



# **First Year Curriculum**

**Admission Year 2026-27**

**Diploma in  
Automobile Engineering**

**Faculty of Engineering & Technology**

**Parul University**

**Vadodara, Gujarat, India**

## Semester 1

**a. Course Name:** Elements of Automobile Engineering

**b. Course Code:** 03062201PC01

**c. Prerequisite:** Basic knowledge of science and mechanics.

**d. Rationale:** The subject “Elements of Automobile Engineering” is introduced in the first semester to provide students with a foundational understanding of the basic systems and components of an automobile. It serves as an essential stepping stone for advanced studies in automotive engineering by covering key areas such as engine fundamentals, transmission, suspension, braking, steering, and electrical systems. Through a balanced mix of theory and practical demonstrations, the subject helps students develop technical vocabulary, functional understanding, and conceptual clarity needed to engage with modern automotive technologies. This early exposure bridges the gap between basic science and applied engineering while supporting career readiness in the automotive sector.

### e. Course Learning Objectives:

CLOBJ No.	Course Learning Objective
CLOBJ 1	To introduce the history, classification, and basic layout of automobiles.
CLOBJ 2	To understand the fundamentals of internal combustion engines and fuel systems.
CLOBJ 3	To develop knowledge of automobile transmission systems and drive arrangements.
CLOBJ 4	To understand suspension, steering, wheel, and tyre systems used in automobiles.
CLOBJ 5	To study braking systems and their applications in vehicle safety.
CLOBJ 6	To familiarize students with basic electrical and electronic systems used in automobiles.

### f. Course Learning Outcomes:

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

CLO No.	Course Learning Outcome
CLO 1	Explain the historical development, classification, layout, and terminology of automobiles.
CLO 2	Describe the working principles of I.C. engines and identify engine components and fuel systems.
CLO 3	Explain the construction and working of clutch, gearbox, differential, and drive systems.
CLO 4	Describe suspension, steering, wheel, and tyre systems along with their functions and maintenance.
CLO 5	Explain different braking systems and their working principles used in automobiles.

CLO 6	Understand the working and applications of automobile electrical and electronic systems.
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**g. Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Marks			ESE		Total
				T	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	<b>Introduction to Automobile and Classification:</b> Definition and purpose of automobile, history and development, classification of automobiles, basic layout, types of chassis, body, drive, and vehicle dimensions	13	6
2	<b>Engine and Fuel System:</b> Introduction to I.C. engines, types of engines, engine components and their functions, petrol and diesel fuel systems	23	10
3	<b>Transmission System:</b> Purpose and layout of transmission system, clutch, gearbox, propeller shaft, universal joint, differential, and drive systems	17	8
4	<b>Suspension, Steering &amp; Wheels:</b> Suspension systems, steering systems, wheel types, tyres, wheel balancing and wheel alignment	17	8
5	<b>Braking System:</b> Purpose and types of brakes, hydraulic and mechanical brakes, drum and disc brakes, ABS concept, brake maintenance	13	6
6	<b>Electrical and Electronic Systems:</b> Battery, starter motor, alternator, ignition system, lighting system, indicators, and introduction to ECU	17	7
	<b>Total</b>	<b>100</b>	<b>45</b>

**List of Practical:**

1. Study and identification of major parts of an automobile
2. Study and identification of I.C. engine components using cut section/model
3. Study of fuel supply system in petrol and diesel engines

4. Demonstration of clutch and gearbox working
5. Study of suspension system components
6. Demonstration of steering system mechanism
7. Study of braking system – hydraulic and mechanical
8. Study of automobile electrical system (battery, lights, horn, wiper)

**i. Text Book and Reference Book:**

**Text Books:**

1. R. B. Gupta, *Automobile Engineering*, Satya Prakashan.
2. Dr. Kripal Singh, *Automobile Engineering Vol-I*.

**Reference Books:**

1. P. L. Kohli, *Automobile Electrical Equipments*, Tata McGraw Hill.
2. Anil Chikara, *Automobile Engineering Vol-I*, Satya Prakashan.

- a. **Course Name: Energy Conservation**
- b. **Course Code: 03061701UE01**
- c. **Prerequisite:** A basic understanding of science and environmental studies at the 10th-grade level. No prior technical knowledge is required, but awareness of energy sources, electricity usage, and environmental impact will be beneficial.
- d. **Rationale:** Energy conservation is essential for reducing waste, lowering costs, and minimizing environmental harm by optimizing energy use, decreasing dependence on non-renewable resources, and mitigating greenhouse gas emissions. It also enhances sustainability, strengthens energy security, and promotes economic growth through innovation in energy-efficient technologies and job creation.
- e. **Course Learning Objective:**

<b>CLOBJ 1</b>	Explains basic concepts of energy, types of energy sources, importance of energy conservation, energy problems in India, and concepts of energy efficiency and energy intensity.
<b>CLOBJ 2</b>	Covers the Energy Conservation Act, 2001, role of the Bureau of Energy Efficiency and Gujarat Energy Development Agency, energy conservation programs, star labelling, and energy audits.
<b>CLOBJ 3</b>	Focuses on energy-saving methods in lighting systems, motors, pumps, HVAC systems, compressed air systems, and household electrical appliances.
<b>CLOBJ 4</b>	Explains energy conservation techniques used in industries, homes, buildings, and IT systems including green computing and e-waste management.
<b>CLOBJ 5</b>	Covers fuel-efficient transportation methods, electric and hybrid vehicles, renewable energy in transport, and future trends in energy conservation.

**f. Course Learning Outcomes:**

<b>CLO 1</b>	Students will define energy, its various forms, energy resources (renewable and non-renewable), the need for energy conservation, and the environmental impacts of energy usage
<b>CLO 2</b>	Students will recall the Energy Conservation Act, 2001, the role of the Bureau of Energy Efficiency (BEE), energy labelling and star rating programs, and government schemes for energy conservation.
<b>CLO 3</b>	Students will explain the energy scenario in India, challenges in conventional energy sources, energy problems, the demand- supply gap, and future energy innovations and emerging technologies.
<b>CLO 4</b>	Students will describe energy conservation techniques in industries, energy-efficient building designs, energy-saving practices in households, and the role of automation and sensors in energy conservation.

