



GOVERNMENT POLYTECHNIC PAONTA SAHIB
AT DHAULA KUAN, DISTT. SIRMOUR (HP) - 173031
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

Academic Year	AUG- DEC 2026
Semester	5 th
Course Code	MEPC301
Course Name	FLUID MECHANICS AND HYDRAULIC MACHINERY
Course Type	PROGRAMME CORE
Class	MECHANICAL ENGINEERING
L-P-DCS	2-0-2
Name of Faculty	ER. ASHISH PATIAL
Semester Start & End Dates	06-08-2026 TO 28-11-2026

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Hours/Weeks			Total hours/week	Credits	Internal Assessment			External Assessment					Total
		L	P	DCS			Th.	Pr	Total	Th.	Hrs.	Pr.	Hrs.	Total	
1	BASIC MECHANICAL ENGINEERING	2	0	2	4	2	40	...	40	60	3	...	...	60	100

Date	Topic Details	Delivery Method
Unit-1 (i) Properties of fluid		Chalk Blackboard and using Digital Media
Day 1	Density, Specific Gravity, Specific Weight, Specific Volume	
Day 2	Dynamic Viscosity and Kinematic Viscosity	
Day 3	Surface Tension and Capillarity	
Day 4	Vapour Pressure and compressibility	
Unit-1 (ii) Fluid pressure and Pressure Measurement		
Day 5	Fluid Pressure, Pressure Head and Pressure Intensity	
Day 6	Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure	
Day 7	Simple manometer and Bourdan Pressure gauge	
Day 8	Differential Manometer	
Day 9-10	Numerical Problems	
Unit-2 (i) Fluid Flow		
Day 11	Types of fluid flow	
Day 12	Path Line and Stream Line, Continuity Equation	
Day 13	Bernoulli's theorem for ideal fluid	
Day 14	Principle of operation of Venturimeter (derivation of discharge)	
Day 15	Orificemeter (derivation of discharge)	
Day 16	Pitot Tube (derivation of discharge)	

Day 17-18	Numerical Problems
Unit-2 (ii) Flow Through Pipes	
Day 19	Laminar and Turbulent Flows
Day 20	Darcy's and Chezy's equation for frictional losses
Day 21	Minor Losses in pipes
Day 22	Hydraulic and total gradient line
Day 23-24	Numerical Problems
Unit-3 Impact of Jets	
Day 25	Impact of Jet on fixed and moving vertical flat plates
Day 26	Impact of jet on curved vanes
Day 27-28	Numerical Problems
Unit-4 Hydraulic Turbines	
Day 29	Layout of Hydroelectric power plant
Day 30	Features of Hydroelectric power plant
Day 31	Classification of Hydraulic Turbines
Day 32	Selection of Turbines on the basis of Head and discharge available
Day 33	Construction and working principle of Pelton Wheel Turbine
Day 34	Construction and working principle of Francis Turbine
Day 35	Construction and working principle of Kaplan Turbine
Day 36	Draft tubes- Types and construction
Day 37	Cavitation in turbine
Day 38	Calculation of Work Done, Power of Turbine
Day 39	Calculation of efficiency of Turbine, Unit Quantities
Day 40-41	Numerical Problems
Unit-5 (i) Centrifugal Pumps	
Day 42	Principle of working and application of centrifugal pump
Day 43	Types of casing and impellers
Day 44	Concept of Multistage centrifugal pump
Day 45	Priming and cavitation in centrifugal pump
Day 46	Manometric Head, Work Done, Manometric Efficiency, Overall Efficiency of centrifugal pump
Unit-5 (ii) Reciprocating Pumps	
Day 47	Construction of single acting reciprocating pump
Day 48	Working and applications of single acting reciprocating pump
Day 49	Construction of double acting reciprocating pump
Day 50	Working and applications of double acting reciprocating pump
Day 51	Concept of Slip and negative slip
Day 52-53	Concept of cavitation and separation
Day 54-56	Revision

Chalk
Blackboard and
using Digital
Media

Described books	Name of Book	Author Name	Publication
	1. Fluid Mechanics and Hydraulic Machines	R.K Bansal	Laxmi Publications
	2. Hydraulics and Fluid Mechanics	P.N Modi and S.M Seth	Standard Book House
	3. Hydraulic, Fluid Mechanics and Fluid Machines	S Ramamrutham	Dhanpath Rai and Sons


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DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Academic Year	AUG - DEC 2026
Semester	FIFTH
Course Code	MEPC305
Course Name	THEORY OF MACHINES & MECHANISMS
Course Type	PROGRAMME CORE
L-T-P	3-2-0
Name of Faculty	ER. ASHISH PATIAL
Semester Start & End Dates	06-08-2026 TO 28-11-2026

STUDY AND EVALUATION SCHEME

STUDY AND EVALUATION SCHEME													Total Marks
S.No	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					
					Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
1.	THEORY OF MACHINES & MECHANISMS	3	2	0	40	0	40	60	3	0	0	60	100

Course Objectives:

- To understand different types of cams and their motions and also to draw cam profiles for various motions.
- To understand the mechanism of various types of drives available for transmission of power.
- To understand the design of Brakes, Dynamometers, Bearings and Clutches and their function and working.
- To understand the need for balancing of masses in the same plane To know different types of governors.

