



**First Year Curriculum
Admission Year 2026-27**

**Bachelor of Technology
Electrical Engineering**

Faculty of Engineering & Technology

Parul University

Vadodara, Gujarat, India

Semester 1

- a. Course Name:** Digital Electronics Circuits
- b. Course Code:** 03010601PC01
- c. Prerequisite:** Knowledge of Physics and Mathematics up to 12th science level
- d. Rationale:** The objective of Fundamental of Digital Electronics is to make the students understand the functioning of a digital circuit. The course contains descriptions of digital components using the core structure of digital logic. This includes number system, Logic gates, Boolean algebra, Combinational logic. This Course will enable students to solve various Boolean expressions, to design and implement digital logic circuits.
- e. Course Learning Objective:**

CLOBJ 1	Master the fundamental concepts of digital systems and the practical implementation of various logic gates.
CLOBJ 2	Develop the skills to analyze and design optimized combinational logic circuits for specific Boolean functions.
CLOBJ 3	Explore the architecture of sequential logic circuits and design systems such as counters and registers for various applications.
CLOBJ 4	Apply formal design procedures to implement both synchronous and asynchronous sequential circuits, ensuring timing and stability requirements are met.

f. Course Learning Outcomes:

CLO 1	Apply concepts of digital systems and implementation of Gates.
CLO 2	Analyze and design combinational logic circuits.
CLO 3	Explore and design of Sequential logic circuits with their applications
CLO 4	Implement the design procedure of synchronous and asynchronous sequential circuits

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	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.	Topic	Weightage	Teaching Hrs.
1	Number system and codes: Binary, octal, hexadecimal and decimal Number systems and their interconversion, BCD numbers (8421-2421), gray code, excess-3 code, cyclic code, code conversion, ASCII, EBCDIC codes. Number System addition, Subtraction, Division and Multiplication signed and unsigned binary numbers, complement representation.	20 %	10
2	Boolean Algebra: Basic logic circuits: Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, ExNOR and their truth tables,), Universal Gates, Laws of Boolean algebra, De-Morgan's theorem, Min term, Max term, POS, SOP, KMap, Simplification by boolean theorems, don't care condition.	20 %	10
3	Logic Families and Programmable Logic Devices: Introduction to digital logic family such as RTL, DTL, TTL, ECL, CMOS, IIR, HTL. Introduction to Programmable Logic Devices, Read-Only Memory, Programmable Logic Arrays (PLA), Programmable Array Logic (PAL), Combinational PLD-Based State Machines, State Machines on a Chip	20 %	8
4	Combinational Logic: The Half adder, the full adder, subtractor circuit. Multiplexer De-multiplexer, decoder, BCD to seven segment Decoder, Encoders.	13 %	6
5	Flip flop and Timing circuit : set-reset latches, D-flip flop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flop.	15 %	6
6	Registers & Counters: Synchronous/Asynchronous counter operation, Up/down synchronous counter, application of counter, Serial in/Serial out shift register, Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, parallel in/Serial out shift register, Bi-directional register.	10 %	3

***Continuous Evaluation:**

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

Reference Books:

1. Digital Fundamentals by Morris and Mano, PHI Publication
2. Fundamental of digital circuits by A.Anandkumar, PHI Publication
3. Digital Fundamentals by Floyd & Jain, Pearsons Pub
4. Fundamentals of Logic Design by Charles H. Roth Thomson

i. List of Experiments:

Sr. No.	Experiment List
1	To study and verify the truth table of logic gates.
2	Verify (a) Demorgan's Theorem for 2 variables. (b) The sum-of-product and product-of-sum expressions using universal gates.
3	Design and implement (a) Full Adder using basic logic gates. (b) Full subtractor using basic logic gates.
4	Design and implement a 4-bit parallel adder/substitutor using IC 7483.
5	Design and Implementation of 4-bit Magnitude Comparator using IC 7485.
6	Realize (a) 4:1 Multiplexer using gates. (b) 3-variable function using IC 74151(8:1 MUX).
7	Realize 1:8 Demux and 3:8 Decoder using IC74138.
8	Realize the following flip-flops using NAND Gates. (a) Clocked SR Flip-Flop (b) JK Flip-Flop.
9	Realize the following shift registers using IC7474. (a) SISO (b) SIPO (c) PISO (d) PIPO
10	Realize the Mod-N Counter using IC7490.

- a. **Course Name:** Linear Algebra and Calculus
 b. **Course Code:** 03019101BS02
 c. **Prerequisite:** Elementary Algebra, Matrices, Differentiation and Integration
 d. **Rationale:** This syllabus builds essential mathematical tools for engineering applications, covering differential equations, Laplace transforms, and vector calculus.
 e. **Course Learning Objective:**

CLOBJ 1	Analyze and solve systems of linear equations using matrix methods and understand eigenvalue problems.
CLOBJ 2	Apply first-order ordinary differential equations to model physical phenomena like cooling and electrical circuits
CLOBJ 3	Understand the principles of partial differentiation for multivariable functions and their applications.
CLOBJ 4	Utilize multiple integration techniques in various coordinate systems to compute geometric properties.
CLOBJ 5	Develop mathematical modeling skills for engineering applications through calculus and linear algebra.

f. **Course Learning Outcomes:**

CLO 1	Understand the concept of eigenvalues and eigenvectors of a matrix.
CLO 2	Formulate first-order differential equations to solve the real-world problem.
CLO 3	Apply partial differentiation to optimize multivariable function.
CLO 4	Evaluate multiple integration in cartesian and polar coordinates.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			External Evaluation		Total
				T	CE	P	Theory	P	
4	-	0	4	40	20	0	60		100

