



First Year Curriculum

Admission Year 2026-27

**Industry Embedded Bachelor of Technology
CSE in Association with Oracle**

Faculty of Engineering & Technology

Parul University

Vadodara, Gujarat, India

8. Detailed Syllabus

Semester 1

(1)

- a. **Course Name:** Web Designing
- b. **Course Code:** 03010501PC01
- c. **Prerequisite:** Basic computer skills, problem-solving mindset.
- d. **Rationale:** Basic computer skills, HTML, CSS, problem-solving, debugging, interactivity, performance optimization, and user experience are essential for web development.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamentals of HTML and CSS for webpage development
CLOBJ 2	Develop forms and multimedia-rich webpages using semantic HTML elements
CLOBJ 3	Apply CSS styling, layouts, Flexbox, and Grid for responsive interfaces.
CLOBJ 4	Understand web deployment concepts, hosting services, and publishing methods.

f. Course Learning Outcomes:

CLO 1	Create simple web pages using HTML and CSS.
CLO 2	Design web forms with different input fields.
CLO 3	Apply CSS for styling and layout using Flexbox and Grid.
CLO 4	Build responsive web pages with media queries and animations.
CLO 5	Understand web hosting, domain names, and website deployment.

g. Teaching & Examination Scheme:

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

Sr. No.	Content	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, <tr>, <td>, <th>, <thead>, <tbody>, <tfoot>) 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, timingfunction, 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	<p>Introduction to Web Deployment (Theory Only)</p> <p>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.</p>	11%	6
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i. 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
4. Responsive Web Design with HTML5 and CSS – Ben Frain

(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:

CLOBJ 1	Understand the consequences of various mean value theorems and fundamental theorems of calculus.
CLOBJ 2	Apply multivariable calculus techniques for optimization and partial differentiation problems.
CLOBJ 3	Solve problems involving double and triple integration for area and volume calculations.
CLOBJ 4	Analyze line, surface, and volume integrals using vector calculus
CLOBJ 5	Apply Green’s, Gauss’s, and Stokes’ theorems in engineering and mathematical applications.

f. Course Learning Outcomes:

CLO 1	Understand the consequences of various mean value theorems for differentiable functions.
CLO 2	Apply the concept of Multivariate calculus in optimization problems.
CLO 3	Apply the concept of multiple integration in problems.
CLO 4	Analyze Inter-relationship amongst the line integral, double and triple integral formulations.
CLO 5	Realize importance of Green, Gauss and Stokes’ theorems in other branches of mathematics.

g. Teaching & Examination Scheme:

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

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

h. Course Content:

Sr. No.	Topics	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

h. Text Book and Reference Book:

1. Calculus and Analytic Geometry, (TextBook) 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:** SQL on Oracle Cloud
- b. **Course Code:** 03015601PC01
- c. **Prerequisite:** Basic computer skills, an understanding of fundamental database concepts.
- d. **Rationale:** This course introduces students to the foundational concepts of relational databases and the powerful SQL language used to manage them. With a strong focus on Oracle Cloud Infrastructure (OCI) and Oracle Database, it equips learners with both theoretical knowledge and practical skills necessary to manage schema objects, retrieve

and manipulate data, and design efficient queries. The course also prepares students for the Oracle Database SQL Specialist certification, enabling them to pursue careers as SQL Developers, Database Administrators, or Data Analysts.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamentals of relational database systems, ER modeling, and database schema design concepts.
CLOBJ 2	Develop SQL queries using SELECT statements, filtering conditions, sorting techniques, and expressions for effective data retrieval.
CLOBJ 3	Apply SQL functions, aggregate functions, and conditional expressions to manipulate and summarize database information.
CLOBJ 4	Construct multi-table queries using joins, set operators, and subqueries for complex data extraction and analysis.
CLOBJ 5	Create and manage database schema objects such as tables, views, indexes, sequences, and synonyms using Oracle SQL
CLOBJ 6	Perform database operations using DDL, DML, and DCL commands while maintaining data integrity and security.
CLOBJ 7	Utilize Oracle Cloud database features and data dictionary views for database administration and metadata management.
CLOBJ 8	Gain practical hands-on experience in Oracle SQL to prepare for industry applications and Oracle SQL certification pathways.

f. Course Learning Outcomes:

CLO 1	Retrieve, restrict, and sort data using SQL SELECT statements with various clauses and operators.
CLO 2	Use SQL functions and conditional expressions to customize output.
CLO 3	Report and summarize aggregated data using group functions.
CLO 4	Display data from multiple tables using various join techniques.