HOURS	Unit & Topic of Discussion	Topic Details	Delivery Method
14 HOURS	Cams and Followers	Concept; Definition and application of Cams and Followers; Classification of Cams and Followers; Different follower motions and their displacement diagrams like uniform velocity, SHM, uniform acceleration and Retardation; Drawing of profile of radial cam with knife-edge and roller follower without offset for reciprocating motion (graphical method for uniform velocity and SHM only).	
17 HOURS	Power Transmission	Types of Drives: Belt Drives - flat belt, V-belt & its applications; Material for flat and V-belt; Angle of lap, Belt length. Slip and Creep; Determination of Velocity Ratio, Ratio of tight side and slack side tension; Centrifugal tension and Initial tension; Condition for maximum power transmission (Formula without proof) (Simple numerical); Chain Drives-Advantages & Disadvantages;; Gear Drives	

		– Spur gear terminology; Types of gears and gear trains; Train value & Velocity ratio for simple and compound gear train.	CHALK-BLACKBOARD & USING TECHNOLOGICAL PEDAGOGY
17 HOURS	Flywheel and Governors	Flywheel - Concept, function and application of flywheel with the help of turning moment diagram for single cylinder 4-Stroke I.C. Engine; Co-efficient of fluctuation of energy, Coefficient of fluctuation of speed and its significance; Governors-Types and explanation with neat sketches (Centrifugal, Watt and Porter); Concept, function & Terminology of Governors; Comparison between Flywheel and Governor.	
18 HOURS	Brakes, Clutches & Bearings	Function of brakes; Types of brakes; Comparison between brakes and dynamometers; Construction and working of i) shoe brake, ii) Band Brake, iii) Disc Brake; Concept of Self Locking & Self energizing brakes; Clutches- Function of Clutch and its application; Construction and working of i) Single plate clutch, ii) Multi plate clutch, iii) Centrifugal Clutch and iv) Cone clutch; Bearings – i) Simple Pivot, ii) Collar Bearing, iii) Conical pivot.	
14 HOURS	Balancing & Vibrations	Concept of balancing; Balancing of single rotating mass; Graphical method for balancing of several masses revolving in same plane; Vibrations, its type and concept of damping ;Causes of vibrations in machines; their harmful effects and remedies.	

	Name of Book	Author Name	Publication
Prescribed Books	Theory of machines	S.S.Rattan	Tata McGraw-Hill publications.
	Theory of machines	R.S. Khurmi & J.K. Gupta	S.Chand publications

Course outcomes:

At the end of the course, the student will be able to:

CO1: Know different machine elements and mechanisms.

CO2 Understand Kinematics and Dynamics of different machines and mechanisms.

CO3 Select Suitable Drives and Mechanisms for a particular application.

CO4 Appreciates the concept of balancing and Vibration.

CO5 Develops the ability to come up with innovative ideas.

CO6 Understand different types of cams and their motions and also draw cam profiles for various motions

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DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

Academic Year	AUG - DEC 2026
Semester	FIFTH
Course Code	MEPC303
Course Name	ADVANCED MANUFACTURING PROCESSES
Course Type	PROGRAMME CORE COURSE (PC)
L-T-P	2-2-0
Name of Faculty	SANJEEV KUMAR SHARMA
Semester Start & End Dates	01-08-2026

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th	DCS	Pr	Internal Assessment			External Assessment					Total Marks
					Th.	Pr.	Total	Th.	Hrs.	Pr.	Hrs.	Total	
1	ADVANCED MANUFACTURING PROCESSES	2	2	0	40	0	40	60	3	0	3	100	100

Hour s	Unit & Topic of Discussion	Topic Details	Delivery Method
	Unit1: Jigs & Fixtures		Chalk & Blackboard And Projector
1Hr	Definition of jig		
1Hr	Types of jigs: Leaf jig, Box and Handle jig		
1Hr	Template jig, Plate jig, Indexing jig		
1Hr	Universal jig, Vice jigs		
1Hr	General consideration in the design of drill jigs		
1Hr	General consideration in the design of Drill bush		
1Hr	Types of fixtures: Vice fixtures, Milling fixtures,		Chalk & Blackboard And Projector
1Hr	Boring fixtures		
1Hr	Grinding fixtures		
1Hr	Basic principles of location		
1Hr	Locating methods and devices		
1Hr	Basic principles of the clamping;		
1Hr	Types of clamps: Strap clamps, Cam clamps		
1Hr	Screw clamps, Toggle clamps, Hydraulic and Pneumatic clamps.		
	Unit-II: Plastic Processing		