L- Lectures; T- Tutorial; P- Practical; C- Credit; CE- Continuous Evaluation,

h. **Course Content:**

Sr.	Topics	Weightage	Teaching Hours
1	Linear Algebra: Review of Determinant and Matrices, types of matrices, Rank of a matrix, System of Linear equations-homogenous and non-homogenous	30	18

	equations, solving techniques- Gauss Elimination method, Gauss-Jordan method, Consistency and inconsistency of the system, Eigenvalues and Eigenvector: Eigenvalues and Eigenvector, Algebraic multiplicity and Geometric multiplicity, Caley-Hamilton theorem, Diagonalization		
2	First order ordinary differential equations and applications: Exact and non-exact differential equations, Integrating factor-function of x only and functions of y only, Linear and nonlinear differential equations, Applications: Newton's Law of cooling, Growth model and RL-Circuit and RC-Circuit	20	12
3	Partial Differentiation and its application Partial Differentiation: Functions of several variables, Limit of function, continuity, partial differentiation, chain rule, Implicit functions and their derivatives, Homogeneous functions and Euler's theorem Applications of Partial Differentiation: Tangent plane and normal line, Maxima and minima,	30	18
4	Multiple Integration: Double integration, change of order, change into polar form, triple integrations Applications: Area, Volume	20	12

i. Text Book and Reference Book:

1. Advanced Engineering Mathematics (TextBook) By Erwin Kreyszig | Willey India Education
2. Elementary Linear Algebra By Howard Anton, Chris Rorres | Willy India Edition | 9th Edition
3. Calculus with early transcendental functions By James Stewart | Cengage Learning
4. Thomas' Calculus By Maurice D. Weir, Joel Hass, Frank R. Giordano | Pearson Education

- a. **Course Name:** Physics of Semiconductors
b. **Course Code:** 03019201B S01
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.

e. **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 systems.
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)

f. **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	20	20	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	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

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 Engineering Physics (TextBook) By B.K.Pandey S Chaturvedi and M. Venkanna | - Cengage Publication
3. 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.

a. Course Name: Basic Electrical Engineering

b. Course Code: 03010601ES01

c. Prerequisite: Standard 12th science.

d. Rationale: Basic Electrical Engineering provides fundamental knowledge of electrical principles, components, and systems that form the backbone of all engineering disciplines. Understanding concepts such as DC and AC circuit analysis, electrical machines, measurement techniques, and safety practices equips students with the skills to interpret, design, and troubleshoot basic electrical systems. This course bridges theoretical understanding with practical applications, enabling learners to apply electrical engineering concepts in multidisciplinary contexts, industrial environments, and further specialized studies.

e. Course Learning Objective:

CLOBJ 1	To master fundamental circuit laws and theorems for determining voltage and current in DC networks.
CLOBJ 2	To provide a comprehensive understanding of R, L, and C behaviour in both single-phase and three-phase sinusoidal steady-state environments.
CLOBJ 3	To apply magnetic circuit principles and equivalent models to evaluate transformer efficiency and regulation.
CLOBJ 4	To examine the construction and performance of electrical machines for diverse industrial applications.
CLOBJ 5	To introduce the components of safe low-voltage installations and the operational role of battery systems.

f. Course Learning Outcomes:

CLO 1	Identify basic electrical circuit elements and fundamental laws to determine voltage and current in DC circuits.
CLO 2	Describe the behavior of R, L, and C elements in sinusoidal steady-state conditions for single-phase and three-phase AC circuits.
CLO 3	Apply magnetic circuit principles and transformer equivalent models to solve practical efficiency and regulation problems.
CLO 4	Analyze the construction and performance characteristics of electrical machines to assess suitability for industrial applications
CLO 5	Explain the role of key components in low-voltage electrical installations and battery systems in ensuring safety and reliability in residential and commercial environments

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	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.	Topic	Weightage	Teaching Hrs.
1	DC Circuits Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, Mesh and Node analysis, Simplifications of networks using series and parallel combinations and star-delta conversions. Superposition, Thevenin and Norton Theorems.	22	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. Study of A.C. circuits consisting of pure resistance, pure inductance, pure capacitance and corresponding voltage-current phasor diagrams and waveforms. Development of concept of reactance, study of series R-L, R-C, R-L-C circuit and resonance, study of parallel R-L, R-C and RLC circuit, concept of impedance, admittance, conductance and susceptance in case of above combinations and relevant voltage-current phasor diagrams, concept of active, reactive and apparent power and power factor, examples based on theory. 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.	33	15
3	Transformers Magnetic effect of an electric current, right hand thumb rule, Concept of m.m.f., flux, flux density, reluctance, permeability and field strength, their units and relationships, comparison between electrical and magnetic parameters. Flemings left hand rule. Self and mutual inductance, Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.	20	9
4	Electrical Machines Construction, working and application of DC Motor	15	7

Sr.	Topic	Weightage	Teaching Hrs.
	and Generator. Generation of 3 phase rotating magnetic fields, Construction and working of a three-phase and Single phase induction motor and its types. Construction and working of Synchronous generators.		
5	Electrical Installations Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries.	10	4

***Continuous Evaluation:**

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

Reference Books:

1. Electrical Technology (Vol-II) (TextBook) By B L Theraja & A K Theraja | S Chand
2. Basic Electrical Engineering By D. P. Kothari and I. J. Nagrath, | Tata McGraw Hill | 3, Pub. Year 2010
3. Basic Electrical Engineering By D. C. Kulshreshtha | McGraw Hill | 1, Pub. Year 2009
4. Fundamentals of Electrical Engineering By Leonard S. Bobrow | Oxford University Press | 2, Pub. Year 1996
5. Electrical and Electronics Technology By E. Hughes | Pearson | 10, Pub. Year 2010
6. Electrical Engineering Fundamentals By Vincent Del Toro | PHI

i. List of Experiments:

Sr. No.	Experiment List
1	To Study about Various Electrical and Electronics Symbols and demonstrate various measuring instruments used in Basic electrical Engineering laboratory.
2	To Perform and Solve Electrical Networks with Series and Parallel Combinations of Resistors Using Kirchhoff's Laws.
3	Verification of superposition theorem with DC source.
4	Verification of Thevenin's theorem with DC source.
5	Verification of Norton's theorems in DC circuits.
6	To Obtain Inductance, Power and Power Factor of the Series RL Circuit With AC Supply Using Phasor Diagram.
7	To Obtain Capacitance, Power and Power Factor of the Series RC Circuit With AC Supply Using Phasor Diagram.
8	To Obtain Inductance, Capacitance, Power and Power Factor of the Series R-L-C Circuit With AC Supply Using Phasor.
9	Verification of Current and Voltage Relations in Three Phase Balanced Star and Delta Connected Loads.
10	Find out the Efficiency and Voltage Regulation of Single Phase Transformer by Direct Load Test.