<b>CLO 5</b>	Students will describe energy conservation techniques in industries, energy-efficient building designs, energy-saving practices in households, and the role of automation and sensors in energy conservation.
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**g. Teaching & Examination Scheme:**

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

**Lect.** - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - Continuous Evaluation

**Note: 15 Hours of additional sessions will be taken (within the semester) to match up 30 hours content.**

**h. Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
1	<b>Introduction to Energy and Its Conservation</b> Basics of energy: Types and sources (renewable & non-renewable), Need for energy conservation: Environmental and economic aspects, Energy problems in India: Demand-supply gap, dependency on fossil fuels, power shortages, Energy intensity and energy efficiency.	20%	09
2	<b>Energy Conservation Act, Policies &amp; Key Organizations</b> Energy Conservation Act, 2001 – Key provisions, Bureau of Energy Efficiency (BEE) and its role, Flagship programs of BEE (PAT, S&L, ECBC, DSM), Gujarat Energy Development Agency (GEDA) – Roles and responsibilities, Star labelling of appliances, Energy audit types: Preliminary & detailed.	20%	09
3	<b>Energy Conservation in Electrical &amp; Mechanical Systems</b> Energy-efficient lighting systems: LED, CFL, and automation, Energy conservation in motors, pumps, and HVAC systems, Energy-saving techniques in compressed air systems, Energy Conservation in Household Electrical Appliances.	22%	10

4	<p><b>Energy Conservation in Industrial, Domestic &amp; IT Applications</b></p> <p>Energy-saving measures in industries: Boilers, furnaces, and refrigeration, Case studies on energy-efficient buildings, Simple Energy Conservation Techniques for Homes and Small Businesses, Energy Conservation in Computers &amp; IT (Power management in computers, green data centres, Energy-efficient software and hardware, Cloud computing for energy reduction, E-waste management and recycling).</p>	20%	09
5	<p><b>Energy Conservation in Transportation and Emerging Technologies</b></p> <p>Fuel-efficient driving techniques and electric vehicles, Energy efficiency in railways and aviation, Hybrid and renewable energy in transport systems, Future trends in energy conservation.</p>	18%	08

**i. Text Book and Reference Book:**

1. Energy Conservation and Management By S. K. Kataria | S. K. Kataria & Sons
2. Energy Management Handbook By Wayne C. Turner | The Fairmont Press, Inc
3. Non-Conventional Energy Resources By G. D. Rai | Khanna Publishers
4. Guide to Energy Management By Barney L Capehart, William J Kennedy and Wayne C Turner | The Fairmont Press and CRC Press.

- a. **Course Name:** Mathematics - I
- b. **Course Code:** 03069101BS01
- c. **Prerequisite:** Students must be passed class 10th examination from a 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:**

<b>CLOBJ 1</b>	Understand the concept of logarithms and partial fractions for algebraic simplifications with examples
<b>CLOBJ 2</b>	Understand trigonometric functions and relationship between them with examples
<b>CLOBJ 3</b>	Solve the complex numbers in various forms like modulus-amplitude (polar) form, Exponential (Euler) form for engineering applications with examples
<b>CLOBJ 4</b>	Understand the concept of functions and limits with examples
<b>CLOBJ 5</b>	Understand concept of differentiation engineering related problems based on applications of differentiation with examples

**f. Course Learning Outcomes:**

<b>CLO 1</b>	Apply logarithms for calculations and convert rational fractions into sums of partial fractions with examples
<b>CLO 2</b>	Analyze basic functions used in trigonometry with examples
<b>CLO 3</b>	Explain complex numbers in various forms like modulus-amplitude (polar) form, Exponential (Euler) form – illustrate with examples
<b>CLO 4</b>	Evaluate and Interpret the function graphically, numerically and analytically with limit of function
<b>CLO 5</b>	Solve engineering related problems based on applications of differentiation

**g. Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	1	-	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	<b>Logarithms and Partial Fractions</b> 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	<b>Trigonometry</b> 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	<b>Complex Numbers</b> 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	<b>Function and Limit</b>	17	8

	Definition and concept of function, Concept of limits and standard forms of limits, Standard formulae of Limit and related simple examples.		
<b>5</b>	<b>Differentiation</b>  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.	<b>23</b>	<b>11</b>

**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
6. Applied Mathematics By H.K.Das | [S.Chand Publication](#)
7. Calculus and Analytic Geometry By G. B. Thomas, R. L. Finney | [Addison Wesley](#) | 9th Edition
8. Engineering Mathematics(Third edition) By Croft, Anthony | Pearson Education, New Delhi
9. Advanced Engineering Mathematics (9th Edition) By Erwin Kreyszig, [Wiley India](#)

- a. **Course Name:** Applied Physics
- b. **Course Code:** 03069201BS01
- c. **Prerequisite:** High School Level Physics
- d. **Rationale:** The Applied Physics course lays a foundational understanding of physical principles essential for engineering. It helps students relate theoretical concepts like motion, energy, heat, and properties of matter to real-world engineering applications, thereby enhancing their problem-solving and analytical skills for practical situations in mechanical, civil, automobile, and related fields.

**e. Course Learning Objective:**

<b>CLOBJ 1</b>	Develop understanding of fundamental physics concepts including measurements, electricity, magnetism, semiconductors, and modern physics relevant to engineering applications.
<b>CLOBJ 2</b>	Apply principles of electrical and electronic physics to analyze basic circuits, semiconductor devices, and electromagnetic systems used in information technology and engineering fields.
<b>CLOBJ 3</b>	Build scientific and analytical skills through practical experiments, measurements, error analysis, and interpretation of physical phenomena for technological problem solving.
<b>CLOBJ 4</b>	Understand the working principles and applications of modern technologies such as lasers, optical fibers, solar cells, and nanotechnology used in communication and electronic systems.
<b>CLOBJ 5</b>	Develop competency in conducting physics laboratory experiments, interpreting observations, and presenting results systematically using scientific methods and engineering practices.

**f. Course Learning Outcomes:**

<b>CLO 1</b>	Apply concepts of units, measurements, and error analysis to perform accurate physical measurements and validate results using dimensional analysis.
<b>CLO 2</b>	Analyze basic electric and magnetic phenomena, including electrostatics, current electricity, and electromagnetic induction, and solve related numerical problems.
<b>CLO 3</b>	Interpret the characteristics and functioning of semiconductor devices such as diodes and transistors, and apply them in basic electronic circuits.

<b>CLO 4</b>	Explain the working principles and applications of modern physics tools including lasers, optical fibers, and nanotechnology-based devices.
<b>CLO 5</b>	Demonstrate the ability to relate theoretical physics concepts to practical engineering applications across electrical, electronics, and communication fields.

**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
<b>1</b>	<b>Physical world, Units and Measurements</b> 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.	<b>20</b>	<b>8</b>
<b>2</b>	<b>Force and Motion</b> Scalar and Vector quantities – examples, representation of vector, types of vectors. Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product, Resolution of a Vector and its application to inclined plane and lawn roller. Force,	<b>25</b>	<b>10</b>

	Momentum, Statement and derivation of conservation of linear momentum, its applications such as recoil of gun, rockets, Impulse and its applications.		
<b>3</b>	<p><b>Work, Power and Energy</b></p> <p>Work: Concept and units, examples of zero work, positive work and negative work Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications. Energy and its units, kinetic energy, gravitational potential energy with examples and derivations, mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples). Power and its units, power and work relationship, calculation of power (numerical problems).</p>	<b>15</b>	<b>7</b>
<b>4</b>	<p><b>Properties of Matter</b></p> <p>Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve. Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications. Surface tension: concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension. Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems. Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynold's number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications</p>	<b>25</b>	<b>12</b>
<b>5</b>	<p><b>Heat and Thermometry</b></p> <p>Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), specific heats, scales of temperature and their relationship, Types of Thermometer (Mercury thermometer, Bimetallic thermometer, Platinum resistance thermometer, Pyrometer) and their uses. Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst</p>	<b>15</b>	<b>8</b>

	them, Co-efficient of thermal conductivity, engineering applications		
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**i. Text Book and Reference Book:**

