First Year Curriculum

Admission Year 2026-27

Bachelor of Technology
CSE in Cyber Security

Faculty of Engineering & Technology

Parul University

Vadodara, Gujarat, India

Semester 1

a. **Prerequisite:** Basic computer skills, problem-solving mindset.

b. **Rationale:** Basic computer skills, HTML, CSS, problem-solving, debugging, interactivity, performance optimization, and user experience are essential for web development.

c. Course Learning Objective:

CLOBJ1	To introduce students to the fundamentals of web technologies including HTML and CSS for creating web pages.
CLOBJ2	To develop the ability to design structured and user-friendly web interfaces using various HTML elements and forms.
CLOBJ3	To enable students to apply CSS styling techniques, layouts, Flexbox, and Grid for effective webpage design.
CLOBJ4	To familiarize students with responsive web design techniques using media queries, animations, and advanced CSS features.
CLOBJ5	To provide basic knowledge of website hosting, deployment methods, and publishing websites on the internet.
CLOBJ6	To enhance creativity and practical skills required for developing modern, responsive, and interactive websites.

d. Course Learning Outcomes:

CLO1	Create simple web pages using HTML and CSS.
CLO2	Design web forms with different input fields.
CLO3	Apply CSS for styling and layout using Flexbox and Grid.
CLO4	Build responsive web pages with media queries and animations.
CLO5	Understand web hosting, domain names, and website deployment.

e. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
				Internal Evaluation			**ESE**		**Total**
L	**T**	**P**	**C**	**MSE**	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-** End Semester Examination

f. Course Content:

Sr. No.	Topics	Weightage	Teaching Hours
1	**Introduction to HTML & CSS** Introduction to HTML (History, evolution, What is HTML? Why it is use?)HTML Page Structure with basic HTML tag (Html, Title, Link, Head, Body) Introduction to CSS (What is CSS, Why it is use? , Syntax)Types of CSS (Inline, Internal, External)	**11%**	**6**
2	**HTML Elements & Forms** Headings, Paragraphs, Lists (ordered , unordered, descriptive), and Tables (table, , , ,,,) Forms and Input Fields (input, label, button, click events, methods, prompt, alert, confirm, radio button , checkbox, text-area, date, select, option, text, email, password, number) HTML5 Semantic Elements (header, footer, navigation, section, article, container, div, aside) Multimedia Elements (Images, Audio, Video)	**26%**	**12**
3	**CSS Basics & Styling** Selectors and Properties (elements, class, id, hover, active) Box Model & Layout Techniques (content, padding, margin, border, height, width, display, visibility, overflow) Colors, Fonts, and Backgrounds (font-family, font-style, font-size, font-weight) CSS Flexbox and Grid (justify-content, align-items, flex-wrap, flex-direction, grid-template rows, grid-template columns, gap) CSS positions and indexes (fixed, absolute, relative, static, z-index)	**26%**	**12**
4	**Responsive Web Design & Advanced CSS** Media Queries for Responsive Design . CSS Transitions and Animations (transition property, duration, timing function, delay, animation-name, iteration-count, direction).CSS Variables & Advanced Styling (shadow, gradient, border- radius).Templates (Pre-defined template, How to use it?)	**26%**	**12**
5	**Introduction to Web Deployment (Theory Only)** What is Web Hosting? Domain Names & Hosting Services. Overview of Deployment Methods. How websites are published online. Students learn about web hosting, domain names, DNS, and different deployment methods using platforms like GitHub Pages or Netlify. Basic version control and SEO considerations are also introduced	**11%**	**6**

g. Text Book and Reference Book:

1. "HTML and CSS: Design and Build Websites" by Jon Duckett
2. JavaScript and JQuery: Interactive Front-End Web Development – Jon Duckett
3. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics By Jennifer Niederst Robbins
4. Responsive Web Design with HTML5 and CSS – Ben Frain
5. Web Design with HTML, CSS, JavaScript and jQuery Set – Jon Duckett
6. HTML5 and CSS3 All-in-One For Dummies – Andy Harris

Experiment List

Sr. NO.	Experiment List
1	1. Create a simple webpage using headings and paragraphs 2. Use to for heading 3. Write at least 3 meaningful paragraphs using the tag
2	1. Add links and images to a webpage 2. Use the tag to add hyperlinks (external and internal). 3. Use the tag to display an image from your computer or a URL.
3	1. Make lists and tables in HTML 2. Create an ordered list and an unordered list. 3. Design a table with rows and columns using.
4	1. Create a registration form 2. Include fields like Name, Email, Gender, Date of Birth, and Submit button. 3. Use appropriate form elements: , , , etc.
5	1. Use semantic HTML elements 2. Build a layout using , , , , and .
6	1. Apply CSS styles to HTML elements 2. Use tag, class (class Name), and ID (#idName) selectors. 3. Change text color, background color, margins, and padding.
7	1. Understand and use the box model 2. Apply padding, borders, and margins to elements. 3. Use width and height properties to control size.
8	1. Create a navigation bar using Flexbox 2. Use CSS Flexbox to arrange menu items horizontally. 3. Add hover effects and spacing between items.
9	1. Make a responsive layout using CSS Grid 2. Use grid to create a two-column layout. 3. Adjust grid layout for different screen sizes using media queries
10	1. Make your webpage work on all screen sizes 2. Use responsive units like %, vw, vh, em, and rem. 3. Use media queries to adapt layout for mobile, tablet, and desktop.
11	1. Add hover effects and simple animations 2. Use the :hover pseudo-class to style elements on mouse-over. 3. Create a simple animation using @keyframes and transition.
12	1. Create a simple webpage with internal and external CSS 2. Write internal CSS in
13	1. Add audio and video to a webpage 2. Use and tags with controls, autoplay, and loop.
14	1. Build a simple personal portfolio website 2. Include sections like About Me, Skills, Projects, and Contact. 3. Add navigation and media (images, links, icons).

(2)

a. **Course Name:** Calculus
b. **Course Code:**03019101BS01
c. **Prerequisite:**: Basic concepts of Calculus
d. **Rationale:** Calculus is the branch of mathematics that deals with continuous change. Calculus is also called infinitesimal calculus or "the calculus of infinitesimals". The meaning of classical calculus is the study of continuous change of functions. Most of these quantities are the functions of time such as velocity is equal to change in distance with respect to time.

e. Course Learning Objective:

CLOBJ1	Understand the consequences of various mean value theorems and fundamental theorems of calculus.
CLOBJ2	Apply multivariable calculus techniques for optimization and partial differentiation problems.
CLOBJ3	Solve problems involving double and triple integration for area and volume calculations.
CLOBJ4	Analyze line, surface, and volume integrals using vector calculus.
CLOBJ5	Apply Green's, Gauss's, and Stokes' theorems in engineering and mathematical applications.

f. Course Learning Outcomes:

CLO1	Understand the consequences of various mean value theorems for differentiable functions.
CLO2	Apply the concept of Multivariate calculus in optimization problems.
CLO3	Apply the concept of multiple integration in problems.
CLO4	Analyze Inter-relationship amongst the line integral, double and triple integral formulations.
CLO5	Realize importance of Green, Gauss and Stokes' theorems in other branches of mathematics.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
				Internal Evaluation			**ESE**		**Total**
L	**T**	**P**	**C**	**MSE**	**CE**	**P**	**Theory**	**P**	
4	**0**	**0**	**4**	**20**	**20**	**-**	**60**	**-**	**100**