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

CLOBJ 1	Recognize and recall fundamental principles and organizations of computers, demonstrating a foundational understanding of computer architecture and design.
CLOBJ 2	Comprehend the concepts of computer programming languages, illustrating a grasp of syntax, semantics, and the essential components of programming languages.
CLOBJ 3	Develop algorithms for solving basic engineering problems, demonstrating the ability to apply theoretical knowledge to practical problem-solving scenarios.
CLOBJ 4	Demonstrate proficiency in the practical application of C programming by writing, compiling, and debugging programs, showcasing the ability to implement and troubleshoot code effectively.
CLOBJ 5	Evaluate and analyse complex computational programs written in C, demonstrating the capacity to assess and understand intricate solutions to computational challenges.
CLOBJ 6	Develop simple projects using the C programming language, showcasing creativity and application of learned principles to produce functional and practical software solutions.

- f. **Course Learning Outcomes:**

CLO 1	Demonstrate basic knowledge of computer hardware and software.
CLO 2	Describe problem-solving and logical skills in programming with C and other languages.
CLO 3	Describe decision-making and looping constructs to solve real-time problems.
CLO 4	Discuss the concept of functions for adaptive programming.
CLO 5	Use the comparisons and limitations of the various programming constructs and choose the right one for the task.

- 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	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.	Topics	Weightage	Teaching Hours
1	Number System: Introduction and type of Number system, Conversion between number system, Arithmetic operations on number system, Signed and unsigned number system Software, Computer Languages and Computer Program	2%	3
2	Introduction to 'C' Programming: Features of C language, structure of C Program, Flow Charts and Algorithms Types of errors, debugging, tracing/stepwise execution of program, watching variables values in memory.	3%	3
3	Constants, Variables and 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.	5%	2
4	Operators and Expression: Introduction to Operators and its types, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Operator precedence and associativity.	10%	3
5	Management Input and Output Operators: Introduction, reading a character, writing a character, formatted input, formatted output.	5%	2
6	Control structure in C: Decision Making & branching: Decision making with If & If Else statements, If Else statements (Nested Ladder), The Switch & goto statements, The ternary (?:) Operator Looping: The while statement, The break statement & The Do.. While loop, The FOR loop, Jump within loops – Programs	15%	4
7	Array: Introduction, One-dimensional arrays, Two-dimensional arrays, arrays, Concept of Multidimensional arrays.	10%	4
8	String: string , string storage , Built-in-string functions	10%	3
9	User-Defined Functions: Concepts of user defined functions, prototypes, definition of	10%	5

Sr. No.	Topics	Weightage	Teaching Hours
	function, parameters, parameter passing, calling a function, recursive function, Macros, Pre-processing.		
10	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	10%	5
11	Pointers: Basics of pointers, pointer to pointer, pointer and array, Pointer to array, array of pointers , functions returning a pointer	10%	5
12	Dynamic memory allocation: Introduction to Dynamic memory allocation, malloc(), calloc(), free(), realloc()	5%	2
13	File Management in C:Introduction to file management and its functions	5%	1

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	Write a program to print HELLO FRIENDS!
2	Write a program that reads two nos. from keyboard and gives their addition, subtraction, multiplication, division and modulo.
3	Write a program to calculate the area of a 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.

Sr. No.	Experiment List								
6	Write a program to demonstrate enumerated data types.								
7	Write a program to compute Fahrenheit from centigrade.								
8	Write a program to calculate simple interest. Read the price of the item in decimal form e.g. 12.50 and separate Rs and Paise from the given value e.g. 12 rupees and 50 paise.								
9	Write a program to find the largest of the three nos. using a Nested-If-Else statement.								
10	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.								
11	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.								
12	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.								
13	Write a program to read marks from keyboard and your program should display equivalent grade according to following table. <table border="0" data-bbox="331 1032 619 1238"> <tr> <td>Marks</td> <td>Grade</td> </tr> <tr> <td>100-80</td> <td>Dist</td> </tr> <tr> <td>60-79</td> <td>First Class</td> </tr> <tr> <td></td> <td>Second Class</td> </tr> </table>	Marks	Grade	100-80	Dist	60-79	First Class		Second Class
Marks	Grade								
100-80	Dist								
60-79	First Class								
	Second Class								
14	Write a program to read marks of a student from keyboard whether the student id pass (if).								
15	Write a program to find the sum of first N odd numbers.								
16	Write a program using a while loop construct which finds the factorial of a given integer number.								
17	Write a C program using do«while and for loop constructs to reverse the digits of the number.								
18	Write a program to demonstrate use of Switch- Break Statement.								
19	Write a program to find out all the numbers divisible by 5 and 7 between 1 to 100.								
20	Check for Armstrong number. A number is Armstrong if sum of cube of every digit is same as the original number. E.g. $153=1^3+5^3+3^3=153$								
21	Write a program to print the output of bellow series. $1!+2!+3!+4!+..... n!$								
22	Write a program to print the following outputs using for Loop. <pre data-bbox="411 1973 517 2116">1 * 12 ** 123 ***</pre>								