1. Text Book of Physics for Class XI& XII (Part-I, Part-II) By N.C.E.R.T., Delhi
2. Comprehensive Practical Physics - Volume I and II By by IN Jaiswal | Laxmi Publishers
3. Practical Physics By C. L. Arora | S. Chand & Company Ltd
4. ENGINEERING CHEMISTRY By JAIN & JAIN | DHANPAT RAI
5. A Text Book of Polytechnic Chemistry By V.P. Mehta | Jain Brothers
6. Engineering Chemistry By S S dhara

- a. **Course Name:** Applied Physics Lab
- b. **Course Code:** 03069201BS01
- c. **Prerequisite:** High School Level Physics
- d. **Rationale:** The Applied Physics course lays a foundational understanding of physical principles essential for engineering. It helps students relate theoretical concepts like motion, energy, heat, and properties of matter to real-world engineering applications, thereby enhancing their problem-solving and analytical skills for practical situations in mechanical, civil, automobile, and related fields.

**e. 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

**f. Text Book and Reference Book:**

1. Text Book of Physics for Class XI& XII (Part-I, Part-II) By N.C.E.R.T., Delhi
2. Comprehensive Practical Physics - Volume I and II By by IN Jaiswal | Laxmi Publishers
3. Practical Physics By C. L. Arora | S. Chand & Company Ltd
4. ENGINEERING CHEMISTRY By JAIN & JAIN | DHANPAT RAI
5. A Text Book of Polytechnic Chemistry By V.P. Mehta | Jain Brothers
6. Engineering Chemistry By S S dhara

**g. Mapping of Experiment List with Course Learning Outcomes:**

Exp . No.	Name of the Experiment
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.

<b>Exp · No.</b>	<b>Name of the Experiment</b>
<b>2</b>	To determine diameter of a wire, a solid ball and thickness of cardboard using a screw gauge.
<b>3</b>	To find the moment of inertia of a flywheel.
<b>4</b>	Measurement of Viscosity by Redwood Viscometer.
<b>5</b>	To find the coefficient of linear expansion of the material of a rod.(Young's Modulus).
<b>6</b>	To find surface tension of a liquid using capillary rise method.
<b>7</b>	To find frequency of given tuning fork with the help of a sonometer.
<b>8</b>	To determine Force constant with the help of periodic time of oscillations of spring.

- 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:**

<b>CLOBJ 1</b>	Identify and use various drawing equipment, instruments, and materials as per their specifications and applications.
<b>CLOBJ 2</b>	Apply standards, standard practices, and suitable scale factors in technical drawing layouts.
<b>CLOBJ 3</b>	Demonstrate proper use of different types of lines, lettering styles, and dimensioning methods in engineering drawings.
<b>CLOBJ 4</b>	Construct basic geometrical entities such as angles, polygons, tangents, and circles using standard construction techniques.
<b>CLOBJ 5</b>	Draw conic sections, cycloidal curves, involutes, and spirals using geometrical methods.
<b>CLOBJ 6</b>	Develop orthographic projections of points, lines, and planes with correct inclinations and true lengths.
<b>CLOBJ 7</b>	Convert pictorial views into orthographic projections using standard projection methods as per standard norms.
<b>CLOBJ 8</b>	Develop isometric views and isometric drawings of objects involving lines, circles, and arcs.

f. **Course Learning Outcomes:**

<b>CLO 1</b>	Identify and use various drawing equipment, instruments, and materials as per their specifications and applications.
<b>CLO 2</b>	Apply standard practices and appropriate scale factors as per BIS norms for planning and layout of drawings.
<b>CLO 3</b>	Demonstrate different types of lines, lettering styles, and dimensioning methods in technical drawings.
<b>CLO 4</b>	Construct basic geometric shapes, angles, polygons, tangents, and circles using standard construction methods.

<b>CLO 5</b>	Draw conic sections, cycloidal curves, involutes, and spirals using standard geometric methods.
<b>CLO 6</b>	Develop orthographic projections of points, lines, and planes with correct inclination and true lengths.
<b>CLO 7</b>	Convert simple pictorial views into orthographic views by applying projection methods as per BIS standards.
<b>CLO 8</b>	Develop skills to create isometric views and drawings of objects involving lines, circles, and arcs.

**g. Teaching & Examination Scheme:**

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

**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	Weight age	Teaching Hours
<b>1</b>	<b>Drawing Instruments and materials</b> 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.	<b>4</b>	<b>1</b>
<b>2</b>	<b>Planning, Layout And Scaling Of Drawing</b> 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.	<b>4</b>	<b>1</b>
<b>3</b>	<b>Lines, Lettering And Dimensioning</b>	<b>4</b>	<b>1</b>

	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.		
<b>4</b>	<b>Geometric Construction</b>  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	<b>7</b>	<b>2</b>
<b>5</b>	<b>Engineering Curves</b>  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).	<b>22</b>	<b>3</b>
<b>6</b>	<b>Projection Of Points, Lines And Planes</b>  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, 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.	<b>25</b>	<b>2</b>
<b>7</b>	<b>Orthographic Projections</b>  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.	<b>22</b>	<b>3</b>

<b>8</b>	<b>Isometric Projections</b>  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.	<b>12</b>	<b>2</b>
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**i. Text Book and Reference Book:**

1. "A Text Book of Engineering Graphics (TextBook) By P.J. Shah | S. Chand & Company Ltd., New Delhi | 2021 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

- a. **Course Name:** Engineering Graphics Lab
- 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:**

<b>CLOBJ 1</b>	Identify and use various drawing equipment, instruments, and materials as per their specifications and applications.
<b>CLOBJ 2</b>	Apply standards, standard practices, and suitable scale factors in technical drawing layouts.
<b>CLOBJ 3</b>	Demonstrate proper use of different types of lines, lettering styles, and dimensioning methods in engineering drawings.
<b>CLOBJ 4</b>	Construct basic geometrical entities such as angles, polygons, tangents, and circles using standard construction techniques.
<b>CLOBJ 5</b>	Draw conic sections, cycloidal curves, involutes, and spirals using geometrical methods.
<b>CLOBJ 6</b>	Develop orthographic projections of points, lines, and planes with correct inclinations and true lengths.
<b>CLOBJ 7</b>	Convert pictorial views into orthographic projections using standard projection methods as per standard norms.
<b>CLOBJ 8</b>	Develop isometric views and isometric drawings of objects involving lines, circles, and arcs.

**f. Course Learning Outcomes:**

<b>CLO 1</b>	Identify and use various drawing equipment, instruments, and materials as per their specifications and applications.
<b>CLO 2</b>	Apply standard practices and appropriate scale factors as per BIS norms for planning and layout of drawings.
<b>CLO 3</b>	Demonstrate different types of lines, lettering styles, and dimensioning methods in technical drawings.
<b>CLO 4</b>	Construct basic geometric shapes, angles, polygons, tangents, and circles using standard construction methods.

