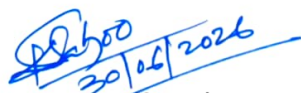


LESSON PLAN 2026-27

NAME OF THE TEACHER : SAMBIT KUMAR SAHOO, LECT.(STAGE-II, AUTOMOBILE)				
Subject: Engineering Materials (AEPC205)				
Program: Diploma in Automobile Engineering				
Semester: 3rd				
Total Contact Hours: 45				
Total Marks: 100				
Assessment: Progressive – 30, End Term – 70				
Credits: 3				
COURSE OUTCOMES:				
At the end of the course, the students will be able to:				
CO1 Identify different engineering materials and their properties along with ferrous, non-ferrous and alloys				
CO2 Describe the iron-carbon phase transformation process and crystal imperfections				
CO3 Explain the effect of heat treatment and its impact on material properties.				
CO4 Classify non-ferrous alloys, bearing and spring materials				
CO5 Identify the properties of polymers, composites and ceramics				
Class No.	Topic	Subtopics	Teaching Aids/Activities	Course Outcome
Unit I – Engineering Materials & Ferrous Alloys (10 classes)				
1	Introduction to Engineering Materials	Definition, importance, classification	PPT, material samples	CO1
2	Material Classification	Ferrous vs Non-Ferrous, Alloys	Chart, material table	CO1
3	Material Properties – Physical	Density, thermal conductivity, melting point	Video, chart	CO1
4	Material Properties – Mechanical	Strength, hardness, ductility, toughness	Comparative table	CO1
5	Material Properties – Chemical	Corrosion resistance, chemical stability	Real-life case examples	CO1
6	Performance & Reliability	Failure mechanisms, safety requirements	Case study	CO1
7	Ferrous Materials – Overview	Introduction and characteristics	Real samples, images	CO1
8	Low, Medium, High Carbon Steels	Composition, properties, applications	Steel grade charts	CO1
9	Alloy Steels	Tool steel, stainless steel, high alloy steel	Alloying element chart	CO1
10	Effect of Alloying Elements	Cr, Mn, Ni, V, Mo and their impact	Alloy wheel examples, video	CO1
Unit II – Iron-Carbon Diagram & Crystal Imperfections (12 classes)				
11	Phase Diagrams – Basics	Concept, cooling curves	Iron-carbon chart	CO2
12	Iron-Carbon Diagram – Overview	Critical points, eutectoid, eutectic	Diagram plotting	CO2
13	Microconstituents in Steel	Ferrite, austenite, cementite, pearlite	Microstructure images	CO2
14	Crystal Structures	Unit cells – BCC, FCC, HCP	3D models, visual demo	CO2
15	Crystal Imperfections – Intro	Ideal vs Real crystals	Crystal lattice visuals	CO2
16	Point Defects	Vacancies, interstitials, substitution	Animation, atomic models	CO2
17	Line Defects	Dislocations – edge & screw	Chalk demo, simulation	CO2
18	Surface & Volume Defects	Grain boundaries, voids	Image comparison	CO2
19	Deformation Mechanisms	Slip and twinning	Diagrams, video	CO2
20	Effect on Material Properties	Strength, brittleness, ductility	Comparative testing data	CO2

