COURSE STRUCTURE(R23)
AND
DETAILED SYLLABUS
(I YEAR)

ELECTRONICS AND COMMUNICATION ENGINEERING

For
B.Tech., Four Year Degree Course
(Applicable for the batches admitted from 2023-24)

LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY
An Autonomous Institution
Approved by AICTE & Permanently Affiliated to JNTUGV, Vizianagaram
Accredited by NAAC with "A" Grade and NBA (CSE,ECE, EEE & ME)
Jonnada (Village), Denkada (Mandal), Vizianagaram Dist – 535 005
Phone No. 08922-241111, 241112
E-Mail: lendi_2008@yahoo.com
Website: www.lendi.org

COURSE STRUCTURE AND DETAILED SYLLABUS
B.TECH- ELECTRONICS AND COMMUNICATION ENGINEERING

I Year I Semester						
S.No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credits**
1.	R23BSH-MA1101	Linear Algebra & Calculus	3	0	0	3
2.	R23BSH-CH1103	Chemistry	3	0	0	3
3.	R23CSE-ES1101	Introduction to Programming	3	0	0	3
4.	R23MEC-ES1101	Engineering Graphics	1	0	4	3
5.	R23EEE-ES1101	Basic Electrical & Electronics Engineering	3	0	0	3
6.	R23BSH-CH1104	Chemistry Lab	0	0	2	1
7.	R23CSE-ES1102	Computer Programming Lab	0	0	3	1.5
8.	R23EEE-ES1102	Electrical &Electronics Engineering Workshop	0	0	3	1.5
9.	R23BSH-MC1102	NSS/NCC/Scouts &Guides/Community Service	0	0	1	0.5
		Total				**19.5**

I Year II Semester						
S.No	**CourseCode**	**Course Name**	**L**	**T**	**P**	**Credits**
1.	R23BSH-MA1201	Differential Equations and Vector Calculus	3	0	0	3
2.	R23BSH-PH1201	Engineering Physics	3	0	0	3
3.	R23BSH-EN1201	Communicative English	2	0	0	2
4.	R23MEC-ES1202	Basic Civil & Mechanical Engineering	3	0	0	3
5.	R23ECE-PC1201	Network Analysis	3	0	0	3
6.	R23BSH-EN1202	Communicative English Lab	0	0	2	1
7.	R23BSH-PH1202	Engineering Physics Lab	0	0	2	1
8.	R23CSE-ES1201	IT workshop	0	0	2	1
9.	R23MEC-ES1203	Engineering Workshop	0	0	3	1.5
10.	R23ECE-PC1202	Network Analysis And Simulation Laboratory	0	0	3	1.5
11.	R23BSH-MC1202	Health and Wellness, Yoga and Sports	0	0	1	0.5
		Total				**20.5**

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-MA1101	Linear Algebra & Calculus	3	0	0	3

Course Objectives:

- This course is designed to equip the students with the necessary Mathematical skills and techniques that are essential for an engineering course.
- To enlighten the learners in the concept of Linear Algebra.
- To enlighten the learners in the concept of Multivariable Calculus.

Course Outcomes:

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

1. Apply the Methods for solving linear equations to engineering applications.
2. Apply the concepts of eigen values and eigen vectors to free vibration of a two mass system.
3. Apply mean value theorems to real world problems.
4. Find maxima and minima of functions of several variables
5. Evaluate the volume and surface area of solids using multiple integrals.

UNIT-I

Linear algebra: Introduction to the basic concepts of Linear algebra-Vector space, basis, linear dependence and independence, linear transformations (Review only). Rank of a matrix by echelon form, normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations, Gauss elimination method, Gauss Seidel Iteration Method and LU decomposition method.

Application: Finding the current in an electrical circuit.

UNIT-II

Eigen values, Eigen vectors and Quadratic forms: Eigen values, Eigen vectors and their properties (without Proof), Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation and linear transformations.

Application: Free vibration of two mass systems.

UNIT-III

Calculus: Basic concepts of Calculus-Functions of single variable, limit, continuity and differentiability (Review only).Mean Value Theorems, Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof) and Problems, indeterminate forms;

Application: Mean value theorems and proving inequalities.

UNIT-IV

Partial differentiation and Applications: Introduction to Partial derivatives (Review only). Total derivatives, chain rule, change of variables, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Hessian matrix, maxima and minima of functions of two variables, necessary and sufficient conditions for maxima and minima of nonlinear programming problems, Lagrange's Method of Undetermined multipliers.

Applications: Tangent planes and Normal to the surface, real world problems on Maxima and Minima.