<b>CLO 5</b>	Draw conic sections, cycloidal curves, involutes, and spirals using standard geometric methods.
<b>CLO 6</b>	Develop orthographic projections of points, lines, and planes with correct inclination and true lengths.
<b>CLO 7</b>	Convert simple pictorial views into orthographic views by applying projection methods as per BIS standards.
<b>CLO 8</b>	Develop skills to create isometric views and drawings of objects involving lines, circles, and arcs.

**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. Text Book and Reference Book:**

1. "A Text Book of Engineering Graphics (TextBook) By P.J. Shah | S. Chand & Company Ltd., New Delhi | 2021 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

Exp. No.	Name of the Experiment
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.

<b>Exp. No.</b>	<b>Name of the Experiment</b>
<b>2</b>	<p>Engineering curves</p> <p>Draw Different types of curves like Ellipse, Parabola, Hyperbola, Cycloid, Involute and Spiral</p>
<b>3</b>	<p>Projection of Points and line</p> <p>Draw at Least Four Problems of Projections of Lines and One problem of Projections of Points.</p>
<b>4</b>	<p>Projection of Plane</p> <p>Draw at least four Problems of Projections of Plane Like Rectangle, Hexagon, Circle and Triangle Plane.</p>
<b>5</b>	<p>Orthographic projection</p> <p>Draw at least two Problems of Orthographic Projection from Given 3D Object.</p>
<b>6</b>	<p>Isometric Projection Draw at Least two Problems of Isometric Projections from Given 2D Object.</p>

- a. **Course Name:** - Engineering Workshop Lab
- b. **Course Code:** 03061901ES03
- 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:**

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

f. **Course Learning Outcomes:**

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

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

- 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:**

<b>CLOBJ 1</b>	Develop basic interpersonal communication skills through effective listening, structured self and peer introductions, ice-breaker activities, and role plays in everyday contexts.
<b>CLOBJ 2</b>	Understand and apply fundamental grammatical structures including parts of speech, tenses, and voice for accurate sentence construction.
<b>CLOBJ 3</b>	Enhance pronunciation and vocabulary usage through basic phonetics, IPA symbols, one-word substitutions, synonyms, antonyms, and contextual application.
<b>CLOBJ 4</b>	Develop reading and writing skills by applying reading strategies and constructing coherent narratives, picture-based descriptions, and functional written texts such as applications.
<b>CLOBJ 5</b>	Improve personal and academic development through goal-setting using SMARTER principles and reflective language use.

f. **Course Learning Outcomes:**

<b>CLO 1</b>	Remember and identify correct pronunciation patterns using basic phonetic symbols, and recall appropriate vocabulary—including one-word substitutions, synonyms, and antonyms—for accurate spoken and written communication.
<b>CLO 2</b>	Understand written texts using basic reading strategies and explain the concept of SMARTER goals for personal and academic development.
<b>CLO 3</b>	Demonstrate understanding of basic interpersonal communication skills through effective listening, structured self and peer introductions, ice-breaker activities, and simple role-plays in everyday contexts.
<b>CLO 4</b>	Apply fundamental grammatical structures including parts of speech, basic tenses, articles and determiners to construct grammatically correct sentences.
<b>CLO 5</b>	Analyse and organize information to produce coherent written texts such as short narratives, and formal or informal applications.

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme		
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Internal Evaluation</b>	<b>ESE</b>	<b>Total</b>

				<b>MSE</b>	<b>CE</b>	<b>P</b>	<b>Theory</b>	<b>P</b>	
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	-	-	<b>20</b>	-	<b>30</b>	<b>50</b>

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

#### **h. Course Content:**

<b>Sr. No.</b>	<b>Content</b>	<b>Weightage</b>	<b>Teaching Hours</b>
<b>1</b>	Ice Breaker + Introducing your Friend <ul style="list-style-type: none"> <li>• Fun Fact Exchange (e.g., Two Truths and a Lie)</li> <li>• Describing Personality and Hobbies</li> <li>• Using Adjectives to Talk About People (Link to Parts of Speech)</li> </ul> Structured Self and Peer Introduction (Name, Interests, Goals)	<b>8</b>	<b>2</b>
<b>2</b>	Parts of Speech & Tenses <ul style="list-style-type: none"> <li>• Identification of Parts of Speech in Simple Sentences</li> <li>• Sentence Formation Using Basic Parts of Speech</li> <li>• Concept of time and verb forms</li> </ul> Sentence Construction and Error Correction Using Tenses	<b>12</b>	<b>6</b>
<b>3</b>	Introduction to Phonetics - symbols and pronunciation <ul style="list-style-type: none"> <li>• Basics of Phonetics</li> <li>• Introduction to IPA (International Phonetic Alphabet)</li> <li>• English Vowel &amp; Consonant Sounds</li> <li>• Pronunciation Practice</li> </ul>	<b>10</b>	<b>4</b>
<b>4</b>	Articles & Determiners <ul style="list-style-type: none"> <li>• Definite, Indefinite Articles and Zero Articles</li> <li>• Demonstrative &amp; Possessive Determiners</li> <li>• Quantifiers &amp; Numerals</li> </ul> Common errors of Articles & Determiners	<b>10</b>	<b>2</b>
<b>5</b>	Vocabulary Building : One-word Substitution, Synonyms, and Antonyms <ul style="list-style-type: none"> <li>• List and Practice Common One-word Substitutions</li> <li>• Synonym-Antonym Match-Up Games</li> </ul> Use New Words in Sentences/Short Paragraphs	<b>10</b>	<b>2</b>
<b>6</b>	Listening Skills	<b>8</b>	<b>2</b>

	<ul style="list-style-type: none"> <li>• Introduction and Importance of Good Listening</li> <li>• Difference Between Listening and Hearing</li> <li>• Types of listening</li> <li>• Barriers to effective Listening</li> <li>• Traits of a good listener</li> </ul>		
<b>7</b>	Types of Application <ul style="list-style-type: none"> <li>• Formal vs Informal Applications</li> <li>• Structure and Format of an Application (Salutation, Body, Closing)</li> <li>• Writing Leave Applications</li> </ul>	<b>10</b>	<b>2</b>
<b>8</b>	Role Play <ul style="list-style-type: none"> <li>• Generic Situations (Buying, Asking for Directions, At a Doctor, etc.)</li> <li>• Customer Service and Complaint Handling</li> </ul>	<b>12</b>	<b>6</b>
<b>9</b>	Goal Setting <ul style="list-style-type: none"> <li>• SMARTER Goals (Specific, Measurable, Achievable, Relevant, Time-bound, Evaluate, Revise)</li> <li>• Short-term vs. Long-term Goals</li> <li>• Overcoming Obstacles to Goals</li> </ul>	<b>10</b>	<b>2</b>
<b>10</b>	Reading Skills – Basic Level <ul style="list-style-type: none"> <li>• Types of reading</li> <li>• Strategies of reading</li> <li>• Reading comprehension</li> </ul>	<b>10</b>	<b>2</b>
		<b>100</b>	<b>30</b>

**i. Text Book and Reference Book:**

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

- 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:**

<b>CLOBJ 1</b>	To introduce the fundamental concepts of ecological balance and the flow of energy/matter in nature.
<b>CLOBJ 2</b>	To provide knowledge on pollutants affecting the atmosphere and sound levels, and the legal framework for control.
<b>CLOBJ 3</b>	To examine the chemical/biological nature of water and soil contaminants and evaluate technical treatment solutions.
<b>CLOBJ 4</b>	To explore the mechanics and benefits of green energy technologies like solar, wind, and biomass.
<b>CLOBJ 5</b>	To categorize different waste streams and understand the "3R" principles (Reduce, Reuse, Recycle) for waste management.
<b>CLOBJ 6</b>	To impart an understanding of seismic risks and the protocols for managing natural and man-made disasters.

