshooting.
2. Understand Hardware components and inter dependencies.
3. Safeguard computer systems from viruses/worms.
4. Document/ Presentation preparation.
5. Perform calculations using spreadsheets.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO4															
CO5												-			

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

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

video would be given as part of the course content.
Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.
Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.
Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 - Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXand word - Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.
Task 2: Using La TeX and Word to create a project certificate. Features to be covered: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing. Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.
Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering. Changing Text Direction, Cell alignment, Footnote, Hyperlink. Symbols, Spell Check, Track Changes.
Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

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

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
Task 2: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel - average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,
LOOKUP/VLOOKUP
Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting
Power point
Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.
Task 2: Interactive presentations - Hyperlinks, Inserting Images, Clip Art, Audio, Video, Objects, Tables and Charts.
Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting - Background, textures, Design Templates, Hidden slides.
AI Tools-ChatGPT
Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.
Ex: Prompt: "You are a knowledgeable Al. Please answer the following question: What is the capital of France?"
Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas
Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."
Task 3: Code Generation: Test the model's ability to generate code by giving it partial code snippets and asking it to complete them. You can also ask the model to explain programming concepts or help you debug code.
Ex:Prompt: "Complete the following Python code to swap the values of two variables: python a5 b= 10 temp = ana bnb = temp "
Task 4: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluent the translations are.
Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?""
Task 5: Summarization: Provide a long piece of text, such as an article or a blog post, and ask the model to summarize it. Compare the model's summary with the original text to assess its ability to condense information effectively.
Ex: Prompt: "Summarize the article titled 'Ramayanam' in 3-4 sentences."
Task 6: Futuristic Predictions: Have fun by asking the model to predict future

technological advancements, societal changes, or even hypothetical scenarios. Compare its responses with your own ideas.
• Ex:Prompt: "Predict how artificial intelligence will transform everyday life in the next 20 years."
Task 7: Technical Explanations: Challenge the model with technical questions from different domains. Ask it to explain scientific concepts, mathematical theorems, or complex algorithms in simple terms.
Ex: Prompt: "Explain the concept of neural networks in machine learning, including their layers and the process of backpropagation."

TEXT BOOKS:

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dream tech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
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 Third Edition by David Anfins on and Ken Quamme. - CISCO Press, Pearson Education.

e-Resources and Digital Material:

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I B.Tech. I Sem.

L	T	P	C
0	0	2	1

(A0071231) ENGINEERING PHYSICS LAB

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability,Skill Development**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

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

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO4															
CO5												-			
CO6											-	-			

1. Determination of radius of curvature of a given plano convex lens by Newton’s rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster’s law

4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susptibility 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 non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.
19. **Determination of particle size using laser**.
20. **Determination of Dispersive power of a prism using spectrometer.**
21. **Study of Solar cell I-V characteristics and Determine its Fill Factor (FF).**

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

TEXT BOOKS:

REFERENCE BOOKS:

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

e-Resources and Digital Material:

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I B.Tech. I Sem.

L	T	P	C
0	0	3	1.5

(A0271231) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

Course Composition	**Engineering Science (ES)**
Course Category	**Employability,Skill Development**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
2. To impart knowledge on the principles of digital electronics and fundamentals of electron devices

COURSE OUTCOMES:

1. Get an exposure to common electrical & electronic components and their ratings.
2. Understand the usage of common electrical & electronic measuring instruments.
3. Understand the basic characteristics of electrical machines and perform energy calculations.
4. Plot and discuss the characteristics of various electron devices.
5. Explain the operation of a digital circuit.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	2	3		2		2		2			2	3	2	
CO2	3		3			2	3				2		3	2	
CO3	3	2					3						3	2	
CO4		3					2						3	2	
CO5	3	3	2			2	3						3	2	

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.

1. 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.

1. Components:

- Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
- Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING WORKSHOP
List of experiments:

1. **Resistor color coding.**
2. **Verification of Resistors in series and parallel**
3. Verification of KCL and KVL
4. Verification of Superposition theorem
5. Measurement of Resistance using Wheat stone bridge
6. Magnetization Characteristics of DC shunt Generator
7. Measurement of Power and Power factor using Single-phase wattmeter
8. Measurement of Earth Resistance using Megger
9. Calculation of Electrical Energy for Domestic Premises

References:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING WORKSHOP
List of Experiments:

1. **Study of C.R.O**.
2. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
3. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.