UNIT–V

Multiple Integrals: Double integrals - change of variables (Cartesian and Polar coordinates), Change of order of integration, cylindrical and spherical coordinates, triple integrals. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Applications: Calculation of Mass, Centre of Gravity, Moment of inertia of plane lamina and solids.

Textbooks:

1. B.S.Grewal,HigherEngineeringMathematics,44/e,KhannaPublishers,2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.

Reference Books:

1. R.K.JainandS.R.K.Iyengar,AdvancedEngineeringMathematics,5/e,AlphaScienceInternationalLtd.,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, 9thedition, Pearson edn.
5. H. K. Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand, 2021

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-CH1103	Chemistry	3	0	0	3

Course Objectives:

- To familiarize chemistry and its applications
- To train the students on the principles and applications of polymers and electrochemistry
- To introduce modern engineering materials, renewable energy sources and Instrumental methods

Course Outcomes:

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

1. Categorize thermoplastics, thermosettings, elastomers conducting polymers and biodegradable polymers.
2. Determine the conductance and emf values of various solutions using conductivity meter and potentiometer. Compare the materials of construction for battery and electrochemical sensors.
3. Apply the principle of nanomaterials, semiconductors, superconductors, and super capacitors in preparing modern engineering materials.
4. Demonstrate the construction and working hydro, geothermal, tidal and ocean thermal power plants.
5. Understand the construction and working of UV-Visible Spectro photo meter, IR spectroscopy and HPLC chromatography techniques.

UNIT-I

Polymer Chemistry: Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation

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

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

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

UNIT-II

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

Electrochemical sensors–potentiometric sensors with examples, 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-III

Modern Engineering materials: Nano materials: Introduction, classification, preparation (arc discharge, laser ablation and chemical vapor deposition methods), properties and applications of carbon nano tubes and fullerenes. Preparation of nanomaterials-sol-gel method, characterization by scanning electron microscopy (SEM)

Semiconductors, band diagram in solids, Semiconductor devices (p-n junction diode as rectifier and transistors)- preparation of single crystal semiconductors- Czochralski process, purification of semiconductors-Zone refining,

Super conductors - Introduction basic concept, applications
Supercapacitors: Introduction, Basic Concept-Classification – Applications.

UNIT- I V

Renewable Energy Resources: Introduction-Design, working, schematic diagram, advantages and disadvantages hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

Solar Energy: Introduction- green house effect-causes, consequences, and remedies, harnessing of solar energy, thermal conversion-solar water heater, parabolic dish parabolic trough and solar tower, solar power plant-construction and working, photo voltaic conversion- construction and working of Photo voltaic cell, applications of solar energy.

UNIT V

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

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.
3. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.M.Lehn, Supra Molecular Chemistry, VCH Publications
3. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing.
4. Engineering chemistry: Fundamentals and applications by Shikha Agarwal

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23CSE-ES1101	Introduction to Programming	3	0	0	3

Course Objectives:

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

Course Outcomes:

A student after completion of the course will be able to

1. Understand basics of computers, the concept of algorithm and problem solving analysis.
2. Understand the concepts of control structures, branching and looping statements.
3. Apply the concepts of arrays in solving complex problems.
4. Develop programs on modular programming using functions and strings.
5. Develop an ability to debug and optimize the code and solve real time problem statements.

UNIT-I

Introduction to Computer Problem Solving: Programs and Algorithms, Computer Problem Solving Requirements, Phases of Problem-Solving, Problem-Solving Strategies, Top-Down Approach, Algorithm Designing. Introduction to Flowchart and Pseudo code.

UNIT-II

Introduction to C Programming: Introduction, Structure of a C Program. Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/output Statements. Operators, Type Conversion. Control Flow, Relational Expressions: Conditional Branching Statements: if, if-else, if-else—if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, goto statement.

UNIT-III

Arrays and Pointers: Introduction, Operations on Arrays, Arrays as Function Arguments, Two Dimensional Arrays, Multidimensional Arrays. Pointers: Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointersas Function Arguments, Pointers and Arrays, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command Line Arguments.

UNIT-IV

Functions and Strings: Introduction Function: Declaration, Function Definition, Function Call, Categories of Functions,Passing Parameters to Functions, Scope of Variables, Variable Storage Classes. Recursion.

Strings: String Fundamentals, String Processing with and without Library Functions, Pointersand Strings.

UNIT-V

Structures and Files: Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type —Enum variables, Using Typedef keyword, Bit Fields.