Sr. No.	Experiment List
23	Write a program to print the following outputs using for Loop. (a) 1 (b) 321 21 21 321 1
24	Write a program which sorts 10 numbers into ascending order.
25	Write a program to find the maximum element from a 1-D array.
26	Write a program to find the number of odd and even elements from the 1-D array.
27	Write a program to add two 2x2 matrices.
28	Write a program to count the number of positive, negative and zero elements from a 3x3 matrix.
29	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.
30	Write a program to count vowels from an entered String.
31	Write a program which finds whether a string is a palindrome or not.
32	Write a program to find the factorial of a number using recursion.
33	Write a program that uses the user defined function Swap () and interchange the value of two variables.
34	Write a function to return 1 if the number is prime otherwise return 0.
35	Define a structure type, personal that would contain a person name, date of joining and salary.
36	Define a structure called cricket that will describe the following information: Player name Team name Batting average
37	Write a program to add two numbers using pointers.
38	Write a program to swap two numbers using pointer
39	Write a program to illustrate reading files contents.
40	Write a program to illustrate the use of fgets()

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

CLOB J 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.
CLOB J 2	Develop basic reading and listening comprehension skills by using appropriate strategies to understand simple texts and spoken content with improved pronunciation awareness.
CLOB J 3	Organize and express ideas clearly in written form through picture-based perception activities.
CLOB J 4	Build confidence and fluency in spoken communication through correct pronunciation practice, meeting and greeting activities, extempore speech, and everyday conversational exercises.
CLOB J 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	Identify and explain parts of speech, punctuation marks, tenses, phrases, clauses, determiners, Quantifiers, sentence structures, and basic IPA phonetic symbols for accurate language use.
CLO 2	Demonstrate effective basic conversational exchanges and short extempore speeches using correct pronunciation, appropriate greetings, logical organization of ideas, and improved fluency.
CLO 3	Apply basic reading and listening strategies to comprehend short passages and spoken texts, recognizing appropriate pronunciation, stress, and intonation patterns.
CLO 4	Analyse personal communication performance and evaluate SMARTER goals through self-assessment and reflective practices to monitor language and pronunciation improvement.
CLO 5	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 Hrs/Week			Credi t	Examination Scheme					Total
Le c.	Tut .	Lab		Internal			External		
				T	CE	P	T	P	
0	0	2	1	-	-	20	-	30	50

L

ec.- Lecture; **Tut.-** Tutorial; **T-** Theory; **P-** Practical; **CE-** Continuous Evaluation.

h. Course Content

Sr .	Content	Weightag e	Teachi ng Hrs.	C O	BT
1	Parts of Speech, Punctuation and Tenses using time line <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Introduction to Phonetics and IPA • English Speech Sounds • Stress and Intonation 	10%	4	1	1
3	Phrase and Clauses; Types of Sentence (Structure Wise) <ul style="list-style-type: none"> • 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	<p>Picture Perception</p> <p>36 Observing and interpreting images 37 Building a short story or description 38 Improving vocabulary and creativity</p>	14%	4	3, 4	3,6
5	<p>Determiners and Quantifiers</p> <p>f. Types of determiners g. Order of determiners in a sentence h. Quantifiers with countable and uncountable nouns i. Common errors in the use of determiners and Quantifiers</p>	8%	2	3	6
6	<p>Meeting and Greeting (Initiating a conversation)</p> <p>a. Basic conversation skill b. Formal and informal greetings c. Common phrases for starting interactions</p>	10%	4	4	2,3
7	<p>Reading Comprehension (Level of difficulty-Basic)</p> <p>j. Types – Skimming & Scanning k. Reading short passages l. Identifying main ideas and details m. Answering basic questions</p>	10%	2	2	2
8	<p>Listening Comprehension</p> <p>1. Listening to short audios/Conversation 2. Understanding and responding to key information</p>	8%	2	2	2

9	Extempore Speech 1. Speaking on random topics 2. Organizing thoughts quickly 3. Improving fluency and confidence	12%	4	4	3
10	Goal Setting and Tracking a. Setting SMARTER goals b. Planning and tracking progress c. Self-assessment and reflection	10%	2	5	5

i. Reference Books:

- 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

- a. **Course Name:** Electrical Circuit Analysis
 b. **Course Code:** 03010602PC01
 c. **Prerequisite:** Knowledge of basics of electrical engineering and mathematics
 d. **Rationale:** The course will impart the knowledge of various network theorems, analysis of transient analysis of series-parallel R-L, RC, R-L-C , two-port network and network topology.
 e. **Course Learning Objective:**

CLOBJ 1	To employ a methodical approach to problem-solving in electrical circuit networks, effectively identifying and analysing complex problems to find solutions.
CLOBJ 2	To apply various theorems to simplify electrical networks, demonstrating the ability to simplify complex circuits using theorem-based techniques.
CLOBJ 3	Use differential equations and Laplace transforms for network analysis.
CLOBJ 4	To understand two-port network parameters and be able to evaluate and manipulate them to obtain network functions for electrical circuits.
CLOBJ 5	Apply graph theory to solve circuits.

f. **Course Learning Outcomes:**

CLO 1	Develop a methodical approach to problem solving in electrical circuits.
CLO 2	Apply the knowledge of various theorems to simplify complex electrical networks.
CLO 3	Analyze the expressions of first and second order networks using differential equations and Laplace transforms.
CLO 4	Determine two-port network parameters and obtain network functions of circuits.
CLO 5	Utilize graph theory for solving electrical circuit networks

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	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	Network Theorems: Super mesh and Super node, Maximum power transfer theorem, Reciprocity theorem, Compensation theorem, Tellegen's theorem, Millman's theorem.	29%	13