CLO 5	Create and manage database schema objects including sequences, synonyms, indexes, and views.
CLO 6	Perform DDL, DML, and DCL operations to define, manipulate, and secure data.
CLO 7	Implement simple and advanced subqueries, including correlated and scalar subqueries.
CLO 8	Retrieve database metadata using data dictionary views and manage user privileges effectively.

g. Teaching & Examination Scheme:

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

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to SQL and Relational Concepts Introduction to SQL – Understanding the role of SQL in modern databases; Basics of Relational Database Management Systems (RDBMS); Data models – Hierarchical, Network, Relational; Entity-Relationship (ER) models – Entities, Attributes, and Relationships; Converting ER models into relational schemas; Understanding table relationships – One-to-One, One-to-Many, Many-to-Many; Primary Keys, Foreign Keys, Candidate Keys, and Composite Keys; Importance of normalization and integrity constraints.	20%	5
2	SQL SELECT Statement and Data Filtering SQL SELECT Statement – Retrieving data from single and multiple tables; Syntax and structure of SELECT; Filtering rows with WHERE clause – Comparison, Logical, and BETWEEN operators; Sorting results using ORDER BY clause – Ascending and Descending order; Removing duplicate entries using DISTINCT keyword; Use of column and table aliases; Introduction to substitution variables; Use of arithmetic expressions in SELECT; Handling NULLs	20%	5

	in queries.		
3	SQL Functions and Aggregations SQL Functions – Classification into Single-row and Multi-row functions; Character Functions – UPPER, LOWER, INITCAP, LENGTH, SUBSTR, INSTR, TRIM; Numeric Functions – ROUND, TRUNC, MOD, CEIL, FLOOR, ABS; Date Functions – SYSDATE, CURRENT_DATE, ADD_MONTHS, MONTHS_BETWEEN, NEXT_DAY; Conversion Functions – TO_CHAR, TO_DATE, TO_NUMBER; CAST and Conversion between data types; JSON Functions for parsing JSON data; General Functions – NVL, NVL2, COALESCE, NULLIF, DECODE; Group Functions – COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING; Conditional Functions – CASE, IF-ELSE logic in queries.	25%	15
4	Multi-table Queries and Subqueries Joining tables – Types of Joins: INNER JOIN, NATURAL JOIN, JOIN...USING, JOIN...ON; LEFT, RIGHT, FULL OUTER JOINS; CROSS JOIN and Cartesian product; Self Joins and Aliasing; Set Operators – UNION, UNION ALL, INTERSECT, MINUS; Introduction to Subqueries – Defining and applying subqueries; Single-row Subqueries – used with =, >, <; Multi-row Subqueries – using IN, ANY, ALL; Multi-column Subqueries and their structure; Use of Subqueries in SELECT, WHERE, FROM, and HAVING clauses.	25%	15
5	DDL, DML, DCL and Advanced SQL Features Data Definition Language (DDL) – CREATE, ALTER, DROP statements for tables and constraints; Data Manipulation Language (DML) – INSERT, UPDATE, DELETE operations with transaction control (COMMIT, ROLLBACK, SAVEPOINT); Data Control Language (DCL) – GRANT, REVOKE privileges; Creating and Managing SEQUENCES for auto-incrementing values; Creating and using SYNONYMS; INDEXES – Purpose and creation, single-column and composite indexes; VIEWS – Creating, updating, and querying views; Introduction to Data Dictionary Views for metadata; Advanced Subqueries – Scalar subqueries in SELECT and WHERE clauses; Correlated subqueries with references to outer queries; Data Manipulation using subqueries for complex data operations.	10%	5

i. Text Book and Reference Book:

1. Mastering Oracle SQL, 2nd Edition [Book] (oreilly.com)

2. Practical Oracle SQL: Mastering the Full Power of Oracle Database : Berg Hansen, Kim:
Amazon.in: Books

j. Experiment List:

Sr. NO.	Experiment List
1	Retrieving data using SQL SELECT with WHERE, ORDER BY, and DISTINCT
2	Reporting aggregated data using GROUP BY and HAVING.
3	Using Set Operators (UNION, INTERSECT, MINUS)
4	Managing tables with DML operations – INSERT, UPDATE, DELETE.
5	Using DDL commands – CREATE, ALTER, DROP for schema objects.
6	Querying data dictionary views for metadata.
7	Creating and using Sequences, Synonyms, and Indexes.
8	Creating and querying Views
9	Managing schema objects: constraints, tablespaces, and naming conventions.
10	Manipulating data using subqueries and conditional expressions

(4)

a. Course Name: Electrical and Electronics Engineering

b. Course Code: 03010601ES02

c. Prerequisite:

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:

CLOBJ 1	To master the application of circuit laws and network theorems for solving DC electrical circuits.
CLOBJ 2	To develop the ability to analyze and calculate parameters for single-phase and three-phase AC systems.
CLOBJ 3	To understand BJT operation and determine stability through DC load line and Q-point analysis.
CLOBJ 4	To design regulated power supplies and understand the functional principles of various transducers.

f. Course Learning Outcomes:

CLO 1	Apply fundamental electrical laws and circuit theorems to electrical circuits.
CLO 2	Analyse single-phase and three phase AC circuits
CLO 3	Evaluate the operating regions of BJTs through DC analysis and Q-points using load line analysis.
CLO 4	Explain the working principle of Steam Generator, Refrigeration, and Air Conditioning system.
CLO 5	Design DC-regulated power supplies using voltage regulators and introduce various transducers with operation.

g. Teaching & Examination Scheme:

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

Sr. No.	Content	Weightage	Teaching Hours
1	<p>DC Circuits</p> <p>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.</p>	20%	5
2	<p>AC Circuits</p> <p>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.</p>	30%	6
3	<p>Diode and Transistors</p> <p>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</p>	30%	6

	switch, Transistor as an amplifier, Voltage divider bias and analysis, VDB load line and Q point.		
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

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.
2. Electrical Engineering Fundamentals (Text Book) By V. D. Toro | Prentice Hall India | 2, Pub. Year 198 By V. D. Toro | Prentice Hall India
3. Electrical and Electronics Technology by E. Hughes | Pearson | 10, Pub. Year 2010 By E. Hughes | Pearson
4. 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

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.

(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:

CLOBJ 1	To introduce students to the fundamentals of computer programming and problem-solving techniques using the C programming language.
CLOBJ 2	To develop logical thinking and analytical skills required for solving engineering and computational problems.
CLOBJ 3	To familiarize students with basic programming concepts such as data types, operators, control structures, arrays, strings, functions, pointers, and file handling.
CLOBJ 4	To enable students to design algorithms and implement efficient C programs for various applications.
CLOBJ 5	To develop debugging, testing, and program execution skills for writing error-free programs.
CLOBJ 6	To provide practical knowledge of structured programming and modular programming concepts using user-defined functions and data structures.

f. Course Learning Outcomes:

CLO 1	Recognize the computer's basic principles and organizations.
CLO 2	Understand Concepts of Computer Programming Language.
CLO 3	Develop the algorithm for solving basic Engineering Problems.
CLO 4	Write, Compile and debug program with C Programming.
CLO 5	Analyse the Solved, Complex Computational Program written in C.

CLO 6	Develop simple projects using C Language.
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g. Teaching & Examination Scheme:

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

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.

	<p>4. Write a program to convert days into months and days.</p> <p>5. Write a program which calculates the summation of three digits from the given 3 digit number.</p> <p>6. Write a program to demonstrate enumerates data type.</p> <p>7. Write a program to compute Fahrenheit from centigrade.</p> <p>8. Write a program to calculate simple interest.</p> <p>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.</p>
2	<p>Practical Set 2 (Control Structures)</p> <p>1. Write a program to find the largest of the three nos. using Nested-If-Else statement.</p> <p>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.</p> <p>3. Write a program to read marks from keyboard and your program should display equivalent grade according to following table.</p> <p>Marks Grade 100-80 Dist 60-79 First Class 35-59 Second Class 0-34 Fail</p> <p>1. Write a program to read marks of a student from keyboard whether the student id pass (if).</p> <p>2. Write a program to find the sum of first N odd numbers.</p> <p>3. Write a program using while loop construct which finds the factorial of a given integer number.</p> <p>4. Write a C program using do...while and for loop constructs to reverse the digits of the number.</p> <p>5. Write a program to demonstrate use of Switch- Break Statement.</p> <p>6. Write a program to find out all the numbers divisible by 5 and 7 between 1 to 100.</p> <p>Check for Armstrong number. A number is Armstrong if sum of cube of every digit is same as the original number. E.g. $153=1^3+5^3+3^3=153$</p> <p>1. Write a program to print the output of bellow series. $1!+2!+3!+4!+. \dots n!$</p> <p>2. Write a program to print the following outputs using for Loop.</p> <p>(a) 1 (b) * 12 ** 123 ***</p> <p>1. Write a program to print the following outputs using for Loop.</p> <p>(a) 1 (b) 321</p>