Data Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Text books:

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

References:

1. A Structured Programming Approach Using C, Forouzan, Gilberg, Cengage.
2. How to solve it by Computer, R. G. Dromey, and Pearson Education.
3. Programming In C A-Practia1 Approach. Ajay Mittal, Pearson
4. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-HillEducation,2008
5. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
6. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23MEC-ES1101	Engineering Graphics	1	0	4	3

Course Objectives:

- To enable the students with various concepts like lines, lettering, dimensions, conventions and standards related to engineering graphics.
- To impart the knowledge on the orthographic projections of points and straight lines.
- To familiarize the knowledge on projection of planes and solids.
- To make the students understand how the industry communicates technical information using isometric and orthographic views..
- To enable the student to draft simple engineering components and analyze different views of components.

Course Outcomes:

After completing the course, the student will be able to

1. ***Understand*** the basics of Engineering Graphics to construct the polygon, curves and scales. (L2)
2. ***Draw*** the orthographic projections of points and straight lines inclined to both the planes. (L3)
3. ***Draw*** the projections of planes in various conditions. (L3)
4. ***Draw*** the projections of regular solids, with its axis inclined to one plane and sections of solids . (L3)
5. ***Visualize*** the 3D isometric views from 2D orthographic views and vice versa along with basic introduction to CAD. (L3)

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general method.

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

Scales: Plain scales, diagonal scales and vernier scales.

UNIT II

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

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

UNIT III

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

UNIT IV

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

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of sections for simple position only.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views and Conversion of orthographic views to isometric views for simple objects only.

Computer graphics: Creating 2D&3D drawings of objects including PCB and Transformations using Auto CAD **(*Not for end examination*).**

Textbook:

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

Reference Books:

2. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill.
3. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc.
4. Engineering Drawing with an Introduction to AutoCAD, DhananjayJolhe, Tata McGraw Hill.

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23EEE-ES1101	Basic Electrical & Electronics Engineering	3	0	0	3

Course Objectives:

- To study the basic ac and dc circuits.
- To learn the principle and operation of basic electrical machines and measuring instruments.
- To know the various power generation mechanisms, electricity bill calculations and safety measures related to electrical operations.
- To study the operation of various basic semiconductor devices.
- To know the applications of semiconductor devices.
- To learn the basic principles of digital circuits.

Course outcomes: After the completion of the course, students will be able to

1. Understand the problem solving concepts associated to dc and ac circuits.
2. Understand the principle and operation of basic electrical machines and measuring instruments.
3. Identify the electricity bill calculations and layout representation of electrical power systems.
4. Understand the operation of various basic semiconductor devices.
5. Make use of the applications of semiconductor devices.
6. Analyze the different digital circuits.

PART A: BASIC ELECTRICAL ENGINEERING

UNIT- I: DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period,frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT- II: Machines and Measuring Instruments

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

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

UNIT- III: Energy Resources, Electricity Bill & Safety Measures

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

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

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

Textbooks:

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

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition.
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020.
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford UniversityPress, 2017.
4. Electrical Engineering Fundamentals, Vincent Del Toro, Pearson Publications, 2015, Second Edition.
5. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Pearson Publications,2018, Second Edition.

Web Resources:

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

PART B: BASIC ELECTRONICS ENGINEERING

UNIT- I:

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

UNIT-II:

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

UNIT-III:

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

Textbooks:

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

Reference Books:

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

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-CH1104	Chemistry Lab	0	0	2	1

Course Objectives:

1. Verify the fundamental concepts with experiments.

Course Outcomes:

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

1. Determine the cell constant and conductance of different solutions.
2. Prepare advanced polymer Bakelite materials.
3. Measure the strength of an acid present in secondary batteries.
4. Determine the amount of acidity of a given samples.
5. Calculate strength of iron present in a given sample.

List of Experiments:

1. Conductometric titration of strong acid vs. strong base
2. Conductometric titration of weak acid vs. strong base
3. Potentiometry - determination of redox potentials and emfs
4. pH metric titration of strong acid vs. strong base
5. Preparation of a Bakelite
6. Determination of Strength of an acid in Pb-Acid battery
7. Determination of the amount of acidity of a given water sample
8. Determination of the amount of alkalinity of a given water sample
9. Determination of amount of copper in a given sample.
10. Determination of amount of zinc in a given sample.
11. Estimation of Ferrous Iron by Dichrometry
12. Determination of $KMnO_4$ by using standard oxalic acid solution.
13. Determination of total hardness of water sample

Virtual Labs

1. Verify Lambert-Beer's law
2. Measurement of 10Dq by spectro photometric method
3. Wavelength measurement of sample through UV-Visible Spectroscopy
4. Preparation of nanomaterials by precipitation method

Reference:

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

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23CSE-ES1102	Computer Programming Lab	0	0	3	1.5

Course Objectives:

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

Course Outcomes:

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

1. Implement and execute the programs written in C language on Windows and Linux OS.
2. Apply conditional and iterative statements to solve real time scenarios in C.
3. Develop C programs which utilize memory efficiently through arrays and strings.
4. Develop programs to demonstrate the applications through user defined datatypes.
5. Construct programs using structures, unions, and files.