21	Revision & Practice – Diagrams	Iron-carbon questions, diagrams	Worksheet, MCQs	CO2
22	Crystal Imperfection Problems	Numerical/conceptual application	Class activity	CO2
Unit III – Heat Treatment (7 classes)				
23	Purpose & Need for Heat Treatment	Introduction, objectives	Real-life tools, animation	CO3
24	Annealing & Normalizing	Process, effects, applications	Heat cycle graph	CO3
25	Hardening & Tempering	Tempering colors, quenching media	Workshop demo/video	CO3
26	Stress Relieving	Causes of stress, method	Sample case study	CO3
27	Surface Hardening	Carburizing, nitriding	Furnace images, video	CO3
28	Effect on Properties	Case depth, hardness profile	Property graphs	CO3
29	Hardenability of Steel	Jominy test, practical meaning	Video, Jominy end-quench test chart	CO3
Unit IV – Non-Ferrous Alloys & Bearings (9 classes)				
30	Aluminium Alloys	Duralumin, Y-alloy – composition and use	Specimen chart	CO4
31	Copper Alloys	Brass, bronze, cupronickel	Alloy samples	CO4
32	Tin, Lead, Babbit Alloys	Applications in bearings	Real bearing samples	CO4
33	Phosphor Bronze, Copper-Tin	Composition, uses	Diagram, sample photos	CO4
34	Low-Alloy Materials	P91, P22 – power plants, high-temp applications	Industrial case studies	CO4
35	High-Alloy Materials	Stainless, duplex, super duplex	Grade comparison chart	CO4
36	Bearing Materials	Copper, tin, lead, cadmium bases	Demo kits, comparison table	CO4
37	Spring Materials	Iron-based, copper-based materials	Springs demo, material chart	CO4
38	Revision on Alloys	Summary + worksheet	Group discussion	CO4
Unit V – Polymers, Composites, Ceramics (7 classes)				
39	Thermoplastics vs Thermosets	Properties, examples	Plastic samples, flow chart	CO5
40	Elastomers	Rubber, silicone, neoprene – properties	Stretch test demo	CO5
41	Particulate Composites	Cement, concrete, alloys	Sample display	CO5
42	Fibre-Reinforced Composites	Carbon, glass fibres	Real samples, structure image	CO5
43	Ceramic Materials	Types, uses, characteristics	Crack test, insulation demo	CO5
44	Properties & Applications Recap	Overview of polymers, ceramics, composites	Flashcards, Q&A	CO5
45	Final Review & Assessment	Model Test, Oral Q&A	Practice paper, final quiz	All COs


30/06/2026
Signature of Teacher


30/6/26
Signature of HOD


LESSON PLAN 2026-27

NAME OF THE TEACHER : SAMBIT KUMAR SAHOO, LECT.(STAGE-II, AUTOMOBILE)
Subject: Basic Thermal Engineering (AEPC209)
Program: Diploma in Automobile Engineering
Semester: 3rd
Total Contact Hours: 45
Total Marks: 100
Assessment: Progressive – 30, End Term – 70
Credits: 3

COURSE OUTCOMES:	
At the end of the course, the student will be able to:	
CO1: Explain various thermodynamic systems and properties the laws of thermodynamics and air cycles and processes of ideal gases	CO2: Describe CO3: State the properties
CO4: Explain the working of reciprocating air compressor and its terminology	
CO5: Identify the processes in gas turbines, refrigeration and various refrigeration systems	

Class No.	Topic	Subtopics	Teaching Aids/Activities	Course Outcome
Unit I – Fundamentals of Thermodynamics (9 Classes)				
1	Thermodynamic Systems	Closed, open, isolated systems	PPT, examples from real systems	CO1
2	Thermodynamic Properties	Pressure, temperature, volume, enthalpy, entropy	Table/chart, visual chart	CO1
3	Extensive & Intensive Props.	Definitions with examples	Demo, quiz	CO1
4	Thermodynamic Processes	State, path, cycle, point/path functions	Process diagram	CO1
5	Thermodynamic Equilibrium	Concept, quasi-static process	Whiteboard explanation	CO1
6	Energy & Its Sources	Forms of energy, mechanical, thermal, electrical	Energy wheel chart	CO1
7	Work & Heat	Comparison, types of work	Real-life examples (e.g., piston-cylinder)	CO1
8	Mechanical Equivalent of Heat	Joule's experiment concept	Chart, demonstration	CO1
9	Practice Problems	Work transfer, displacement work	Worksheet	CO1
Unit II – Laws of Thermodynamics (9 Classes)				
10	Zeroth Law	Thermal equilibrium, temperature measurement	Thermometer, conceptual demo	CO2
11	First Law of Thermodynamics	Statement, energy balance	Examples, derivation	CO2
12	Limitations of 1st Law	Practical limitations	Real-world examples	CO2
13	Applications of 1st Law	Turbines, compressors, nozzles	Sketches, process flow	CO2
14	Steady Flow Energy Equation	SFEE derivation and explanation	Derivation on board	CO2
15	Second Law – Concepts	Heat flow direction, need for second law	Kelvin-Planck, Clausius statements	CO2
16	Heat Engines & Heat Pumps	Working, definitions	Schematic diagram, animation	CO2
17	COP and Efficiencies	Carnot efficiency, COP of refrigerator & HP	Example comparison, formula chart	CO2