	21 21 321 1
3	<p>Practical Set 3 (Array & Strings)</p> <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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	<p>Practical Set 4 (Functions)</p> <ol style="list-style-type: none"> 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	<p>Practical Set 5 (Structures)</p> <ol style="list-style-type: none"> 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	<p>Practical Set 6 (Pointers)</p> <ol style="list-style-type: none"> 1. Write a program to add two numbers using pointers. 2. Write a program to swap two numbers using pointer
7	<p>Practical Set 7 (File Management)</p> <ol style="list-style-type: none"> 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.
CLOBJ 2	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:

CLO 1	Enable students to apply essential grammar rules for accurate and effective communication.
CLO 2	Develop ability to construct clear and coherent sentences and paragraphs using varied sentence structures.
CLO 3	Enhance reading and listening comprehension through identification of main ideas, details, and contextual meanings.
CLO 4	Build s confidence in everyday communication using appropriate greetings, expressions, and speaking skills.
CLO 5	Encourage creative and logical thinking through picture perception and extempore activities.
CLO 6	Help students set and track realistic personal and academic goals for continuous self-improvement.

g. 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-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Parts of Speech, Punctuation Overview of 8 parts of speech Basic punctuation marks and their usage Importance of grammar in writing	10%	4
2	Tenses Types: Present, Past, Future Forms and correct usage Common tense errors	8%	2
3	Phrase and Clauses; Types of Sentences (Structure Wise) Difference between phrases and clauses Classification of Simple, Compound & Complex Interchange of Simple to Compound, Simple to Complex, Compound to Complex	10%	4
4	Picture Perception Observing and interpreting images Building a short story or description Improving vocabulary and creativity	15%	4

5	Paragraph Development Structure: topic sentence, development, conclusion	8%	2
6	Meeting and Greeting (Initiating a conversation)Basic conversation skills Formal and informal greetings Common phrases for starting interactions	7%	2
7	Reading Comprehension (Basic Level)Types – Skimming & Scanning Reading short passages Identifying main ideas and details Answering basic questions	12%	4
8	Listening Comprehension (Basic Level)Listening to short audios/Conversation Understanding and responding to key information	8%	2
9	Extempore SpeechSpeaking on random topics Organizing thoughts quickly Improving fluency and confidence	15%	4
10	Goal Setting and TrackingSetting SMART goals Planning and tracking progress Self-assessment and reflection	7%	2

i. Text Book and Reference Book:

1. English Grammar in Use (TextBook) By Murphy, Raymond | Cambridge University Press, Pub. Year 2019
2. A Practical English Grammar (TextBook) By Thomson & Martinet | Oxford University Press, Pub. Year 1986
3. The St. Martin's Guide to Writing By Rise B. Axelrod & Charles R. | Cooper, Bedford/St. Martin's, Pub. Year 2021
4. Tactics for Listening (Basic) By Jack C. Richards | Oxford University Press, Pub. Year 2011
5. Active Skills for Reading: Book 1 By Neil J. Anderson | Cengage Learning, Pub. Year 2013
6. Speak with Impact By Allison Shapira | HarperCollins Leadership, Pub. Year 2018

Semester 2

(1)

a. **Course Name:** PL/SQL on Oracle Cloud

b. **Course Code:** 03015602PC01

c. **Prerequisite:** SQL proficiency, database fundamentals, programming knowledge, and practical experience within the Oracle database environment | 03015602PC01 - PL/SQL on Oracle Cloud.