1Hr	Processing of plastics	Chalk Blackboard And Projector
1Hr	Moulding processes	
1Hr	Injection moulding	
1Hr	Compression moulding,	
1Hr	Transfer moulding	
1Hr	Extruding; casting	Chalk & Blackboard And Projector
1Hr	Fabrication methods-sheet forming	
1Hr	Blow moulding	
1Hr	Laminating plastics(sheets, rods & tubes)	
1Hr	Reinforcing; applications of plastics	
	UNIT-III	Chalk & Blackboard And Projector
	Modern Machining Processes	
1Hr	Principle	
1Hr	Description of Ultrasonic Machining	
1Hr	Applications of Ultrasonic Machining	
1Hr	Electric Discharge Machining	
1Hr	Electric Discharge Machining	
1Hr	Wire cut EDM	
1Hr	Abrasive Jet Machining	
1Hr	Laser Beam Machining	
1Hr	Electro Chemical Machining.	
	Unit-IV: CNC Milling Machines Vertical and horizontal machining center	Chalk & Blackboard And Projector
1Hr	Vertical and horizontal machining center	
1Hr	Constructional features	
1Hr	Constructional features	
1Hr	Axis identification,	
1Hr	Electronic control system	
1Hr	Automatic tool changer	
1Hr	tool magazine	
1Hr	CNC programming: Preparatory functions (G code)	
1Hr	miscellaneous functions (M code)	
1Hr	Part programming	Chalk & Blackboard And Projector
1Hr	Part programming	
	Unit-IV :Special Purpose Machines (SPM)	
1Hr	Concept of Special Purpose Machines (SPM)	
1Hr	General elements of SPM	
1Hr	Productivity improvement by SPM	
1Hr	Principles of SPM design	
1Hr	Maintenance of Machine Tools	
1Hr	Types of maintenance	
1Hr	Repair cycle analysis	
1Hr	Repair complexity	
1Hr	Maintenance manual	

Chalk & Blackboard And Vector	Maintenance records	
	Housekeeping	
	Introduction to Total Productive Maintenance(TPM)	

	Name of Book	Author Name	Publication
Prescribed Books	CNC machines	Pabla B.S. & M. Adithan,	New Age international limited.
	Manufacturing Processes	Begman & Amsted	John Willey and Sons.
	Advanced manufacturing technology	David L. Goetsch	

Signature of Subject Incharge

Saijan

Signature of Head of Department

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DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Session : Aug.2026 - Dec. 2026

Branch: Mech. Engineering

Year/Semester : 3rd/5th

Subject : ELEMENTS OF REFRIGERATION AND AIR-CONDITIONING

HOURS	Unit	Name of the chapter	Contents to be taught	Remarks
13 Hrs.	UNIT-I	Introduction to Refrigeration:	Definition of Refrigeration; Refrigerating effect-unit of refrigeration-Coefficient of performance; Carnot refrigeration Cycle; Air refrigeration-Bell-Coleman cycle, PV & TS diagram; Advantage and disadvantages in air refrigeration; (Simple problems on Carnot refrigeration cycle only)	
14 Hrs.	UNIT-II	Refrigeration systems (Problems omitted):	Basic Components, Flow diagram of working of Vapour compression cycle; Representation of the vapour compression cycle on P-H & T-S Diagram; Expression for Refrigerating effect, work done and power required; Types of Vapour Compression cycle; Effects of superheating and sub cooling, its advantages and disadvantages; Simple Vapour absorption cycle and its flow diagram; Comparison of Vapour absorption and vapour compression system	
13 Hrs.	UNIT-III	Refrigeration equipments:	Compressor - Hermetically sealed and Semi hermetically sealed compressor; Condensers - Air Cooled, water cooled, natural and forced draught cooling system; Advantages and disadvantages of air cooled and water cooled condensers; Evaporators- natural convection, forced convection types.	
		Refrigerants and lubricants:	Introduction to refrigerants; Properties of good refrigerants; Classification of refrigerants; Detection of refrigerants leakage; Charging the system with refrigerant; Lubricants used in refrigeration and their properties.	
09 Hrs.	UNIT - IV	Refrigerant flow controls:	Capillary tube; Automatic Expansion valve; Thermo static expansion valve; High side and low side float valve; Solenoid valve; Evaporator pressure regulator.	
		Application of refrigeration:	Slow and quick freezing; Cold storage and Frozen storage; Dairy refrigeration; Ice making industry; Water coolers.	
15 Hrs	UNIT- V	Air conditioning	Introduction to Air conditioning; Factors affecting Air conditioning; Brief description of Dry Bulb Temperature, Wet bulb Temperature, Dew point temperature; Psychrometric chart and its use; Psychrometric process-sensible heating and cooling, Humidification and dehumidification; cooling and dehumidification, heating and humidification, (Simple problems on above psychrometric processes only by using psychrometric chart); Equipment used in air conditioning cycle.	
		Refrigeration and Air-conditioning tools:	Tools used in refrigeration and Air conditioner installation; Installation procedure; Servicing procedure.	

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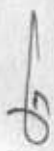
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