18	Numerical Practice	Problems based on 1st & 2nd law	Worksheet	CO2
Unit III – Ideal Gas Properties & Processes (9 Classes)				
19	Ideal Gas Laws	Boyle's law, Charles' law, Gay-Lussac's law	Gas law animation	CO3
20	Gas Constants	R, Cp, Cv, Universal Gas Constant	Derivation, table of values	CO3
21	Relation between Cp & Cv	Derivation of $C_p - C_v = R$	Board derivation	CO3
22	Enthalpy of Gases	Concept and formula	Chart, example problems	CO3
23	Non-Flow Work Calculations	Work for isothermal, adiabatic etc.	Real-life piston-cylinder model	CO3
24	Isothermal Process	Definition, equations, graphical representation	PV diagram demo	CO3
25	Isobaric & Isochoric Process	Characteristics, heat interaction	Interactive sketching	CO3
26	Isentropic & Polytropic	Properties, equations	Board summary table	CO3
27	Throttling & Free Expansion	Conceptual understanding	Video demo of expansion valve	CO3
Unit IV – Gas and Vapor Power Cycles (9 Classes)				
28	Carnot Cycle	Working, efficiency	T-S & P-V diagrams	CO4
29	Stirling & Ericsson Cycles	Construction, working, efficiency	Cycle comparisons	CO4
30	Otto Cycle	P-V & T-S diagram, applications	Petrol engine model	CO4
31	Diesel Cycle	Process explanation, diagrams	Board sketch, video	CO4
32	Dual Cycle	Combination of Otto & Diesel	Cycle comparison chart	CO4
33	Comparison of All Cycles	Efficiency, power output, fuel used	Table, MCQ practice	CO4
34	Numerical Problems	Otto, Diesel, Dual cycle performance	Worksheet with solutions	CO4
35	Heat Engines – Applications	Use in automobiles, aircraft	Videos, case study	CO4
36	Summary of Air Standard Cycles	Revision and concept linking	Summary sheet	CO4
Unit V – Fuels and Combustion (9 Classes)				
37	Fuel – Types	Solid, liquid, gaseous, biofuels	Sample display	CO5
38	Combustion Process	Exothermic, endothermic reactions	Reaction examples, demo	CO5
39	Heating Values	HCV, LCV, calculations	Calorific value chart	CO5
40	Air-Fuel Ratio	Stoichiometric ratio, excess air	Practical example, combustion videos	CO5
41	Octane & Cetane Numbers	Importance in SI/CI engines	Fuel comparison chart	CO5
42	Calorific Value Measurement	Bomb calorimeter (theory)	Diagram + virtual lab	CO5
43	Emissions from Fuels	Combustion emissions, environmental effects	Emission charts	CO5
44	Practice on Fuel Calculations	Calorific value, combustion problems	Worksheet	CO5
45	Final Review & Mock Test	Complete syllabus revision, model questions	Full syllabus test	All COs