**f. Course Learning Outcomes:**

<b>CLO 1</b>	Explain ecosystem structure, biotic/abiotic components, food chains, webs, and cycles.
<b>CLO 2</b>	Identify sources, types, effects, and control of air and noise pollution, including regulations.
<b>CLO 3</b>	Analyse water and soil pollution sources, characteristics, treatment, and prevention.
<b>CLO 4</b>	Describe various renewable energy sources, working principles, and environmental impacts.

<b>CLO 5</b>	Classify solid waste types, management techniques, recycling, and disposal methods.
<b>CLO 6</b>	Explain seismic engineering principles and disaster management strategies.

**g. Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
<b>1</b>	-	-	<b>0</b>	<b>20</b>	<b>20</b>	-	-	-	<b>50</b>

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

**a. Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
<b>1</b>	<b>Ecosystem</b> Structure of ecosystem, Biotic & Abiotic components, Food chain and food web Carbon, Nitrogen, Sulphur, Phosphorus cycle.	<b>10%</b>	<b>2</b>
<b>2</b>	<b>Air and Noise Pollution</b> 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.	<b>25%</b>	<b>3</b>

3	<p><b>Water and Soil Pollution</b></p> <p>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.</p>	25%	3
4	<p><b>Renewable Sources of Energy</b></p> <p>Solar Energy: Basics of Solar energy. Flat plate collector (Liquid &amp; 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.</p>	10%	2

5	<p><b>Solid Waste Management</b></p> <p>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.</p>	5%	2
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**a. Text Book and Reference Book:**

1. "Principles of Solar Engineering" By Yogi Goswami D., Frank Kreith, Jan F. Kreider | Taylor & Francis, 2003 | Second.
2. "Environmental Studies" By M.P. Poonia, S.C. Sharma | Khanna Publishing House, NewDelhi | 2017.
3. "Renewable Energy Sources" By Twidell J.W. and Weir. A | EFN Spon Ltd "Linear Systems and Signals" by B.P. Lathi.
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 Pollution Control Engineering", By Rao C.S | 2nd edition
7. "Solid Waste Treatment and Disposal", By G. Tchabanoglous | McGraw Hill Pub.

## Semester 2

**a. Course Name:** 3D Modelling & Drafting

**b. Course Code:** 03062202PC01

**c. Prerequisite:** Fundamental geometric concepts and basic computer literacy.

**d. Rationale:**

This subject aims to equip Diploma in Automobile students with fundamental AutoCAD software skills for creating 2D engineering drawings specific to the automotive industry. It develops essential drafting abilities, enabling students to understand, create, and effectively communicate automotive designs, thereby forming a strong foundation for further studies in automotive design and manufacturing.

**e. Course Learning Objectives:**

<b>CLOBJ No.</b>	<b>Course Learning Objective</b>
CLOBJ 1	To understand the fundamentals of engineering graphics and drawing standards.
CLOBJ 2	To develop proficiency in AutoCAD interface and basic drafting tools.
CLOBJ 3	To learn editing and modification techniques for creating precise engineering drawings.
CLOBJ 4	To create detailed 2D automotive component drawings using layers and dimensioning tools.
CLOBJ 5	To introduce basic 3D modeling concepts and commands in AutoCAD.
CLOBJ 6	To develop complete automotive drawing projects involving 2D drafting, basic 3D modeling, and plotting.

**f. Course Learning Outcomes:**

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

<b>CLO No.</b>	<b>Course Learning Outcome</b>
CLO 1	Understand engineering graphics standards and navigate the AutoCAD interface effectively.
CLO 2	Create basic 2D geometric and automotive component drawings using AutoCAD tools.
CLO 3	Apply editing and modification commands for accurate drafting and drawing refinement.

CLO 4	Develop detailed automotive drawings with layers, dimensions, annotations, and basic GD&T concepts.
CLO 5	Generate simple 3D models of automotive components using AutoCAD 3D commands.
CLO 6	Complete and print automotive drafting projects involving both 2D and basic 3D representations.

#### g. Teaching & Examination Scheme:

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

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	<b>Introduction to Engineering Graphics &amp; Standards:</b> Importance of engineering graphics, types of lines, lettering, dimensioning principles, scales, orthographic projections, sectional views	10	4
2	<b>Introduction to CAD and AutoCAD Interface:</b> CAD concepts, AutoCAD interface, file management, navigation tools, units and limits, coordinate systems, basic drawing tools	20	9
3	<b>Editing and Modifying 2D Drawings:</b> Selection methods, object snaps, ortho mode, polar tracking, erase, copy, move, rotate, mirror, offset, trim, extend, fillet, chamfer, scale, stretch, lengthen	20	9
4	<b>Creating Detailed 2D Automotive Drawings:</b> Hatching, layers, dimensioning techniques, annotations, introduction to GD&T concepts	20	9
5	<b>Introduction to 3D for Automotive:</b> 3D modeling concepts, UCS and WCS, extrude command, 3D viewing, predefined 3D solids, simple automotive component modeling	15	7
6	<b>Automobile Drawing Project (2D &amp; Basic 3D) &amp; Plotting:</b> Complete automotive drawing project, 3D	15	7

	representation, plotting and printing with proper scale and layout		
	<b>Total</b>	<b>100</b>	<b>45</b>

**List of Practical:**

1. Introduction to AutoCAD interface and basic drawing tools
2. Drawing basic 2D automotive shapes and component outlines
3. Editing and modifying automotive drawings using AutoCAD commands
4. Creating detailed 2D automotive drawings with dimensions and annotations
5. Introduction to 3D modeling of automotive components
6. Automobile drawing project involving both 2D and basic 3D modeling
7. Plotting and printing of automotive engineering drawings

**i. Text Book and Reference Book:**

**Text Books:**

1. P. Nageswara Rao, *AutoCAD for Engineering Drawing Made Easy*, Tata McGraw Hill.

**Reference Books:**

1. George Omura and Rick Graham, *AutoCAD 2013 and AutoCAD LT 2013*.

- 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:**

<b>CLOBJ 1</b>	To understand the fundamental concepts of disasters, hazards, vulnerabilities, risks, and disaster management frameworks.
<b>CLOBJ 2</b>	To study various types of natural, technological, and man-made disasters along with their causes, impacts, and control measures.
<b>CLOBJ 3</b>	To understand disaster management cycles including preparedness, mitigation, response, recovery, and risk assessment.
<b>CLOBJ 4</b>	To study legal and institutional disaster management frameworks in India and the role of various agencies.
<b>CLOBJ 5</b>	To apply GIS, remote sensing, early warning systems, and mitigation techniques for disaster preparedness and management.