	Analysis with dependent current and voltage sources.		
2	Solution of First and Second order networks: Solution of first and second order differential equations for Series and parallel R-L, R-C, R-L-C circuits, initial and final conditions in network elements, forced and free response, time constants, steady state and transient state response.	27%	12
3	Electrical Circuit Analysis Using Laplace Transforms: Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots).	22%	10
4	Two Port Network and Network Functions: Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port Networks.	11%	5
5	Graph Theory and Network Topology: Introduction, graph of network, tree, co-tree, loop incidence matrix, cut set matrix, tie set matrix and loop current, number of possible tree of a graph, analysis of network equilibrium equation.	11%	5

i. Text Book and Reference Book:

1. Engineering Circuit Analysis by W H Hayt, S M Durbin, Tata McGraw-Hill Education
2. Fundamentals of Electric Circuits by C. K. Alexander and M. N. O. Sadiku, McGraw Hill Education, 5th edition, Pub. Year 2013
3. Network Analysis by M. E. Van Valkenburg , PHI
4. Circuit Theory: Analysis and Synthesis by Abhijit Chakrabarti, Dhanpat Rai & co.
5. Networks and Systems by D. Roy Choudhury, New Age Science, 2nd Edition

j. List of Experiments:

Sr. No.	Experiment List
1	Verification of Maximum power transfer theorems in dc circuits
2	Verification of Norton's theorems in dc circuits
3	Verification of Reciprocity Theorem dc circuits.
4	Verification of Tellegen's theorem dc circuits
5	Verification of open circuit impedance parameter of two port networks.
6	Verification of short circuit admittance parameter of two port networks.
7	Verification of hybrid parameters of two port networks.
8	Verification of ABCD parameters of two port networks.
9	Verification of transient RL circuit and obtain time constant

Sr. No.	Experiment List
10	Verification of transient RC circuit and obtain time constant
11	Verification of transient response of second order system for step input
12	Verification of transient response of second order system for ramp input

k. Laboratory Equipment: Training kit, Multimeters, CRO, DSO, capacitor, transformer, and resistor.

- a. **Course Name:** Privacy and Security in Online Social Media
- b. **Course Code:** 03M10002UE01
- c. **Prerequisite:** Basic knowledge of social media, privacy and security
- d. **Rationale:** The course explores the fundamentals of Online Social Networks (OSNs), focusing on data collection, analysis, trust, security, and privacy.
- e. **Course Learning Objective:**

CLOBJ 1	Identify the architecture of Online Social Networks (OSNs) and demonstrate various data collection methods while addressing the technical and ethical challenges of social data acquisition.
CLOBJ 2	Analyse the mechanisms of trust and reputation within social systems to identify misinformation and implement strategies that enhance content credibility.
CLOBJ 3	Assess common OSN vulnerabilities—including phishing, fraud, and privacy disclosure—to design and propose effective technical and behavioural countermeasures.
CLOBJ 4	Implement social media APIs and data cleaning pipelines to extract and process real-world datasets for quantitative and qualitative analysis.
CLOBJ 5	Conduct independent research on contemporary OSN topics, such as digital law enforcement and privacy legislation, by producing comprehensive case studies and research papers.

g. Course Learning Outcomes:

CLO 1	Understand Online Social Networks and Data Collection – Explain the fundamentals of online social networks, data collection methods, and the challenges and opportunities associated with them.
CLO 2	Analyze Trust, Credibility, and Reputation in Social Systems – Evaluate the role of trust and reputation in online communities and develop strategies to detect misinformation and enhance credibility.
CLO 3	Examine Privacy and Security Risks in OSNs – Assess the impact of privacy disclosure, phishing, and fraudulent activities in social media and propose countermeasures
CLO 4	Apply Data Collection and Analysis Techniques – Utilize social media APIs and data processing methods to extract, clean, and analyze information from online social networks.
CLO 5	Conduct Research on Emerging OSN Topics – Engage in discussions and research on social media security, privacy, and law enforcement applications, contributing to the field through case studies and research papers.

h. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	0	0	3	20	20	-	60	-	100

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

i. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Online Social Networks Definition and Evolution of Online Social Networks (OSNs), Data Collection from Social Networks, Challenges, Opportunities, and Pitfalls in OSNs, Social Media APIs for Data Extraction.	20%	8
2	Data Collection and Analysis in OSNs Techniques for Collecting Data from Online Social Media, Ethical Considerations in Social Media Data Collection, Data Processing and Cleaning for Analysis, Case Studies on Social Media Data Collection.	20%	8
3	Trust, Credibility, and Reputation in Social Systems Understanding Trust and Credibility in Online Communities, Reputation Systems and Their Impact on User Behaviour, Detecting Misinformation and Fake News in OSNs, Methods for Enhancing Trustworthiness in Social Media.	20%	8
4	Security, Privacy, and Fraud Detection in OSNs Online Social Media and Its Role in Law Enforcement & Policing, Information Privacy: Disclosure, Revelation, and Its Effects, Phishing Attacks in OSNs and Their Countermeasures, Identifying Fraudulent Entities and Fake Profiles in OSNs.	20%	8
5	Research and Practical Applications Review and Discussion of Key Topics (Refresher), Analysing Real-World OSN Case Studies, Research Paper Discussions on Online Social Networks and Security, Future Trends in OSN Security and privacy.	20%	8

i. Text Book and Reference Book:

1. Social Media Mining: An Introduction By Reza Zafarani, Mohammad Ali Abbasi, Huan Liu: Provides a comprehensive introduction to social media data mining, including machine learning and network analysis techniques.
2. Mining the Social Web By Matthew A. Russell: Covers data collection, analysis, and visualization techniques using Python and APIs from platforms like Twitter, Facebook, and LinkedIn.
3. Security and Privacy-Preserving Techniques in Social Networks By Barbara Carminati & Elena Ferrari Explores security challenges, privacy risks, and trust management in online social networks.

