

Govt. Polytechnic Hamirpur		Department :- Mechanical Engg. (5 th Sem.)		Subject- FM&HM(MEPC301)		Remarks
SYLLABSE COVERRAGE		Course- Diploma		Duration -3 Years		
		Total Periods – 56 (Lecture-28 + DCS- 28)		Theory-56 (Lecture-28 + DCS- 28)		
Sr no.	Period No's	Topic	Details	Instruction Reference	Additional Study Recommended	
1	1-12	Properties of fluid Fluid Pressure & Pressure Measurement:	Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity, Surface tension, Capillarity, Vapour Pressure, Compressibility. Fluid pressure, Pressure head, Pressure intensity, Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure, Simple and differential manometers, Bourdan pressure gauge. (Simple problems on Manometers only).	Fluid Mechanics and Hydraulic Machines- R.K. Bansal	Fluid Mechanics & Hydraulic Machines, S.S. Rattan,	
2	13-23	Fluid Flow Flow Through Pipes:	Types of fluid flows, Path line and Stream line, Continuity equation, Bernoulli's theorem for ideal fluid, Principle of operation of Venturimeter, Orifice meter and Pitot tube, Derivations for discharge, coefficient of discharge and simple numerical problems. Laminar and turbulent flows; Darcy's equation and Chezy's equation for frictional losses (Formula for the above terms without proof), Minor losses in pipes, Hydraulic gradient and total gradient line, Simple Numerical problems to estimate losses only.	-----do-----	-----do-----	
3	24-32	Impact of jets:	Impact of jet on fixed vertical, moving vertical flat plates, Impact of jet on curved vanes with special reference to turbines , Simple Numerical on work done and efficiency.	-----do-----	Hydraulic, fluid mechanics & fluid machines- Ramamrutham S	
4	33-45	Hydraulic Turbines	Layout of hydroelectric power plant, Features of Hydro electric power plant. Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available, Construction and working principle of Pelton wheel, Francis and Kaplan turbines, Draft tubes – types and construction. Concept of cavitation in turbines, Calculation of Work done, Power, efficiency of turbines, Unit quantities (Formula only) and simple numerical.	-----do-----	-----do-----	

Sr. no.	Period No's	Topic	Details	Instruction Reference	Additional Study Recommended	Remark
5	46-56	Centrifugal Pumps Reciprocating Pumps (Problems omitted):	Principle of working and applications, Types of casings and impellers, Concept of multistage, Concept of Priming and Cavitation, Manometric head, Work done, Manometric efficiency, Overall efficiency. Construction, working principle and applications of single and double acting reciprocating pumps. Concept of Slip, Negative slip, Cavitation and separation.	----do----	----do-----	

Tanuj Gupta
(Lect Mech)

Approved	HOD Sign
Date : 1/8/24	

Govt. Polytechnic Hamirpur (H.P.)
Lesson Planning (Practical)

Branch : Mechanical Engineering

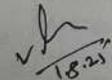
Semester: 5th

Subject : Automotive Lab

Session: Aug - Dec 2025

Teacher: Er. Vikas Thakur

Sr. No.	Week	Detail of Contents	Remarks
1	1-4	<ul style="list-style-type: none">• Study of different types of clutches and adjust the clutch pedal play.• Study of front axle, rear axle and differential of an automobile.	
2	5-6	<ul style="list-style-type: none">• Study of different types of gear box.• Study of steering system of the automobile.	
3	7-8	<ul style="list-style-type: none">• Study of hydraulic brake system of an automobile, bleeding of hydraulic brakes	
4	9-12	<ul style="list-style-type: none">• Procedure of rotation of wheels, balancing of wheels and alignment of wheels.• Study of drive train of Electric Vehicles and its various parts	
5	13-16	<ul style="list-style-type: none">• Spark plug cleaning and gap setting.• Driving practice on four wheelers one hour/student in the semester.	


Signature of Teacher with Date


Signature of H.O.D.

Govt. Polytechnic Hamirpur (H.P.)
Lesson Planning (Theory)

Branch : Mechanical Engineering

Semester: 5th

Subject : Vehicular Systems

Session: Aug - Dec 2025

Teacher: Er. Vikas Thakur

Sr. No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Remarks
1	10	Unit-1: Introduction	<ul style="list-style-type: none"> Types of automobiles, different layouts of vehicle, chassis, frame and body Spark Ignition (SI) & Compression Ignition (CI) engines. 	R1& R2	
2	14	Unit- 2 Automotive Engine Parts	<ul style="list-style-type: none"> Automotive Engine Parts Cylinder – arrangements and their relative merits, Liners, Piston, connecting rod, crankshaft, valves valve actuating mechanisms. 	R1& R2	
3	10	Unit- 3 Transmission Systems	<ul style="list-style-type: none"> Transmission Systems Clutch-types and construction of single plate clutch, propeller shaft, slip joints universal joints, Differential, and rear axle. 	R1& R2	
4	12	Unit- 4 Brakes and Suspension Systems	<ul style="list-style-type: none"> Brakes and Suspension Systems Requirements, leaf spring, coil spring. Types of brakes, mechanical and hydraulic braking systems, brake shoe arrangements, Disk brakes, drum brakes, Antilock – Braking systems purpose and operation of antilock-braking system. 	R1& R2	
5	10	Unit- 5 Safety and Comfort Systems	<ul style="list-style-type: none"> Safety and Comfort Systems Passive Safety Systems – Airbags, Seatbelts, Crumple Zones, Active Safety Systems – Automatic Driver Assist Systems (ADAS), Antilock Braking System, Reverse parking system, Anti-collision system, Traction control system, Comfort Systems – Cruise control system, Heating, ventilation and Air-conditioning system (HVAC), Autonomous Driving Cars – Level of Driving Automation.(Basic definitions and functions only) 	R1& R2	

REFERENCE RESOURCES

R1 Automobile Engineering-R. B. Gupta, Satya Prakashan.