L-Lectures; **T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation,
ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Application of Functions of One Variable** Review of the function of one variable, limit, continuity, and differentiability, mean value theorems and applications, Riemann integration, fundamental theorem of calculus, application to length, area, volume, and surface area of revolution.	**25%**	**15**
2	**Multivariate Calculus** Functions of several variables, limit and continuity, partial derivatives and differentiability, composite functions, chain rule, implicit functions, Euler's theorem, Taylor's expansion, Jacobian, maxima and minima, method of Lagrange multipliers.	**25%**	**15**
3	**Multiple Integration** Double integration, change of order, change into polar form, application to area and volume.	**20%**	**12**
4	**Vector Calculus** Vector-valued function, velocity and acceleration, the gradient of a scalar function, directional derivatives, divergence and curl of a vector-valued function. Parameterization of curves and surfaces, vector fields, line integrals, Green's theorem, surface integrals, Gauss divergence theorem and Stokes' theorems with applications.	**30%**	**18**

i. Text Book and Reference Book:

1. "Calculus and Analytic Geometry, (Text Book) By G. B. Thomas, Jr. and R. L. Finney, | Pearson India.
2. Calculus, By Ron Larson, Bruce Edwards, | Cengage Learning
3. Calculus: Early Transcendentals, By James Stewart, | Brooks/Cole
4. Calculus, By Tom M Apostol, | Wiley Publication.

(3)

a. **Course Name:** Electrical and Electronics Engineering
b. **CourseCode:**03010601ES02
c. **Prerequisite:** Knowledge of Physics and Mathematics up to 12th science level
d. **Rationale:** The main objective of this subject is introductory treatment of the field of Electrical and Electronics Engineering to the students of various branches of engineering

e. Course Learning Objective:

CLOBJ1	To master the application of circuit laws and network theorems for solving DC electrical circuits.
CLOBJ2	To develop the ability to analyze and calculate parameters for single-phase and three-phase AC systems.
CLOBJ3	To understand BJT operation and determine stability through DC load line and Q-point analysis.
CLOBJ4	To design regulated power supplies and understand the functional principles of various transducers.

f. Course Learning Outcomes:

CLO1	Apply fundamental electrical laws and circuit theorems to electrical circuits.
CLO2	Analyze single-phase and three phase AC circuits
CLO3	Evaluate the operating regions of BJTs through DC analysis and Q-points using load line analysis
CLO4	Design DC-regulated power supplies using voltage regulators and introduce various transducers with operation.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
				Internal Evaluation			**ESE**		**Total**
L	**T**	**P**	**C**	**MSE**	**CE**	**P**	**Theory**	**P**	
3	**-**	**2**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

h. Course Content:

Sr.No.	Content	Weightage	Teaching Hours
1	**DC Circuits** Concepts of Electrical Current, Voltage, Power and Energy. Electrical circuit elements (R, L and C), voltage and current sources, - Ohm's Law and Kirchhoff‟s Laws, simplifications of networks using series and parallel resistance circuits and its examples, star-delta conversions. Superposition, Thevenin's and Norton Theorems.	**20%**	**10**
2	**AC Circuits** Sinusoidal voltages and currents, their mathematical and graphical representation, Concept of instantaneous, peak (maximum), average and R.M.S. values, frequency, cycle, period, peak factor and form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors, examples based on theory. Analysis with phasor diagrams of R, L, C, R-L, R-C and R-L-C series circuits and it's example. study of parallel R-L, R-C and R-L-C circuit, concept of impedance , admittance, conductance and susceptance in case of above combinations and relevant voltage-current phasor diagrams, Resonance in series and parallel circuits. Q-factor. concept of active, reactive and apparent power and power factor. Concept of three-phase supply and phase sequence. Voltages, currents and power relations in three-phase balanced star-connected loads and delta-connected loads along with phasor diagrams with examples.	**30%**	**13**
3	**Diode and Transistors** Introduction to Ideal Diode, Effect of temperature Ideal diodes, unbiased diode and Forward and reverse bias of Diode. PIV, surge current, Diode as Uncontrolled switch. Rectifiers: Half wave, Full wave, and bridge wave. Ripple factor, PIV rating. Choke and Capacitor input filter rectifiers, Clipper and Clamper circuits, Construction and working of BJT, Characteristics & specifications of BJT (PNP & NPN transistors), Biased and unbiased BJT, Configuration of the transistor, the concept of gain & BW, Operation of BJT in the cut-off, saturation & active regions (DC analysis), BJT as a switch, Transistor as an amplifier, Voltage divider bias and analysis, VDB load line and Q point.	**30%**	**12**

4	**Voltage Regulators and Transducers** Basic series and shunt regulator, Types of voltage regulator IC: Fixed and adjustable positive and negative linear voltage regulator, IC linear fixed voltage regulator (78XX, 79XX,) Linear Adjustable Regulator, DC Regulated Power supply.Introduction of Transducers. Types of Transducers and its applications	**20%**	**10**

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

i. Text Book and Reference Book:

1. A textbook of Electrical technology Vol2 by B.L.Theraja | S. Chand Publication (TextBook) By B.L.Theraja | S. Chand Publication

1. Electrical Engineering Fundamentals (Text Book) By V. D. Toro | Prentice Hall India | 2, Pub. Year 198 By V. D. Toro | Prentice Hall India
2. Electrical and Electronics Technology by E. Hughes | Pearson | 10, Pub. Year 2010 By E. Hughes | Pearson
3. Basic Electrical Engineering by D. P. Kothari and I. J. Nagrath, | Tata McGraw Hill | 3, Pub. Year 2010 (TextBook) By D. P. Kothari and I. J. Nagrath | Tata McGraw Hill
4. Basic Electrical Engineering by D. C. Kulshreshtha | McGraw Hill | 1, Pub. Year 2009 By D. C. Kulshreshtha | McGraw Hill
5. Introduction to Electrical Engineering by M.S Sarma, Oxford university press 2001 By M.S Sarma | Oxford university press 2001

j. Experiment List:

Sr. NO.	Experiment List
1	To study about various electrical and electronics symbols and demonstrate various measuring instruments used in electrical & electronics laboratories.
2	Verification of superposition theorem with DC source.
3	Verification of Thevenin's theorem with DC source.
4	To experimentally investigate the behaviour of a series RLC circuit under AC excitation
5	Verification of current and voltage relations in three-phase balanced star and delta-connected loads
6	To plot V-I characteristics of the P-N junction diode.
7	To perform half wave rectifier with and without filter.
8	To perform full wave rectifier with and without filter
9	To plot and study input-output characteristics of the Common Emitter (CE) configuration of the transistor
10	To perform and observe the response of voltage regulator IC 7805

(4)

a. **Course Name:** Prompt Engineering
b. **Course Code:** 03014601ES01
c. **Prerequisite:** Basic computer literacy; familiarity with any programming language
d. **Rationale:** This course introduces students to the principles and practices of Prompt Engineering for Large Language Models (LLMs) and Generative AI systems. Students will learn how to design, refine, and evaluate prompts to achieve desired outputs across various domains including code generation, education, data analysis, and content creation. The course combines theoretical understanding with extensive hands-on practice through laboratory sessions.

e. Course Learning Objective:

CLOBJ1	To explain the fundamentals of artificial intelligence
CLOBJ2	To apply core prompting techniques and prompt design strategies for generating accurate
CLOBJ3	To develop advanced prompting workflows using reasoning
CLOBJ4	To demonstrate domain-specific applications of prompt engineering while evaluating ethical

f. Course Learning Outcomes:

CLO1	Demonstrate proficiency in designing effective prompts for various LLM applications.
CLO2	Apply appropriate prompting techniques based on task requirements.
CLO3	Evaluate and iterate on prompt designs to improve output quality.
CLO4	Understand the ethical implications and limitations of generative AI.
CLO5	Build practical applications leveraging prompt engineering principles.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
				Internal Evaluation			**ESE**		**Total**
L	**T**	**P**	**C**	**MSE**	**CE**	**P**	**Theory**	**P**	
2	**-**	**2**	**3**	**20**	**20**	**20**	**60**	**30**	**150**

L-Lectures; **T**-Tutorial; **P-**Practical;**C**-Credit; **MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr.No.	Content	Weightage	Teaching Hours
1	**Foundations of AI & Prompt Engineering** Introduction to AI, LLMs, and Generative AI - Overview of artificial intelligence, introduction to large language models, and understanding generative AI systems at a high level; Evolution of Language Models - Historical progression from rule-based systems to modern transformer-based models like GPT; What is Prompt Engineering - Definition, importance, and real-world applications of prompt engineering across industries. Anatomy of a Prompt - Understanding prompt components: instruction, context, input data, and output format specifications; Types of Prompts - Classification of prompts: open-ended, instructional, conversational, and role-based prompts; How LLMs Generate Responses - Technical overview of tokens, temperature, top-p sampling, and other generation parameters.	**20%**	**6**
2	**Core Prompting Techniques** Zero-Shot Prompting - Techniques for asking questions without providing examples. One-Shot and Few-Shot Prompting - Guiding model behavior through strategic use of examples; Chain-of-Thought (CoT) Prompting - Eliciting step-by-step reasoning from language models; Instruction-Based Prompting - Imperative framing techniques and achieving clarity in instructions; Role Prompting - Assigning personas and roles to models for context-appropriate responses; Contextual Prompting - Providing background information for enhanced output quality; Negative Prompting - Specifying what the model should avoid in its responses; Iterative Prompting - Refining outputs through systematic follow-up instructions.	**27%**	**8**
3	**Prompt Design Principles** Clarity and Specificity - Understanding why vague prompts fail and techniques for precise prompt construction; Constraints and Format Control - Requesting specific output formats: JSON, bullet points, tables, word limits; Decomposing Complex Tasks - Breaking large requests into manageable sub-prompts for better results; Prompt Chaining - Sequential prompting where output from one prompt feeds into the next; Managing Hallucinations - Detection strategies and mitigation techniques for factual inaccuracies. Bias in LLM Outputs - Recognizing and reducing unintended bias in model responses.	**20%**	**6**

4	**Advanced Prompting Strategies** Tree of Thoughts (ToT) Prompting - Exploring multiple reasoning paths for complex problem-solving; ReAct Prompting - Combining reasoning and action steps in prompt design; Self-Consistency Prompting - Sampling multiple outputs and selecting optimal responses; System Prompts and Meta-Prompting - Configuring model behavior at a higher architectural level; Retrieval-Augmented Generation (RAG) Concepts - Introduction to combining prompts with external knowledge sources.	**17%**	**5**
5	**Domain-Specific Applications** Prompt Engineering for Code Generation - GitHub Copilot-style prompting techniques and AI-assisted debugging; Prompt Engineering for Education - Quiz generation, lesson planning, and educational explanation prompts; Prompt Engineering for Data Analysis - Using LLMs for data interpretation, SQL generation, and chart creation; Prompt Engineering for Content Creation - Professional writing: blogs, emails, summarization, and translation tasks.	**13%**	**4**
6	**Evaluation, Ethics & Capstone** Evaluation, Ethics, and Responsible AI - Metrics for prompt quality assessment (accuracy, relevance, coherence); prompt versioning and documentation; ethical considerations including prompt injection risks.	**3%**	**1**

i. Text Book and Reference Book:

1. Alto, V. (2024). Building LLM Apps. Packt Publishing. Useful for advanced modules on RAG and chaining techniques.
2. Foster, D. (2023). Generative Deep Learning (2nd ed.). O'Reilly Media. Provides strong theoretical background on how LLMs work.
3. Taulli, T. (2024). AI-Assisted Programming. O'Reilly Media. Excellent companion for code generation practical labs.
4. Hunter, N. (2023). The Art of Prompt Engineering with ChatGPT. Clear, accessible introduction suitable for both technical and non-technical learners.
5. Phoenix, J., & Taylor, M. (2024). Prompt Engineering for Generative AI. O'Reilly Media. Best beginner-friendly textbook covering all core techniques with practical examples.

j. Experiment List:

Sr. NO.	Experiment List
1	Interface Exploration Lab: Hands-on exploration of ChatGPT/Gemini interfaces; experimentation with different prompt types and observation of output variations by changing temperature and phrasing.
2	Zero-Shot vs Few-Shot Comparison Lab: Comparative analysis of same tasks using different prompting strategies; evaluation of output quality across approaches.
3	Chain-of-Thought Lab: Application of CoT prompting to mathematical problems, logical puzzles, and step-by-step reasoning tasks.

4	Role Prompting Lab: Development of specialized agents: customer support bot, educational tutor, and code reviewer using role-based prompts.
5	Format Control Lab: Generation of outputs in multiple structured formats: JSON, Markdown, HTML, and tabular representations.
6	Prompt Chaining Lab: Building a 3-step pipeline: outline generation → draft creation → summarization for a research topic.
7	Hallucination Detection Lab: Identification of factual errors in LLM responses and crafting prompts that minimize hallucinations.
8	ToT and Self-Consistency Lab: Complex decision-making scenarios with multiple solution paths and consistency verification.
9	System Prompt Design Lab: Building a domain-specific assistant (e.g., coding tutor) using system-level instructions.
10	Code Generation Lab: Writing Python functions, debugging code, and generating unit tests using prompt engineering.
11	Education Content Lab: Generation of multiple-choice questions, lesson plans, and concept explanations for computer science topics.
12	Data Analysis Lab: Using LLMs to write SQL queries and interpret dataset descriptions.
13	Content Creation Lab: Drafting professional emails, blog posts, and summaries using prompt templates.
14	Prompt Evaluation Lab: Creation of scoring rubrics and comparison of five different prompting strategies on identical tasks.
15	Capstone Project: End-to-end project where students design a prompt-based application (e.g., interview prep bot, course assistant, code reviewer), document design decisions, and present results.

(5)

a. **Course Name:** Programming for Problem Solving
b. **Course Code:**03010501ES01
c. **Prerequisite:** Requires Basic Knowledge of Computer
d. **Rationale:** This course is design to provide basic ideas of computer programming. This course also makes help to understand programming language. It will help to develop their logical abilities

e. Course Learning Objective:

CLOBJ1	To introduce students to the fundamentals of computer programming and problem-solving techniques using the C programming language.
CLOBJ2	To develop logical thinking and analytical skills required for solving engineering and computational problems.
CLOBJ3	To familiarize students with basic programming concepts such as data types, operators, control structures, arrays, strings, functions, pointers, and file handling.
CLOBJ4	To enable students to design algorithms and implement efficient C programs for various applications.
CLOBJ5	To develop debugging, testing, and program execution skills for writing error-free programs.
CLOBJ6	To provide practical knowledge of structured programming and modular programming concepts using user-defined functions and data structures.

f. Course Learning Outcomes:

CLO1	Recognize the computer's basic principles and organizations
CLO2	Understand Concepts of Computer Programming Language.
CLO3	Develop the algorithm for solving basic Engineering Problems.
CLO4	Write, Compile and debug program with C Programming.
CLO5	Write, Compile and debug program with C Programming.
CLO6	Develop simple projects using C Language.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
				Internal Evaluation			**ESE**		**Total**
L	**T**	**P**	**C**	**MSE**	**CE**	**P**	**Theory**	**P**	
3	**2**	**-**	**4**	**20**	**20**	**20**	**60**	**30**	**150**