4. Implementation of half wave and full wave rectifiers
5. Plot Input & Output characteristics of BJT in CE and CB configurations
6. Frequency response of CE amplifier.
7. Simulation of RC coupled amplifier with the design supplied
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
9. Verification of Truth Tables of S-R, J-K& D- & **T-** 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.
Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

TEXT BOOKS:

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

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I B.Tech. I Sem.

L	T	P	C
0	0	3	1.5

(A0571231) COMPUTER PROGRAMMING LAB

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To use basic data types, operators, expressions and expression evaluation mechanisms using C Programming Language.
2. To implement control flows, construct in C Programming Language and understand the syntax, semantics and usability contexts of these different constructs.
3. To develop composite data types in C and constructs available to develop their datatypes, utilize them to model things and dealing with data from and to external files.
4. To design programs with different variations of the constructs available for practicing modular programming and understand the pros and cons of using different variants and apply optimization.

COURSE OUTCOMES:

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

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3
CO1	3	2	1												
CO2	3	3	1	1				1				1			
CO3	2	3	3	2	1				1						
CO4	3	3	3	2	1				1	1	2				

UNIT I
WEEK 1
Objective: Getting familiar with the programming environment on the computer and

writing the first program.
Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment

1. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
2. Exposure to Turbo C, gcc
3. Writing simple programs using printf(), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.
Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 2: Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs

1. Sum and average of 3 numbers
2. Conversion of Fahrenheit to Celsius and vice versa
3. Simple interest calculation

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

1. Finding the square root of a given number
2. Finding compound interest
3. Area of a triangle using heron’s formulae
4. Distance travelled by an object

UNIT II
WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.
Suggested Experiments/Activities:
Tutorial4: Operators and the precedence and as associativity:
Lab4: Simple computational problems using the operator’ precedence and associativity

1. Evaluate the following expressions.
    1. A+B*C+(D*E) + F*G
    2. A/B*C-B+A*D/3
    3. A+++B---A

4. J= (i++) + (++i)

2. Find the maximum of three numbers using conditional operator
3. 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.

1. Write a C program to find the max and min of four numbers using if-else.
2. Write a C program to generate electricity bill.
3. Find the roots of the quadratic equation.
4. Write a C program to simulate a calculator using switch case.
5. Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

Lab 6: Iterative problems e.g., the sum of series

1. Find the factorial of given number using any loop.
2. Find the given number is a prime or not.
3. Compute sine and cos series
4. Checking a number palindrome
5. Construct a pyramid of numbers.

UNIT III

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

Lab 7:1D Array manipulation, linear search

1. Find the min and max of a 1-D integer array.
2. Perform linear search on1D array.
3. The reverse of a 1D integer array
4. Find 2's complement of the given binary number.

5. Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.
Suggested Experiments/Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 8: Matrix problems, String operations, Bubble sort

1. Addition of two matrices
2. Multiplication two matrices
3. Sort array elements using bubble sort
4. Concatenate two strings without built-in functions
5. Reverse a string using built-in and without built-in string functions

UNIT IV
WEEK 9: 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 9: Functions, call by value, scope and extent,
Lab 9: Simple functions using call by value, solving differential equations using Eulers theorem

1. Write a C function to calculate NCR value
2. Write a C function to find the length of a string
3. Write a C function to transpose of a matrix
4. Write a C function to demonstrate numerical integration of differential equations using Euler’s method

WEEK 10:
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 10: Recursion, the structure of recursive calls
Lab 10: Recursive functions

1. Write a recursive function to generate Fibonacci series
2. Write a recursive function to find the lcm of two numbers
3. Write a recursive function to find the factorial of a number
4. Write a C Program to implement Ackermann function using recursion
5. Write a recursive function to find the sum of series.

WEEK 11:
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 11: Call by reference, dangling pointers
Lab 11: Simple functions using Call by reference, Dangling pointers

1. Write a C program to swap two numbers using call by reference
2. Demonstrate Dangling pointer problem using a C program
3. Write a C program to copy one string into another using pointer
4. Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

UNIT V
WEEK12:
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 12: Pointers, structures and dynamic memory allocation
Lab12: Pointers and structures, memory dereference.