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:

Tutorial 1: Problem-solving using Computers.

Lab1: Familiarization with programming environment

i. Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii. Exposure to Dev C++, Turbo C, gcc and other Online Editors etc.
iii. Writing simple programs using printf(), scanf()

WEEK 2

Objective: Getting familiar with how to formally describe a solution to a problem in a seriesof finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:

Tutorial 2: Problem-solving using Algorithms and Flow charts.

Lab 1: Converting algorithms/flow charts into C Source code.

Developing the algorithms/flowcharts for the following sample programs

i. Sum and average of 3 numbers
ii. Conversion of Fahrenheit to Celsius and vice versa
iii. Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:

Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.

i. Finding the square root of a given number
ii. Finding compound interest
iii. Area of a triangle using heron's formulae
iv. Distance travelled by an object

WEEK 4

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

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

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

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

WEEK 5

Objective: Explore the full scope of different variants of ―if construct‖ namely if-else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for ―if construct‖.

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Lab 5: Problems involving if-then-else structures.

i. Write a C program to find the max and min of four numbers using if-else.
ii. Write a C program to generate electricity bill.
iii. Find the roots of the quadratic equation.
iv. Write a C program to simulate a calculator using switch case.
v. Write a C program to find the given year is a leap year or not.

WEEK 6

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

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops

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

i. Find the factorial of given number using any loop.
ii. Find the given number is a prime or not.
iii. Compute sine and cos series
iv. Checking a number palindrome
v. Construct a pyramid of numbers.

WEEK 7:

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

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

Lab 7:1D Array manipulation, linear search

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

WEEK 8:

Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 8: Matrix problems, String operations, Bubble sort

i. Addition of two matrices
ii. Multiplication two matrices
iii. Sort array elements using bubble sort
iv. Concatenate two strings without built-in functions
v. Reverse a string using built-in and without built-in string functions

WEEK 9:

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

Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.

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

WEEK 10:

Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10 : Bitfields, linked lists
Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

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

WEEK 11:

Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

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

WEEK 12:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have

naturally recursive solutions.
Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions

i. Write a recursive function to generate Fibonacci series.
ii. Write a recursive function to find the lcm of two numbers.
iii. Write a recursive function to find the factorial of a number.
iv. Write a C Program to implement Ackermann function using recursion.
v. Write a recursive function to find the sum of series.

WEEK 13:

Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers
Suggested Experiments/Activities:
Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.

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

WEEK14:

Objective: To understand data files and file handling with various file I/O functions. Explore thedifferences between text and binary files.
Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File operations

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

Textbooks:

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

Reference Books:

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

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23EEE-ES1102	Electrical & Electronics Engineering Workshop	0	0	3	1.5

Course Objectives:

- To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
- To impart knowledge on the principles of digital electronics and fundamentals ofelectron devices & its applications

Course Outcomes:

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

1. Apply theoretical concepts to obtain calculations for the measurement of electrical parameters.
2. Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.
3. Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.
4. Summarize the characteristics of various electronic devices.
5. Analyze the different digital circuits.
6. Evaluate the electronic devices with simulation

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 usedby the students.

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

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

3. **Components:**

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

List of experiments:

PART A: Electrical Engineering Lab

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

PART B: Electronics Engineering Lab

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

Note: *Minimum Six Experiments to be performed in each part. All the experiments shall be implemented using Hardware/ Software.*

References:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, ThirdEdition
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. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

I Year I Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-MC1102	NSS/NCC/Scouts &Guides/Community Service	0	0	1	0.5

Course Objectives:

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

Course Outcomes:

After completion of the course the students will be able to

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

UNIT I

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

Activities:

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

UNIT II

Nature & Care Activities:

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

UNIT III

Community Service Activities:

i. Conducting One Day Special Camp in a village contacting village-area leaders-Survey in the village, identification of problems- helping them to solve via media-authorities- experts-etc.
ii. Conducting awareness programs on Health-related issues such as General Health,
iii. Mental health, Spiritual Health, HIV/AIDS,
iv. Conducting consumer Awareness. Explaining various legal provisions etc.
v. Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
vi. Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme
2. Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
3. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
4. Davis M. L. and Cornwell D. A., ―Introduction to Environmental Engineering‖, McGraw Hill, New York 4/e 2008
5. Masters G. M., Joseph K. and Nagendran R. ―Introduction to Environmental Engineering and Science‖, Pearson Education, New Delhi. 2/e 2007
6. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

General Guidelines:

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

Evaluation Guidelines:

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

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-MA1201	Differential Equations and Vector Calculus	3	0	0	3

Course Objectives:

- To enlighten the learners in the concept of differential equations.
- 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.
- To enlighten the learners in the concept of Multivariable Calculus.