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Introduction to 'C' Programming** What is C language, History of C language, Application areas of C, Features of C language, structure of C Program, execution flow of program, reading a character, writing a character, formatted input, formatted output functions.	**10%**	**8**
2	**Constants, Variables, Data Types, Operators and Expressions** Constants, Variables, Data Types: Character Set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, Assigning values to variables, typedef, and Defining symbolic constants. Operators and Expression: Introduction to Operators and its types, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Operator precedence and associativity.	**15%**	**5**
3	**Control structures in C** Decision Making & branching: Decision making with If &If .. Else statements, If .. Else statements (Nested …. Ladder), The Switch,The break statement & goto statements, The ternary (?:) Operator Looping: The while statement, & The Do.. While loop, The FOR loop, Jump within loops – Programs	**15%**	**4**
4	**Arrays and Strings** Arrays: Introduction, One-dimensional array, Two-dimensional array, Concept of Multidimensional arrays. Strings: String declaration, storage, Built-in-string functions	**20%**	**7**
5	**User-Defined Functions, Structure and Unions** User-Defined Functions: Concepts of user defined functions, prototypes, definition of function, parameters, parameter passing, calling a function, recursive function, Macros, Pre-processing. Structure and Unions: Introduction, Structure definition, declaring and initializing Structure variables, Accessing Structure members, Copying & Comparison of structures, Arrays of structures, Arrays within structures, Structures within Structures, Structures and functions, Unions	**20%**	**10**
6	**Pointers, Dynamic memory allocation and File Management in C** **Pointers:** Basics of pointers, pointer to pointer, pointer and array, Pointer to array, array of pointers , functions returning pointers Dynamic memory allocation: Introduction to Dynamic memory allocation, malloc(), calloc(), free(), realloc(). File Management in C: Introduction and standard file handling functions.	**20%**	**8**

i. Text Book and Reference Book:

1. "Programming in ANSI C (TextBook) By E. Balaguruswamy | Tata McGraw-Hill
2. C Programming: Test Your Skills By Ashok Kamthane
3. Computer Fundamentals By P.K.Sinha and Priti Sinha | BPB Publications | 4th Edition
4. Star C Programming STAR Certification | C Certification Exam
5. Programming with C By Byron Gottfried | Tata McGraw Hill Education
6. C The Complete Reference By Herbert Schildt
7. Let Us C By Yeshavant Kanetkar | BPB Publications

j. Experiment List:

Sr. NO.	Experiment List
1	Practical Set 1 (Basics) 1. Write a program to print HELLO FRIENDS! 2. Write a program that reads two nos. from key board and gives their addition, subtraction, multiplication, division and modulo. 3. Write a program to calculate area of circle,use Ω as symbolic constants. 4. Write a program to convert days into months and days. 5. Write a program which calculates the summation of three digits from the given 3 digit number. 6. Write a program to demonstrate enumerates data type. 7. Write a program to compute Fahrenheit from centigrade. 8. Write a program to calculate simple interest. 9. Read the price of item in decimal form e.g. 12.50 and separate Rs and Paise from the given value e.g. 12 rupees and 50 paise
2	Practical Set 2 (Control Structures) 1. Write a program to find the largest of the three nos. using Nested-If-Else statement. 2. Write a C program to enter a character and to check whether it is a small letter or it is a capital letter or it is a digit or it is a special symbol. 3. Write a program to read marks from keyboard and your program should display equivalent grade according to following table. Marks Grade 100-80 Dist 60-79 First Class 35-59 Second Class 0-34 Fail 1. Write a program to read marks of a student from keyboard whether the student id pass (if).2. Write a program to find the sum of first N odd numbers. 3. Write a program using while loop construct which finds the factorial of a given integer number. 4. Write a C program using do…while and for loop constructs to reverse the digits of the number. 5. Write a program to demonstrate use of Switch-Break Statement. 6. Write a program to find out all the numbers divisible by 5 and 7 between 1 to 100. Check for Armstrong number. A number is Armstrong if sum of cube of every digit is same as the original number. E.g. 153=13+53+33=153 1. Write a program to print the output of bellow series. 1!+2!+3!+4!+ .....n! 2. Write a program to print the following outputs using for Loop. (a) 1 (b) * 12 ** 123 *** 1. Write a program to print the following outputs using for Loop. (a) 1 (b) 321 21 21 321 1
3	Practical Set 3 (Array & Strings) 1. Write a program which sorts 10 numbers
	into ascending order. 2. Write a program to find maximum element from 1-D array. 3. Write a program to find number of odd and even elements from the 1-D array. 4. Write a program add two 2x2 matrices. 5. Write a program to count number of positive, negative and zero elements from 3x3 matrix. 6. Write a function for the following operations on string: Copy one string to another Comparing two strings Adding a string to the end of another. 1. Write a program to count vowels from a entered String. 2. Write a program which finds whether a string is a palindrome or not
4	Practical Set 4 (Functions) 1. Write a program to find factorial of a number using recursion. 2. Write a program that used user defined function Swap ( ) and interchange the value of two variable. 3. Write a function to return 1 if the number is prime otherwise return 0.
5	Practical Set 5 (Structures) 1. Define a structure type, personal that would contain person name, date of joining and salary. 2. Define a structure called cricket that will describe the following information: Player name Team name Batting average
6	Practical Set 6 (Pointers) 1. Write a program to add two numbers using pointers. 2. Write a program to swap two numbers using pointer
7	Practical Set 7 (File Management) 1. Write a program to illustrate reading files contents. 2. Write a program to illustrate the use of fgets( ).

(6)

a. **Course Name:** Principles of Communication Skills
b. **Course Code:**03010001HM01
c. **Prerequisite:** Knowledge of English Language studied till 12th standard
d. **Rationale:** Basic Communication Skills are essential for all Engineers.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental grammatical structures including parts of speech, punctuation, tenses, phrases, clauses, determiners, Quantifiers, sentence types, and basic concepts of phonetics (IPA symbols, speech sounds, stress, and intonation) for accurate and effective language use.
CLOBJ2	Develop basic reading and listening comprehension skills by using appropriate strategies to understand simple texts and spoken content with improved pronunciation awareness.
CLOBJ 3	Organize and express ideas clearly in written form through picture-based perception activities.
CLOBJ 4	Build confidence and fluency in spoken communication through correct pronunciation practice, meeting and greeting activities, extempore speech, and everyday conversational exercises.
CLOBJ 5	Apply goal-setting and self-reflection techniques to monitor personal language learning progress, pronunciation improvement, and overall communication skills development.

f. Course Learning Outcomes:

CLO1	Identify and explain parts of speech, punctuation marks, tenses, phrases, clauses, determiners, Quantifiers, sentence structures, and basic IPA phonetic symbols for accurate language use.
CLO2	Demonstrate effective basic conversational exchanges and short extempore speeches using correct pronunciation, appropriate greetings, logical organization of ideas, and improved fluency.
CLO3	Apply basic reading and listening strategies to comprehend short passages and spoken texts, recognizing appropriate pronunciation, stress, and intonation patterns.
CLO4	Analyse personal communication performance and evaluate SMARTER goals through self-assessment and reflective practices to monitor language and pronunciation improvement.
CLO5	Compose structured short picture-based perceptions by developing clear topic sentences, supporting details, and coherent conclusions with grammatical accuracy.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
				Internal Evaluation			ESE		Total
L	T	P	C	MSE	CE	P	Theory	P	
0	0	2	1	-	-	20	-	30	50