1. Write a C program to find the sum of a 1D array using malloc()
2. Write a C program to find the total, average of n students using structures
3. Enter n students data using calloc() and display failed students list
4. Read student name and marks from the command line and display the student details along with the total.
5. Write a C program to implement realloc()

WEEK 13:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures
Suggested Experiments/Activities:
Tutorial 13: Bitfields, Self-Referential Structures, Linked lists
Lab13: Bitfields, linked lists
Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

1. Create and display a singly linked list using self-referential structure.
2. Demonstrate the differences between structures and unions using a C program.
3. Write a C program to shift/rotate using bitfields.
4. Write a C program to copy one structure variable to another structure of the same type.

WEEK14:

Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:

Tutorial 14: File handling

Lab 14: File operations

1. Write a C program to write and read text into a file.
2. Write a C program to write and read text into a binary file using fread() and fwrite()
3. Copy the contents of one file to another file.
4. Write a C program to merge two files into the third file using command-line arguments.
5. Find no. of lines, words and characters in a file
6. 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
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

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(A0072231) NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3

UNIT I
WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.
Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment

1. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
2. Exposure to Turbo C, gcc
3. Writing simple programs using printf(), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.
Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
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1. Sum and average of 3 numbers
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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.

1. Finding the square root of a given number
2. Finding compound interest
3. Area of a triangle using heron's formulae
4. Distance travelled by an object

UNIT II

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

Lab4: Simple computational problems using the operator' precedence and associativity

1. Evaluate the following expressions.
    1. A+B*C+(D*E) + F*G
    2. A/B*C-B+A*D/3
    3. A+++B---A
    4. J= (i++) + (++i)
2. Find the maximum of three numbers using conditional operator
3. Take marks of 5 subjects in integers, and find the total, average in float

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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".

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UNIT IV

WEEK 9: 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:
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4. Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

UNIT V
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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
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3. Write a C program to shift/rotate using bitfields.
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WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
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Tutorial 14: File handling
Lab 14: File operations

1. Write a C program to write and read text into a file.
2. Write a C program to write and read text into a binary file using fread() and fwrite()
3. Copy the contents of one file to another file.
4. Write a C program to merge two files into the third file using command-line arguments.
5. Find no. of lines, words and characters in a file
6. Write a C program to print last n characters of a given file.

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I B.Tech. II Sem.

L	T	P	C
2	0	0	2

(A0003232) COMMUNICATIVE ENGLISH

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

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

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1						2		3	2	3		2			
CO2									2	3		2			
CO3						2			2	3		2			
CO4						2			2	2		2			
CO5								1	1	3		2			

UNIT-I HUMAN VALUES

Gift of magi (short story):lesson: human values: gift of magi (short story) listening: identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions – listing to ted talks 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 – book review – the monk who sold his ferrari. Writing: mechanics of writing - capitalization, spellings, punctuation, pre-writing techniques - parts of sentences. Grammar: parts of speech, basic sentence structures-forming questions. Vocabulary: synonyms, antonyms, affixes (prefixes/suffixes), root words

UNIT-II NATURE

The brook by alfred tennyson (poem):lesson: nature: the brook by alfred tennyson (poem) listening: answering a series of questions about main ideas and supporting ideas after listening to audio texts – listening techniques – chinese pictograph. 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 – sqr3 techniques. Writing: structure of a paragraph - paragraph writing (specific topics) - compare and contrast. Grammar; cohesive devices - linkers, use of articles and zero articles, prepositions. Vocabulary: homonyms, homophones, homographs

UNIT-III BIOGRAPHY

Elon musk:lesson: biography: elon musk listening: listening for global comprehension and summarizing what is listened to – sample listening from- ielts (international english language testing system) 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 – sample reading - chandrayaan-3 writing: summarizing, note-making, paraphrasing grammar: verbs - tenses; subject-verb agreement; vocabulary: compound words, collocations

UNIT-IV INSPIRATION

The toys of peace by saki: lesson: inspiration: the toys of peace by saki listening: making predictions while listening to conversations/ transactional dialogues without video; listening with video. Speaking: role plays for practice of conversational english in academic contexts (formal and informal) - asking for and giving information/directions. Reading: studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data writing: letter writing - official letters, resumes - report writing - email writing grammar: reporting verbs, direct & indirect speech, active & passive voice vocabulary: words often confused, jargons - idioms & phrases