d. **Rationale:** This course equips students with the knowledge of PL/SQL programming to enhance SQL operations through automation and modularity. The content aligns with Oracle's Database Program with PL/SQL Specialist certification, providing a pathway to professional credentialing.

e. **Course Learning Objective:**

CLOBJ 1	Understand the architecture, syntax, and programming structure of PL/SQL within the Oracle Cloud environment.
CLOBJ 2	Develop PL/SQL programs using variables, operators, control statements, and embedded SQL queries.
CLOBJ 3	Apply composite data types, collections, and cursors for efficient data processing and database operations.
CLOBJ 4	Implement exception handling techniques to build robust and error-resistant database applications.
CLOBJ 5	Design and develop reusable stored procedures, functions, packages, and triggers for modular programming.
CLOBJ 6	Integrate SQL and PL/SQL concepts to automate and optimize database-related tasks.
CLOBJ 7	Improve code performance, maintainability, and dependency management in Oracle database applications.
CLOBJ 8	Gain practical hands-on experience in PL/SQL programming aligned with Oracle professional certification standards.

f. **Course Learning Outcomes:**

CLO 1	Declare and use PL/SQL variables.
CLO 2	Write executable and control statements.
CLO 3	Build reusable procedures and functions.
CLO 4	Develop and manage packages and triggers.
CLO 5	Optimize PL/SQL performance and manage code dependencies.

g. Teaching & Examination Scheme:

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

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

g. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to PL/SQL Introduction to PL/SQL, including its purpose, benefits over SQL, and key features; Architecture of PL/SQL engine and block structure; Basic syntax and development environment setup; Understanding anonymous blocks and structure of PL/SQL programs.	20%	10
2	Writing PL/SQL Blocks Writing PL/SQL blocks including declaration, executable, and exception handling sections; Working with scalar variables, constants, and operators; Control structures such as IF-THEN, CASE, and LOOPS; Embedding SQL statements within PL/SQL blocks; Best practices in structuring PL/SQL code.	25%	10
3	Composite Data Types & Explicit Cursors Using composite data types like records and collections (nested tables, VARRAYs, and associative arrays); Introduction to explicit cursors and cursor attributes; Cursor FOR loops and parameterized cursors; Managing memory and performance in cursor operations.	15%	5
4	Handling Exceptions Handling exceptions in PL/SQL using predefined and user-defined exceptions; Propagation of exceptions and the WHEN OTHERS clause; Logging errors and debugging techniques; Best practices for robust error handling and troubleshooting.	15%	5

5	Stored Procedures & Functions Creating and using stored procedures and functions; Understanding parameter modes (IN, OUT, IN OUT); Designing modular and reusable code using packages; Specifying package specifications and bodies; Implementing database triggers for INSERT, UPDATE, DELETE operations; Managing dependencies and compilation order; Code design strategies and maintenance guidelines.	25%	15
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h. Experiment List:

Exp. No.	Name of the Experiment
1	Integrating SQL statements into PL/SQL blocks
2	Implementing conditional and loop control structures.
3	Defining and using composite data types.
4	Writing and using explicit cursors.
5	Managing predefined and custom exceptions
6	Creating, compiling, and executing procedures and functions.
7	Designing and using PL/SQL packages.
8	File operations using the UTL_FILE package.

(2)

a. Course Name: Linear Algebra

b. Course Code: 03019102BS01

c. Prerequisite: Basic Knowledge of Matrix and Determinants

d. Rationale: To attain the knowledge of Matrices and apply to the engineering field to check the consistency of the system. The concept of vector space helps to understand programming in field of computer engg.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental concepts of matrices, systems of linear equations, and matrix decomposition techniques.
CLOBJ 2	Analyze eigenvalues, eigenvectors, diagonalization, and Cayley-Hamilton theorem for solving mathematical problems.