Course Outcomes:

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

1. Solve the first order ordinary differential equations related to various engineering fields. (L3)
2. Solve the higher order differential equation and analyze physical situations. (L3)
3. Solve partial differential equations of first order and higher order related to engineering applications. (L2)
4. Apply vector differential operators to the real world situations(L3)
5. Estimate the work done against a field, circulation and flux using vector calculus. (L3)

UNIT-I

Differential equations of first order and first degree: Definition of differential equations, Formation of differential equations, order and degree of the differential equations. Solutions of differential equations, Method of variable and separable, homogeneous differential equations, non-homogeneous differential equations (Review only). 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 (LR & CR), orthogonal trajectories, Chemical reactions (Mixing problems).

UNIT –II

Linear differential equations of higher order (Constant Coefficients): Definitions, homogenous and non-homogenous, complimentary function, general particular integral, Wronskian, method of variation of parameters. Simultaneous linear equations,

Applications: LCR Circuit problems and Simple Harmonic motion.

UNIT –III

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

Application: One dimensional wave equations.

UNIT–IV

Vector differentiation: Scalar and vector point functions, vector operator del, del applies to scalar point functions, Gradient, del applied to vector point functions, Divergence and Curl, vector identities, Laplacian Operators

Application: Scalar potential

UNIT –V

Vector integration: Line integral, circulation, surface integral, flux, volume integral, Green's theorem in the plane (without proof), Stoke's theorem(without proof), Divergence theorem (without proof) and applications of these theorems.

Application: Work done, flux.

Textbooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.
2. B.S.Grewal,HigherEngineeringMathematics,44/e,Khannapublishers,2017.
3. R Kent Nagle, E B Saff, Arthur David Snider, Fundamentals of differential equations and boundary value problems-Pearson Addison-Wesley (2012)

Reference Books:

1. Dennis G.Zill and Warren S.Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2018.
2. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearsonedn.
3. George B. Thomas, Maurice D. Weirand Joel Hass, Thomas Calculus, 14/e, Pearson Publishers, 2018.
4. R. K. Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 5/e, Alpha Science International Ltd., 2021 (9th reprint).
5. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education, 2017
6. William E. Boyce, Richard C. DiPrima, Elementary Differential Equations-Wiley (2012)

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-PH1201	Engineering Physics	3	0	0	3

Course Objectives:

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

Course Outcomes:

After the completion of this course the student can able to

1. Analyse the intensity variation of light due to polarization, interference and diffraction.
2. Identify the crystals structures with X-Ray diffraction principles.
3. Classify the various types of magnetic and dielectrics materials.
4. Explain the basic concepts of Quantum Mechanics and the band theory of solids.
5. Recognize the type of semiconductors using Hall Effect.

UNIT I

Wave Optics

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

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

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

UNIT II

Crystallography and X-ray

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

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

UNIT III

Dielectric and Magnetic Materials

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) - Frequency dependence of polarization – dielectric loss

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

UNIT IV

Quantum Mechanics and Free electron theory

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

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

UNIT V

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

Textbooks:

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

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).

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-EN1201	Communicative English	2	0	0	2

Course Objectives:

- The main objective of introducing this course, ***Communicative English***, is to facilitate using Listening, Reading, Speaking and Writing skills effectively by the students.
- It should result in their better comprehension abilities, oral presentations, reporting of useful information and with enhanced knowledge of grammatical structures and vocabulary.
- This course helps the students in using speaking and writing (productive) skills more efficiently and make them industry-ready

Course Outcomes:

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

1. learn how to understand the context, topic, and specific information from social or transactional dialogues.
2. learn remedially to apply grammatical structures to formulate sentences and use appropriate words and correct word forms.
3. improve communicative competence in formal and informal contexts and for social and academic purposes.
4. critically comprehend and appreciate reading /listening texts and write summaries based on global comprehension of these texts.
5. write coherent paragraphs, essays, letters/emails and resumes.