30/06/2022
Signature of Teacher


30/6/22
Signature of HOD

LESSON PLAN 2026-27

NAME OF THE TEACHER : LOKESH PATTNAIK, (SR. LECT, AUTOMOBILE)				
Subject: Strength of Materials (AEPC203)				
Program: Diploma in Automobile Engineering				
Semester: 3rd				
Total Contact Hours: 45				
Total Marks: 100				
Assessment: Progressive – 30, End Term – 70				
Credits: 3				
COURSE OUTCOMES:				
After completion of the course, the students will be able to				
1. Apply the concept of Simple Stresses and Strains .				
2. Describe the concept of Strain Energy.				
3. Define the concept of Shear Force and Bending Moment Diagrams.				
4. Apply the concept of Theory of Simple Bending and Deflection of Beams.				
5. Outline the concept of Torsion in Shafts and Springs.				
6. Illustrate the concept of Thin Cylindrical Shells.				
Class No.	Topic	Subtopics	Teaching Aids/Activities	Course Outcome
Unit I: Simple Stress & Strain + Strain Energy (10 classes)				
1	Introduction to SOM	Applications in real life; types of loads	PPT, Examples from vehicles	CO1
2	Types of Forces	Tensile, compressive, axial, etc.	Diagrams, animation	CO1
3	Stress & Strain	Definitions, units, types	Numerical exercise	CO1
4	Stress-Strain Diagram	M.S. and C.I. curves	Chart, actual test video	CO1
5	Elastic Constants	Young's Modulus, Bulk Modulus, etc.	Formula chart, solved problems	CO1
6	Composite Sections	Stress/strain in parallel & series bars	Problem solving session	CO1
7	Thermal Stresses	Stresses due to temperature changes	Case study, formula derivation	CO1
8	Introduction to Strain Energy	Types, definitions	Visual explanation	CO2
9	Energy under Gradual/Sudden Load	Energy expressions, problems	Worksheets, derivation	CO2
10	Impact Load Problems	Numerical problems on energy types	Assignment, MCQ quiz	CO2
Unit II: S.F. & B.M. Diagrams (9 classes)				
11	Beam Types & Loads	Cantilever, Simply supported, Overhanging; Point/UDL/UVL	Beam models, drawing board	CO3
12	Introduction to S.F. and B.M.	Concepts, positive/negative forces	Whiteboard explanation	CO3
13	Cantilever with Point Loads	S.F. & B.M. diagrams	Solved examples, class work	CO3
14	Cantilever with UDL	Analytical method, calculations	Group exercise	CO3
15	Simply Supported with Point Loads	Diagram plotting, logic behind forces	Sketching board	CO3
16	SSB with UDL	Diagrams, bending effects	Numerical quiz	CO3
17	Overhanging Beam – Point Load	Reactions and moment analysis	Animated simulation	CO3
18	Overhanging Beam – UDL	Diagrams and equations	Problem sheet	CO3
19	Mixed Loads – Practice	Combined UDL & point loads	Test, individual practice	CO3
Unit III: Simple Bending & Deflection (9 classes)				

20	Theory of Simple Bending	Assumptions, neutral axis, moment of resistance	Derivation board, video explanation	C04
21	Bending Stress	Formula, unit, bending moment	Problem solving	C04
22	Modulus of Section & Resistance	Section properties	Charts and section view	C04
23	Radius of Curvature	Concept and calculation	Derivation + application	C04
24	Safe Load & Span	Deriving safe limits	Examples from engineering practice	C04
25	Deflection of Beams - Concept	Deflection in beams (point load, UDL)	Real beam video	C04
26	Cantilever – Deflection	Standard formulae, cases	Problem solving	C04
27	Simply Supported Beam – Deflection	Standard formulae	Assignment	C04
28	Summary + Practice	All bending & deflection topics	Worksheet and test	C04
Unit IV: Torsion in Shafts & Springs (9 classes)				
29	Introduction to Shafts	Solid vs hollow shafts, applications	Videos, actual shaft demo	C05
30	Polar Moment of Inertia	Calculation for solid & hollow shafts	Examples, formula derivation	C05
31	Theory of Torsion	Derivation of $T/J = f\theta/r$	Derivation with explanation	C05
32	Design Based on Strength	Torque and angle of twist	Numerical problems	C05
33	Solid vs Hollow Shaft Comparison	Weight, strength, economy	Table comparison	C05
34	Types of Springs	Classification, uses	Physical demo	C05
35	Closed Coil Helical Spring	Nomenclature and stiffness	Chart explanation	C05
36	Spring Formulas & Problems	Safe load, deflection, number of coils	Numerical solving	C05
37	Practice Session	Mixed problems on torsion and springs	Group problem sheet	C05
Unit V: Thin Cylindrical Shells (9 classes)				
38	Introduction to Shells	Types, construction	Video of boilers/tanks	C06
39	Longitudinal & Hoop Stress	Concept and diagrams	Sketching, animated explanation	C06
40	Derivation – Hoop Stress	Seamless and seam shell equations	Whiteboard derivation	C06
41	Derivation – Longitudinal Stress	Formula explanation	Worksheet and Q&A	C06
42	Numerical – Hoop Stress	Practice problems	Calculation worksheet	C06
43	Numerical – Longitudinal Stress	Safe working pressure, thickness	Problems with units	C06
44	Mixed Problems & Summary	All topics on shells	Combined worksheet	C06
45	Course Review & Model Test	Complete syllabus practice + queries	Revision test	All