UNIT-V MOTIVATION

The power of intrapersonal communication (an essay):lesson: motivation: the power of intrapersonal communication (an essay) listening: identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. Speaking: formal oral presentations on topics from academic contexts - preparation of slides reading: reading comprehension - sample reading on engineering in society by sarah bell writing: writing structured essays on specific topics. Grammar: editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement) vocabulary: technical jargon

TEXT BOOKS:

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

REFERENCE BOOKS:

1. 1) Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020.
2. 2) Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. 3) Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. 4) Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.
5. 5) Practical English usage by Michall Swan, Oxford University Press.
6. 6) The Definitive guide to IELTS Avademy writing, Oxford University Press 2019.

e-Resources and Digital Material:

1. 1) www.bbc.co.uk/learningenglish
2. 2) https://dictionary.cambridge.org/grammar/british-grammar/
3. 3) www.eslpod.com/index.html

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L	T	P	C
3	0	0	3

(A0004232) CHEMISTRY

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To familiarize engineering chemistry and its applications
2. To train the students on the principles and applications of electrochemistry and polymers
3. To introduce about the applications of instrumental methods in characterization of materials

COURSE OUTCOMES:

1. Compare the materials of construction for battery and electrochemical sensors.
2. Explain the preparation, properties, and applications of thermoplastics & thermosetting &elastomers conducting polymers.
3. Explain the principles of spectrometry, SLC in separation of solid and liquid mixtures.
4. Apply the principle of Band diagrams in the application of conductors and semiconductors.
5. Summarize the concepts of Instrumental methods.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	1		1				2		1			1			
CO2	1	2			1	1		1							
CO3	2			1			1	1							
CO4	1	2		1	1	2		1		1					
CO5	2	1		2	1			1		1		1			

UNIT-I STRUCTURE AND BONDING MODELS

:fundamentals of quantum mechanics, schrodinger wave equation, significance of Ψ and Ψ2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of o2 and co, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order. Crystal field theory and its salient features – splitting in octahedral and tetrahedral geometry.

UNIT-II MODERN ENGINEERING MATERIALS

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 graphene's nanoparticles. Preparation methods – sol-gel method, chemical reduction method.

UNIT-III ELECTROCHEMISTRY AND APPLICATIONS

Introduction – conductance, specific conductance, equivalent conductance and molar conductance – determination of equivalent conductance by wheatstone bridge method, 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 primary cells – zinc-air battery, secondary cells –lithium-ion batteries- working of the batteries including cell reactions; fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer electrolyte membrane fuel cells (pemfc).

UNIT-IV POLYMER CHEMISTRY

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization with specific examples and mechanisms of polymer formation. Plastics –thermo and thermosetting plastics, preparation, properties and applications of – pvc, teflon, bakelite, nylon-6,6, nylon 11, carbon fibres. Elastomers – buna-s, buna-n, butyl rubber, thiokol – preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-degradable polymers - poly glycolic acid (pga), polyl lactic acid (pla).

UNIT-V INSTRUMENTAL METHODS AND APPLICATIONS

Electromagnetic spectrum. Absorption of radiation: beer-lambert's law. Uv-visible spectroscopy, electronic transition, absorption and intensity shifts, instrumentation, applications of uv-visible spectroscopy, ir spectroscopies, fundamental modes and selection rules, instrumentation. Applications of ir spectroscopy, chromatography-basic principle, classification-hplc: principle, instrumentation and applications.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. 1) Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. 2) J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. 3) Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition.

e-Resources and Digital Material:

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L	T	P	C
3	0	0	3

(A0005232) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

Course Composition	**Basic Science (BS)**
Course Category	**Employability**
Developmental Needs	**Global**

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:

1. Solve the differential equations related to various engineering fields.
2. Identify solution methods for partial differential equations that model physical processes.
3. Interpret the physical meaning of different operators such as gradient, curl and divergence.
4. Estimate the work done against a field, circulation and flux using vector calculus.
5. Apply the concept of vector integration to solve many problems in field theory, Electromagnetic theory and transmission lines.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	3	1	2										
CO2	3	2	2	2	1										
CO3	2	2	1	2	1										
CO4	3	2	2	1	2										
CO5	2	1	2	1	3										

UNIT-I Differential equations of first order and first degree

Formation of odes - solution of odes - linear differential equations – bernoulli’s equations- exact equations and equations reducible to exact form. Applications: newton’s law of cooling – law of natural growth and decay- electrical circuits (l – r & c – r circuits).