CLOBJ 3	Develop understanding of vector spaces, subspaces, basis, dimension, and linear dependence concepts.
CLOBJ 4	Apply linear transformations, rank-nullity theorem, and matrix representations in mathematical and engineering applications.
CLOBJ 5	Construct orthogonal and orthonormal bases using inner product spaces and Gram–Schmidt orthogonalization process.
CLOBJ 6	Apply linear algebra concepts in coding-decoding, data analysis, and computational applications such as Principal Component Analysis (PCA).

f. Course Learning Outcomes:

CLO 1	Understand system of linear algebraic equation and solution techniques using matrix
CLO 2	Exhibit the understanding of vector space and subspace and solve related problems
CLO 3	Compute eigenvalues and eigenvectors and diagonalize the matrix
CLO 4	Create orthogonal and orthonormal bases: Gram-Schmidt process and use bases and orthonormal bases to solve application problem.

g. Teaching & Examination Scheme:

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

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	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

i. 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:** 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 12th science level.

d. **Rationale:** Knowledge of physics is essential for all Engineering branch because physics is the foundation subject of all the branches of engineering and it develops scientific temperament and analytical capability of engineering students.

Comprehension of basic physics concepts enables the students to solve engineering problem logically and develop scientific approach.

e. **Course Learning Objective:**

CLOBJ 1	Understand semiconductor materials using band theory concepts.
CLOBJ 2	Explain principles of optoelectronic devices and optical fibers.
CLOBJ 3	Understand the fundamentals of quantum mechanics and quantum computing.
CLOBJ 4	Analyze low-dimensional and nanomaterials with their applications.
CLOBJ 5	Develop knowledge of semiconductor-based modern technologies.

f. **Course Learning Outcomes:**

CLO 1	To conceptualize semiconducting materials on the basis of band theory
CLO 2	To get familiar with optical fibres and semiconductor based optoelectronic devices useful in fibre optic system.
CLO 3	To conceptualize the foundational principles of quantum Physics and their role in quantum computing.
CLO 4	Formulate and conceptualize various theoretical aspects and the physical phenomena at Low dimensional level (nano)

g. **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-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **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 Computing Quantum 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

i. 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.

j. 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.

(4)

- a. **Course Name:** Objected Oriented Programming
- b. **Course Code:** 03010502ES01
- c. **Prerequisite:** strong foundation in programming and object oriented concepts.
- d. **Rationale:** OOP in C++ provides a structured approach to programming by enabling encapsulation, inheritance, polymorphism, and abstraction. It enhances code reusability, maintainability, security, and scalability, making it a preferred choice for building largescale software applications
- e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental principles of Object-Oriented Programming and differentiate it from procedural programming.
CLOBJ 2	Apply core C++ concepts including classes, objects, functions, constructors, and destructors.
CLOBJ 3	Implement various types of inheritance and use function overriding and virtual functions for achieving polymorphism.
CLOBJ 4	Use pointers, virtual functions, and the 'this' pointer effectively in object-oriented design.
CLOBJ 5	Develop modular and reusable code using features like function overloading, friend functions, inline functions, and access specifiers.
CLOBJ 6	Design and implement real-world applications using object-oriented programming concepts in C++.

f. **Course Learning Outcomes:**

CLO 1	Perform various Program of functions in C++.
CLO 2	Perform class and object concept of program
CLO 3	Apply constructors and destructors for object initialization and cleanup.
CLO 4	Demonstrate various inheritance types and function overriding.
CLO 5	Utilize pointers and virtual functions for dynamic behaviors.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
2	-	2	4	20	20	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:

Sr. No.	Content	Weightage	Teaching Hours
1	Principles of Object Oriented Programming Object Oriented Languages, Applications of Object Oriented Programming, C++ Concepts, Structure of C++ program, Basic Data types in C++, User defined Data types, Derived Data types, Declaration of variables and Dynamic initialization of variables, Reference variables, Operators in C++, Scope Resolution Operators, Differentiate OOP and POP, Access Specifiers: Public, Private, Protected	25%	5
2	Functions, Class and Objects Concept of Functions in C++, Function prototyping, Function Defining, Function Calling, Inline Function, Default Arguments, Constant Arguments, Function Overloading, Defining Class and Creating Objects, Defining Member function, Nesting of Member functions, Private Member functions, Friend function	25%	6
3	Constructor and Destructor Constructor, Types of Constructor: Default Constructor, Parameterized Constructor, Copy Constructor, Destructor	20%	6
4	Inheritance Inheritance, Defining Derived Classes, Types of Inheritance: Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hybrid Inheritance, Function Overriding, Function Overloading vs. Function Overriding, Virtual Base Class, Abstract Classes.	20%	6
5	Pointer & Virtual Functions Pointers to objects, Pointer to Derived Classes, Virtual Functions, Pointer to Virtual Functions, 'this' Pointer.	10%	6

i. Text Book and Reference Book:

1. Object Oriented programming with C++ (TextBook) By E. Balagurusamy | TMH
2. The Complete Reference C++, (TextBook) By by Herbert Schildt | TMH
3. Object Oriented Programming with ANSI and Turbo C++ By Ashok Kamthane | Pearson

j. Experiment List:

Sr. NO.	Experiment List
1	Write a program to Display Hello World on your Output Screen in C++.
2	Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
3	Write a C++ Program to generate first n terms of Fibonacci sequence.
4	Write a program for recursive function.
5	Write a C++ program to find both the largest and smallest number in a list of integers.
6	Write a C++ Program to take two values from the user side and perform all kinds of Arithmetic Operation.
7	Write a C++ program to sort a list of numbers in ascending order.
8	Write a program to check Given Number is Even or Odd Using if-else in C++.
9	Write a Program that shows the use of call by reference and Call by Value in C++.
10	Write a Program to Demonstrate Friend Function and Friend Class.
11	Write a Program to show the use of Inline Function.
12	Create a Class named as "STUDENT", Create two data members of that class:sid, smarks and Take two member Function of that class i.e.:GetData() to get the value of data member and ShowData() to Display the value of data members and call that function from the main function.
13	Create a Class named as "EMPLOYEE", Declare Three Data Members i.e.: eid,ename and e-salary and create two member functions of that class i.e.: GetDetails() to get the input of all the datamembers and PrintDetails() to Display all the details of the Employee. (note: create eid of int datatype, e-name is of char array data type and e-salary is of float data type. 14. Write a Program to show the use of Function Overloading.
14	Write a Program to show the use of Single level inheritance.
15	Write a Program to show the use of multilevel inheritance.
16	Write a Program to show the use of multiple inheritance.
17	Write a Program to show the use of Hybrid inheritance.
18	Write a Program to show the use of Virtual Base Class.

19	Write a Program to show the use of a Default Constructor.
20	Write a Program to show the use of a Parameterized Constructor.
21	Write a Program to show the use of a Copy Constructor.
22	Write a Program to show the use of 'this' pointer.
23	Develop a program using pointers to derived classes.

(5)

a. **Course Name:** ICT Workshop

b. **Course Code:** 03010702ES01

c. **Prerequisite:** Basic Computer Knowledge

d. **Rationale:** This course is design to provide basic knowledge of Electronics components and computer components. This course helps in learning problem

e. **Course Learning Outcomes:**

CLOBJ 1	Understand the fundamental concepts and operating principles of basic electronic components such as resistors, capacitors, inductors, and diodes.
CLOBJ 2	Demonstrate the ability to use testing instruments for measuring electrical parameters such as voltage, current, frequency, and resistance.
CLOBJ 3	Understand the basic concepts and types of power supplies, including DC regulated and unregulated power supplies.
CLOBJ 4	Demonstrate the interfacing of various IoT sensors with microcontrollers such as Arduino or similar platforms.

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-Semester Evaluation, 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	Understand the fundamentals of Environmental Science and the interaction between humans and the environment.
CLOBJ 2	Explain various types of environmental pollution, their impacts, and pollution control techniques.
CLOBJ 3	Explain various types of environmental pollution, their impacts, and pollution control techniques.
CLOBJ 4	Analyze contemporary environmental issues and sustainable development practices.
CLOBJ 5	Understand the concept of climate resilient cities and sustainable urban planning

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 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 conservation-development of watersheds, Rain water harvesting and ground water recharge. National river conservation plan –	15%	3

	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:** Basic Communication Skills are essential for all Engineers
- d. **Rationale:** Strengthen core language and soft skills through applied grammar, communication tasks, and vocabulary building.
- e. **Course Learning Objective:**

CLOBJ 1	Apply core grammatical principles including subject–verb agreement, reported speech, and active–passive voice to improve accuracy in spoken and written communication.
CLOBJ 2	Expand functional vocabulary and language usage by applying synonyms, antonyms, homonyms, idioms, and contextual word meanings effectively.
CLOBJ 3	Develop effective reading comprehension skills to understand, interpret, and respond to intermediate-level texts and spoken content.
CLOBJ 4	Enhance written and spoken expression through structured essay writing, Paragraph development, confident self-introduction, and professional grooming practices.
CLOBJ 5	Develop self-management and personal development skills by applying SWOT analysis, practicing effective time management strategies, and engaging in reflective learning processes.

