First Year Curriculum

Admission Year 2026-27

Diploma in Automation and Robotics

Faculty of Engineering & Technology

Parul University

Vadodara, Gujarat, India

SEMESTER 1

a. Course Name: Basic Electrical and Electronics Engineering

b. Course Code: 03063301PC01

c. Prerequisite: Basic knowledge of Physics and Mathematics at the high school level. Additionally, basic concepts of semiconductors and logic circuits will help in grasping electronic circuit analysis and digital system design.

d. Rationale: This course provides a fundamental understanding of electrical and electronic systems essential for Mechatronics, Robotics, and Automation Engineering. It covers circuit analysis, electrical machines, power systems, semiconductor devices, and digital electronics, forming the foundation for automation, control, and embedded systems. The practical exposure helps students develop problem solving skills and apply theoretical concepts in real-world engineering applications.

e. Course Learning Objective:

CLOBJ 1	To enable students to analyze DC and AC electrical circuits using fundamental circuit laws and network theorems.
CLOBJ 2	To develop understanding of the construction, operating principles, and applications of transformers and electrical machines.
CLOBJ 3	To familiarize students with power supplies, electrical measurements, and basic instrumentation techniques.
CLOBJ 4	To develop the ability to design and analyze basic electronic circuits using semiconductor devices and operational amplifiers.
CLOBJ 5	To enable students to apply Boolean algebra and implement basic digital logic circuits for solving engineering problems.
CLOBJ 6	To enable students to analyze DC and AC electrical circuits using fundamental circuit laws and network theorems.

f. Course Learning Outcomes:

CLO 1	Analyze DC and AC circuits using circuit theorems.
CLO 2	Explain the working of transformers and electrical machines.
CLO 3	Apply power supplies, measurements, and instrumentation.
CLO 4	Design circuits using semiconductor devices and op-amps.
CLO 5	Implement digital logic circuits and Boolean algebra.

g. Teaching and Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
3	0	2	4	20	20	50	60	-	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 Hrs.
1	**DC and AC circuit analysis** **DC circuit analysis:** Elements and characteristics of electric circuits, ideal and practical sources, independent and dependent electrical sources, Ohm's law, source transformation, Kirchhoff's laws. Mesh analysis, nodal analysis, voltage and current division rules, star-delta conversions, Thevenin's and Norton's theorems, Superposition Theorem. **AC Circuit Analysis:** Generation of sinusoidal AC voltage, average and RMS values, concept of phasor, analysis of series RL, RC and RLC circuits, power triangle, power factor, series resonance and Q factor. Generation of three-phase voltages, advantages of three-phase systems, star and delta connections (balanced only), relation between line and phase quantities.	20	9
2	**Electrical Machines:** DC Motor: Construction, principle of operation, Different types of DC motors, Voltage equation of a motor, significance of back emf, Speed, Torque, Torque-Speed characteristics, Output Power, Efficiency and applications. Single Phase Transformer: Construction, principle of operation, EMF Equation. Regulation and Efficiency of a Transformer. Induction Machine: Three Phase Induction Motor: Construction and Principle of Operation, Slip and Torque, Speed Characteristics. Stepper motor: Construction, principle and mode of operation.	20	8
3	**Industrial Electrical Engineering Power supply**Linear power supply, switch mode power supply (SMPS), block diagram of UPS. Measurements And Instrumentation: Functional elements of an instrument, Standards and calibration, Operating Principle, types -Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument	10	6

	Transformers-CT and PT, DSO- Block diagram-Data acquisition.		
4	**Semiconductor Devices:** Semiconductor basics, PN Junction diode construction & working, Volt-amp characteristics, Diode current equation, Half wave rectifier, Full wave rectifier: Bridge and center tapped rectifier, Clipper and Clamper. Zener diode and zener diode-based voltage regulator, LED, 555 Timer, Integrated circuits. Operational Amplifiers – Inverting and Non-inverting amplifiers – Instrumentation amplifiers.	**25**	**11**
5	**Number Systems:** Decimal, Binary, Octal, Hexadecimal, 1‘s and 2‘s complements, Codes – Binary, BCD, Excess 3, Gray, Boolean theorems, Minterms and Maxterms, Sum of products and products of sums, Karnaugh map Minimization, Logic gates: NOT, AND, OR, NAND, NOR, EX-OR and EX-NOR, half adder and full adder.	**25**	**11**

i. Reference Books:

1. A textbook of Electrical technology Vol2 by B.L.Theraja | S. Chand Publication By B.L.Theraja | S. Chand Publication
2. A Textbook of Applied Electronics By Dr. R.S. Sedha, | S. Chand & Company Limited, | 1
3. Digital Logic and Computer Design By M Morris Mano | Pearson Education;
4. Basic Electrical Engineering By D. P. Kothari and I. J. Nagrath, | Tata McGraw Hill | 3, Pub. Year 2010
5. Basic Electrical Engineering, By Mittle and Mittal | McGraw Education

a. List of Experiments:

Sr No.	Experiment List
1	Verification of Ohm’s Law and Kirchhoff’s Laws using resistive circuits.
2	Mesh and Nodal Analysis for DC circuit analysis.
3	Thevenin’s and Norton’s Theorem verification using resistive networks.
4	Superposition Theorem application in a multi-source DC circuit.
5	AC Circuit Analysis of RL, RC, and RLC circuits using phasors and resonance.
6	Power Factor Measurement and improvement in AC circuits.
7	Load Test on DC Motors to determine torque-speed characteristics.

8	Transformer Efficiency and Regulation using open-circuit and short-circuit tests.
9	Rectifier Circuits (Half-wave & Full-wave) performance analysis.
10	Logic Gate Implementation and verification using Boolean algebra and K-maps.

a. **Course Name:** Mathematics - I
b. **Course Code:** 03069101BS01
c. **Prerequisite:** Student must be passed class 10th examination from recognized board of education. Also, students has knowledge of basic concept studied till 10th standard.
d. **Rationale:** The goal of this Mathematics course is to give students a strong foundation in fundamental ideas and procedures that are essential for both everyday problem-solving and future education. This course aims to foster logical reasoning and critical thinking skills while covering subjects that are directly relevant to a variety of engineering, technology, business, and scientific domains.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts of logarithms, partial fractions, trigonometry, complex numbers, functions, limits, and differentiation.
CLOBJ 2	Develop analytical and mathematical problem-solving skills required for engineering and scientific applications.
CLOBJ 3	Apply trigonometric identities, complex number operations, and logarithmic principles in solving mathematical problems.
CLOBJ 4	Analyze functions and limits to understand continuity and behavior of mathematical expressions.
CLOBJ 5	Apply differential calculus techniques for solving algebraic, trigonometric, exponential, and logarithmic problems.
CLOBJ 6	Build a strong mathematical foundation for advanced engineering and biomedical applications.

f. Course Learning Outcomes:

CLO 1	Solve problems involving logarithms, antilogarithms, and partial fraction decomposition.
CLO 2	Apply trigonometric functions, identities, and formulae to solve mathematical and engineering problems.
CLO 3	Perform operations on complex numbers and represent them in Cartesian and polar forms using De Moivre's theorem.
CLO 4	Evaluate functions and limits using standard limit theorems and mathematical techniques.
CLO 5	Differentiate algebraic, trigonometric, exponential, logarithmic, implicit, and composite functions accurately.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				T	**CE**	**P**	**Theory**	**P**	
3	**1**	**0**	**4**	**20**	**20**	**-**	**60**	**-**	**100**

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

h. Course Content:

Sr. No.	Content	Weightage (%)	Teaching Hours
1	**Logarithms and Partial Fractions** Logarithms: Definition, Logarithm as a transformation, Antilogarithm, Rules of Logarithms and examples, Use logarithmic functions for simplifying arithmetic computations. Partial fractions: Definition of partial fractions, Types of partial fraction (denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors).	**17%**	**8**
2	**Trigonometry** Units of Angles (degree and radian), Trigonometric Functions, Allied & Compound Angles, Multiple –Submultiples angles, Graph of Sine and Cosine, Periodic trigonometric functions, Sum and factor formulae.	**23%**	**9**
3	**Complex Numbers** Definition of a complex number, real and imaginary parts of a complex number, Polar and Cartesian representations of complex number, Conjugate of complex number, Geometric representation of complex numbers and their operations, Modules and Amplitude form, De Moivre's Theorem, Root of Complex Number, Use of De Moivre's Theorem to simplify mathematical expressions.	**20%**	**9**
4	**Function and Limit** Definition and concept of function, Concept of limits and standard forms of limits, Standard formulae of Limit and related simple examples.	**17%**	**8**
5	**Differentiation** Definition of derivative, differentiation of standard function by first principle, Rule of Differentiation, Differentiation of algebraic, trigonometric, Exponential, Logarithmic, Implicit functions and Composite functions, Higher order derivatives.	**23%**	**11**
	Total:	**100 %**	**45**

i. Text Book and Reference Book:

1. Advanced Mathematics for Polytechnic By Pandya N R | Macmillan Publishers India Ltd.,2012
2. Mathematics-I, By Deepak Singh | Khanna Book Publishing Co.
3. Mathematics II, By Garima Singh | Khanna Book Publishing Co.
4. A text book of Engineering Mathematics, By N.P. Bali and Manish Goyal | Laxmi Publications
5. Polytechnic Mathematics, By S P Deshpande | Pune Vidyarthi Gruh Prakashan

a. **Course Name:** Basic Physics
b. **Course Code:** 03069202BS01
c. **Prerequisite:** High School Level Physics.
d. **Rationale:** Applied Physics aims to give an understanding of this world both by observation and by prediction of the way in which objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. The course will help the diploma engineers to apply the basic concepts and principles to solve broad-based engineering problems and to understand different technology based applications.

e. Course Learning Objective:

CLOBJ 1	Understand the fundamental principles of physics related to measurements, electricity, magnetism, semiconductor physics, modern physics, lasers, fiber optics, and nanotechnology.
CLOBJ 2	Develop analytical and problem-solving skills for interpreting physical phenomena and engineering applications.
CLOBJ3	Apply the concepts of electric and magnetic fields, circuits, and electromagnetic laws in scientific and technological systems.
CLOBJ4	Explain the working principles and applications of semiconductor devices, lasers, optical fibers, and nanomaterials.
CLOBJ 5	Analyze modern technological developments based on principles of electronics, photonics, and nanotechnology.
CLOBJ 6	Build a strong foundation in applied physics for biomedical, electronics, and engineering applications.

f. Course Learning Outcomes:

CLO 1	Apply units, dimensions, and measurement techniques to solve engineering and physical problems.
CLO 2	Analyze electric circuits and apply concepts such as electric field, capacitance, resistance, Kirchhoff's laws, and electromagnetic induction.
CLO 3	Explain magnetic properties, magnetic field interactions, and the working principles of galvanometers and measuring instruments.
CLO 4	Describe semiconductor materials, pn junctions, diodes, solar cells, and their applications in electronic systems.
CLO 5	Interpret the principles and applications of lasers, optical fibers, and communication technologies.

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**	**50**	**60**	**-**	**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	**Physical world, Units and Measurements** Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units),Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis. Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect), Errors in measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.	**15%**	**8**
2	**Electrostatics Current Electricity** Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law. Capacitor and its working, Types of capacitors, Capacitance and its units. Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical), dielectric and its effect on capacitance, dielectric break down. Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances. Factors affecting resistance of a wire, carbon resistances and color coding. Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only), Concept of terminal potential difference and Electro motive force (EMF) Heating effect of current, Electric power, Electric energy and its units (related numerical problems), Advantages of Electric Energy over other forms of energy.	**25%**	**10**
3	**Electromagnetism and Magnetic materials** Types of magnetic materials; dia, para and ferromagnetic with their properties, Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and units, magnetization. Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field. Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.	**20%**	**8**
4	**Semiconductor Physics** Energy bands in solids, Types of materials (insulator, semi-	**20%**	**10**

	conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier –half wave and full wave rectifier (center taped). Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only). Photocells, Solar cells; working principle and engineering applications.		
5	**Modern Physics** Lasers: Energy levels, ionization and excitation potentials; spontaneous and stimulated emission; population inversion, pumping methods, optical feedback, Types of lasers; Ruby, He-Ne and semiconductor, laser characteristics, engineering and medical applications of lasers. Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture, fiber types, applications in; telecommunication, medical and sensors. Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at nanoscale, nanotechnology, and nanotechnology based devices and applications.	**20%**	**9**
	Total:	**100 %**	**45**

i. Text books:

1. Comprehensive Practical Physics - Volume I and II, By in Jaiswal | Laxmi Publishers
2. Text Book of Physics for Class XI& XII (Part-I, Part-II), By N.C.E.R.T., Delhi

j. List of Experiments:

Sr. NO.	Experiment List
1.	To measure length, radius of a given cylinder, a test tube and a beaker using a Vernier calliper and find volume of each object.
2.	To determine diameter of a wire, a solid ball and thickness of cardboard using a screw gauge.
3.	To verify Ohm's law by plotting graph between current and potential difference.
4.	To verify laws of resistances in series and parallel combination.
5.	To draw V-I characteristics of a semiconductor diode (Ge, Si) and determine its knee voltage.
6.	To verify Kirchhoff's law using electric circuits.
7.	To determine A.C. frequency with the help of sonometer.
8.	To calculate SA/V ratio of simple objects to understand nanotechnology.

a. **Course Name:** Foundation of IT and Web Design Application
b. **Course Code:** 03061601ES02
c. **Prerequisite:** Basic computer usage and internet familiarity.
d. **Rationale:** This course equips students with essential computing skills, including MS Office, HTML, and CSS, enhancing digital literacy, productivity, and web development proficiency for academic and professional success.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts of Information Technology, computer systems, internet technologies, and web design principles.
CLOBJ 2	Develop knowledge of web technologies including HTML, CSS, basic scripting, and webpage structuring techniques.
CLOBJ 3	Apply design principles for creating user-friendly, responsive, and visually effective web pages.
CLOBJ 4	Understand networking, internet applications, and web hosting concepts used in modern IT systems.
CLOBJ 5	Develop problem-solving and technical skills required for designing and managing basic web applications.

f. **Course Learning Outcomes:**

CLO 1	Explain the basic concepts of Information Technology, computer networks, and internet applications.
CLO 2	Design and develop basic web pages using HTML, CSS, and related web technologies.
CLO 3	Apply formatting, layout, multimedia, and hyperlinking techniques in webpage development.
CLO 4	Demonstrate understanding of website structure, web publishing, and hosting concepts.
CLO 5	Create simple interactive and user-friendly web applications following standard design practices.

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**		
L	**T**	**P**	**C**	**Internal Evaluation**	**ESE**	**Total**

				MSE	CE	P	Theory	P	
0	**0**	**4**	**2**	**-**	**-**	**100**	**-**	**-**	**100**

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

h. List of Experiments:

Sr. NO.	Experiment List
1.	Describe below components with its working: 1. CPU 2. GPU 3. Motherboard
2.	Explain the different types of computer storage devices: 1. Hard Disk Drive 2. Floppy Disk 3. HDD 4. USB Flash Drive 5. Compact Disc 6. DVD 7. RAM 8. ROM
3.	Perform the following email-related tasks: 1. Create an email account and compose a formal email. 2. Draft an invitation email for an event or gathering. 3. Design a custom email signature and include it in the message. 4. Send the email to at least four recipients. 5. Add your teacher's email ID in the CC field and your mentor's email ID in the BCC field.
4.	Explain basics of UNIX OS. 1. Structure of UNIX OS 2. UNIX Kernal 3. Shell
5.	Explain following commands for LINUX OS: cd, ls, cat, touch, mkdir, pwd, echo, rmdir, mv, rm, chmod, wc
6.	Develop an excel sheet which has record of 50 students result of 5 subjects and marks following analysis: 1. Fetch the data of the students who has distinction. 2. Fetch the data of students with minimum mark in each subject. 3. Sort the data based on percentage.
7.	Prepare a table for the student mark sheet using MS Excel. Containing Student Name, 5 Subject name, Total and performing following operation : 1. Percentage

	2. Sorting 3. Result with grading 4. Pass/fail
8.	Create an MS Excel sheet with the following columns: Product Name, Quantity Sold, Price per Unit, Total Price and perform the following tasks: 1. Calculate Total Price (Quantity Sold × Price per Unit) 2. Sort Data (Arrange products in descending order based on Total Price) 3. Categorize Products (Label products as "Low Sales" or "High Sales" based on quantity sold) 4. Highlight Expensive Products (Use conditional formatting to highlight products with a high price per unit)
9.	Create an MS Excel sheet containing the following columns: Employee Name, Basic Salary, HRA, DA, Deductions, Net Salary and perform the following operations: 1. Calculate Net Salary (Basic Salary + HRA + DA - Deductions) 2. Apply Sorting (Sort employees based on Net Salary in descending order) 3. Assign Tax Slab (Based on Net Salary, categorize employees into tax slabs) 4. Highlight High Earners (Use conditional formatting to highlight employees with a Net Salary above a certain threshold)
10.	Prepare PowerPoint Presentation of your favourite movie using animation.
11.	Create a PowerPoint presentation on your dream travel destination, including images, key attractions, and animations to enhance the visual appeal.
12.	Design a PowerPoint presentation on a famous personality, highlighting their achievements, life journey, and contributions, using transitions and animations.
13.	Create a word file for your resume, containing 1. Personal details 2. Education details 3. Experience 4. Achievement 5. Objective 6. Internship 7. Key skills
14.	Create and apply a Macro in MS Word to automate formatting tasks: 1. Record a Macro to apply the following formatting: • Change font to Times New Roman, size 12. • Set 1.5 line spacing. • Apply Bold and Underline to headings. • Justify paragraph text. 2. Save the Macro and apply it to a sample document.
15.	Create a formal letter using Mail Merge for sending invitations: 1. Write an invitation letter for an annual college event. 2. Use Mail Merge to insert recipient names and addresses from an Excel sheet. 3. Format the letter with: • Bold and Center-aligned title. • Left-aligned body text.

	• 1.5 line spacing. 4. Preview and generate multiple letters with recipient details
16.	Write html code to display : Write html code to display “Hello World” using <H1> to <H6> tags. Set color Red and set alignment Center.
17.	Write HTML code to create a table for student marksheet. Apply - center alignment, height: 60%, width :70%, background color: Light sky blue, border color: pink and give the caption “STUDENT MARKSEET”
18.	Write HTML code to create a simple registration form.
19.	Write HTML code for creating Restaurant menu using List (OL, UL, DL).
20.	Write HTML code to print following.
21.	Display your family information detail with background color and other formatting using CSS. Background color: light green Text: blue Title: family information
22.	Design the web page to display your collage with hyperlink
23.	Create a web page which shows the use of all types of borders in a single page using CSS. 1. No top border 2. Dotted top border 3. Dashed top border 4. Solid top border 5. Double top border
24.	Create a sticky social media bar using HTML and CSS.
25.	Create a Food Ordering Menu with Checkboxes. Select Your Favorite Food 1. ☐ Pizza 2. ☐ Burger 3. ☐ Pasta 4. ☐ Ice Cream
26.	Design a Contact Information Page with CSS and Hyperlinks. 1. Background Color: Yellow 2. Text Color: Black 3. Title: "My Contact Details" 4. Font Style: Bold 5. Alignment: Center the text 6. Add a Hyperlink: Link to a personal social media profile or portfolio
27.	Create an Online Shopping Preference Form. Task: Choose your preferred online shopping categories:

	Clothing Electronics Home Decor Books Select your preferred shopping platform: Amazon Flipkart eBay Other Select Your Payment Method (Dropdown List): (Dropdown List) Credit Card / Debit Card / PayPal / Cash on Delivery Additional Preferences: (Enter text in a box) Submit Button
28.	Create a Technology Review Page with a YouTube Video Tasks to Perform: 1. Add an image of the latest tech gadget (e.g., smartphone, laptop, smartwatch). 2. Write a short review about the gadget (features, pros & cons, pricing). 3. Embed a YouTube video demonstrating the gadget's features. 4. Use CSS to style the page: • Background color: Light Gray (#f0f0f0) • Font style: Arial or Sans-serif • Font color: Dark Blue (#003366) • Text alignment: Justified for the review, Centered for the title • Image alignment: Center with a border and shadow effect • Video alignment: Centered with responsive scaling 5. Add hyperlinks to official product websites and social media pages.
29.	Create a Student Report Card Using HTML Table Expected Output: CSS Features: • Border: Solid black border for table and cells • Background Color: Light blue for table header
30.	Create a Profile Page with an Image and Styling Tasks to Perform: 1. Add a Profile Picture using the tag. 2. Resize the Image using CSS (width: 150px, height: 150px). 3. Apply a Border and Shadow to the image. 4. Set Font Color: Dark Blue (#003366). 5. Choose Font Type: Arial or Sans-serif. 6. Set Background Color: Light Gray (#f0f0f0). 7. Make the Image Circular using CSS (border-radius: 50%). 8. Align Image Left or Right using CSS float property. 9. Center the Profile Title using text-align: center. 10. Add a Short Bio Section with paragraph styling (line-height: 1.5, text-align: justify). Expected Output (Visual Representation): [Profile Picture (Circular, Shadow)] (Aligned Left/Right) Profile Title (Bold, Centered, Dark Blue Font) Short Bio (Justified, Clean Layout

a. **Course Name:** Fundamentals of Communication Skills
b. **Course Code:** 03060001HM01
c. **Prerequisite:** Knowledge of English Language studied till 10th standard.
d. **Rationale:** Basic communication skills are essential for all Engineers.
e. **Course Learning Objective:**

CLOBJ 1	Develop fundamental communication skills required for academic, professional, and social interactions.
CLOBJ 2	Understand and apply basic English grammar concepts including parts of speech, tenses, and active-passive voice in oral and written communication.
CLOBJ 3	Enhance vocabulary through synonyms, antonyms, and one-word substitutions for effective expression.
CLOBJ 4	Improve speaking confidence through role-plays, self-introductions, group activities, and interpersonal communication exercises.

f. **Course Learning Outcomes:**

CLO 1	Communicate confidently in basic speaking situations including introductions, role-plays, and everyday conversations.
CLO 2	Apply grammar concepts such as parts of speech, tenses, prepositions, conjunctions, and active-passive voice correctly in communication.
CLO 3	Use appropriate vocabulary, synonyms, antonyms, and one-word substitutions in written and spoken English.
CLO 4	Draft simple formal and informal applications, narratives, and structured written content effectively.

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
0	**0**	**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.	**Ice Breaker + Introducing your Friend** Fun Fact Exchange (e.g., Two Truths and a Lie) Describing Personality and Hobbies Using Adjectives to Talk About People (Link to Parts of Speech) Structured Self and Peer Introduction (Name, Interests, Goals)	**5%**	**2**
2.	**Parts of Speech** Identifying and Using Nouns, Pronouns, and Adjectives Verbs and Adverbs in Sentence Construction Prepositions and Conjunctions: Linking Ideas Interjections and Their Usage in Conversations	**8%**	**2**
3.	**Story Mason** Elements of a Story (Character, Setting, Plot, Conflict, Resolution) Sequencing Events (Beginning, Middle, End) Using Tenses Appropriately in Narratives	**15%**	**4**
4.	**Tenses** Simple Tenses (Present, Past, Future) Continuous Tenses (Present, Past) Perfect Tenses (Present, Past) Perfect Continuous Tense (Present)	**10%**	**4**
5.	**Active -Passive Voice** Rules of Active & Passive Voice Identifying Active vs Passive Constructions Converting Sentences from Active to Passive and Vice Versa Tense Changes in Passive Voice	**10%**	**2**
6.	**Vocabulary Building: One-word Substitution, Synonyms, and Antonyms** List and Practice Common One-word Substitutions Synonym-Antonym Match-Up Games Use New Words in Sentences/Short Paragraphs	**8%**	**2**
7.	**Types of Application** Formal vs Informal Applications Structure and Format of an Application (Salutation, Body, Closing) Writing Leave Applications	**10%**	**2**
8.	**Role Play** Generic Situation(Buying, Asking for Directions, At a Doctor etc) Customer Service and Complaint Handling	**15%**	**6**
9.	**Goal Setting** SMART Goals (Specific, Measurable, Achievable, Relevant, Time-bound) Short-term vs Long-term Goals Overcoming Obstacles to Goals	**7%**	**2**
10.	**Reading Skills- Basic level** Types of reading Strategies of reading Reading comprehension	**12%**	**4**

11.	REVISION OF ALL TOPICS	**5%**	**2**
	Total:	**100%**	**32**

i. Text Book and Reference Book:

1. Word Power Made Easy, By Norman Lewis | Goyal Publishers, Year 2014.
2. Soft Skills: Enhancing Employability and Career Development, By M. Ashraf Rizvi | McGraw Hill Education, Pub. Year 2010.
3. High School English Grammar and Composition, By Wren & Martin | S. Chand Publishing, Pub. Year 2017.
4. Developing Communication Skills, By Krishna Mohan & Meera Banerji | Macmillan Publishers India, Pub. Year 2009
5. English Grammar in Use, By Murphy, Raymond | Cambridge University Press, Pub. Year 2019

j. List of Experiments:

Sr. NO.	Experiment List
1.	Ice Breaker and Introducing your Friend Fun Fact Exchange (e.g., Two Truths and a Lie), Describing Personality and Hobbies, Using Adjectives to Talk About People (Link to Parts of Speech), Structured Self and Peer Introduction (Name, Interests, Goals).
2.	Story Mason Elements of a Story (Character, Setting, Plot, Conflict, Resolution), Sequencing Events (Beginning, Middle, End), Using Tenses Appropriately in Narratives.
3.	Parts of Speech Identifying and Using Nouns, Pronouns, and Adjectives, Verbs and Adverbs in Sentence Construction, Prepositions and Conjunctions: Linking Ideas, Interjections and Their Usage in Conversations.
4.	Tenses Simple Tenses (Present, Past, Future), Continuous Tenses (Present, Past), Perfect Tenses (Present, Past), Perfect Continuous Tense (Present).
5.	Active -Passive Voice Rules of Active & Passive Voice, Identifying Active vs Passive Constructions, Converting Sentences from Active to Passive and Vice Versa, Tense Changes in Passive Voice.
6.	Vocabulary Building: One-word Substitution, Synonyms, and Antonyms List and Practice Common One-word Substitutions, Synonym-Antonym Match-Up Games, Use New Words in Sentences/Short Paragraphs.
7.	Types of Application Formal vs Informal Applications, Structure and Format of an Application (Salutation, Body, Closing), Writing Leave Applications.

8.	Role Play Generic Situation (Buying, Asking for Directions, At a Doctor etc), Customer Service and Complaint Handling.
9.	Goal Setting SMART Goals (Specific, Measurable, Achievable, Relevant, Time-bound), Short-term vs Long-term Goals, Overcoming Obstacles to Goals.
10.	Reading Skills- Basic level Types of reading, Strategies of reading, Reading comprehension.

a. **Course Name:** Environmental Science
b. **Course Code:** 03061501MC01
c. **Prerequisite:** Basic knowledge of science (biology, chemistry, physics), environmental awareness, geography, data interpretation, and ethical responsibility towards sustainability.
d. **Rationale:** Sustainable development is essential for a nation's progress, making environmental conservation and hazard management crucial for every Indian citizen. The country has endured numerous natural disasters, and significant energy wastage remains a challenge. Saving energy is as valuable as producing it. Industrial mismanagement and lack of discipline have led to rising environmental pollution. Embracing renewable energy is a key solution to both the energy crisis and pollution control. This course aims to raise awareness of these pressing issues, inspiring students to act responsibly and contribute to a cleaner, more sustainable future for the country and the world.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts of ecosystem, environmental pollution, renewable energy, waste management, and disaster management.
CLOBJ 2	Develop awareness regarding environmental issues related to air, water, soil, noise pollution, and their impact on human health and ecosystems.
CLOBJ 3	Apply principles of environmental protection, pollution control, and sustainable resource management.
CLOBJ 4	Understand the importance of renewable energy resources and their role in sustainable development.

f. **Course Learning Outcomes:**

CLO 1	Explain the structure and functions of ecosystems and describe biotic, abiotic, and ecological cycles.
CLO 2	Identify sources, effects, and control measures of air, water, soil, and noise pollution.
CLO 3	Describe water treatment methods, solid waste management techniques, and environmental protection practices.
CLO 4	Analyze the principles, applications, and significance of renewable energy resources such as solar, wind, geothermal, and ocean energy.

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
1	**0**	**0**	**0**	**20**	**20**	**-**	**-**	**-**	**40**

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.	**Ecosystem** Structure of ecosystem, Biotic & Abiotic components, Food chain and food web Carbon, Nitrogen, Sulphur, Phosphorus cycle.	**10%**	**2**
2.	**Air and Noise Pollution** Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, I.C., Boiler). Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator). Gaseous Pollution Control: Absorber, Catalytic Converter, and Effects of air pollution due to Refrigerants, I.C., Boiler, Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000.	**25%**	**3**
3.	**Water and Soil Pollution** Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation. Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis), Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E- Waste.	**25%**	**3**
4.	**Renewable Sources of Energy** Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer. Solar stills. Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas. Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy.	**25%**	**3**

5.	**Solid Waste Management** Solid waste generation- Sources and characteristics of: Municipal solid waste, E- waste, biomedical waste. Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries. Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste.	**10%**	**2**
6.	**Seismic Engineering and Disaster Management** Introduction of seismic engineering and its application civil engineering designs, Features of disasters such as Floods, Earthquakes, Fires, Epidemics, Gas/radioactive leaks etc. Management and mitigation of above disasters.	**5%**	**2**
	Total:	**100%**	**15**

i. Text Book and Reference Book:

1. Basics of Environmental Studies, By U K Khare | Tata McGraw Hill
2. Environmental Sciences, By Daniel B Botkin & Edward A Keller | John Wiley & Sons
3. Environmental Pollution Control Engineering,By Rao C.S. | New Age International
4. Environmental Studies, By Dr. Suresh K Dhameja | S.K Kataria & Sons New Delhi
5. Air Pollution, By M. N. Rao and H. V. N. Rao; | Tata McGraw-Hill Publishing Company

a. **Course Name:** Pollution Prevention and Control Techniques
b. **Course Code:** 03061501UE01
c. **Prerequisite:** Student must be passed class 10th examination from a UGC-recognized board of education.
d. **Rationale:** Study of environmental pollution, related to the industry is must to understand various types of pollutions and its preventive and control majors. The study of this course would help engineers in operating diverse pollution control equipment for controlling gaseous, water and land pollution. Hence the course has been designed to develop this competency and its associated cognitive and affective domain learning outcomes.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts of environmental pollution, pollutants, and their impact on human health and ecosystems.
CLOBJ 2	Develop knowledge of air, water, noise, and solid waste pollution along with their sources, monitoring methods, and control techniques.
CLOBJ 3	Gain awareness of environmental regulations, sustainability principles, and industrial responsibilities toward environmental protection.
CLOBJ 4	Analyze solid waste management practices including collection, recycling, composting, incineration, and disposal methods.
CLOBJ 5	Promote environmental conservation and sustainable engineering practices for pollution prevention and resource management.

f. **Course Learning Outcomes:**

CLO 1	Explain the concepts, classification, sources, and effects of environmental pollution and pollutants.
CLO 2	Identify major air pollutants and apply suitable air pollution monitoring and control techniques.
CLO 3	Describe water and noise pollution sources, impacts, wastewater treatment methods, and pollution control measures.
CLO 4	Demonstrate understanding of Effluent Treatment Plants (ETP), Sewage Treatment Plants (STP), and environmental quality standards.

g. **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

h. Course Content:

Sr. No.	Content	Weightage (%)	Teaching Hours
1.	**Introduction to Pollution** Definition of pollution and pollutants, Classification: Air, water, and solid pollution, Sources and effects of pollution.	**10%**	**6**
2.	**Air Pollution and Control** Major air pollutants and their impact, Sampling and monitoring of air pollutants, Air pollution control techniques (filtration, electrostatic precipitators, scrubbers).	**25%**	**10**
3.	**Water and Noise Pollution: Sources, Impacts, and Control Measures** Water pollutants and their effects, Wastewater treatment processes (primary, secondary, tertiary treatment), Effluent treatment plant (ETP), Sewage treatment Plant (STP) understanding process and parameters. Water standards. Noise pollution and its effects and its control measures.	**25%**	**10**
4.	**Solid Waste Management** Types of solid waste (municipal, industrial, hazardous), Collection, disposal, and recycling methods, Composting, incineration, and landfilling.	**20%**	**10**
5.	**Environmental Regulations and Sustainability** Environmental laws and policies (Air & Water Pollution Acts), ISO 14001 and environmental management systems, Role of industries in pollution control and sustainability initiatives.	**20%**	**9**
	Total:	**100%**	**45**

i. Text Book and Reference Book:

1. Environmental Pollution Control Engineering, By Rao C.S. | New Age International
2. Text Book of Environmental Pollution and Control, By Dr. Bhatia H. S. | Galgotia Publication, 1st edition, New Delhi
3. Pollution Control in Process Industries, By Mahajan S. P. | Tata Mc GrawHill, New Delhi, 21st reprint, 2008
4. Environmental Engineering, By Pandey G. N., Carney G. C. | Tata Mc GrawHill, New Delhi

SEMESTER 2

a. **Course Name:** Engineering Graphics
b. **Course Code:** 03061901ES02
c. **Prerequisite:** Drawing Basic Knowledge.
d. **Rationale:** Engineering drawing is the essential language of engineers that transforms ideas into precise, standardized technical visuals. This course builds foundational skills in drawing tools and standards, enabling clear and effective communication in engineering.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamentals of engineering drawing, drawing instruments, scales, lettering, and standard drawing practices.
CLOBJ 2	Develop the ability to visualize and represent engineering components and geometrical constructions accurately.
CLOBJ 3	Apply principles of orthographic and isometric projections for graphical representation of engineering objects.
CLOBJ 4	Interpret and construct projections of points, lines, planes, and solids using standard engineering drawing methods.

f. **Course Learning Outcomes:**

CLO 1	Identify and use drawing instruments, scales, and BIS standards in engineering drawings.
CLO 2	Construct geometrical figures and conic sections using standard geometric construction methods.
CLO 3	Draw and interpret projections of points, lines, and planes in different reference positions.
CLO 4	Apply orthographic projection techniques to represent three-dimensional engineering objects in two-dimensional views.

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	
1	**-**	**4**	**3**	**20**	**20**	**100**	**60**	**-**	**200**

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.	**Drawing Instruments and materials** Equipments-Types, Specifications, Method To Use Them, Applications. Instruments-Types, Specifications, Methods To Use Them And Applications. Pencils-Grades, Applications, Types Of Points And Applications. Other Materials-Types And Applications.	**4%**	**1**
2.	**Planning, Layout And Scaling Of Drawing** Follow And Apply Standard Practice As Per Bureau Of I.S. For Planning And Layout,Choose Appropriate Scale, Factor For The Drawing As Per Given Situation.	**4%**	**1**
3.	**Lines, Lettering And Dimensioning** Different Types Of Lines. Vertical Capital And Lower Case Letters. Inclined Capital And Lower Case Letters. Numerals And Greek Alphabets. Dimensioning Methods. Aligned Method. Unilateral With Chain, Parallel, Progressive And Combined Dimensioning.	**4%**	**1**
4.	**Geometric Construction** Geometric Construction Related With Line Like Bisecting a Line, to Draw Perpendicular With a Given Line, Divide a Line, Etc. Geometric Construction Related With Angle Like Bisect An Angle, Trisect an Angle, Etc. to Construct Polygon. Triangle, Square / Rectangle, Pentagon With Special Method. Hexagon With Special Method. To Draw Tangents. Geometric Construction Related With Circle & Arc.	**7%**	**2**
5.	**Engineering Curves** Conic Sections: Concept And Understanding Of Focus, Directrix, Vertex And Eccentricity And Drawing Of Conic Sections.Using Various Methods, Understand Construction Of: Ellipse. Parabola. Hyperbola. Cycloidal Curves (Cycloid, Epicycloid, Hypocycloid) Involutes. Involutes Of A Circle, Involutes Of A Polygon, Spiral (Archimedean Spiral Only).	**22%**	**3**
6.	**Projection Of Points, Lines And Planes** Reference Planes, Orthographic Projections. Concept Of Quadrant.1st Angle And 3rd Angle Projection And Their Symbols. Projection Of Points. Projection Of Lines – Determination Of True Length And Inclinations For Following Cases. Line Parallel To One Or Both The Plane. Line Perpendicular To One Of The Plane. Line Inclined To One Plane And Parallel To Another. Line Inclined To Both The Planes. Projection Of Planes: Types Of Planes,	**25%**	**2**

	Projection Of Planes Parallel To One Of The Reference Planes, Projection Of Plane Inclined To One Reference Plane And Perpendicular To Another, Projection Of Planes Inclined To Both Reference Planes.		
7.	**Orthographic Projections** Types Of Projections-Orthographic, Perspective, Isometric And Oblique: Concept And Applications. Various Term Associated With Orthographic Projections. Theory Of Projection, Methods Of Projection, Orthographic Projection, Planes Of Projection. Conversion Of Simple Pictorial Views Into Orthographic Views. Illustrative Problems On Orthographic Projection B.I.S. Code Of Practice.	**22%**	**3**
8.	**Isometric Projections** Isometric Axis, Lines And Planes. Isometric Scales. Isometric View And Isometric Drawing. Difference Between Isometric Projection And Isometric Drawing. Illustrative Problems Limited To Objects Containing Lines, Circles And Arcs Shape Only.	**12%**	**2**
	Total:	**100%**	**15**

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 GRAPHICS, By P. J. Shah | S. Chand & Co., New Delhi Publications.
3. Engineering Graphics & Design (TextBook), By Jain & Gautam | Khanna Publishing House
4. Engineering Drawing, By N. D. Bhatt | Charotar Publishing House | 55th edition, Pub. Year 2010
5. Engineering Drawing, By R. K. Dhawan | S. Chand and Company

j. List of Experiments:

Sr. NO.	Experiment List
1.	Practice Sheet Which Includes Dimensioning Methods, Different Types of Line, Construction of Different Polygon, Divide the Line and Angle in Parts, Use of Stencil.
2.	Engineering curves Draw Different types of curves like Ellipse, Parabola, Hyperbola, Cycloid, Involute and Spiral
3.	Projection of Points and line Draw at Least Four Problems of Projections of Lines and One problem of Projections of Points.
4.	Projection of Plane Draw at least four Problems of Projections of Plane Like Reactangle, Hexagon,Circle and

	Triangle Plane.
5.	Orthographic projection Draw at least two Problems of Orthographic Projection from Given 3D Object.
6.	Isometric Projection Draw at Least two Problems of Isometric Projections from Given 2D Object.

a. **Course Name:** Mathematics - II
b. **Course Code:** 03069102BS01
c. **Prerequisite:** Knowledge of Basic concept of mathematics studied till first semester.
d. **Rationale:** This course is an extension of the course Mathematics-I of first semester namely Mathematics II. Using the methods of differentiation, integration, differential equations, matrix theory, geometry, and differential equations, the course aims to in still its applications in pertinent engineering and technological fields.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts of matrices, determinants, vector algebra, coordinate geometry, integral calculus, and differential equations.
CLOBJ 2	Develop analytical and mathematical problem-solving abilities required for engineering and scientific applications.
CLOBJ 3	Apply matrix operations, vector algebra, and coordinate geometry techniques to solve algebraic and geometrical problems.
CLOBJ 4	Understand the principles and applications of integration and differential equations in engineering mathematics.
CLOBJ 5	Develop the ability to analyze mathematical models and apply computational approaches using basic MATLAB concepts.
CLOBJ 6	Build a strong mathematical foundation for advanced engineering, biomedical, and scientific studies.

f. **Course Learning Outcomes:**

CLO 1	Solve systems of linear equations using determinants, Cramer's rule, and matrix inversion methods.
CLO 2	Perform vector operations including scalar and vector products and apply them to engineering-related problems.
CLO 3	Analyze and formulate equations of straight lines and circles using coordinate geometry concepts.
CLO 4	Apply techniques of integration including substitution, integration by parts, and partial fractions to solve mathematical problems.
CLO 5	Evaluate areas and volumes using definite integrals and applications of integration.
CLO 6	Solve first-order differential equations using standard methods and demonstrate basic understanding of MATLAB applications.

g. **Teaching & Examination Scheme:**

Teaching Scheme	**Evaluation Scheme**

L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	1	0	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.	**Determinants and Matrices** Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix inversion method to solve a system of linear equations in 3 variables.	23%	10
2.	**Vector Algebra** Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.	20%	9
3.	**Co-Ordinate Geometry** Straight line Inclination and slope of a line, different forms of equations to a straight line, Slope-intercept form, and Point slope form, Two-point form, Intercept form. General equation of a Straight line, Family of lines. Conditions for concurrency of lines. Circle Definition, Equation of a circle with given center and radius, General form of equation of circle, Equation of a circle when intercepts are given, circle passing through three points, Equation of chord, Equations of tangents and normal at a point on a circle.	17%	8
4.	**Integral Calculus** Integration as inverse operation of differentiation, Integration of simple functions, Integration by substitution, by parts and by partial fractions (for linear factors only). Definite integral: Definition, Properties of Definite integral, Odd and Even functions, Use of formulas, and for solving problems Where m and n are positive integers. Applications of integration for i. Simple problem on evaluation of area bounded by a curve and axes. ii. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems)	23%	10

5.	**Differential Equations** Solution of first order and first degree differential equation by variable separation method (simple problems), Exact differential equations (simple problems), Linear differential equations (simple problems), MATLAB – Simple Introduction.	**17%**	**8**
	Total:	**100%**	**45**

i. Text Book and Reference Book:

1. Mathematics-I, By Deepak Singh | Khanna Book Publishing Co
2. Mathematics II, By Garima Singh | Khanna Book Publishing Co.
3. Elementary Engineering Mathematics, By Dr. B. S. Grewal | Khanna Publishers | 15th Edition
4. Calculus and Analytic Geometry, By G. B. Thomas, R. L. Finney | Addison Wesley | 9th Edition
5. Higher Engineering Mathematics, By B. S. Grewal | Khanna Publications.

a. **Course Name:** Applied Mechanics
b. **Course Code:** 03061502ES01
c. **Prerequisite:** Basic knowledge of Laws and Principles of Mathematics and Physics.
d. **Rationale:** The primary purpose of the study of Engineering Mechanics is to develop the capacity to predict the effects of force while carrying out the creative design functions of engineering. The course addresses the modeling and analysis of static equilibrium problems with an emphasis on real world engineering applications and problem solving. It bridges the gap between physical theory and its application to technology.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental principles of engineering mechanics including forces, equilibrium, motion, friction, and lifting machines.
CLOBJ 2	Develop analytical and problem-solving skills related to statics and dynamics in engineering applications.
CLOBJ 3	Apply concepts of centroid, centre of gravity, force systems, and moments for analyzing engineering structures and mechanical systems.
CLOBJ 4	Understand equilibrium conditions of coplanar concurrent and non-concurrent force systems and their engineering significance.
CLOBJ 5	Analyze frictional forces and the working principles of simple lifting machines used in mechanical systems.
CLOBJ 6	Build a strong foundation in applied mechanics for engineering design, analysis, and industrial applications.

f. **Course Learning Outcomes:**

CLO 1	Explain the basic concepts of mechanics, force systems, vector representation, and Newton's laws of motion.
CLO 2	Determine centroid and centre of gravity of simple and composite geometrical figures and solids.
CLO 3	Resolve forces and analyze equilibrium conditions of coplanar concurrent force systems using analytical methods.
CLO 4	Calculate moments, beam reactions, and equilibrium conditions for coplanar non-concurrent force systems.
CLO 5	Analyze frictional problems involving bodies on horizontal and inclined planes using laws of friction.
CLO 6	Explain the principles, efficiency, velocity ratio, and applications of simple lifting machines used in engineering practice.

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	50	60	-	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.	**Basics of Mechanics** Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a Force. Newton's Laws of Motion. Principle of transmissibility of force, Principle of Superposition. Force system and its classification.	10%	4
2.	**Centroid & Centre of Gravity** Concept of Centroid, Centre of Gravity. Axis of reference and Axis of Symmetry. Centroid of One Dimensional geometrical figures using principle of moment. Centroid of Two Dimensional geometrical Plane figures (Square, Rectangle, Triangle, Circle, Semi-circle, Quarter circle) & Composite figures (not more than three figures) using first moment of area. Centre of Gravity of Simple solids (Cube, Cuboid, Cone, Cylinder, Sphere, and Hemisphere) & Composite solids (not more than two solids) using first moment of mass.	15%	7
3.	**Coplanar Concurrent Forces** Resolution of a force - Orthogonal components of a force. Equilibrium and Equilibrant, Free body and Free body diagram, conditions of equilibrium. Resultant of forces using analytical methods for the forces acting at a point: 1. Law of Parallelogram, 2. Law of triangle, and 3. Law of Polygon. Lami's Theorem – statement and explanation, Application for various engineering problems using analytical methods.	25%	12
4.	**Coplanar Non-Concurrent Forces** Moment of a force, Varignon's Theorem, Couple, application, properties of couple, conditions of	25%	12

	equilibrium. Resultant of force, Equilibrium forces and its position using analytical methods for the coplanar non – concurrent force system. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical point load, uniformly distributed load, uniformly varying load). Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load.		
5.	**Friction** Friction, Types of Friction and laws of friction, limiting equilibrium, limiting friction. Coefficient of friction, angle of friction, angle of repose, relation between coefficient of friction and angle of friction. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.	**15%**	**6**
6	**Simple Lifting Machines** Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines. Application of law of machine. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency. Reversible and non-reversible machines, conditions for reversibility. Velocity ratios of Simple wheel and axle, Differential axle and Wheel and, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack.	**10%**	**4**
	Total:	**100%**	**45**

i. Text Book and Reference Book:

1. Applied Mechanics, By H. J. Shah and S. B. Junarkar | Charotar publication
2. A Text Book of Engineering Mechanics, By Bansal R K | Laxmi Publishers, New Delhi.
3. Engineering Mechanics, By S.S. Bhavikatti and K. G. Rajashekarappa | Wiley 'Eastern Ltd
4. Engineering Mechanics, By J.L. Meriam, and L.G.Kraige | John Wiley and sons, New York.

j. List of Experiments:

Sr. NO.	Experiment List
1	Verify and calculate resultant force through Law of Parallelogram using analytical and graphical methods.
2	Verify Law of Triangle using analytical and graphical methods.
3	Verify and calculate resultant force through Polygon Law of Forces using analytical and graphical methods.

4	Verify and calculate the value of unknown force through Lami's Theorem.
5	Verify and calculate support reactions of a simply supported beam using analytical and graphical methods.
6	Calculate centroid of a lamina having regular and irregular shapes.
7	Calculate angle of repose for different surfaces – Wood , Glass, Steel, plastic, wrought iron etc...
8	Calculate coefficient of Static Friction for different surfaces – Wood , Glass, Steel, plastic, wrought iron etc...
9	Verify and calculate theoretical and practical velocity ratios of any four simple lifting machines. (Simple wheel and axle, Differential axle and wheel and simple screw jack)

a. **Course Name:** Verbal Ability
b. **Course Code:** 03060002HM01
c. **Prerequisite:** Basic knowledge of Grammar and Communication.
d. **Rationale:** Practical language proficiency and essential soft skills for academic and professional success.
e. **Course Learning Objective:**

CLOBJ 1	Develop effective listening, speaking, reading, and writing skills required for academic and professional communication.
CLOBJ 2	Enhance vocabulary and language proficiency through the study of homophones, homonyms, homographs, phrasal verbs, and idioms.
CLOBJ 3	Understand and apply grammatical concepts such as subject-verb agreement and direct-indirect speech in communication.
CLOBJ 4	Improve interpersonal and presentation skills through activities such as product presentations, public speaking, and storytelling.
CLOBJ 5	Develop professional communication skills including formal letter writing and email writing.
CLOBJ 6	Build personality development, analytical thinking, and self-assessment skills through SWOT analysis and logical reasoning activities.

f. **Course Learning Outcomes:**

CLO 1	Demonstrate effective listening habits and identify barriers to effective communication.
CLO 2	Use advanced vocabulary, idioms, phrasal verbs, homophones, homonyms, and homographs appropriately in communication.
CLO 3	Apply grammatical rules related to subject-verb agreement and direct-indirect speech accurately in oral and written English.
CLO 4	Draft formal and informal letters and professional emails using appropriate format, tone, and language.
CLO 5	Deliver short presentations and speeches confidently with improved pronunciation, voice modulation, and organization of ideas.
CLO 6	Apply SWOT analysis, logical reasoning, and creative thinking skills in personal, academic, and professional situations.

g. **Teaching & Examination Scheme:**

Teaching Scheme				**Evaluation Scheme**		
L	**T**	**P**	**C**	**Internal Evaluation**	**ESE**	**Total**

				MSE	CE	P	Theory	P	
1	**0**	**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.	**Listening Skills- Basic level** Introduction and importance of good Listening, Difference between listening and hearing, Types of listening, Barriers to effective Listening, Traits of a good listener.	**10%**	**1**
2.	**Crazy Scientist** Invent a product, Presentation of a product	**8%**	**1**
3.	**Advanced Building Vocabulary: Homophones, Homonyms, Homographs, Phrasal verbs & Idioms** Homophones and Their Confusing Pairs, Homographs and Contextual Meaning, Homonyms: Words with Multiple Meaning, Common Phrasal Verbs in Conversation, Popular Idioms and Their Real-Life Application.	**10%**	**2**
4.	**Subject Verb Agreement** Basic Rules and Exceptions, Spot the Error & Correction Exercises.	**8%**	**2**
5.	**SWOT Analysis** Introduction to SWOT, Creating a Personal SWOT Chart, Applying SWOT for Goal Setting.	**10%**	**1**
6	**Letter Writing & E-mail Writing** Formal vs Informal Letter Format, Structure of a Professional Email (Subject, Greeting, Body, Sign-off), Tone and Language Appropriateness, Common Mistakes in Letters/Emails.	**13%**	**2**
7	**Direct-Indirect Speech** Rules for Changing Tenses, Pronouns, and Time Expressions, Reporting Statements, Questions, Commands, and Requests, Reporting Modal Verbs (can → could, will → would), Conversion Exercises.	**8%**	**2**
8	**Blood Relation & Alphabetical series** Introduction to Family Tree Terms, Types of Blood Relation Questions, Introduction to Alphabetical Series, Common Patterns in Alphabetical Series.	**8%**	**1**
9	**Story Writing by using hints** Elements of a Story (Characters, Setting, Plot, Conflict, Resolution, Types of Stories (Narrative, descriptive, imaginative, moral-based, fables).	**10%**	**1**

10	**Speaking Skill Building Introduction** Overcoming Stage Fear and Speaking Anxiety, Voice Modulation and Pronunciation Tips, Organizing Thoughts Before Speaking, Basic Public Speaking Formats (Self-Intro, Small Speeches).	**15%**	**2**
	Total:	**100%**	**15**

i. Text Book and Reference Book:

1. English Grammar in Use, By Raymond Murphy | Cambridge University Press, Pub. Year 2019
2. Word Power Made Easy, By Norman Lewis | Goyal Publishers, Pub. Year 2014
3. A Modern Approach to Logical Reasoning, By R.S. Aggarwal | S. Chand Publishing, Pub. Year 2018
4. Developing the Leader Within You, By John C. Maxwell | Thomas Nelson, Pub. Year 2013
5. Cambridge Listening and Speaking Skills Series, By Cambridge University Press | Cambridge University Press, Pub. Year 2017
6. The 7 Habits of Highly Effective People, By Stephen R. Covey | Simon & Schuster, Pub. Year 2020

j. List of Experiments:

Sr. NO.	Experiment List
1	Listening Skills – Basic level Audio Comprehension Practice (e.g., TED Talks, dialogues, interviews), Note-Taking While Listening (key points, summarizing), Fill in the Blanks from Audio Clips, Listening for Tone and Emotion.
2	Crazy Scientist - Practice Group Activity: Invent & Present a Scientific Invention, Create a Poster or Diagram of an invention.
3	Advanced Building Vocabulary: Homophones, Homonyms, Homographs, Phrasal verbs & Idioms - Practice Sorting Game: Match Homophones/Homographs to Meanings, Fill in the Blanks with Correct Homonyms, Vocabulary Crossword or Word Jumble Challenges, Finding the meaning of different Phrasal verbs & Idioms.
4	Subject Verb Agreement- Practice Spot the Error Exercises in Paragraphs, Group Quiz: “Choose the Correct Verb”, Rewrite Sentences with Correct Agreement.
5	SWOT Analysis - Practice Individual SWOT Chart Creation, Peer Review: Partner Reviews Your SWOT, Case Study Analysis (SWOT of a famous person or company), Group Discussion: Present Your SWOT Plan, Goal-Setting Activity Based on SWOT Insights.
6	Letter Writing & E-Mail Writing - Practice Writing practice of different types of Formal Letters, Drafting Emails with Subject, Salutation, Body, and Sign-off, Email

	Etiquette Activity (Identify Dos and Don’ts).
7	Direct-Indirect Speech - Practice Convert Dialogue into Reported Speech, Rewriting News Headlines from Direct to Indirect, Mixed Tense Exercises Involving Speech Conversion.
8	Blood Relation & Alphabetical Series – Practice Diagram Drawing Practice: Family Tree, Solving questions of Blood Relation, Solving questions of Alphabetical series.
9	Story writing by using hints - Practice Story Starters: Continue the Given Opening, Peer Feedback: Review and Improve Stories, Group Story Chain (Each Student Adds a Sentence), Edit and Rewrite: Improve a Poorly Written Story.
10	Speaking Skill Building Activity Self-Introduction and Peer Introduction, Extempore Speech Practice (1–2 min topics), Pronunciation Practice Using Tongue Twisters or Audio Aids.

a. **Course Name:** Universal Human Values
b. **Course Code:** 03060002MC01
c. **Prerequisite:** Basic communication and interpersonal skills.
d. **Rationale:** The Universal Human Values (UHV) course aims to develop a holistic understanding of life, fostering ethical behavior, responsible decision-making, and harmonious living. It helps students align their personal and professional actions with core human values, ensuring happiness, well-being, and sustainable development in society.
e. **Course Learning Objective:**

CLOBJ 1	Understand the concept and importance of value education for holistic human development and continuous happiness.
CLOBJ 2	Develop self-awareness and self-exploration to identify the relationship between human values, behavior, and ethical living.
CLOBJ 3	Understand harmony within the individual, family, society, and nature for peaceful and sustainable coexistence.
CLOBJ 4	Analyze the role of trust, respect, justice, and responsibility in maintaining healthy human relationships and social harmony.
CLOBJ 5	Develop awareness regarding environmental balance, coexistence, and mutual fulfillment among all forms of nature.
CLOBJ 6	Apply universal human values and professional ethics in personal life, education, workplace, and society.

f. **Course Learning Outcomes:**

CLO 1	Explain the significance of value education, self-exploration, and holistic development in human life.
CLO 2	Differentiate between the needs of the self and the body and understand the importance of self-regulation and health.
CLO 3	Demonstrate understanding of harmony in family and society through values such as trust, respect, justice, and cooperation.
CLO 4	Analyze the interconnectedness and coexistence among human beings, society, and nature.
CLO 5	Explain the role of ethical conduct, professional ethics, and humanistic values in personal and professional life.
CLO 6	Apply value-based thinking and ethical decision-making for sustainable development and social well-being.

g. **Teaching & Examination Scheme:**

Teaching Scheme	**Evaluation Scheme**

L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
1	0	0	0	20	20	-	-	-	40

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 Value Education** Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations.	20%	3
2.	**Harmony in the Human Being** Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health.	20%	3
3.	**Harmony in the Family and Society** Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to- Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order.	20%	3
4.	**Harmony in the Nature/Existence** Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence.	20%	3
5.	**Implications of the Holistic Understanding – a Look at Professional Ethics** Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition	20%	3

	towards Value-based Life and Profession.		
	Total:	**100%**	**15**

i. Text Book and Reference Book:

1. A. Nagraj, 1998, Jeevan Vidyaek Parichay, Divya Path Sansthan, Amarkantak.
2. A.N. Tripathy, 2003, Human Values, New Age International Publishers
3. The Story of My Experiments with Truth, By M K Gandhi
4. Small is Beautiful, By E. F Schumacher
5. Rediscovering India, By Dharampal

a. **Course Name:** Disaster Management
b. **Course Code:** 03061502UE01
c. **Prerequisite:** High School Science.
d. **Rationale:** Disaster management is an essential subject for equipping students with the knowledge and skills needed to prevent, prepare for, respond to, and recover from disasters efficiently. It contributes to building safer communities and sustainable development.
e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamental concepts of disaster, hazard, vulnerability, risk, and disaster management.
CLOBJ 2	Develop knowledge of different types of natural, technological, biological, and manmade disasters along with their causes and impacts.
CLOBJ 3	Understand the disaster management cycle including prevention, preparedness, mitigation, response, recovery, and rehabilitation.
CLOBJ 4	Analyze disaster management frameworks, policies, institutional mechanisms, and disaster management practices in India.
CLOBJ 5	Develop awareness regarding the application of science and technology in disaster prediction, communication, mitigation, and management.
CLOBJ 6	Promote disaster preparedness, safety awareness, and sustainable strategies for minimizing disaster risks and impacts.

f. **Course Learning Outcomes:**

CLO 1	Explain the concepts of disaster, hazard, vulnerability, risk, and capacity in disaster management.
CLO 2	Identify and classify different types of disasters and analyze their causes, consequences, and control measures.
CLO 3	Describe the disaster management cycle and apply principles of preparedness, mitigation, rescue, relief, and rehabilitation.
CLO 4	Explain disaster management policies, institutional frameworks, and the role of governmental and non-governmental agencies in India.
CLO 5	Demonstrate understanding of early warning systems, disaster communication, and disaster-safe planning and construction practices.
CLO 6	Apply scientific and technological tools such as GIS, GPS, and remote sensing in disaster monitoring and management applications.

g. **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

h. Course Content:

Sr. No.	Content	Weightage (%)	Teaching Hours
1.	**Introduction and Basic Principle of Disaster Management** Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, and Capacity. Disaster and Development, and disaster management.	10%	3
2.	**Types, Trends, Causes, Consequences and Control of Disasters** Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends − Emerging Risks of Disasters – Climate Change and Urban Disasters.	20%	10
3.	**Disaster Management Cycle and Framework** Basics of Disaster Management Cycle, Paradigm Shift in Disaster Management, Understanding Risk, How to Prevent and Reduce Disaster Impact, Early Warning Systems, Being Prepared: Awareness and Capacity Building, What to Do During a Disaster, Search and Rescue Operations in Disaster Situations, Relief and Rehabilitation After a Disaster ,Assessing Damage and Restoring Infrastructure, Reconstruction and Redevelopment.	30%	12
4.	**Disaster Management in India** Disaster Profile of India − Mega Disasters of India and Lessons Learnt. Disaster Management Act 2005 & minus; Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local,	20%	10

	state and national),Non-Government and Inter Governmental Agencies.		
5.	**Applications of Science and Technology for Disaster Management** Geo-informatics in Disaster Management (RS, GIS, GPS and RS). Disaster Communication System (Early Warning and Its Dissemination). Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters. S&T Institutions for Disaster Management in India.	**20%**	**10**
	Total:	**100%**	**15**

i. Text Book and Reference Book:

1. Disaster Management Guidelines, By GOI-UNDP Disaster Risk Reduction Programme (2009-2012)
2. Environment Engineering and Disaster Management, By Sharma, Sanjay K. | Luxmi Publications, New Delhi
3. Handbook of Disaster Management: Techniques & Guidelines, By Singh B.K
4. Disaster Management, By Ghosh G.K.

a. **Course Name:** - Basic Robotics Workshop
b. **Course Code: 03063302PC02**
c. **Prerequisite:** Engineering Workshop Practice requires basic knowledge of science, mathematics, and engineering drawing. Students should also be aware of safety rules and be ready to perform hands-on tasks with discipline and teamwork.
d. **Rationale:** The Engineering Workshop Practice course is designed to provide diploma-level mechanical engineering students with practical skills essential for their professional development. The hands-on experience gained through this course enables students to understand the operation of various hand tools, ensuring they can perform fundamental mechanical tasks efficiently. By exploring fitting, carpentry, welding, and plumbing operations, students build a strong foundation in practical engineering techniques. This course also emphasizes the importance of safety, and adherence to industry standards, preparing students for real-world challenges in mechanical engineering environments.

e. Course Learning Objective:

CLOBJ 1	Apply safety rules, precautions, and safe working practices while performing operations in different workshop environments.
CLOBJ 2	Demonstrate the use of measuring instruments, hand tools, and workshop equipment for basic engineering operations.
CLOBJ 3	Perform fitting, carpentry, sheet metal, welding, and plumbing operations for fabrication of simple engineering components.
CLOBJ 4	Explain piping systems, components, material selection, and layout practices used in industrial applications.
CLOBJ 5	Interpret standard codes, specifications, and engineering practices related to workshop and mechanical operations.

f. Course Learning Outcomes:

CLO 1	Apply safety measures and practices while handling tools, machines, and materials in various workshop environments to ensure safe operations.
CLO 2	Demonstrate proficiency in using fundamental tools and techniques for mechanical tasks, including measurements, marking, and basic engineering operations.
CLO 3	Perform fitting, carpentry, sheet metal, welding, and plumbing operations to fabricate simple components.
CLO 4	Outline piping systems and their industrial applications, including material selection, layout design, and component identification.
CLO 5	Interpret codes and standards relevant to mechanical engineering practices.

g. Teaching & Examination Scheme:

Teaching Scheme				**Evaluation Scheme**					
L	**T**	**P**	**C**	**Internal Evaluation**			**ESE**		**Total**
				MSE	**CE**	**P**	**Theory**	**P**	

-	**-**	**4**	**2**	**-**	**-**	**100**	**-**	**-**	**100**

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

Exp. No.	Name of the Experiment
1	Prepare workshop layout with general specifications of equipment's available in various shops.
2	Workshop Safety Practices
3	Fundamentals of unit Conversions, Mechanical Measurements, Materials and Engineering Specifications.
4	Demonstration of Hand Tools and Power Tools with general Specifications.
5	FITTING SHOP
6	CARPENTRY SHOP
7	SHEET METAL WORKING
8	WELDING SHOP
9	PLUMBING

h. Text Book and Reference Book:

1. Mechanical Workshop Practice By K.C. John
2. A Course in Workshop Technology By Raghuwamsi B.S. | Dhanpat Rai and Sons, New Delhi | Pub. Year 1982
3. Workshop Practice Manual By K. Venkat Reddy | BS Publications
4. Elements of Workshop Technology Vol. I By Hajra Chaudhary S.K. | Asia Publishing House
5. Comprehensive Workshop Technology By S.K. Garg | Laxmi Publications