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**EndSemester Examination

h. Course Content:

Lab (Practical)

Sr.	Content	Weightage	Teaching Hrs.	CO	BT
1	Parts of Speech, Punctuation and Tenses using time line • Overview of 8 parts of speech • Basic punctuation marks and their usage • Types: Present, Past, Future • Forms and correct usage • Common tense errors	10%	4	1	1
2	Introduction to Phonetics-Symbols and Pronunciation • Introduction to Phonetics and IPA • English Speech Sounds • Stress and Intonation	10%	4	1	1
3	Phrase and Clauses; Types of Sentence (Structure Wise) • Difference between phrases and clauses • Classification of Simple, Compound & Complex • Interchange of Simple to Compound, Simple to Complex, Compound to Complex	8%	2	1	1

4	Picture Perception • Observing and interpreting images • Building a short story or description • Improving vocabulary and creativity	14%	4	3,4	3,6
5	Determiners and Quantifiers • Types of determiners • Order of determiners in a sentence • Quantifiers with countable and uncountable nouns • Common errors in the use of determiners and Quantifiers	8%	2	3	6
6	Meeting and Greeting (Initiating a conversation) • Basic conversation skill • Formal and informal greetings • Common phrases for starting interactions	10%	4	4	2,3
7	Reading Comprehension (Level of difficulty-Basic) • Types – Skimming & Scanning • Reading short passages • Identifying main ideas and details • Answering basic questions	10%	2	2	2
8	Listening Comprehension • Listening to short audios/Conversation • Understanding and responding to key information	8%	2	2	2
9	Extempore Speech • Speaking on random topics • Organizing thoughts quickly • Improving fluency and confidence	12%	4	4	3
10	Goal Setting and Tracking • Setting SMARTER goals • Planning and tracking progress • Self-assessment and reflection	10%	2	5	5
		100%	**30**		

i. Text Book and Reference Book:

- Murphy, Raymond. *English Grammar in Use*. Cambridge University Press, 2019.
- Swan, Michael. *Practical English Usage*. Oxford University Press, 2016.
- Lewis, Norman. *Word Power Made Easy*. Goyal Publishers, 2014.
- Raman, Meenakshi, and Sangeeta Sharma. *Communication Skills*. Oxford University Press, 2017.
- Kaul, Asha. *Business Communication*. PHI Learning, 2014.
- Lucas, Stephen E. *The Art of Public Speaking*. McGraw-Hill Education, 2015.
- Bailey, Stephen. *Academic Writing: A Handbook for International Students*. Routledge, 2018.
- Balasubramaniam, T. *A Textbook of English Phonetics for Indian Students*. Macmillan Publishers, 2012

Semester 2

(1)

a. **Course Name:** Operating System and Platform Security
b. **Course Code:** 03012602PC01
c. **Prerequisite:** Basic computer architecture, OS fundamentals, command-line, Linux commands, and networking.
d. **Rationale:** Enables efficient resource management, security, and system administration, including multitasking, memory, storage, and cyber security.

e. Course Learning Objective:

CLOBJ1	Demonstrate basic knowledge of Unix/Linux systems, including system architecture, kernel functionality, services, and system calls.
CLOBJ2	Analyze and apply various process scheduling algorithms to evaluate system performance.
CLOBJ3	Analyze different directory implementation techniques and evaluate their impact on system organization.
CLOBJ4	Work with Unix/Linux and Kali Linux Environments – Utilize Unix/Linux architecture, system calls, basic Linux commands, and service management while navigating the Kali Linux operating system.
CLOBJ5	Apply Cyber security and Ethical Hacking Techniques – Perform passive information gathering, reconnaissance, and security assessments using Kali Linux tools like Whois, Google Hacking, Netcraft, and Shodan.

f. Course Learning Outcomes:

CLO1	Demonstrate basic knowledge of Unix/Linux systems, including system architecture, kernel functionality, services, and system calls.
CLO2	Analyze and apply various process scheduling algorithms to evaluate system performance.
CLO3	Analyze different directory implementation techniques and evaluate their impact on system organization.
CLO4	Work with Unix/Linux and Kali Linux Environments – Utilize Unix/Linux architecture, system calls, basic Linux commands, and service management while navigating the Kali Linux operating system.
CLO5	Apply Cyber security and Ethical Hacking Techniques – Perform passive information gathering, reconnaissance, and security assessments using Kali Linux tools like Whois, Google Hacking, Netcraft, and Shodan.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
				Internal Evaluation			ESE		Total
L	T	P	C	MSE	CE	P	Theory	P	
3	-	2	4	20	20	20	60	30	150

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Operating System Fundamentals and Architecture** Overview of Operating System, Computer system components, Goals of Operating System, Types of OS, Characteristics and Services of OS, Introduction to Unix/Linux, Unix/Linux Architecture, Kernel, Services, System Calls, System Programs	**15%**	**08**
2	**Process, Memory, and Input-Output Management** Process Concepts, Operations on Processes, Inter-Process Communication (IPC), Process Scheduling Algorithms, Memory Management: Memory Allocation, Swapping, Paging, Segmentation, Virtual Memory, Input/Output System: Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling Algorithms, Swap Space Management, RAID Types	**20%**	**08**
3	**File Management Systems** Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing and Protection, File System Structure and Implementation, Directory Implementation, Free Space Management, Efficiency and Performance, Different Types of File Systems	**15%**	**08**
4	**Introduction to Unix/Linux & Kali Linux Basics** Unix/Linux Architecture, Kernel, Services, System Calls & System Programs, Booting Up Kali Linux & Kali Menu Overview, Kali Documentation & Support Forums, Linux Filesystem & Basic Linux Commands, Managing Services: SSH & HTTP.	**25%**	**10**

5	**Kali Linux Toolset & Cyber security Reconnaissance** Searching, Installing, and Removing Tools (apt update, upgrade, install, remove), The Bash Environment & Environment Variables, Passive Information Gathering: Website Recon, Whois Enumeration, Google Hacking, Netcraft, Recon-ng, Open-Source	**25%**	**11**
	Code & Shodan, Security Headers Scanner, SSL Server Test, User Information Gathering & Email Harvesting, Social Media Tools & Site-Specific Tools.		

i. Text Book and Reference Book:

1. Operating System Concepts – Abraham Silberschatz, Peter B. Galvin, Greg Gagne
2. Modern Operating Systems – Andrew S. Tanenbaum, Herbert Bos
3. Linux Command Line and Shell Scripting Bible – Richard Blum, Christine Bresnahan
4. Kali Linux Revealed: Mastering the Penetration Testing Distribution – Raphaël Hertzog, Jim O'Gorman, Mati Aharoni
5. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws – Dafydd Stuttard, Marcus Pinto

(2)

j. **Course Name:** Linear Algebra
k. **CourseCode:**03019102BS01
l. **Prerequisite:** Basic Knowledge of Matrix and Determinants

m. Course Learning Objective:

CLOBJ1	Understand the fundamental concepts of matrices, systems of linear equations, and matrix decomposition techniques.
CLOBJ2	Analyze eigenvalues, eigenvectors, diagonalization, and Cayley-Hamilton theorem for solving mathematical problems.
CLOBJ3	Develop understanding of vector spaces, subspaces, basis, dimension, and linear dependence concepts.
CLOBJ4	Apply linear transformations, rank-nullity theorem, and matrix representations in mathematical and engineering applications.
CLOBJ5	Construct orthogonal and orthonormal bases using inner product spaces and Gram–Schmidt orthogonalization process.
CLOBJ6	Apply linear algebra concepts in coding-decoding, data analysis, and computational applications such as Principal Component Analysis (PCA)

n. Course Learning Outcomes:

CLO1	Understand system of linear algebraic equation and solution techniques using matrix
CLO2	Exhibit the understanding of vector space and subspace and solve related problems
CLO3	Compute eigen values and eigenvectors and diagonalize the matrix
CLO4	Create orthogonal and orthonormal bases: Gram-Schmidt process and use bases and orthonormal bases to solve application problem.

o. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
				Internal Evaluation			ESE		Total
L	T	P	C	MSE	CE	P	Theory	P	
4	-	-	4	20	20	-	60	-	100

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

p. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Matrices** Introduction, System of linear equations (Homogeneous and Nonhomogeneous systems) by Gauss Elimination, and LU Decomposition Method, Rank, Eigenvalues and Eigenvectors, Algebraic and Geometric Multiplicity, Diagonalization, Cayley-Hamilton theorem and Applications-coding-decoding, Principal Component Analysis (PCA).	**35%**	**21**
2	**Vector Space** Vector spaces over the field of real numbers, Elementary Properties of Vector Spaces, Subspaces, Spanning set, Linear independence and dependence, Basis and Dimension.	**20%**	**12**
3	**Linear Transformation:** Definition of Linear Transformation from R^n to R^m Some Standard Linear Transformation, The Null Space & Column Space, The Rank-Nullity Theorem, Matrix of Linear Transformation.	**25%**	**15**
4	**Inner Product Spaces** Inner-product spaces, norm and its properties, angle between two vectors, orthogonal vectors, orthonormal vector, Gram-Schmidt process, orthonormal basis.	**20%**	**12**

q. Text Book and Reference Book:

1. Elementary Linear Algebra with Applications, (TextBook) By H. Anton | John Wiley
2. Linear Algebra and Its Applications By G. Strang | Brooks/Cole India
3. Advanced Engineering Mathematics By Erwin Kreyszig | Willey India Education
4. Linear Algebra, By K. Hoffman and R. Kunze, | Prentice Hall
5. Calculus By T.M. Apostol | John Wiley Publication | Vol. II
6. Linear Algebra: A Modern Introduction, By D. Poole, | 2nd Edition, Brooks/Cole

(3)

a) **Course Name:** Object Oriented Programming with java

b) **Course Code:** 03010802ES03

c) **Prerequisite:** Basic knowledge of programming

d) **Rationale:** The practical component reinforces Core Java concepts through hands-on programming. It helps students apply OOP,collections, exception handling, file I/O, multithreading, and Java 8 features to solve real-world problems, preparing them for advanced development and industry roles.

e) Course Learning Objective:

CLOBJ1	Explain Java architecture, JVM working, and program execution process.
CLOBJ2	Apply core programming constructs including data types, control statements, and operators.
CLOBJ3	Implement object-oriented programming concepts to design modular applications.
CLOBJ4	Utilize collections, exception handling, file I/O, and multithreading in application development

r. Course Learning Outcomes:

CLO1	Explain Java architecture, JVM working, and program execution process.
CLO2	Apply core programming constructs including data types, control statements, and operators.
CLO3	Implement object-oriented programming concepts to design modular applications.
CLO4	Utilize collections, exception handling, file I/O, and multithreading in application development

s. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
2	**-**	**2**	**3**	**20**	**20**	**20**	**60**	**30**	**150**

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

t. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	**Java Basics, JVM & Syntax** History and features of Java, JDK vs JRE vs JVM, compilation and execution flow. JVM basics (class loading, memory areas). Basic syntax: data types, variables, operators, input (Scanner), control flow (if/switch, loops). Simple console programs.	**12%**	**05**
2	**Core OOP Concepts in Java** Defining classes and objects, constructors, this and super, encapsulation with getters/setters. Inheritance (single, multilevel), method overloading and overriding, runtime polymorphism, abstract classes and interfaces. Access modifiers and packages basics. UML-style thinking for class design.	**20%**	**05**
3	**Arrays, Strings & Basic I/O** Working with 1D and 2D arrays for data storage and algorithms. Strings in Java (String, StringBuilder), immutability, common string methods. Basic file and console I/O use-cases (reading input, printing formatted output). Simple problems using arrays and strings.	**16%**	**05**
4	**Exception Handling & Debugging** Types of errors, exceptions vs errors. try-catch-finally, multiple catch blocks. Checked vs unchecked exceptions, throws, reating simple custom exceptions. Exception propagation and basic debugging using stack traces and IDE tools.	**16%**	**05**
5	**Introduction to Collections** Need for collections vs arrays. Introduction to List and Set with ArrayList and HashSet. Iteration using for- each and Iterator. Basics of Map with HashMap (key-value access). Generics at a basic level (List<String>, List<Integer>). When to choose which collection.	**20%**	**05**
6	**Java Multithreading** Introduction to concurrency and multithreading, Thread creation (Thread class, Runnable interface), Thread lifecycle and states, Thread methods (start, run, sleep, join, interrupt), Thread priorities and daemon threads, Synchronization (synchronized keyword**)**	**16%**	**05**

u. Text Book and Reference Book:

1. Herbert Schildt, Java: The Complete Reference, McGraw-Hill.
2. Cay S. Horstmann, Core Java – Volume I & II, Pearson.
3. Joshua Bloch, Effective Java, Addison-Wesley.
4. Kathy Sierra & Bert Bates, Head First Java, O'Reilly.

(4)

a. **Course Name:** Physics of Semiconductors
b. **Course Code:**03019201BS01
c. **Prerequisite:** Knowledge of Physics and some basic concepts in Mathematics like differentiation, integration, limit, differential equation, vector calculus up to 12thscience level.

d. Course Learning Objective:

CLOBJ1	Understand semiconductor materials using band theory concepts.
CLOBJ2	Explain principles of optoelectronic devices and optical fibers.
CLOBJ3	Understand the fundamentals of quantum mechanics and quantum computing.
CLOBJ4	Analyze low-dimensional and nanomaterials with their applications.
CLOBJ5	Develop knowledge of semiconductor-based modern technologies.

e. Course Learning Outcomes:

CLO1	To conceptualize semiconducting materials on the basis of band theory
CLO2	To get familiar with optical fibres and semiconductor based optoelectronic devices useful in fibre optic system.
CLO3	To conceptualize the foundational principles of quantum Physics and their role in quantum computing.
CLO4	Formulate and conceptualize various theoretical aspects and the physical phenomena at Low dimensional level (nano)

f. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	0	2	4	60	20	30	20	20	150

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

g. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Band theory& Semiconductors Band structure of solid materials, E-k diagram, Direct and Indirect band gap, Effective mass, Concept of Fermi Energy, Density of state, Fermi Level in Intrinsic and Extrinsic Semiconductors, Ohmic and Schottky Junction	25%	11
2	Optoelectronics Interaction of radiation with Matter, Absorption, Spontaneous and Stimulated emission, Characteristics of Lasers, Diode Laser, LED, Photodiode and their applications. Principle and Structure of Optical Fiber, Numerical Aperture of fiber, Types of Optical Fibers, Attenuation in Optical Fibers, Applications of Optical Fibers	25%	11
3	Quantum Mechanics & Quantum ComputingQuantum postulates, wave function, Schrodinger's equation time dependent, independent (No derivation), One dimensional potential well, quantum tunneling and its application in soft computing Key Principles of Quantum Computing, Difference between classical and quantum computing, Quantum Computing advantages Challenges and Application.	30%	13
4	Low Dimensional Materials Basic characteristic including synthesis, properties, quantum confinement, classification: Quantum Dot, Quantum well , Quantum Wire and their applications, Novel Materials and their applications	20%	10

h. Text Book and Reference Book:

1. Physics of Semiconductor Devices (TextBook) By S. M. Sze and K. N. Kwok | John Wiley & Sons
2. Semiconductor Optoelectronic Devices By P. Bhattacharya | Prentice Hall of India, Pub. Year 1997
3. Engineering Physics (TextBook) By B.K.Pandey S Chaturvedi and M. Venkanna | - Cengage Publication
4. Semiconductor Optoelectronics (TextBook) By J. Singh | McGraw-Hill Inc, Pub. Year 1995.

i. Experiment List:

Sr. NO.	Experiment List
1	I-V characteristics of light emitting diode in forward bias.
2	I-V characteristics of Zener diode in reverse bias.
3	Determination of Velocity of ultrasonic waves in water.
4	Determination of Dielectric constants of Dielectric samples.
5	Measurement of Band gap of semiconductor material.
6	Measurement of Hall coefficient and carrier concentration in semiconductor material.
7	Measurement of Planck's constant using LED.
8	Measurement of wavelength of laser light using diffraction grating
9	Measurement of Numerical aperture of an optical Fiber.
10	Determination of the size of lycopodium powder particles
11	Measurement of power loss in an optical fibre
12	Moment of Inertia of a flywheel.
13	Young's Modulus by bending of beam.

(5)

a. **Course Name:** ICT Workshop
b. **CourseCode:**03010702ES01
c. **Prerequisite:** Basic Computer Knowledge and physics.
d. **Rationale:** This course is design to provide basic knowledge of Electronics components and computer components. This course helps in learning problem solving process of Electronics circuits and Computer.

e. Course Learning Outcomes:

CLOBJ1	Understand the fundamental concepts and operating principles of basic electronic components such as resistors, capacitors, inductors, and diodes.
CLOBJ2	Demonstrate the ability to use testing instruments for measuring electrical parameters such as voltage, current, frequency, and resistance.
CLOBJ3	Understand the basic concepts and types of power supplies, including DC regulated and unregulated power supplies.
CLOBJ4	Demonstrate the interfacing of various IoT sensors with microcontrollers such as Arduino or similar platforms.
CLOBJ5	Understand the fundamental concepts and operating principles of basic electronic components such as resistors, capacitors, inductors, and diodes.

Course Learning Outcomes:

CLO1	Explain the working principles of basic electronic components.
CLO2	Demonstrate the operation of various testing and Measurement instruments.
CLO3	Apply the working of different IoT sensors in practical scenarios.
CLO4	Design and develop electronic circuits for specific applications.

Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
-	**-**	**2**	**1**	**-**	**-**	**20**	**-**	**30**	**50**

L-Lectures;**T**-Tutorial;**P-**Practical;**C**-Credit;**MSE-**Mid-SemesterEvaluation,**CE**-Continuous Evaluation, **ESE-**End Semester Examination

g. Experiment List:

Sr. NO.	Experiment List
1	Introduction to Breadboard and Digital Multi Meter, Verify the circuit analysis (voltage and current)
2	Identification, symbolic representation and testing of various electronics components.
3	To study CRO and Function generator with specifications.
4	To verify Ideal Value and practical value of voltage regulator ICs.
5	Introduction to Arduino IDE with LED Blinking
6	Interfacing Button-Controlled LED with Arduino board.
7	Buzzer Alarm System Using Arduino.
8	Demonstrate the function of LCD Display Interfacing with Arduino.
9	Relay-Based ON/OFF Control System with Arduino
10	Demonstrate the working of Temperature Sensor-DHT
11	Demonstrate the working of Ultrasonic Distance Measurement sensor.
12	Verify the functionality of water flow sensor
13	Demonstrate the working of PIR Sensor using Arduino.
14	Project based on electronics components and sensors

(6)

a. **Course Name:** Environmental Science
b. **Course Code:** 03010002MC01
c. **Prerequisite:** Knowledge of Physics, Chemistry and Mathematics up to 12th science level and Biology up to 10th science level
d. **Rationale:** The proposed syllabus of Environmental Science is comprehensive and multidisciplinary, reflecting the interconnectedness of ecological systems, technological development, human behavior, and urban planning. This rationale explains the relevance and importance of each thematic area covered: Environmental Health, Ecology, and Quality of Life; Pollution Prevention; Population Growth and Global Environmental Challenges; Environmental Information Systems and Technological Tools; Smart Cities

e. Course Learning Objective:

CLOBJ 1	xplain the basic principles, scope, and structure of environmental science, including the composition of atmosphere, hydrosphere, lithosphere, biosphere, and the interaction between Earth, Man, and Environment.
CLOBJ 2	Identify different types of pollution (air, water, soil, noise, thermal, etc.), their sources, impacts, measurement techniques, standards, and various pollution control methods and devices.
CLOBJ 3	Describe key environmental legislations in India and important international conventions, protocols, and agreements related to environmental protection and sustainable development.
CLOBJ 4	Discuss major environmental challenges in India such as dam-related issues, river conservation, climate change, waste management, wildlife conservation, and epidemiological problems, along with government initiatives and sustainable solutions.
CLOBJ 5	Explain the concepts of climate resilience, sustainable urban planning, green infrastructure, and smart city development, with the ability to analyze global case studies for building climate-resilient urban environments.

f. Course Learning Outcomes:

CLO 1	Analyze the impact of human activities on environmental sustainability and ecosystems.
CLO 2	Promote awareness about biodiversity conservation and its importance for ecological balance.
CLO 3	Assess the effects of pollution and propose strategies for pollution control and waste management.

CLO 4	Describe the significance of climate change and its global implications on ecosystems and human life.
CLO 5	Develop skills to evaluate and mitigate environmental risks in industrial and urban development.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	-	0	-	50	-	-	-	50

L- Lectures; **T**- Tutorial; **P-** Practical; **C**- Credit; **MSE-** Mid-Semester Evaluation, **CE**-

Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	FUNDAMENTALS OF ENVIRONMENTAL SCIENCE Definition, Principles and Scope of Environmental Science. Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere. Laws of thermodynamics, heat transfer processes, mass and energy transfer across various interfaces, material balance. Meteorological parameters - pressure, temperature, precipitation, humidity, radiation and wind velocity. Interaction between Earth, Man and Environment. Biogeographic provinces of the world and agro-climatic zones of India. Concept of sustainable development goals. Environmental education and awareness. Environmental ethics.	15%	3
2	ENVIRONMENTAL POLLUTION AND CONTROL Air, Noise, Water, Soil, Thermal, Marine, and Radioactive pollution, focusing on sources, types of pollutants, and their impacts on human health, plants, and materials. It includes the measurement techniques and standards for air and water quality, along with pollution control devices and methods. Key topics include criteria air pollutants, noise indices, wastewater treatment, and soil pollution management.	25%	4