f. Course Learning Outcomes:

CLO 1	Remember the essential rules of English grammar and core vocabulary required for accurate communication.
CLO 2	Understand spoken and written texts at an intermediate level to grasp meaning, ideas, and context.
CLO 3	Apply grammatical structures, vocabulary, and writing skills in essays, self-introductions, and everyday communication.
CLO 4	Analyze personal strengths and weaknesses through SWOT analysis to enhance grooming and personality development.
CLO 5	Analyze communication habits and daily routines to improve time management and professional effectiveness.

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:

Sr. No.	Content	Weightage	Teaching Hours
1	Subject Verb Agreement Rules of subject-verb matching Singular vs plural forms Common agreement errors	10%	1
2	Reported Speech Direct and indirect speech Changing tenses, pronouns, and time expressions Reporting statements, questions, and commands	10%	1
3	Active and Passive Voice Difference between Active and Passive Rules for converting sentences Usage in real-life contexts	10%	1
4	Building Vocabulary Word meanings and usage Synonyms and antonyms Homonyms, Homophones, Homographs, Idioms	10%	2
5	Grooming and Personality Development Importance of dressing and professional etiquette Building confidence and positive body language	10%	2
6	SWOT Analysis with Self Introduction Identifying strengths, weaknesses, opportunities, threats Preparing and delivering a confident self-introduction Developing self-awareness and a growth mindset	10%	2
7	Reading Comprehension (Intermediate Level) Understanding written texts Finding main ideas and supporting details Answering questions accurately	10%	2
8	Listening Comprehension (Intermediate Level) Listening for specific information Identifying tone and purpose Responding appropriately	10%	1
9	Essay Writing Structure of an essay: introduction, body, conclusion Organizing ideas logically Using appropriate language and tone	10%	2
10	Time Management Importance of managing time Prioritization Creating schedules	10%	1

i. Text Book and Reference Book:

1. Technical Communication: Principles And Practice By Sangeetha Sharma, Meenakshi Raman | Oxford University Press | 2nd Edition
2. Personality Development and Soft Skills By Barun K Mitra | Oxford, 2011
3. High School English Grammar and Composition By Wren & Martin | S. Chand Publishing, Pub. Year 2017
4. English Grammar in Use By Raymond Murphy | Cambridge University Press, Pub. Year 2019
5. Communication Skills and Soft Skills By Suresh Kumar | Pearson Publication, 2010

Experiment List:

Sr. NO.	Experiment List
1	Subject Verb Agreement a. Fill-in-the-blank exercises b. Sentence correction tasks c. Group quiz competition d. Role-play using correct subject-verb forms
2	Reported Speech a. Dialogue conversion practice b. Pair work: narrate a conversation c. Reporting classroom news d. Role-play followed by reporting
3	Active and Passive Voice a. Transform active sentences to passive and vice versa b. Rewrite instructions in passive voice c. Classroom narration using passive structures d. Group activity: change story voice
4	Building Vocabulary a. Daily word journal b. Vocabulary flashcards and games c. Synonym-antonym match-up d. Word building through storytelling
5	Grooming and Personality Development a. Personal grooming checklist task b. Group discussion on personality traits c. Mock social interaction d. Confidence-building exercises
6	SWOT Analysis with Self Introduction a. SWOT worksheet filling b. Self-introduction in pairs or groups c. Strength-sharing circle d. Feedback on introductions
7	Reading Comprehension (Intermediate Level) a. Reading passage followed by Q&A b. Find-the-theme activity c. Vocabulary hunt from the passage d. Summarizing a short text
8	Listening Comprehension (Intermediate Level) a. Listen and answer exercises b. Listening and completing notes c. Audio- based MCQs d. Paraphrasing what was heard
9	Essay Writing a. Brainstorming and outline creation b. Writing on guided topics c. Peer feedback session d. Editing and final draft submission
10	Time Management and Team Building a. Create a weekly schedule b. Prioritization task (urgent vs important) c. Reflection on time use habits