- a. **Course Name:** Differential Equations and Vector Calculus
b. **Course Code:** 03019102BS02
c. **Prerequisite:** Differential Calculus, Integral Calculus, Vector Algebra, Differential Equations.
d. **Rationale:** This syllabus builds essential mathematical tools for engineering applications, covering differential equations, Laplace transforms, and vector calculus.
e. **Course Learning Objective:**

CLOBJ 1	Solve higher-order linear differential equations using standard methods for homogeneous and non-homogeneous cases.
CLOBJ 2	Apply differential equations to physical problems such as free, damped, and forced oscillations and RLC circuits.
CLOBJ 3	Use Laplace transforms and their properties to solve initial value problems efficiently.
CLOBJ 4	Expand functions using Fourier series, including half-range expansions for even and odd functions.
CLOBJ 5	Apply vector calculus concepts like gradient, divergence, curl, and line integrals in solving practical problems.

f. **Course Learning Outcomes:**

CLO 1	Solve Second and Higher-Order Ordinary Differential Equations
CLO 2	Apply Laplace Transform to Solve Differential Equations.
CLO 3	Apply Fourier series techniques to approximate periodic functions in mathematical and engineering contexts.
CLO 4	Compute and interpret vector differentiation concepts.
CLO 5	Evaluate vector integrals.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	T	P	
4	-	-	4	40	20	-	-	60	100

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

h. **Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
1	Second and Higher-Order Ordinary Differential Equations Homogeneous Linear ODE, Homogeneous constant coefficient linear ODE, non-homogeneous linear constant coefficient linear ODE, Undetermined coefficient and Variation of Parameter, Applications of higher order linear differential equations in Free oscillations, forced oscillations, Damped oscillations, RLC circuit	25	15

2	Laplace Transformations and Its Applications: Definition and Laplace transformation of elementary functions, Properties of Laplace Transformations - linearity property, First-Shifting Theorem, Derivative of Laplace transformation, Integration of Laplace transformation, Laplace transformation of Integral, Laplace transformation of derivatives, Inverse Laplace Transformation, Convolution theorem and Application of Laplace Transformation to solve ODE.	30	18
3	Fourier Series Fourier Series of periodic functions with arbitrary period, Even and Odd functions, Half-Range Fourier Series	15	9
4	Vector Calculus: Vector Differentiation: Vector-valued functions, smooth curve, vector differentiation, scalar valued function, Gradient of scalar valued function, Divergence and curl of vector-valued functions, Laplacian operator, Scalar potential function, Vector Integration: Line integral of scalar functions, Line integral of vector valued function, conservative vector field and independent of path, Green's theorem.	30	18

i. Text Book and Reference Book:

1. Advanced Engineering Mathematics (Text Book) By Erwin Kreyszig | Willey India Education
2. D.A. Murray, Introductory Course in Differential Equations. Orient Longman (India).
3. Fourier Series and Boundary Value Problems, By James Brown and Ruel Churchill, | McGraw Hill
4. Elementary Differential Equations and Boundary Value Problems, By William E Boyce and Richard C. D'Prima | Willey India Edition
5. Advanced Engineering Mathematics, By K. A. Stroud and Dexter Booth, | Macmillan Publication

b. Course Code: 03010901ES01

c. Prerequisite: Knowledge of Physics and Mathematics up to 12th science level.

d. Rationale: This course introduces the basic principles of Mechanical Engineering to students in various branches of Engineering.

e. Course Learning Objective:

CLOBJ 1	To develop a fundamental understanding of thermodynamic principles, laws, systems, and basic energy concepts used in engineering applications.
CLOBJ 2	To analyze the properties and behavior of gases and steam, including gas laws, thermodynamic processes, and steam generation characteristics.
CLOBJ 3	To understand the working principles, performance, and efficiency of heat engines, including internal combustion engines and thermodynamic cycles.
CLOBJ 4	To study energy conversion devices such as boilers, refrigeration systems, and air conditioning systems, along with their components and applications.
CLOBJ 5	To gain knowledge of pumps, compressors, and mechanical power transmission systems, including their working principles, classifications, and practical uses.

f. Course Learning Outcomes:

CLO 1	Describe basic terminology of mechanical systems and various conventional and non-conventional energy sources.
CLO 2	Estimate the fundamental properties of Gas and Steam.
CLO 3	Calculate the Power and efficiency of the Internal Combustion engine.
CLO 4	Explain the working principle of Steam Generators, IC engines, Refrigeration, Air Conditioning, Pumps, and Compressors
CLO 5	Differentiate the various power transmission systems and its applications.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
3	-	2	4	40	20	20	60	30	150

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

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction Prime Movers, Conventional and Non-Conventional Energy Sources and their applications. Basics of Thermodynamics: Basic terminologies, Specific heat, Internal Energy, Enthalpy, Specific Volume. Change of State, Path, Process, Cycle, and Thermodynamic systems, Statement of Zeroth Law, First Law and Second Law of Thermodynamics.	10	5
2	Properties of Gases Gas Laws, Gas Constant, and Relation between specific heat at constant pressure and constant volume, Non-flow processes.	20	8
3	Heat Engines Definition and Classification of Heat Engine; Internal Combustion Engine: Classification, Otto and Diesel Cycle, Two and Four Stroke Petrol and Diesel Engine; Calculation of Power and Efficiency.	20	10
4	Properties of Steam Types of Steam and Steam Formation, Specific Enthalpy, Specific Volume, Dryness Fraction of Steam, Measurement of Dryness Fraction, Calorimeters, and Steam Table.	15	7
5	Energy Conversion Devices Steam Generators: Classification; Cochran, Lancashire, Babcock and Wilcox Boiler, Function of Boiler Mounting and Accessories. Refrigeration and Air Conditioning: Refrigerant, Vapor compression refrigeration system, Vapor absorption refrigeration system, Domestic refrigeration, Window and split air conditioners.	20	8
6	Basics of Pumps and Compressors Definition, Classification, Applications, Working Principle and Components of Pumps and Compressors.	10	4
7	Motion and Power Transmission Devices Shaft and Axle; Belt Drive, Chain Drive, Friction Drive, Gear Drive, Clutch, Coupling, and Brake.	5	3

i. Text Book and Reference Book:

1. Elements of Mechanical Engineering By Sadhu Singh | S. Chand Publisher. | Revised edition, Pub. Year 2013
2. Elements of Mechanical Engineering By S.B.Mathur, S. Domkundwar | Dhanpat Rai & Sons Publication, Pub. Year 2013
3. Fundamental of Mechanical Engineering By G. S. Sawhney | PHI Publication New Delhi. | Third edition, Pub. Year 2015
4. Engineering Thermodynamics By P. K. Nag | Tata McGraw-Hill Education | Sixth edition, Pub. Year 2017
5. Thermal Science and Engineering By Dr. D. S. Kumar | S. K. Kataria and sons Publishers. | Fourth edition, Pub. Year 2022

j. List of Practical

Sr.	Practical
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No.	
1	Case study on Conventional and Non-Conventional Energy Sources.
2	Demonstration of various types of Steam Generators.
3	Demonstration of various types of mountings and accessories.
4	Demonstration of 4-stroke Petrol and Diesel Engines.
5	Demonstration of 2-stroke Petrol and Diesel Engines.
6	Determination of Power and Thermal Efficiency of an IC Engine.
7	Demonstration of Vapor Compression and Vapor Absorption refrigeration cycle.
8	Demonstration of different types of Pumps.
9	Demonstration of different types of Compressors.
10	Demonstration of various Power Transmission Devices.

- a. **Course Name:** Engineering Graphics & Design
 b. **Course Code:** 03010901ES02
 c. **Prerequisite:** Zeal to learn the subject.
 d. **Rationale:** Engineering Graphics is the language of communication for Engineers. Engineering Graphics course provides tools and techniques of communication for various fields of Engineering
 e. **Course Learning Objective:**

CLOB J 1	To develop fundamental knowledge of engineering drawing, including standards, drawing instruments, scales, dimensioning, and BIS practices.
CLOB J 2	To understand and construct various engineering curves such as conics, spirals, involutes, and cycloids with their practical applications.
CLOB J 3	To apply principles of projections for points, lines, and planes, and determine true lengths, inclinations, and auxiliary views.
CLOB J 4	To visualize and draw projections and developments of solids, including sectional views and surface developments used in engineering design.
CLOB J 5	To interpret and create orthographic and isometric projections and develop basic skills in computer-aided drafting for 2D and 3D modeling.

f. **Course Learning Outcomes:**

CLO 1	Understand the uses of drawing instruments, accessories, scales and BIS drawing standards in engineering graphics.
CLO 2	Form various engineering curves using basic drafting techniques.
CLO 3	Illustrate the projections of points, lines and planes in different quadrants using orthographic projection techniques.
CLO 4	Draw section of solids and development of surfaces using reference planes.
CLO 5	Draw orthographic and isometric projections of 3D objects using basic principles of projection.
CLO 6	Draft 2D and 3D engineering drawings with aid of basic AutoCAD.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
2	-	4	4	40	20	20	60	30	150

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

h. Course Content:

S r .	Topics	Weighta ge	Teachi ng Hours
1	Introduction Scope of Engineering Drawing in all Branches of Engineering, Uses of Drawing Instruments and Accessories, Introduction to Drawing Standards BIS-SP-46, Representative Fraction, Engineering Scales, Dimensioning Terms and Notations, Types of Lines used in Engineering. Practice recommended by BIS.	10	5
2	Engineering Curves Classification of Engineering Curves, Application of Engineering Curves, Constructions of Engineering Curves - Conics, Spirals, Involutés and Cycloids with Tangents and Normals.	15	10
3	Principles of Projections Types of Projection, Parallel Projection, One-point Perspective projection. Introduction to principal planes of projections, Projections of the points: Projections of the points located in the same quadrant and different quadrants. Projections of line: Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes. Projections of planes: Projections of planes (polygons, circle and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane.	20	10
4	Projections and Development of Solids Projections of Solids: Classifications of basic Solids, Projections of Solids - Right Regular Prism, Pyramid, Cone, Cylinder, Tetrahedron and Cube; Sectional Views. Development of Surfaces: Methods of Development of Lateral Surfaces of Right Regular Solids, Parallel Line Development and Radial Line Development, Applications of Development of Surfaces.	20	10
5	Orthographic and Isometric Projections Orthographic Projections: Principle of orthographic projections, Conversion of pictorial views into orthographic projections including sectional orthographic projections. Isometric Projections: Conversion of orthographic views into isometric projections/views.	20	5
6	Computer Aided Drafting Basic User Interface of Drafting Software, Demonstration of basic modelling commands, Preparation of 2D and 3D models using Drafting Software.	15	5

i. Text Book and Reference Book:

1. A Text Book of Engineering Graphics (Textbook) By P.J.Shah | S.Chand & Company Ltd., New Delhi | 2021st edition
2. Engineering Drawing By N. D. Bhatt | Charotar Publishing House | 55th edition, Pub. Year 2010
3. A Text Book of Engineering Drawing By P.S.Gill | S.K. Kataria & Sons | 2013th edition
4. Engineering Graphics with Auto CAD By James D.Bethune, | Pearson Education | 2020th edition

j. List of Practical

Sr. No.	Practical
1	Demonstration of different drawing instruments, dimensioning systems, symbols and Engineering Scale.
2	Exercise on Projections of Points and Lines.
3	Exercise on Projections of Planes.
4	To draw a sheet involving Projections of Solids and Sections of Solids
5	To draw a sheet involving Development of Surfaces.
6	Practice sheets on Orthographic Projections.
7	Practice sheets on Isometric Projection.
8	Demonstration of Industrial Drawings.
9	To create basic objects (2D sketches) using Computer Aided Drafting tool
10	To create precise drawing (3D modeling), dimensions and editing using Computer Aided Drafting tool