R2 Automobile Engineering-Kirpal Singh. Vol I and II.


1.8.25

Signature of Teacher with Date



Signature of H.O.D.



DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Name of Faculty	Manoj Kumar	Academic Session	Aug - Dec 2025
Course Name	Elements of Refrigeration and Air Conditioning	Scheme	N- 2022
Course Code	MEPE301- 2	Semester	5th
Course Type	Programme Elective Course (PE)	Semester Start Date	04-08-2025
L-T-P	4-0-0	Semester End Date	26-11-2025

STUDY AND EVALUATION SCHEME

Teaching Hours/Week		Internal Assessment		External Assessment				Total		Credit
Theory	Practical	Theory	Practical	Theory	Hrs.	Practical	Hrs.	Theory	Practical	
04 Hrs.	NA	40	NA	60	03 Hrs.	NA	NA	100	NA	03

COURSE OUTCOMES(COs)

On the successful completion of this course, students will be able to:-	
CO1	Define refrigeration and types of Refrigeration cycles
CO2	Explain Vapour Compression and Vapour Absorption System working principles
CO3	Identify the components required for refrigeration system and lubricants of refrigeration system
CO4	Identify the controlling components for a refrigeration system.
CO5	Explain the working principles of Air-conditioning.
CO6	Explain the basics about air conditioning systems.

COURSE CONTENTS

Hours	Unit & Topic of Discussion	Topic Details	Pedagogical Tools	Remarks	
12	Unit-1 : Introduction to Refrigeration		Chalk, Blackboard and Projector	CT-1 (2 nd Week of September, 2025)	
	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)				
12	Unit-2 : 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 absorptions cycle and its flow diagram; Comparison of Vapour absorption and vapour compression system.				
12	Unit-3 : Refrigeration Equipments, Refrigerants & Lubricants				CT-2 (3 rd Week of October, 2025)
	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. 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.				
08	Unit-4 : Refrigerant Flow Controls & Application of Refrigeration				House Test (2 nd Week of November 2024)
	Capillary tube; Automatic Expansion valve; Thermo static expansion valve; High side and low side float valve; Solenoid valve; Evaporator pressure regulator. Slow and quick freezing; Cold storage and Frozen storage; Dairy refrigeration; Ice making industry; Water coolers.				
12	Unit-5 : Air Conditioning and Refrigeration & Air Conditioning Tools				
	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. Tools used in refrigeration and Air conditioner installation; Installation procedure; Servicing procedure.				

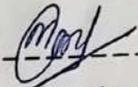
Recommended Books

1.	Refrigeration and Air Conditioning by R.S Khurmi & J.K Gupta, S. Chand
2.	Refrigeration and Air Conditioning – A.S.Sarao & G.S. Gabi, Satya Prakashan
3.	Thermodynamics by Yunus A. Cengel, Special Indian Edition
4.	Refrigeration and Air Conditioning–C.P Arora, Tata McGraw
5.	Refrigeration and Air Conditioning by G.S Aulakh.
6.	Refrigeration and Air Conditioning–M.Zakria Baig, Premier/ Radiant Publishing House.

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Faculty Signature: _____


01/08/2025

Govt. Polytechnic Hamirpur (H.P.)

Lecture Planning

Branch: Mechanical Engineering (5th Sem.)

Session: Aug. - Nov. 2025

Teacher: Er. Dinesh Kumar Patial,

Subject: Theory of Machines & Mechanisms

Sr. No.	Dates	Chapter/ Unit Description	Detail of Contents	Reference Resources
1.	04 Aug. to 23 Aug. 25 (12 Hrs)	UNIT-I: 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).	R1,R2,
2.	25 Aug. to 15 Sep. 25 (15 Hrs)	Unit-II: 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.	R2,R3
3.	17 Sep. to 08 Oct. 25 (15 Hrs)	Unit-III: I.C. 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.	R1,R3,
4.	09 Oct. to 07 Nov. 25 (15 Hrs)	Unit-IV: 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.	R1,R3,
5.	10 Nov. to 26 Nov. 25 (12 Hrs)	Unit-V: 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.	R1,R2,

R1.- Theory of machines–S.S.Rattan, Tata McGraw-Hill publications.

R2.- Theory of machines–R.K. Bansal, Laxmi publications

R3 - Theory of machines–R.S. Khurmi & J.K.Gupta, S.Chand publications.


Signature of Teacher with Date 01/08/25


Signature of H.O.D.