Signature of Teacher



Signature of HOD

LESSON PLAN 2026-27

NAME OF THE TEACHER : Nilakantha Nayak, LECT. (STAGE-II, AUTOMOBILE)				
Subject: Manufacturing Engineering (AEPC201)				
Program: Diploma in Automobile Engineering				
Semester: 3rd				
Total Contact Hours: 45				
Total Marks: 100				
Assessment: Progressive – 30, End Term – 70				
Credits: 3				
COURSE OUTCOMES:				
At the end of the course, the students will be able to:				
CO1 Identify various cutting fluids, lubricants and lathe operations.				
CO2 Describe various broaching machines and drilling processes.				
CO3 Explain different welding and milling operations.				
CO4 Identify various types of gear making and press working operations.				
CO5 Describe various grinding and finishing processes.				
Class No.	Topic	Subtopics	Teaching Aids / Activities	Course Outcome
Unit I: Cutting Tools & Lathe Operations (9 Classes)				
1	Introduction to Manufacturing	Importance, applications, relevance in automobile industry	PPT, Real-life examples	CO1
2	Cutting Tools	Chisels, hacksaw blades, dies, reamers	Physical samples, videos	CO1
3	Tool Geometry	Turning tool geometry, tool angles and functions	Charts, diagrams, tool models	CO1
4	Machining Parameters	Speed, feed, depth of cut	Calculation sheet, charts	CO1
5	Coolants & Lubricants	Purpose, types, usage in machining	Sample bottles, video explanation	CO1
6	Lathe Machine – Types	Light duty, medium duty, heavy duty, CNC lathe	Images, videos, lab visit	CO1
7	Parts of Lathe	Headstock, tailstock, carriage, etc.	Real model / Workshop demo	CO1
8	Lathe Operations – I	Turning, facing, parting off, boring	Tool samples, process animation	CO1
9	Lathe Operations – II	Knurling, threading, taper & step turning	Workshop tool demo, model part drawing	CO1
Unit II: Casting & Drilling (12 Classes)				
10	Introduction to Casting	Definition, classification	Foundry video, chart	CO2
11	Sand Mould Casting	Procedure, applications	Sand mould demo model	CO2
12	Moulding Sand	Types, composition, properties	Samples, table chart	CO2
13	Patterns and Allowances	Types of patterns, allowances (shrinkage, draft, etc.)	Pattern samples, PPT	CO2
14	Cores in Casting	Types and functions	Core box, animations	CO2
15	Furnaces for Casting	Cupola and Crucible furnaces – construction and working	Diagrams, process video	CO2
16	Die Casting	Procedure, uses, advantages	Die casting video, discussion	CO2
17	Centrifugal Casting	True centrifugal, centrifuging – advantages, limitations	Case study, video demonstration	CO2
18	Casting Defects	Types, causes, remedies	Defect chart, defected parts	CO2
19	Introduction to Drilling	Classification, parts and functions of drilling machines	Drill machine model or lab visit	CO2
20	Drilling Operations	Radial drilling, operations like reaming, boring, tapping	Real part demo, video	CO2
21	Drills & Reamers	Types, uses, specifications	Drill bit set, visual demo	CO2