UNIT-II Linear differential equations of higher order (Constant Coefficients)
Definitions- homogenous and non-homogenous- complimentary function(c. F)- general solution,-particular integral(p. I) with rhs term of the type,e^ax,sin ax,cos ax, polynomials in x, e^ax v(x), xv(x). Wronskean-method of variation of parameters-simultaneous linear equations-applications to l-c-r circuit problems and simple harmonic motion.

UNIT-III Partial Differential Equations
Introduction - 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- method of separation of variables.

UNIT-IV Vector differentiation
Introduction of vector differentiation - scalar and vector point functions-vector operator del,-del applied to scalar point functions, - gradient - directional derivatives del applied to vector point functions-divergence and curl- vector identities – del applied twice to point functions.

UNIT-V Vector integration
Line integral-circulation, work done-surface integral,flux-volume integral. Green's theorem in the plane (without proof)- stoke's theorem (without proof)- divergence theorem (without proof) - verification of green's, stoke's and gauss theorems.

TEXT BOOKS:

1. 1) Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
2. 2) B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.
3. 3) T.K.V. Iyengar, B. Krishna Gandhi, A Text Book of Engineering Mathematics, Vol – I, S. Chand & Company.

REFERENCE BOOKS:

1. 1) Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2018.
2. 2) Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
3. 3) George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
4. 4) R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
5. 5) B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education, 2017.
6. 6) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

e-Resources and Digital Material:

1. 1) https://onlinecourses.nptel.ac.in/noc23_ma86/preview
2. 2) https://onlinecourses.nptel.ac.in/noc23_ma90/preview

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L	T	P	C
3	0	0	3

(A0101232) BASIC CIVIL & MECHANICAL ENGINEERING

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

1. • Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
2. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
3. • Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
4. • Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
5. • Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1			2				1		1			
CO2	3	2	1			2				1		1			
CO3	3	2	1		2	2				1		1			
CO4	3	2	1			2	2			1		1			
CO5	3	2	1			2				1		1			

UNIT-I Basics of Civil Engineering

Role of civil engineers in society- various disciplines of civil engineering- structural engineering- geo-technical engineering- transportation engineering - hydraulics and water resources engineering - environmental engineering -scope of each discipline- building construction and planning- construction materials-cement - aggregate - bricks - cement concrete- steel-introduction to prefabricated construction techniques. Building bye laws: floor area ratio, carpet area, built up area, super built up area, standard dimensions of residential building

UNIT-II Surveying

Objectives of surveying- horizontal measurements: instruments used in chain survey and its functions - vertical measurements: component parts of levelling instrument and its functions - angular measurements: components of prismatic compass and its functions- levelling instruments used for levelling- introduction to bearings-simple problems on levelling(finding out the r. L.) and bearings(whole circle bearing system and reduced bearing)-contour mapping. - global positioning system (gps) and its applications.

UNIT-III Transportation Engineering

Importance of transportation in nation’s economic development- types of highway pavements- flexible pavements and rigid pavements (structure of pavement, function of pavement components) - simple differences. Basics of harbour, tunnel, airport, and railway engineering. Water resources and environmental engineering: introduction, sources of water- quality of water- specifications- introduction to hydrology–rain water harvesting - water storage and conveyance structures (simple introduction to dams and reservoirs). - cross drainage works: simple introduction to aqueduct, siphon aqueduct, super passage and canal siphon.