Instructions:

1. The reading texts can be given as podcasts to the students so that their listening skills can be enhanced
2. While listening and reading to the text can be given as homework, the class work for the students is for discussing the texts critically, evaluating them based on the context, and purpose of writing and understanding it from the author's as well as the reader's point of view.
3. Reading, as a habit for both academic and non-academic (pleasure) purposes, has to be inculcated in the students. So training has to be given in intensive and extensive reading strategies.
4. Writing is for both academic (assignments, examinations) and non-academic (General Reports, e-mails/letters etc.) purposes
5. The writing tasks given in the classes are to be self and peer-evaluated by the students before they are finally graded by the faculty.
6. Note: Please note that the texts given here are just contexts for teaching various language skills and sub-skills. The students' ability to use language cannot be confined to comprehending or using the language related to the given texts (textbooks). The given texts can be used only for practice.
7. All the activities to develop language skills have to be integrated and interconnected, within each unit and across the units.
8. Use as many supplementary materials as possible in various modes (Audio, visual and printed versions) in the classroom so that the students get multimode input and will know how to use language skills in the absence of the teacher.

UNIT I

Lesson: HUMAN VALUES: A Power of a Plate of Rice by Ifeoma Okoye (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.

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

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

Writing: Mechanics of Writing -Capitalization, Spellings, Punctuation- Parts of Sentences.

Grammar: Parts of speech, Basic Sentence Structures-forming questions

Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II

Lesson: NATURE: Night of the Scorpion by Nissim Ezekiel (Indian and contemporary)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.

Speaking: Discussion in Pairs/small groups on specific topics followed by short structure talks.

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

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

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

Vocabulary: Homonyms, Homophones, Homographs.

UNIT III

Lesson: BIOGRAPHY: Steve Jobs

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

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

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

Writing : Summarizing, Note-making, paraphrasing

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

Vocabulary: Compound words, Collocations

UNIT IV

Lesson:INSPIRATION: The Toys of Peace by Saki

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

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

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

Writing: Letter Writing: Official Letters, Resumes

Grammar: Reporting verbs, Direct & Indirect speech, Active&PassiveVoice

Vocabulary: Words often confused, Jargon

UNIT V

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

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

Speaking: Formal oral presentations on topics from academic contexts

Reading: Reading comprehension.

Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement)
Vocabulary: Technical Jargons

Text books:

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

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:

GRAMMAR:

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

VOCABULARY

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

Assessment Procedure: Theory

1. The formative and summative assessment procedures are to be adopted (mid-exams and end-semester examinations).
2. Neither the formative nor summative assessment procedures should test the memory of the content of the texts given in the textbook. The themes and global comprehension of the units in the present-day context with the application of the language skills learnt in the unit are to be tested.
3. Only new unseen passages are to be given to test the reading skills of the learners. Written skills are to be tested from sentence level to essay level. The communication formats—emails, letters and reports-- are to be tested along with appropriate language and expressions.

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23MEC-ES1202	Basic Civil & Mechanical Engineering	3	0	0	3

PART A: BASIC CIVIL ENGINEERING

Course Objectives:

The students after completing the course are expected to

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

Course Outcomes:

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

1. ***Understand*** the disciplines of Civil Engineering and their role in development of the society.
2. ***Apply*** the concepts of surveying for the measurement of distances, angles and levels
3. ***Explain*** the key elements of Transportation Engineering, Water Resources and Environmental Engineering

UNIT I

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

UNIT II

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

UNIT III

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

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology-.Rainwater Harvesting

Textbooks:

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

Reference Books:

1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi.
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and

Brothers Publications 2019. 10th Edition.

5. Indian Standard Drinking Water Specification IS10500.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives:

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

Course Outcomes:

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

4. CO4: ***Identify*** the materials required for the specified applications.
5. CO5: ***Illustrate*** the principles of basic and advanced manufacturing processes
6. CO6: ***Explain*** the working principles of the Power production systems and mechanical power transmission systems

UNIT I

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

Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites

UNIT II

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

Introduction to Robotics -Configurations, and applications of robotics.

UNIT III

Thermal Engineering working principle of Boilers, IC engines, Electric, Hybrid Vehicles, Refrigeration and air-conditioning.

Power plants- working principle of Steam, Diesel, Hydro, Nuclear power plants. **Mechanical Power Transmission -** Belt Drives, Chain, Rope drives, Gear Drives and their applications.

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

Textbooks:

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

Reference Books:

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

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23ECE-PC1201	Network Analysis	3	0	0	3

Course Objectives:

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

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand basic electrical circuits with nodal and mesh analysis.
2. Apply transient behaviour of the elements to electrical networks.
3. Analyze the circuits using various network theorems.
4. Analyze magnetic circuit and resonance of electrical circuits .
5. Compute the parameters of a two-port network.