Unit III: Welding & Milling (9 Classes)				
22	Welding – Introduction	Classification, gas welding, types of flames	Welding torch demo, video	CO3
23	Arc Welding	Principle, equipment, applications	Welding simulator video	CO3
24	Advanced Welding Methods	TIG, MIG, Submerged Arc Welding	Practical video, equipment photo	CO3
25	Resistance Welding	Spot, seam, projection welding	Process animation, sample parts	CO3
26	Welding Defects	Types, causes, remedies	Defect images, group discussion	CO3
27	Brazing and Soldering	Principles, types, applications	Hands-on demo/video	CO3
28	Milling Machines – Types	Plain, universal, vertical milling machines	Machine images/video tour	CO3
29	Milling Operations	Simple, compound, differential indexing	Indexing head demo, PPT	CO3
30	Milling Tools & Holding Devices	Cutter types, nomenclature, tool signature, holding devices	Tool charts, cutter samples	CO3
Unit IV: Gear Making & Press Working (9 Classes)				
31	Gear Manufacturing – I	Casting, moulding, stamping, coining	Flowchart, real world examples	CO4
32	Gear Manufacturing – II	Extruding, rolling, machining	Process animation, case study	CO4
33	Gear Shaping	Pinion & rack cutter method	Animated video, sketches	CO4
34	Gear Hobbing	Hobbing machine, hob types	Machine video, sample gears	CO4
35	Gear Finishing	Lapping, shaving, grinding, burnishing	Finishing chart, gear samples	CO4
36	Gear Materials & Heat Treatment	Materials, carburizing, nitriding, quenching	Metallurgy chart, video	CO4
37	Press Working – I	Press types, specifications, working	Machine images/video	CO4
38	Press Operations – II	Cutting, bending, drawing, blanking	Punching video, workshop demo	CO4
39	Die Components & Clearances	Punch, die shoe, guide pin, clearances	Die set model, animation	CO4
Unit V: Grinding & Finishing (6 Classes)				
40	Introduction to Grinding	Significance, applications	Grinding wheel demo	CO5
41	Grinding Wheel Manufacturing	Process, types, bond types	Sample wheels, process video	CO5
42	Grinding Wheel Selection	Selection criteria, examples with specifications	Wheel chart, selection exercise	CO5
43	Types of Grinding Machines	Cylindrical, Surface, Centreless	Lab video or machine visit	CO5
44	Surface Finish & Super Finishing	Surface finish definition, importance, super finishing processes	Finish comparison samples	CO5
45	Lapping Process	Principle, applications, materials used	Lapping video, lab demo	CO5

Signature of Teacher


Signature of HOD

LESSON PLAN 2026-27

NAME OF THE TEACHER : Guest Faculty-01				
Subject: Fluid Mechanics and Fluid Power (AEPC207)				
Program: Diploma in Automobile Engineering				
Semester: 3rd				
Total Contact Hours: 45				
Total Marks: 100				
Assessment: Progressive – 30, End Term – 70				
Credits: 3				
COURSE OUTCOMES:				
After completion of the course, the students will be able				
1. Identify the properties of a fluid and hydrostatics.				
2. Explain the basic kinematics and dynamics of fluid mechanics				
3. Describe the flow through orifices, notches and pipes.				
4. Classify different types of turbines and pumps.				
5. Apply the knowledge of fluid power.				
Class No.	Topic	Subtopics	Teaching Aids / Activities	Course Outcome
Unit I – Properties of Fluid & Hydrostatics (9 classes)				
1	Introduction to Fluids	Definition, classification (ideal, real, compressible, incompressible)	PPT, examples	CO1
2	Properties of Fluids (1)	Density, specific weight, specific gravity	Chart, real-world examples	CO1
3	Properties of Fluids (2)	Viscosity, surface tension	Demo with liquids, videos	CO1
4	Fluid Pressure	Concept, pressure head, Pascal's Law	Pressure tube demo	CO1
5	Hydrostatic Force	Total pressure & center of pressure on surfaces	Whiteboard derivation	CO1
6	Curved/Inclined Surface	Applications, location of center of pressure	Sketches, previous year problems	CO1
7	Manometers	Simple, differential, inverted manometers	Glass tube setup demo	CO1
8	Buoyancy & Floatation	Archimedes' principle, floating body, metacenter	Float test, case study	CO1
9	Practice & Numericals	Problems on pressure, manometer and floatation	Worksheet, quiz	CO1
Unit II – Kinematics & Dynamics of Fluid (6 classes)				
10	Types of Flow	Steady/unsteady, laminar/turbulent, uniform/non-uniform	Flow diagrams, animations	CO2
11	Flow Lines	Streamline, pathline, streakline	Chalkboard sketch	CO2
12	Fluid Energies & Continuity	Kinetic, potential, internal energy; continuity equation	Derivation + visuals	CO2
13	Bernoulli's Equation	Law and derivation	Derivation and chart	CO2
14	Venturimeter	Working, formula, application	Lab model/video	CO2
15	Pitot Tube & Flowmeter	Pitot static tube principle, velocity measurement	Demonstration with models	CO2
Unit III – Orifices, Notches & Pipes (9 classes)				
16	Orifices – Intro & Coefficients	Cc, Cv, Cd – concepts and relations	Board derivation	CO3
17	Discharge Equations	Orifice discharge, velocity of jet	Application problems	CO3