- a. **Course Name:** Advanced Communication and Interpersonal Skills
- b. **Course Code:** 03010002HM01
- c. **Prerequisite:** Basic Communication Skills are essential for all Engineers
- 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:

CLOB J 1	Apply core grammatical principles including subject–verb agreement, reported speech, and active–passive voice to improve accuracy in spoken and written communication.
CLOB J 2	Expand functional vocabulary and language usage by applying synonyms, antonyms, homonyms, idioms, and contextual word meanings effectively.
CLOB J 3	Develop effective reading comprehension skills to understand, interpret, and respond to intermediate-level texts and spoken content.
CLOB J 4	Enhance written and spoken expression through structured essay writing, Paragraph development, confident self-introduction, and professional grooming practices.
CLOB J 5	Develop self-management and personal development skills by applying SWOT analysis, practicing effective time management strategies, and engaging in reflective learning processes.
CLOB J 6	Students will be able to Incorporate advanced document design principles for clarity and readability.

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 body language.
CLO 4	Analyse intermediate-level reading passages by identifying main ideas, supporting details, tone, and purpose.
CLO 5	Evaluate SWOT analysis and time-management techniques to plan personal goals, prioritize tasks, and improve academic 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	0	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 a. Rules of subject-verb matching b. Singular vs plural forms c. Common agreement errors	10%	1
2	Reported Speech a. Direct and indirect speech b. Changing tenses, pronouns, and time expressions c. Reporting statements, questions, and commands	10%	1
3	Active and Passive Voice g. Difference between Active and Passive h. Rules for converting sentences i. Usage in real-life contexts	10%	1
4	Building Vocabulary a. Word meanings and usage b. Synonyms and antonyms c. 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 and Self Introduction • Identifying strengths, weaknesses, opportunities, threats • Preparing and delivering a confident self-introduction • Developing self-awareness and growth mind set	10%	2
7	Reading Comprehension (Level of difficulty-Intermediate) • Understanding written texts • Finding main ideas and supporting details • Answering questions accurately	10%	2
8	Paragraph Development • Elements of a paragraph • Unity and coherence • Types of paragraphs	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 1. Importance of managing time 2. Pomodoro and Eisenhower matrix 3. Prioritization 4. Creating schedules 5. Time Wasters and Time Distractors	10%	1

Lab (Practical)

S r.	Content	Weightage	Teachin g Hrs.	C O	B T
x t 1 B o o k	Subject Verb Agreement <ul style="list-style-type: none"> • Fill-in-the-blank exercises • Sentence correction tasks • Group quiz competition • Role-play using correct subject-verb forms 	10%	2	1	1
2 a n d R	Reported Speech <ul style="list-style-type: none"> • Dialogue conversion practice • Pair work: narrate a conversation • Reporting classroom news • Role-play followed by reporting 	10%	2	1	1
e f 3 e r e n c	Active and Passive Voice <ul style="list-style-type: none"> • 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
e 4 B o o k	Building Vocabulary <ul style="list-style-type: none"> • Daily word journal • Vocabulary flashcards and games • Synonym-antonym match-up • Word building through storytelling 	10%	4	2	2
: 5 1. D h a	Grooming and Personality Development <ul style="list-style-type: none"> 39 Personal grooming checklist task 40 Group discussion on personality traits 41 Mock social interaction 42 Confidence-building exercises 	10%	4	4	3
n 6 a v e l , S	SWOT Analysis with Self <ul style="list-style-type: none"> Introduction j. SWOT worksheet filling k. Self-introduction in pairs or groups l. Strength-sharing circle m. Feedback on introductions 	10%	4	4, 5	3, 5
S 7 P	Reading Comprehension (Level of Difficulty – Intermediate) <ul style="list-style-type: none"> d. Reading passage followed by Q&A e. Find-the-theme activity f. Vocabulary hunt from the passage g. Summarizing a short text 	10%	4	3	4

5. . *English and Soft Skills*. Orient Blackswan, 2010.
6. Mitra, Barun K. *Personality Development and Soft Skills*. Oxford University Press, 2011.
7. Murphy, Raymond. *English Grammar in Use*. 5th ed., Cambridge University Press, 2019.
8. Raman, Meenakshi, and Sangeeta Sharma. *Technical Communication: Principles and Practice*. Oxford University Press, 2004.
9. Wren, P. C., and H. Martin. *High School English Grammar and Composition*. S. Chand & Company, 1995.

- 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. The course helps students understand environmental health, ecology, pollution prevention, environmental legislation, climate change, and sustainable urban development. It also creates awareness regarding environmental protection and sustainable practices for future generations.

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	Develop awareness regarding environmental laws, policies, and global environmental agreements.
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 ecological balance.
CLO 3	Assess the effects of pollution and propose suitable pollution control and waste management strategies.
CLO 4	Describe the significance of climate change and its impact 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
				T	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.	Topics	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, meteorological parameters, sustainable development goals, environmental ethics and awareness.	15%	3
2	Environmental Pollution and Control: Air, Noise, Water, Soil, Thermal, Marine and Radioactive pollution, sources and impacts of pollutants, air and water quality standards, pollution control devices, wastewater treatment and soil pollution management.	25%	4
3	Environment Management and Legislation: Constitutional provisions, Forest Conservation Act, Water Act, Air Act, Environmental Protection Act, Waste Management Rules, Noise Pollution Rules, Stockholm Conference, Montreal Protocol, Kyoto Protocol, UNFCCC, and other environmental conventions.	25%	3
4	Contemporary Environmental Issues: Water resource projects, watershed development, rainwater harvesting, Namami Gange, wetland conservation, climate change, wildlife conservation projects, carbon credits, Swachh Bharat Abhiyan, green buildings, vehicular emission norms and environmental disasters.	15%	3
5	Climate Resilient City: Introduction to climate resilience, urban heat islands, flooding, pollution, sustainable urban planning, green infrastructure, smart cities, urban forests, permeable surfaces, and global case studies including 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