UNIT I

Types of circuit components, Types of Sources and Source Transformations, Mesh analysis and Nodal analysis, problem solving with resistances only including dependent sources also. Principle of Duality with examples.

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.

UNIT II

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.

UNIT III

Network Theorems: Thevenin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens - problem solving using dependentsources also.

UNIT IV

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.

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: 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.

Image and iterative impedances. Image and iterative transfer constants. Insertion loss. Attenuators and pads. Lattice network and its parameters. Impedance matching networks.

Textbooks:

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

Reference Books:

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

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-EN1202	Communicative English Lab	0	0	2	1

Course Objectives:

- The main objective of introducing this course, ***Communicative English Laboratory***, is to expose the students to a variety of **self-instructional, learner-friendly modes of language learning**.
- It is to train the students in **oral communication skills in real situations**. Students will get trained in **the basic communication skills to be ready to face job interviews**.
- They will be helped **to overcome the mother tongue/local language influence and neutralize their accent** which makes their speech **more intelligible** to all listeners.

Course Outcomes:

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

- Understand the different aspects of the English language oral communication with emphasis on Listening and Speaking Skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm and intonation for better listening and speaking comprehension.
- Evaluate and exhibit professionalism in participating in debates and group discussions with polite turn-taking strategies and sound more professional while communicating with others
- Create effective resonate and prepare them to face interviews and communicate appropriately in corporate settings.

List of Topics:

1. Vowels & Consonants (Not rules but use of them in various syllable structures)
2. Neutralization/Accent Rules (No rules again, required more practice)
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. Resume Writing, Cover letter, SOP (This can be part of theory course)
6. Group Discussions-methods & practice
7. Debates- Methods & Practice
8. PPT Presentations/ Poster Presentation
9. Interviews Skills

Suggested Software:

- Walden Infotech
- Young India Films

Reference Books:

1. Meenakshi Raman, Sangeeta-Sharma. Technical Communication. Oxford Press.2018.
2. Grant Taylor: English Conversation Practice, Tata McGraw-Hill EducationIndia,2016
3. Hewing's, Martin. Cambridge Academic English (B2). CUP, 2012.
4. T.Balasubramanyam, A Textbook of English Phonetics for Indian Students,(3rd Ed) Trinity Press.

Web Resources:

Spoken English:

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

4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

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

Assessment Procedure: Laboratory

1. Every Practice Session (100 minutes) should be handled by not less than two teachers (three would be ideal) where each faculty has to conduct a speaking activity for 20/30 students.
2. The teachers are to assess each learner in a Practice Session for not less than 3 speaking activities.
3. As part of Practice Sessions of the whole Semester, a minimum of 20 speaking activities should be conducted and each one is to be assessed for 10 marks or 10%. The average of any 10 activities'marks are scaled down to 10 in mid I and other 10 in mid II
4. An Internal test is conducted for 10 marks.

The rubric given below has to be filled in for all the students for all activities.

Body language (Gestures & Postures) (Eye Contact)	Fluency & Audibility	Clarity in Speech	Neutralization of accent	Appropriate Language (Grammar Accuracy & appropriate Vocabulary)	Total 10 marks	Rem arks

ASSESSMENT: INTERNAL EXAM

Day to Day Performance (10M)	**Record (5M)**	**Internal Exam(15M)**	**Final Total (30 M)**
In lab Activity Participation and day to day Assessment performance (10)	Completing the exercises in Lab Manual cum Record (5)	Written Exam (10) +Oral (5)`	30(M)

***NOTE**:*

- 10 day to day Assessments based on five modules carry grades which can be scaled to 10 marks.
- Similarly All Modules Practice Work is graded that can be scaled to 5 marks for the Record
- Written Exam is on Listening, Reading & Writing along with Grammar & Vocabulary.

a) ***Listening:****(Note taking/inference meaning/watching Video clips & Listening to Audio Clip)5 marks*
b) ***Reading Comprehension: From all Units of the Text Book*** *(Multiple-Choice/Multiple cloze/right,wrong,doesn't say)-5 Marks*
c) ***Writing****:Emails,/Letter writing/CV -10 Marks*
d) ***Grammar & Vocabulary****:Common errors in grammar (5M) Vocabulary from Word power Made Easy (5 M)-10 Marks*

Note: The written exam is for 30 marks and the final score will be scaled for 15 marks.