18	Weirs & Notches	Rectangular and triangular notches	Lab video	CO3
19	Numerical Problems	Notch & orifice discharge calculations	Worksheet	CO3
20	Pipe Flow – Basics	Definitions, types, fittings	Pipe models	CO3
21	Fluid Friction Laws	Darcy-Weisbach, Hazen-Williams	Chart, derivation	CO3
22	Loss of Head in Pipes	Major and minor losses, calculation	Sample calculations	CO3
23	Nozzle & Power Transmission	Use of nozzle, power equation	Design sketch	CO3
24	Numerical Practice	Pipes & nozzles – energy line, gradient line	Problem solving sheet	CO3
Unit IV – Turbines and Pumps (12 classes)				
25	Classification of Turbines	Impulse & reaction, selection based on head/discharge	Chart, comparison table	CO4
26	Pelton Wheel	Construction, working principle	Pelton wheel model/video	CO4
27	Francis Turbine	Mixed flow reaction turbine	Working animation	CO4
28	Kaplan Turbine	Axial flow reaction turbine	Visual demo, model	CO4
29	Draft Tubes	Function, types	Diagram on board	CO4
30	Cavitation in Turbines	Causes, effects, prevention	Case study	CO4
31	Efficiency & Power	Calculations: Work done, efficiency	Numerical problems	CO4
32	Centrifugal Pump – Intro	Working principle, applications	Real pump demo/video	CO4
33	Components & Efficiency	Impellers, casings, priming, multistage, efficiency	Parts diagram	CO4
34	Reciprocating Pump – Basics	Single/double acting, working	Piston pump model	CO4
35	Reciprocating Pump Concepts	Slip, negative slip, cavitation	Explanation + numericals	CO4
36	Numerical Practice	Pumps – Efficiency, Work done, head	Quiz, worksheet	CO4
Unit V – Fluid Power (9 classes)				
37	Intro to Fluid Power	Hydraulic vs Pneumatic systems	Comparison chart	CO5
38	Pascal's Law	Enclosed system, principle	Lab demo, bottle experiment	CO5
39	Hydraulic System Components	Reservoir, filter, valves, accumulator, actuator	Block diagram, actual parts	CO5
40	Valves & Actuators	Direction, flow control, linear/rotary actuators	Circuit symbols	CO5
41	Hydraulic Pumps	Gear, vane, piston types	Cut-section models	CO5
42	Hydraulic Circuits – Basics	Reading and drawing simple circuits	Schematic diagrams	CO5
43	Circuit Examples	Press operation, rotary actuator, holding job	Animation videos	CO5
44	Practice Problems & Case Study	Common fluid power problems	Class activity	CO5
45	Final Review & Mock Test	Complete syllabus revision	Model paper + doubt clearing	All COs

Signature of Teacher


Signature of HOD