UNIT-IV Introduction to Mechanical Engineering

Role of mechanical engineering in industries and society- technologies in different sectors such as energy, manufacturing, automotive, aerospace, marine sectors, bio-medical engineering and infrastructure development. Engineering materials – metals - ferrous and non-ferrous, ceramics, composites, functionally graded materials, smart materials

UNIT-V Manufacturing Processes

Principles of casting, forming, joining processes, machining, non-conventional machining, introduction to cnc machines, 3d printing, and smart manufacturing. Thermal engineering – working principle of boilers, otto cycle, diesel cycle, rankine cycle, refrigeration and air-conditioning cycles, ic engines, 2-stroke and 4-stroke engines, si/ci engines, crdi engine, components of electric and hybrid vehicles.

UNIT-VI Power plants

Working principle of steam, diesel, hydro, nuclear power plants. Mechanical power transmission – belt drives, chain, rope drives, gear drives, electromagnetic drives and their applications. Introduction to robotics - joints & links, configurations, grippers and applications of robotics.

TEXT BOOKS:

1. 1) Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. 2) Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. 3) Basic Civil Engineering, SatheeshGopi, Pearson Publications, 2009, First Edition
4. 1) Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
5. 2) A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
6. 3) An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

REFERENCE BOOKS:

1. 1) Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. 2) Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. 3) Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. 1) Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
5. 2) 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
6. 3) Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.

e-Resources and Digital Material:

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(A0401232) NETWORK ANALYSIS

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To introduce basic laws, mesh & nodal analysis techniques for solving electrical circuits
2. To impart knowledge on applying appropriate theorem for electrical circuit analysis
3. To explain transient behavior of circuits in time and frequency domains
4. To teach concepts of resonance
5. To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.

COURSE OUTCOMES:

1. Understand basic electrical circuits with nodal and mesh analysis.
2. Analyze the circuit using Network simplification theorems.
3. Infer and evaluate Transient response and Steady state response of a network.
4. Analyze electrical networks in the Laplace domain.
5. Compute the parameters of a two-port network.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2							2	1					
CO2	3	2							2	1		1			
CO3	2	3	2						2	2		2			
CO4	3	3	2						22	2		2			
CO5	2	3	2						2	2		2			

UNIT-I Network Theorems

Types of circuit components, types of sources and source transformations, independent and dependent source transformations with examples, mesh analysis and nodal analysis, problem solving with resistances only including dependent sources also. Principal of duality with examples. Network theorems: thevenin's, norton's, milliman's, reciprocity, compensation, substitution, superposition, max power transfer, tellegens - problem solving using dependent sources also.

UNIT-II Transients

Transients: first order differential equations, definition of time constants, r-l circuit, r-c circuit with dc excitation, evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem-solving using r-l-c elements with dc excitation and ac excitation, response as related to s-plane rotation of roots. Laplace transform: introduction, laplace transformation, basic theorems, problem solving using laplace transform, partial fraction expansion, heaviside's expansions, problem solving using laplace transform, problems in s-domain.

UNIT-III Steady State Analysis of A.C Circuits

Steady state analysis of a. C circuits: impedance concept, phase angle, series r-l, r-c, r-l-c circuits problem solving. Complex impedance and phasor notation for r-l, r-c, r-l-c problem solving using mesh and nodal analysis, star-delta conversion, problem solving using laplace transforms also, applications of ac circuits: phase shifters.

UNIT-IV Resonance

Resonance: introduction, definition of q, series resonance, bandwidth of series resonance, parallel resonance, general case-resistance present in both branches, anti-resonance at all frequencies, effect of frequency on r, xl, xc, zt in series resonant circuit. Coupled circuits: coupled circuits: self-inductance, mutual inductance, coefficient of coupling, analysis of coupled circuits, natural current, dot rule of coupled circuits, conductively coupled equivalent circuits- problem solving.

UNIT-V Two-port Networks

Two-port networks: relationship of two port networks, z-parameters, y-parameters, transmission line parameters, h- parameters, relationships between parameter sets, parallel & series connection of two port networks, cascading of two port networks, problem solving using dependent sources also, conditions for reciprocity and symmetry in two-port networks. Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

TEXT BOOKS:

1. 1) Network Analysis – ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. 2) Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.
3. 3) Network lines and Fields by John. D. Ryder 2nd Edition, PHI

REFERENCE BOOKS:

1. 1) D. Roy Choudhury, Networks and Systems, New Age International Publications, 2013.
2. 2) Joseph Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Outline Series, 7th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017
3. 3) Fundamentals of Electric Circuits by Charles K. Alexander and Matthew N. O. Sadiku, McGraw-Hill Education.

e-Resources and Digital Material:

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(A0073232) COMMUNICATIVE ENGLISH LAB

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. 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 students will get trained in the basic communication skills and also make them ready to face job interviews.