- *Oral Examination is on (Group Discussion/Debate/Presentation Skills / Interview technique tasks from Lab Manual)*

EXTERNAL EXAM PATTERN

- **Written test: 30 marks.(Listening+Reading+Writing+Grammar & Vocabulary)**
  Note: LRWGV Activities are given from the entire Syllabi.
- **Oral Exam: 20 marks** (Debate/GD/Oral presentation) **(Speaking)**
- **Viva-Voce by the External Examiner: 20 marks**
  Note: Total marks allotted for the exam is 70

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-PH1202	Engineering Physics Lab	0	0	2	1

Course Objectives:

- 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
- study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes

After the completion of this course the student can able to

1. Apply the working principles of laboratory experiments in optics, electrical and electronics.
2. Compute the required parameter by suitable formula using experimental values (observed values) in optics, electrical and electronic experiments.
3. Analyze the experimental results through graphical interpretation.
4. Recognize the required precautions to carry out the experiment and handling the apparatus in the laboratory.
5. Demonstrate the working principles, procedures and applications.

List of Experiments:

1. Determination of radius of curvature of a given Plano convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law- Virtual mode
4. Determination of wavelength of Laser light using diffraction grating.
5. Determination of energy gap of a semiconductor using p-n junction diode.
6. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect-virtual mode.
7. Determination of temperature coefficients of a Thermister.
8. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
9. Sonometer: Verification of laws of stretched string.
10. Determination of rigidity modulus of the material of the given wire using Torsional pendulum

Additional Experiments

1. Determination of Resolving power of a diffraction grating using Spectrometer
2. Determination of Numerical Aperture of a given optical fibre

Text books:

Manual Prepared by the department of Physics, Lendi Institute of Engineering & Technology.

REFERENCE BOOKS

1. S.BalaSubrahmanian, M.N.Srinivasan "A Text Book of practical physics" by S.Chand publishers, 2017
2. Engineering Physics Lab Manual by Dr.Y.Aparna & Dr.K.Venkateswarao (V.G.S.Book links).
3. "Engineering physics Lab Manual; by Narendra Kolla, amigobookssales@gmail.com.

Web Source References

1. http://vlab.co.in/ba_labs_all.php?id=8
2. http://va-iitk.vlabs.ac.in/
3. http://ml-iitb.vlabs.ac.in/
4. http://vlab.amrita.edu/?sub=1&brch=282
5. http://vlab.amrita.edu/?sub=1&brch=192

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23CSE-ES1201	IT workshop	0	0	2	1

Course Objectives:

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

Course Outcomes:

A student after completion of the course will be able to

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

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit it 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. Lab instructor should verify the installation and follow it up with a Viva.

Task 5: Every student should be given awareness regarding dual boot. Lab instructors should 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 WWWon 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, Usinghelp and resources, rulers, format painter in word.

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

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

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

EXCEL

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

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

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

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

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

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

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

Explore – GITHUB

Task 1: Students should understand GITHUB and should possess accounts in it.

Task 2: Students should explore different repositories available in GITHUB and student should create his/ her own simple repositories.

Task 3: Students should take simple experiments /presentations and upload them in their GITHUB account.

Task 4: Students should understand how GITHUB Enterprise Cloud is used and also explore the GIT and GIT HUB resources.

Reference Books:

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

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23MEC-ES1203	Engineering Workshop	0	0	3	1.5

Course Objectives:

- 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
5. ***Prepare*** the pipe joint with couplings for same diameter and with reduced diameters for the given application.

SYLLABUS

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

Textbooks:

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

Reference Books:

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

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23ECE-PC1202	Network Analysis And Simulation Laboratory	0	0	3	1.5

Course Objectives:

- To gain hands on experience in verifying Kirchoff's laws and network theorems
- To analyze transient behavior of circuits
- To study resonance characteristics
- 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.

Note:

- The following experiments need to be performed using both Hardware and simulation Software.
- The experiments need to be simulated using software and the same need to be verified usingthe hardware.

List of Experiments

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 1^{st} order RL & RC networks
8. To study the transient and steady state response of a 2^{nd} order circuit by varying itsvarious 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.

Hardware Requirements: Regulated Power supplies, Analog/Digital Function Generators, Digital Multimeters, Decade Resistance Boxes/Rheostats, Decade Capacitance Boxes, Ammeters (Analog or Digital), Voltmeters (Analog or Digital), Active & Passive Electronic Components

Software requirements: Multisim/ Pspice/Equivalent simulation software tool, Computer Systems with requiredspecifications

References:

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

I Year II Semester

Course Code	Course Name	L	T	P	Credits
R23BSH-MC1202	Health and Wellness, Yoga and Sports	0	0	1	0.5

Course Objectives:

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

Course Outcomes:

After completion of the course the student will be able to

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

UNIT I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:

i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas-Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III

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

Activities:

i. Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
ii. Practicing cardiorespiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

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

General Guidelines:

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

Evaluation Guidelines:

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