f. **Course Learning Outcomes:**

<b>CLO 1</b>	Define and explain key concepts related to disasters, including hazards, vulnerabilities, risks, and disaster management frameworks.
<b>CLO 2</b>	Identify various types of natural, technological, and man-made disasters, their causes, impacts, and control measures.
<b>CLO 3</b>	Describe and implement disaster management cycles, including risk assessment, preparedness, response, and recovery.
<b>CLO 4</b>	Explain the legal and institutional frameworks in India, including the Disaster Management Act, policies, and the role of government and non-government agencies.
<b>CLO 5</b>	Apply GIS, remote sensing, early warning systems, and structural mitigation techniques to enhance disaster preparedness and response.

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:**

<b>Sr. No</b>	<b>Content</b>	<b>Weightage</b>	<b>Teaching Hours</b>
<b>1</b>	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.	<b>10</b>	<b>3</b>
<b>2</b>	Types, Trends, Causes, Consequences and Control of Disasters: Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunderstorms, 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, chemical and biological disasters). Global Disaster Trends, Emerging Risks of Disasters, Climate Change and Urban Disasters.	<b>20</b>	<b>10</b>
<b>3</b>	Disaster Management Cycle and Framework: Basics of Disaster Management Cycle, Paradigm Shift in Disaster Management, Understanding Risk, Prevention and Reduction of Disaster Impact, Early Warning Systems, Awareness and Capacity Building, Disaster Preparedness, Search and Rescue Operations, Relief and Rehabilitation, Damage Assessment, Infrastructure Restoration, Reconstruction and Redevelopment.	<b>30</b>	<b>12</b>
<b>4</b>	Disaster Management in India: Disaster Profile of India, Mega Disasters of India and Lessons Learnt, Disaster Management Act 2005, Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans, Role of Government (Local, State and National), Non-Governmental and Inter-Governmental Agencies.	<b>20</b>	<b>10</b>

5	Applications of Science and Technology for Disaster Management: Geo-informatics in Disaster Management (RS, GIS, GPS and Remote Sensing), Disaster Communication Systems, Early Warning Dissemination, Land Use Planning, Disaster Safe Design and Construction, Structural and Non-Structural Mitigation Measures, S&T Institutions for Disaster Management in India.	20	10
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**i. Text Book and Reference Book:**

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

- 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 instill its applications in pertinent engineering and technological fields.

**e. Course Learning Objective:**

<b>CLOBJ 1</b>	Understand the concept of determinant and matrix with examples
<b>CLOBJ 2</b>	Analyze engineering related problems based on concepts of vectors with examples
<b>CLOBJ 3</b>	Understand basic engineering problems under given conditions of straight lines and circle.
<b>CLOBJ 4</b>	Understand the concept of functions and limits with examples
<b>CLOBJ 5</b>	Understand differential equations to significant applied problems.

**f. Course Learning Outcomes:**

<b>CLO 1</b>	Solve engineering related problems based on matrices.
<b>CLO 2</b>	Analyze engineering related problems based on concepts of vectors.
<b>CLO 3</b>	Understand basic engineering problems under given conditions of straight lines and circle.
<b>CLO 4</b>	Apply integral calculus to engineering related problems.
<b>CLO 5</b>	Obtain solutions of differential equations to significant applied problems.

**g. Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				MSE	CE	P	Theory	P	
3	1	-	4	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:**

<b>Sr. No</b>	<b>Content</b>	<b>Weightage</b>	<b>Teaching Hours</b>
<b>1</b>	Determinants and Matrices Elementary properties of determinants up to 3rd order, consistency of equations, Cramer's rule. Algebra of matrices, Inverse of a matrix, matrix inversion method to solve a system of linear equations in 3 variables.	<b>23</b>	<b>10</b>
<b>2</b>	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.	<b>20</b>	<b>9</b>
<b>3</b>	Co-Ordinate Geometry Straight line Inclination and slope of a line, different forms of equations to a straight line, Slope-intercept form, 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	<b>17</b>	<b>8</b>
<b>4</b>	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)	<b>23</b>	<b>10</b>
<b>5</b>	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.	<b>17</b>	<b>8</b>

**j. Text Book and Reference Book:**

1. Polytechnic  
By S. P. Deshpande | Pune Vidyarthi Gruh Prakashan

Mathematics

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

**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 Engineering Mechanics is to develop the ability to predict the effects of forces while performing engineering design and analysis. The course emphasizes real-world engineering applications and bridges the gap between physical theory and practical engineering technology.

**e. Course Learning Objectives:**

CLOBJ No.	Course Learning Objective
CLOBJ 1	To understand basic concepts and principles of engineering mechanics.
CLOBJ 2	To study force systems and equilibrium conditions.
CLOBJ 3	To analyze centroid and center of gravity of engineering bodies.
CLOBJ 4	To solve problems involving coplanar concurrent and non-concurrent forces.
CLOBJ 5	To understand friction and its engineering applications.
CLOBJ 6	To study simple lifting machines and their performance characteristics.

**f. Course Learning Outcomes:**

CLO No.	Course Learning Outcome
CLO 1	Apply basics of mechanics to identify force systems and determine unknown forces.
CLO 2	Calculate centroid and center of gravity of engineering components.
CLO 3	Analyze coplanar concurrent force systems using equilibrium principles.
CLO 4	Analyze coplanar non-concurrent force systems and beam reactions.
CLO 5	Apply principles of friction in engineering applications.
CLO 6	Select suitable lifting machines and evaluate their efficiency and velocity ratio.

**g. Teaching & Examination Scheme:**

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

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	<b>Basics of Mechanics:</b> Concepts of statics and dynamics, scalar and vector quantities, SI units, force systems, Newton's laws	10	4
2	<b>Centroid &amp; Centre of Gravity:</b> Centroid of plane figures, center of gravity of solids, composite figures and solids	15	7
3	<b>Coplanar Concurrent Forces:</b> Resolution of forces, equilibrium, free body diagrams, parallelogram law, triangle law, polygon law, Lami's theorem	25	12
4	<b>Coplanar Non-Concurrent Forces:</b> Moment of force, Varignon's theorem, couples, beam reactions, supports and loading systems	25	12
5	<b>Friction:</b> Laws of friction, coefficient of friction, angle of friction, angle of repose, equilibrium on inclined planes	15	6
6	<b>Simple Lifting Machines:</b> Mechanical advantage, velocity ratio, efficiency, law of machine, screw jack, wheel and axle, crab winch	10	4
	<b>Total</b>	<b>100</b>	<b>45</b>

#### List of Practical:

1. Verification of parallelogram law of forces
2. Verification of triangle law of forces
3. Verification of polygon law of forces
4. Verification of Lami's theorem
5. Determination of beam reactions
6. Calculation of centroid of lamina
7. Determination of angle of repose for different surfaces

8. Determination of coefficient of static friction
9. Study of simple lifting machines and velocity ratio

**i. Text Book and Reference Book:**

**Text Books:**

1. H. J. Shah and S. B. Junarkar, *Applied Mechanics*, Charotar Publication.
2. R. K. Bansal, *A Text Book of Engineering Mechanics*, Laxmi Publishers.