COURSE OUTCOMES:

1. Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit professionalism in participating in debates and group discussions.
5. Create effective resonate and prepare themselves to face interviews in future.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO1**	**PSO2**	**PSO3**
CO1						1		1	2	2		1			
CO2								1	1	3		1			
CO3						1			1	2		2			
CO4						1			2	2		1			
CO5								1	1	2		1			

1. **Introduction to Phonetics**, Vowels & Consonants - CALL
2. Neutralization/Accent Rules - **EPD** - CALL
3. **Self-Introduction**, Communication Skills & JAM - ICS
4. Role Play or Conversational Practice - ICS
5. E-mail Writing and **Email Etiquettes** - ICS
6. Resume Writing, Cover letter, SOP - CALL

7. Group Discussions - methods & practice - ICS
8. Debates - Methods & Practice - ICS
9. PPT Presentations/ Poster Presentation/ **Describing Object** - ICS
10. Interview Skills & **MOCK Interviews** - ICS

TEXT BOOKS:

REFERENCE BOOKS:

1. 1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. 2. Grant Taylor: English Conversation Practice, Tata McGraw-Hill Education India, 2016
3. 3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. 4. T. Balasubramanyam, A Textbook of English Phonetics for Indian Students,(3rd Ed) Trinity Press.
5. 5. E.Suresh Kumar, P.Srihari, A Hand Book for English Language Laboratories, Cambridge University Press India Pvt. Ltd., 2009.

e-Resources and Digital Material:

1. 1. www.esl-lab.com
2. 2. www.englishmedialab.com
3. 3. www.englishinteractive.net

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L	T	P	C
0	0	2	1

(A0074232) CHEMISTRY LAB

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. Verify the fundamental concepts with experiments.

COURSE OUTCOMES:

1. Determine the cell constant and conductance of solutions.
2. Prepare advanced polymer Bakelite materials.
3. Measure the strength of an acid present in secondary batteries.
4. Analyse the IR spectra of some organic compounds.
5. Calculate strength of acid in Pb-Acid battery.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	1		1					2			1			
CO2	1	1	2		2	1	1	1			1				
CO3	2	1			1		2		`11			1			
CO4	1	3	2	1	2		1			1		1			
CO5	2	2	1		2	1			2	1		1			

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

13. **Estimation of Copper by using Standard EDTA solution**
14. **Estimation of Magnesium by using Standard EDTA solution**

TEXT BOOKS:

REFERENCE BOOKS:

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

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	3	1.5

(A0371232) ENGINEERING WORKSHOP

Course Composition	**Humanities & Social Sciences (HS)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

1. Identify workshop tools and their operational capabilities.
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
3. Apply fitting operations in various applications.
4. Apply basic electrical engineering knowledge for House Wiring Practice

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1		1	2	2	1				2		2	1	1		
CO2					2	1			2	2	2		2		
CO3					2	1			2	2	2		2		
CO4					2	1			2	2	2		2		

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **Wood Working:** Familiarity with different types of woods and tools used in wood working and make following joints.

a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint

1. **Sheet Metal Working**: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.

a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing

1. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.

a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two-wheeler tyre

1. **Electrical Wiring**: Familiarity with different types of basic electrical circuits and make the following connections.

a) Parallel and series b) Two-way switch c) Godown lighting d) Tube light
e) Three phase motor f) Soldering of wires

1. **Foundry Trade:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
2. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
3. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

TEXT BOOKS:

1. 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. 2) A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

REFERENCE BOOKS:

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

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	3	1.5

(A0471232) NETWORK ANALYSIS AND SIMULATION LAB

Course Composition	**Engineering Science (ES)**
Course Category	**Employability**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To gain hands on experience in verifying Kirchoff's laws and network theorems
2. To analyze transient behavior of circuits
3. To study resonance characteristics
4. To determine 2-port network parameters

COURSE OUTCOMES:

1. Verify Kirchoff's laws and network theorems.
2. Measure time constants of RL & RC circuits.
3. Analyze behavior of RLC circuit for different cases.
4. Design resonant circuit for given specifications.
5. Characterize and model the network in terms of all network parameters.