3	ENVIRONMENT MANAGEMENT AND LEGISLATION Overview of Environmental Laws in India: Constitutional provisions in India (Article 48A and 51A), Forest Conservation Act, 1980, Water (Prevention and Control of Pollution) Act, 1974 amended 1988 and Rules 1975, Air (Prevention and Control of Pollution) Act, 1981 amended 1987 and Rules 1982, Environmental (Protection) Act, 1986 and Rules 1986, The Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016, The Solid Waste Management Rules, 2016, , Noise Pollution (Regulation 8 and Control) Rules, 2000, Environmental Conventions and Agreements: Stockholm Conference on Human Environment 1972, Montreal Protocol, 1987, Basel Convention (1989, 1992), Earth Summit at Rio de Janeiro, 1992, Agenda-21, Global Environmental Facility (GEF), Convention on Biodiversity (1992), UNFCCC, Kyoto Protocol, 1997, Clean Development Mechanism (CDM), Copenhagen Summit, 2009.	25%	3
4	CONTEMPORARY ENVIRONMENTAL ISSUES Current Environmental Issues in India: Environmental issues related to water resource projects - Narmada dam, Tehri dam etc., Hydro-power projects in Jammu & Kashmir etc.. Water	15%	3
	conservation-development of watersheds, Rain water harvesting and ground water recharge. National river conservation plan – Namami Gange and Yamuna Action Plan. Eutrophication and restoration of lakes. Conservation of wetlands, Ramsar sites in India. Climate change - adaptability, energy security, food security and sustainability. Wild life conservation projects: Project tiger, Project Elephant etc., Carbon sequestration and carbon credits. Waste Management – Swachha Bharat Abhiyan. Sustainable Habitat: Green Building, GRIHA Rating Norms. Vehicular emission norms in India. Epidemiological Issues: Fluorosis, Arsenocosis, Goitre, Dengue. Environmental Disasters: Minnamata Disaster, Love Canal Disaster, Bhopal Gas Disaster, 1984		
5	CLIMATE RESILIENT CITY Introduction to Climate Resilience – Understanding the need for cities to adapt to climate change. Impact of Climate Change on Cities – Urban heat islands, flooding, pollution, and infrastructure challenges. Sustainable Urban Planning – Role of green spaces, energy-efficient buildings, and smart city concepts. Green Infrastructure – Importance of urban forests, permeable surfaces, and nature-based solutions. Case Studies and Future Trends – Learning from cities like Singapore, Rotterdam, and Copenhagen.	20%	2

i. Text Book and Reference Book:

1. Textbook of Environmental Studies for Undergraduate Courses' (TextBook) By Erach Bharucha | Universities press
2. Basics of Environmental Studies By U K Khare | Tata McGraw Hi
3. Environmental Studies (TextBook) By Anindita Basak | Drling Kindersley(India)Pvt. Ltd Pearson
4. Environmental Sciences By Daniel B Botkin & Edward A Keller | John Wiley & Sons
5. Air Pollution By M. N. Rao and H. V. N. Rao; | Tata McGraw-Hill Publishing Company
6. Environmental Engineering By Howard S. Peavy, Donald R. Rowe, George Tchobanoglous | McGraw-Hill

(7)

a. **Course Name:** Advanced Communication and Interpersonal Skills
b. **Course Code:** 03010002HM01
c. **Prerequisite:** Knowledge of Principles of Communication Skills.
d. **Rationale:** Equips students with professional communication and collaborative teamwork skills essential for effective performance and industry readiness in the workplace.

e. Course Learning Objective:

CLOBJ 1	Apply core grammatical principles including subject–verb agreement
CLOBJ 2	Expand functional vocabulary and language usage by applying synonyms
CLOBJ 3	Develop effective reading comprehension skills to understand
CLOBJ 4	Enhance written and spoken expression through structured essay writing
CLOBJ 5	Develop self-management and personal development skills by applying SWOT analysis
CLOBJ 6	Apply core grammatical principles including subject–verb agreement

f. Course Learning Outcomes:

CLO 1	Remember rules of subject–verb agreement, reported speech, and active–passive voice to produce grammatically correct sentences in real-life contexts.
CLO 2	Understand the usage of appropriate vocabulary including synonyms, antonyms, homonyms, homophones, homographs, and idioms in spoken and written communication.
CLO 3	Apply structured essays, Paragraph, and confident self-introductions using appropriate language, logical organization, professional etiquette, and positive
CLO 4	body language.
CLO 5	Analyse intermediate-level reading passages by identifying main ideas,

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	-	2	2	40		20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE-

Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Lecture

Sr.	Content	Weightage	Teaching Hrs.	CO	BT
1	Subject Verb Agreement • Rules of subject-verb matching • Singular vs plural forms • Common agreement errors	10%	1	1	1
2	Reported Speech • Direct and indirect speech • Changing tenses, pronouns, and time expressions • Reporting statements, questions, and commands	10%	1	1	1
3	Active and Passive Voice • Difference between Active and Passive • Rules for converting sentences • Usage in real-life contexts	10%	1	1	1
4	Building Vocabulary • Word meanings and usage • Synonyms and antonyms • Homonyms, Homophones, Homographs, Idioms	10%	2	2	2
5	Grooming and Personality Development • Importance of dressing and professional etiquette • Building confidence and positive body language	10%	2	4	3

6	SWOT Analysis and Self Introduction • Identifying strengths, weaknesses, opportunities, threats • Preparing and delivering a confident self-introduction • Developing self-awareness and growth mind set	10%	2	4,5	3,5
7	Reading Comprehension (Level of difficulty-Intermediate) • Understanding written texts • Finding main ideas and supporting details • Answering questions accurately	10%	2	3	4
8	Paragraph Development • Elements of a paragraph • Unity and coherence • Types of paragraphs	10%	1	3	4
9	Essay Writing • Structure of an essay: introduction, body, conclusion • Organizing ideas logically • Using appropriate language and tone	10%	2	4	3
10	Time Management • Importance of managing time • Pomodoro and Eisenhower matrix • Prioritization • Creating schedules • Time Wasters and Time Distractors	10%	1	5	5
		100%	**15**		

Lab (Practical)

Sr.	Content	Weightage	Teaching Hrs.	CO	BT	
1	Subject Verb Agreement • Fill-in-the-blank exercises • Sentence correction tasks • Group quiz competition • Role-play using correct subject-verb forms	10%	2	1	1	
2	Reported Speech • Dialogue conversion practice • Pair work: narrate a conversation • Reporting classroom news • Role-play followed by reporting	10%	2	1	1	
3	Active and Passive Voice • Transform active sentences to passive and vice versa • Rewrite instructions in passive voice • Classroom narration using passive structures • Group activity: change story voice	10%	2	1	1	

4	Building Vocabulary • Daily word journal • Vocabulary flashcards and games • Synonym-antonym match-up • Word building through storytelling	10%	4	2	2
5	Grooming and Personality Development • Personal grooming checklist task • Group discussion on personality traits • Mock social interaction • Confidence-building exercises	10%	4	4	3
6	SWOT Analysis with Self Introduction • SWOT worksheet filling • Self-introduction in pairs or groups • Strength-sharing circle • Feedback on introductions	10%	4	4,5	3,5
7	Reading Comprehension (Level of Difficulty –Intermediate) • Reading passage followed by Q&A • Find-the-theme activity • Vocabulary hunt from the passage • Summarizing a short text	10%	4	3	4
8	Paragraph Development • Paragraph writing using prompts • Sentence reordering activity • Peer editing for coherence	10%	2	3	4
9	Essay Writing • Brainstorming and outline creation • Writing on guided topics • Peer feedback session • Editing and final draft submission	10%	4	4	3

10	Time Management and Team Building • Create a weekly schedule • Prioritization task (urgent vs important) • Reflection on time use habits	10%	2	5	5
		100%	**30**		

i. Text Book and Reference Book:

j. Dhanavel, S. P. *English and Soft Skills*. Orient Blackswan, 2010.

k. Mitra, Barun K. *Personality Development and Soft Skills*. Oxford University Press, 2011.

l. Murphy, Raymond. *English Grammar in Use*. 5th ed., Cambridge University Press, 2019.

m. Raman, Meenakshi, and Sangeeta Sharma. *Technical Communication: Principles and Practice*. Oxford University Press, 2004.

Wren, P. C., and H. Martin. *High School English Grammar and Composition*. S. Chand & Company, 1995.