**Reference Books:**

1. S. S. Bhavikatti and K. G. Rajashekarappa, *Engineering Mechanics*, Wiley Eastern Ltd.
2. J. L. Meriam and L. G. Kraige, *Engineering Mechanics*, John Wiley & Sons.

**a. Course Name:** Material Sciences in Automobile Engineering

**b. Course Code:** 03062202BS01

**c. Prerequisite:** A foundational understanding of Physics and Chemistry.

**d. Rationale:**

This subject is concerned with the changes in structure and properties of matter. Many engineering activities are based on these changes. The study of basic concepts of material science and metallurgy helps students understand engineering applications where emphasis is laid on the use of materials in automobile engineering.

**e. Course Learning Objectives:**

<b>CLOBJ No.</b>	<b>Course Learning Objective</b>
CLOBJ 1	To understand engineering materials, atomic structure, and bonding mechanisms.
CLOBJ 2	To study crystal structures and phase diagrams used in engineering materials.
CLOBJ 3	To develop knowledge of ferrous and non-ferrous materials used in automobiles.
CLOBJ 4	To understand non-metallic materials and their automotive applications.
CLOBJ 5	To learn metallurgical examination and non-destructive testing techniques.
CLOBJ 6	To understand corrosion mechanisms and surface engineering processes.

**f. Course Learning Outcomes:**

<b>CLO No.</b>	<b>Course Learning Outcome</b>
CLO 1	Interpret crystal structures and categorize different atomic bonds in materials.
CLO 2	Explain phase diagrams and properties of ferrous materials and alloys.
CLO 3	Compare non-ferrous and non-metallic materials with metallic materials.
CLO 4	Describe metallurgical microscope operation and specimen preparation techniques.
CLO 5	Apply non-destructive testing methods for material inspection.
CLO 6	Classify types of corrosion and suggest suitable prevention methods.

**g. Teaching & Examination Scheme:**

<b>Teaching Scheme</b>	<b>Evaluation Scheme</b>
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L	T	P	C	MSE	CE	P	Theory (ESE)	Total
3	-	0	3	20	20	-	60	-

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	<b>Introduction to Engineering Materials, Atomic Structure and Bonding:</b> Classification and properties of materials, atomic structure, atomic bonds, crystal structures (SC, BCC, FCC, HCP)	20	9
2	<b>Phase Diagrams, Ferrous Metals and Alloys:</b> Iron-carbon diagram, steels, alloy steels, stainless steels, tool steels, cast irons and applications	25	10
3	<b>Non-ferrous Metals and Non-Metallic Materials:</b> Aluminum, copper, magnesium, titanium, polymers, rubber, ceramics, abrasives, adhesives	20	9
4	<b>Metallurgical Microscope and Non-Destructive Testing:</b> Metallography, specimen preparation, metallurgical microscope, visual inspection, LPT, MPI, ultrasonic testing, radiography	15	8
5	<b>Corrosion and Surface Engineering:</b> Types of corrosion, corrosion control, coatings, electroplating, polishing, PVD, CVD and thermal spraying	20	9
	<b>Total</b>	<b>100</b>	<b>45</b>

#### List of Practical:

1. Study of crystal structures (BCC, FCC, HCP)
2. Study of metallurgical microscope and its components
3. Preparation of specimen for microscopic examination
4. Microstructure analysis of ferrous and non-ferrous metals
5. Study of basic NDT methods

6. Identification of corrosion types and corrosion prevention methods

**i. Text Book and Reference Book:**

**Text Books:**

1. O.P. Khanna, *Material Science & Metallurgy*, Dhanpat Rai and Sons.
2. R.K. Rajput, *Material Science & Engineering*, S.K. Kataria & Sons.

**Reference Books:**

1. R.S. Khurmi, *Material Science*, S. Chand & Co. Ltd.

**a. Course Name: Thermodynamics & Hydraulics**

**b. Course Code: 03062202ES01**

**c. Prerequisite:** Basic understanding of science, particularly concepts of physics and general mechanics. Familiarity with units, energy forms, and basic principles of pressure, temperature, heat, and work.

**d. Rationale:** Thermodynamics and Hydraulics is fundamental to understanding energy systems and fluid behavior—both essential aspects of automobile engineering. Modern automotive systems such as engines, refrigeration units, compressors, and hydraulic brakes are based on thermodynamic laws and fluid mechanics.

**e. Course Learning Objectives:**

**CLOBJ 1:** To introduce fundamental thermodynamic concepts and properties.

**CLOBJ 2:** To develop understanding of ideal gas laws and thermodynamic processes.

**CLOBJ 3:** To explain Zeroth, First, and Second Laws of Thermodynamics.

**CLOBJ 4:** To introduce fundamentals of fluid statics and fluid dynamics.

**CLOBJ 5:** To explain principles of hydraulic systems and pumps.

**CLOBJ 6:** To develop analytical ability for solving basic thermodynamic and hydraulic problems.

**f. Course Learning Outcomes:**

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

**CLO 1:** Understand and explain thermodynamic properties such as temperature, pressure, volume, internal energy, enthalpy, and entropy.

**CLO 2:** Apply ideal gas laws to analyze thermodynamic processes.

**CLO 3:** Explain and apply Zeroth, First, and Second Laws of Thermodynamics to practical systems like heat engines, refrigerators, and heat pumps.

**CLO 4:** Understand fluid properties, buoyancy, total pressure, and stability of floating bodies.

**CLO 5:** Apply continuity equation and Bernoulli's theorem to basic fluid flow problems.

**CLO 6:** Analyze the working principles and applications of centrifugal and reciprocating pumps.

**g. Teaching & Examination Scheme:**

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

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	<b>Basic of Thermodynamics:</b> Thermodynamic system; properties of substances (pressure, temperature, volume, heat, work, energy); thermodynamic processes and cycles; reversible and irreversible processes; difference between heat and work; displacement work; electrical work, shaft work, stirring work, flow work; specific heat; latent heat; forms of energy (kinetic, potential, internal); enthalpy and entropy.	27	8
2	<b>Ideal Gases and Processes:</b> Ideal gas laws and equation of state; specific heat of ideal gas; various thermodynamic processes.	14	4
3	<b>Laws of Thermodynamics:</b> Zeroth Law; First Law and its limitations; application to flow processes (no numericals); Second Law; Kelvin–Planck and Clausius statements; heat engine, refrigerator, and heat pump.	27	8
4	<b>Fundamentals of Hydraulics:</b> Properties of fluids; fluid statics; total pressure and center of pressure; buoyant force; stability of floating bodies; Pascal’s law; types of flow; continuity equation; Bernoulli’s theorem; Euler’s equation of motion; flow through pipes; pressure drop in pipes; instruments for measuring fluid properties.	18	6
5	<b>Fluid Control System and Pumps:</b> Concept and need of control system; types of pumps; working of reciprocating pump; working of centrifugal pump; comparison of RC and CF pumps; simple problems on pumps.	14	4
	<b>Total</b>	100	30

#### i. Text Book and Reference Books:

##### Text Books:

1. P. K. Nag – *Engineering Thermodynamics*
2. R. K. Rajput – *Engineering Thermodynamics*
3. R. S. Khurmi – *Engineering Thermodynamics*

**Reference Books:**

1. Cengel & Boles – *Thermodynamics: An Engineering Approach*
2. Bansal – *Fluid Mechanics and Hydraulic Machines*
3. Modi & Seth – *Hydraulics and Fluid Mechanics*

- a. **Course Name:** Verbal Ability
- b. **Course Code:** 03060002HM01
- c. **Prerequisite:** Knowledge of Fundamentals of Communication Skills.
- d. **Rationale:** Practical language proficiency and essential soft skills for academic and professional success.

**e. Course Learning Objectives:**

CLOBJ 1	Develop effective listening and speaking skills by understanding listening processes, overcoming barriers, and applying basic public speaking techniques.
CLOBJ 2	Strengthen grammatical accuracy by applying rules of subject-verb agreement, direct-indirect speech and active passive voice in spoken and written communication.
CLOBJ 3	Expand advanced vocabulary knowledge including homophones, homonyms, homographs, phrasal verbs, and idioms for contextual and practical usage.
CLOBJ 4	Enhance analytical and creative thinking skills through activities such as SWOT analysis, problem-solving exercises, and guided story writing.
CLOBJ 5	Apply professional written communication skills by producing well-structured letters, emails and presentations with appropriate tone and format.

**f. Course Learning Outcomes:**

CLO 1	Understand the use of vocabulary including homonyms, idioms, and phrasal verbs in spoken and written communication.
CLO 2	Apply grammatical structures related to subject-verb agreement, direct- indirect speech and active passive voice in sentences and short texts.
CLO 3	Apply formal and informal letters, professional emails, and simple product presentations using appropriate structure, tone, and language conventions.
CLO 4	Analyse personal SWOT charts, simple problem-solving responses, and guided stories by organizing ideas logically.
CLO 5	Create a logical and grammatically correct oral or written narrative based on a given picture, organizing ideas clearly and coherently.

**a. Teaching & Examination Scheme:**

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

Sr. No.	Content	Weightage	Teaching Hours
1	Active – Passive Voice: Rules of Active and Passive, Structures of Passive Voice, Conversion from Active to Passive and Vice Versa	10%	1
2	Crazy Scientist: Invent a Product and Presentation of a Product	10%	1
3	Vocabulary Building: Homophones, Homonyms, Homographs, Phrasal Verbs and Idioms	12%	2
4	Homophones, Homographs and Homonyms: Confusing Pairs, Contextual Meaning and Multiple Meanings	10%	2
5	Phrasal Verbs and Idioms: Common Phrasal Verbs in Conversation and Popular Idioms with Real-Life Applications	8%	1
6	Subject–Verb Agreement: Basic Rules and Exceptions, Spot the Error and Correction Exercises	12%	2
7	SWOT Analysis: Introduction to SWOT, Creating a Personal SWOT Chart and Applying SWOT for Goal Setting	8%	2

8	Letter Writing and E-mail Writing: Formal and Informal Letter Format, Professional Email Structure, Tone and Common Mistakes	8%	1
9	Direct–Indirect Speech: Rules for Changing Tenses, Pronouns and Time Expressions, Reporting Statements, Questions, Commands and Requests	10%	1
10	Picture Perception, Story Writing and Self-Introduction: Sequencing Ideas, Description, Narrative Writing, Public Speaking, Voice Modulation and Speaking Confidence	12%	2

### Experiment List :

Exp. No.	Name of the Practical
1	Active – Passive Voice
2	Crazy Scientist – Presentation of a Product
3	Vocabulary Building: Homophones, Homonyms, Homographs, Phrasal Verbs & Idioms
4	Subject–Verb Agreement
5	SWOT Analysis
6	Letter Writing & E-mail Writing
7	Direct–Indirect Speech
8	Picture Perception
9	Story Writing Using Hints



- a. **Course Name:** Universal Human Values
- b. **Course Code:** 03060002MC01
- c. **Prerequisite:** Zeal to Learn the Subject.
- d. **Rationale:** The Universal Human Values (UHV) course aims to develop a holistic understanding of life, fostering ethical behaviour, 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:**

<b>CLOBJ 1</b>	Understanding of the concept and significance of value education in achieving holistic human development. It focuses on building clarity about right understanding, relationships, and physical facilities while introducing self-exploration as a key process for value education. It also enables learners to analyse the ideas of continuous happiness and prosperity as basic human aspirations and to identify appropriate methods for fulfilling these aspirations in the present scenario.
<b>CLOBJ 2</b>	the human being as a co-existence of the self and the body. It emphasizes distinguishing between the needs of the self and the body and recognizing the body as an instrument of the self. The chapter further develops an understanding of harmony within the self and between the self and the body, along with practices to ensure self-regulation and maintain good health.
<b>CLOBJ 3</b>	Harmony in the family and society, considering the family as the basic unit of human interaction. It develops clarity about foundational values such as trust and respect in relationships and explores the concept of justice in human-to-human interactions. It also helps learners understand harmony at the societal level while encouraging the development of a vision for a universal human order based on values.
<b>CLOBJ 4</b>	build an understanding of harmony in nature and existence by highlighting the interconnectedness and mutual fulfilment among the different orders of nature. It enables learners to realize existence as co-existence at all levels while developing a holistic perception of harmony in nature and the environment.
<b>CLOBJ 5</b>	Implications of holistic understanding in professional ethics. It helps learners understand the natural acceptance of human values and the definitiveness of ethical human conduct. The chapter also emphasizes the importance of humanistic education and constitution, analyzes professional ethics through

	case studies, and develops competence in value-based decision-making and ethical practices in professional life.
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**f. Course Learning Outcomes:**

<b>CLO 1</b>	Understand the importance of value education and develop clarity about human aspirations, self-exploration, and holistic development.
<b>CLO 2</b>	Comprehend the co-existence of self and body while developing harmony, self-regulation, and health awareness.
<b>CLO 3</b>	Understand values in relationships and develop harmony within family and society with a vision of universal human order.
<b>CLO 4</b>	Analyse interconnectedness in nature and develop a holistic understanding of harmony at all levels of existence.
<b>CLO 5</b>	Apply holistic understanding to professional ethics and develop competence in value-based decision-making in profession.

**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	0	60	0	100

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

<b>Sr. No.</b>	<b>Content</b>	<b>Weightage</b>	<b>Teaching Hours</b>
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%	03
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%	03
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	25%	03
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.	15%	03

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 towards Value-based Life and Profession	20%	03
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**h. 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