Mapping COs with POs & PSOs:

CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2							2	1			3	1	
CO2	2	3							3	2		2	3	1	
CO3	3	2							2	1		1	3	1	
CO4	3	3	2						3	1		1	3	1	
CO5	2	3							2	2		2	2	2	1

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits
7. To study frequency response of various 1st order RL & RC networks
8. To study the transient and steady state response of a 2nd order circuit by varying its various parameters and studying their effects on responses

9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a twin-T network and study its frequency response.

TEXT BOOKS:

REFERENCE BOOKS:

1. 1. Network Analysis - ME Van Valkenburg, Prentice Hall of India, revised 3rd Edition, 2019.
2. 2. Engineering Circuit Analysis by William H. Hayt, Jack Kemmerly, Jamie Phillips, Steven M. Durbin, 9th Edition 2020.

e-Resources and Digital Material:

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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

(A0075232) HEALTH AND WELLNESS, YOGA AND SPORTS

Course Composition	
Course Category	
Developmental Needs	
Course Enrichment Relevance as per NEP-2020	

COURSE OBJECTIVES:

COURSE OUTCOMES:

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3

1. Study of components of a circuit and Verification of KCL and KVL.
2. Verification of mesh and nodal analysis for AC circuits
3. Verification of Superposition, Thevenin's & Norton theorems for AC circuits
4. Verification of maximum power transfer theorem for AC circuits
5. Verification of Tellegen's theorem for two networks of the same topology.
6. Study of DC transients in RL, RC and RLC circuits
7. To study frequency response of various 1st order RL & RC networks
8. To study the transient and steady state response of a 2nd order circuit by varying its various parameters and studying their effects on responses
9. Find the Q Factor and Bandwidth of a Series and Parallel Resonance circuit.
10. Determination of open circuit (Z) and short circuit (Y) parameters
11. Determination of hybrid (H) and transmission (ABCD) parameters
12. To measure two port parameters of a twin-T network and study its frequency response.

TEXT BOOKS:

REFERENCE BOOKS:

e-Resources and Digital Material:

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(AUTONOMOUS)
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

I B.Tech. II Sem.

L	T	P	C
0	0	3	1.5

(A0271232) ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

Course Composition	**Engineering Science (ES)**
Course Category	**Employability,Skill Development**
Developmental Needs	**National**
Course Enrichment Relevance as per NEP-2020	**Environment & Sustainability**

COURSE OBJECTIVES:

1. To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
2. To impart knowledge on the principles of digital electronics and fundamentals of electron devices

COURSE OUTCOMES:

1. Get an exposure to common electrical & electronic components and their ratings.
2. Understand the usage of common electrical & electronic measuring instruments.
3. Understand the basic characteristics of electrical machines and perform energy calculations.
4. Plot and discuss the characteristics of various electron devices.
5. Explain the operation of a digital circuit.

Mapping COs with POs & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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.

1. 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.

1. Components:

- Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
- Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING WORKSHOP
List of experiments:

1. **Resistor color coding.**
2. **Verification of Resistors in series and parallel**
3. Verification of KCL and KVL
4. Verification of Superposition theorem
5. Measurement of Resistance using Wheat stone bridge
6. Magnetization Characteristics of DC shunt Generator
7. Measurement of Power and Power factor using Single-phase wattmeter
8. Measurement of Earth Resistance using Megger
9. Calculation of Electrical Energy for Domestic Premises

References:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Basic Electrical Engineering by S. N. Singh, PHI Publishers, 2011
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI publishers, Third Edition, 2014.

Note: Minimum Six Experiments to be performed.

PART B: ELECTRONICS ENGINEERING WORKSHOP
List of Experiments:

1. **Study of C.R.O**.
2. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
3. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.

4. Implementation of half wave and full wave rectifiers
5. Plot Input & Output characteristics of BJT in CE and CB configurations
6. Frequency response of CE amplifier.
7. Simulation of RC coupled amplifier with the design supplied
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
9. Verification of Truth Tables of S-R, J-K& D- & **T-** 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.
Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

TEXT BOOKS:

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

e-Resources and Digital Material: