



GOVERNMENT POLYTECHNIC PAONTA SAHIB

AT DHAULA KUAN, DISTT. SIRMOUR (H.P) - 173031
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Academic Year	JAN 2024-JUNE 2024
Semester	SIXTH
Course Code	ME6.2
Course Name	REFRIGERATION AND AIR CONDITIONING
Course Type	PROGRAMME CORE COURSE (PC)
L-T-P	4-0-2
Name of Faculty	MUNEESH KUMAR
Semester Start & End Dates	30-01-2024 TO 25-05-2024

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th.	Pr.	Internal Assessment			External Assessment					Total Marks
				Th.	Pr.	Total	Th.	Hrs.	Pr.	Hrs.	Total	
1	REFRIGERATION AND AIR CONDITIONING	4	2	30	20	50	100	3	50	3	150	200

Hours	Dates	Lectures	Unit & Topic of Discussion	Assignments	Delivery Method
Jan 29-Feb 2024			Unit-1 : Principles of Refrigeration	ASSIGNMENT-1 DATED ON 28/02/2024 AND SUBMISSION ON 06/03/2024	Chalk & Blackboard And Projector
7 hours	30/01/2024	L1,L2,L3,	1.1 Meaning		
	31/01/2024	L4,L5,L6, L7	1.2 Refrigeration Methods		
	06/02/2024		1.3 Units of Refrigeration		
	07/02/2024		1.4 Reversed Carnot cycle		
Feb 2024			Unit-2 : Refrigeration Systems		
9 hours	07/02/2024	L8,L9,L10,	1.5 Heat pump		
	13/02/2024	L11,L12,	1.6 Coefficient of Performance		
	14/02/2024	L13,L14,	1.7 Rating of refrigeration machines		
	20/02/2024	L15, L16	2.1 Air refrigeration cycle- applications and its limitations		
	21/02/2024		2.2 Vapour Compression Cycle		
Feb-March 2024			Unit-3 : Refrigerants		
7 hours	27/02/2024	L17,L18,	2.3 Effect of sub cooling and super heating		
	28/02/2024	L19,L20,	2.4 Departure of Actual vapour compression cycle from theoretical cycle		
	05/03/2024	L21,L22,	2.5 Effect of varying condensing and suction temperature on coefficient of performance.		
	06/03/2024	L23	2.6 Simple mathematical calculation with pressure-enthalpy charts.		
			2.7 Vapour Absorption cycle		
			2.8 Actual vapour absorption cycle and application		
			3.1 Important properties of a refrigerant		
			3.2 Properties and applications of commonly used refrigerants such as R11, R12, R22, NH3 and Water.		
			3.3 Newer Refrigerants		
			Unit-4 : Refrigeration System, Components and Controls		

Mar-April 2024				
7 Hours	06/03/2024 12/03/2024 13/03/2024 19/03/2024 20/03/2024	L24,L25, L26,L27, L28,L29, L30	4.1 Function, types, specification and constructional details of components such as compressor, condenser, throttling device, evaporator, oil separator, accumulator, header. 4.2 Various controls- Solenoid Valve, thermostat, low pressure/high pressure cut out, oil safety switch	
CLASS TEST-1 ON 13/03/2024, TIME 1 HOUR				
Mar-April 2024			Unit 5: Psychrometry	ASSIGNMENT-2 DATED ON 10/04/2024 AND SUBMISSION ON ON 23/04/2024
7 Hours	20/03/2024 26/03/2024 27/03/2024 02/04/2024	L31,L32, L33,L34, L35,L36, L37	5.1 Various terms-Dry and wet bulb temperatures, Saturation, Dew point, adiabatic saturation, temperature, Relative humidity, absolute humidity, humidity ratio. 5.2 Psychrometric chart and its uses 5.3 Psychrometric processes-Sensible heating and sensible cooling, humidification and dehumidification, cooling and dehumidification, heating and humidification, and their representation on psychrometric chart. 5.4 Simple Problems	
April 2024			Unit-6 : Air-conditioning	
5 Hours	03/04/2024 09/04/2023 10/04/2024	L38,L39, L40,L41, L42	6.1 Introduction 6.2 Metabolism in human body 6.3 Human comfort 6.4 Applications of air-conditioning	
April 2024			Unit-7 : Heat Loads	
5 Hours	10/04/2024 16/04/2024 23/04/2024	L43,L44, L45,L46, L47	7.1 Various types of loads 7.2 Sensible and latent heat load 7.3 Load calculations	
CLASS TEST-2 ON 16/04/2024, TIME 1 HOUR				
April-May 2024			Unit-8: Air-conditioning System	ASSIGNMENT-3 ON 01/05/2024 AND SUBMISSION ON 08/05/2024
5 Hours	24/04/2024 30/04/2024 01/05/2024	L48,L49, L50,L51, L52	8.1 Description of room air conditioner 8.2 Central air-conditioning system 8.3 Round the year air conditioning system 8.4 Air distribution systems: concept of filter, damper, fan, blower, air register and diffuser	
April 2024			Unit-9: Miscellaneous Topics	
4 hours	01/05/2024 07/05/2024 08/05/2024	L53, L54, L55,L56	9.1 Evaporative cooling - Principle, Desert air cooler	
REVISION SESSION ON DATE 21/05/2024 TILL END OF SEMESTER CLASSES				

	Name of Book	Author Name	Publication
Prescribed Books	1. Refrigeration & air conditioning.	Domkundwar	Dhanpat Rai & Sons
	2. Refrigeration and Air Conditioning.	C.P Arora	Tata Mc Graw Hills
	3. Refrigeration and Air Conditioning.	R.S Khurmi	S Chand and Company
	4. Refrigeration & Air condition.	A.S Saroq	Satyaprakashan

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PLANNED SYLLABUS COVERAGE (Theory)

GP Paonta Sahib		Department: Mechanical Engineering		Subject : Automobile Engineering		
SYLLABUS COVERAGE		Total Period: 56		Theory : 56		
Sr. No.	Period Nos	Date	Content	Instruction Reference	Additional Study Recommende	Remarks
1	4 (1-4)		1.1 Components of an automobile 1.2 Classification of automobiles 1.3 Layout of chassis 1.4 Types of drives-front wheel, rear wheel, four wheel, left hand, right hand 1.5 Introduction to electric vehicle	Automobile Engineering by Kirpal Singh, Standard Publishers	Automobile Engineering by GBS Narang, Khanna Publishers	
2	18 (05-22)		2.1 Clutch Function, Constructional details of single plate and multi plate friction clutches, Centrifugal and semi centrifugal clutch 2.2 Gear Box: Function, Working of slide mesh, constant mesh and synchro mesh gear box, Torque converter and overdrive 2.3 Propeller shaft and rear axle Function, Universal joint, Differential, Rear axle drives and different types of rear axles 2.4 Wheels and Tyres Types of wheels- disc wheels and wire wheel, Types of tyres used in Indian vehicles, Causes of tyre wear, Toe in, Toe out, Camber, Caster, Kingpin inclination, Tube less tyres	----do----	-----do-----	
3.	5 (23-27)		3.1 Function and principle 3.2 Ackerman and Davis steering gears 3.3 Types of steering gears- worm and nut, worm and wheel, Rack and pinion type 3.4 Introduction to power steering	-----do-----	-----do-----	

4.	7 (28-34)	<p>4.1 Constructional detail and working of mechanical, hydraulic and vacuum brake.</p> <p>4.2 Concept of brake adjustment & Bleeding of brakes</p> <p>4.3 Introduction to ABS, EBD and hill assist braking system</p> <p>4.4 Introduction to Traction control</p>	---do---	-----do-----
5.	3 (35-37)	<p>5.1 Function</p> <p>5.2 Types</p> <p>5.3 Working of coil spring, leaf spring</p> <p>5.4 Shock absorber</p>	---do---	-----do-----
6.	5 (38-42)	<p>6.1 Constructional details of lead and cell battery</p> <p>6.2 Specific gravity of electrolyte</p> <p>6.3 Effect of temperatures, charging and discharging on specific gravity</p> <p>6.4 Capacity and efficiency of battery</p> <p>6.5 Battery charging</p> <p>6.6 Maintenance of batteries</p> <p>6.7 Checking of batteries for Voltage and specific gravity</p>	---do---	-----do-----
7.	5 (43-47)	<p>7.1 Dynamo, Function and details, Regulators-voltage, current and compensated Type, Cut out-Construction, working and their adjustment.</p> <p>7.2 Alternator, Construction and working, Charging of battery from alternator</p>	---do---	-----do-----
8.	4 (48-51)	<p>8.1 Tractors</p> <p>8.2 Forklift</p> <p>8.3 Cranes & Recovery vehicles</p>	---do---	-----do-----
9.	5 (52-56)	<p>9.1 Introduction to Lighting system of automobile</p> <p>9.2 Windscreen Wiper</p> <p>9.3 Horn</p> <p>9.4 Speedometer</p> <p>9.5 HVAC system</p>	---do---	-----do-----

Subject incharge

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AT DHAULA KUAN, DISTT. SIRMOUR (HP) - 173031
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Academic Year	JAN 2024-JUNE2024
Semester	SIXTH
Course Code	ME6.5
Course Name	CNC Machine and Automation
Course Type	PROGRAMME CORE COURSE (PC)
L-T-P	4-0-4
Name of Faculty	NITISH SHARMA
Semester Start & End Dates	29-01-2024 TO 25-05-2024

STUDY AND EVALUATION SCHEME

Sr. No.	Name of the Subject	Th.	Pr.	Internal Assessment			External Assessment					Total Marks
				Th.	Pr.	Total	Th.	Hrs.	Pr.	Hrs.	Total	
1	CNC Machine and Automation	4	4	30	20	50	100	3	50	3	150	200

Hours	Unit & Topic of Discussion	Topic Details	Delivery Method
	Unit-1 : 1. Introduction		Chalk & Blackboard And Projector
1Hr	Basic concepts of NC, CNC & DNC		
1Hr	Advantages & disadvantage of CNC Machines		
1Hr	Application of CNC Machines		
1Hr	Difference between conventional & CNC Machines		
1Hr	Profitable applications of CNC Machines		
1Hr	Introduction to CAM		
	2. Construction of CNC Machines		Chalk & Blackboard And Projector
1Hr	Machine control unit its advantages &disadvantages		
1Hr	NC control its advantages &disadvantages		
1Hr	PLC control its advantages &disadvantages		
1Hr	Application and limitations of PLC machines		
1Hr	Axis designate of CNC machines		
1Hr	Special constructional requirement of CNC machines		Chalk & Blackboard
1Hr	Slide ways		
1Hr	Bolt screw & nut assembly		
1Hr	Lubrication & cooling of CNC machines		
1Hr	Spindle & spindle motors		

1Hr	Axis drives motor	And Projector
1Hr	Swarf removal & safety provision of CNC machines	
1Hr	Feedback mechanism in CNC machines	
	3. Tooling of CNC Machines	Chalk & Blackboard And Projector
1Hr	Introduction Tooling of CNC Machines	
2Hr	Various cutting tools for CNC machines	
2Hr	Work holding devices	
1Hr	Automatic tool changer	Chalk & Blackboard And Projector
	4. Control System	
1Hr	Open & close loop control system	
1Hr	Fundamental problem in control	
1Hr	Accuracy, resolution	
1Hr	Repeatability, instability	
1Hr	Response & damping	
1Hr	Position control Point to point	
1Hr	Position control Straight line	
1Hr	Position control Continuous	
	5. Part Programming	Chalk & Blackboard And Projector
1Hr	Part programming and basic concepts of part programming	
1Hr	NC words	
1Hr	part programming formats	
1Hr	simple programming for rational components	
2Hr	part programming using canned cycles,	
2Hr	subroutines and do loops	
2Hr	tool off se cutter radius compensation	
1Hr	wear compensation	Chalk & Blackboard And Projector
	6. Common Problems in CNC Machines	
1Hr	Common problems in mechanical	
1Hr	Common problems in electrical	
1Hr	Common problems in pneumatic	
1Hr	Common problems in electronic	
1Hr	PC components of NC machines	
1Hr	Diagnostic study of common problems and remedies	
1Hr	Use of on-time fault finding diagnosis tools in CNC machines	Chalk & Blackboard And Projector
	7. Industrial Automation	
1Hr	Meaning of automation	
1Hr	need of automation	
1Hr	different types of automation	
1Hr	advantages/ disadvantages of automation,	Chalk & Blackboard And Projector
1Hr	Components of automated system, concept of FMS.	

	Name of Book	Author Name	Publication
Prescribed Books	1. CNC Machines-Programming and Applications	M Adithan and BS Pabla	New Age International (P) Ltd., Delhi
	2. Computer Aided Manufacturing	Rao, Kundra and Tiwari	Tata Mc GrawHill, New Delhi
	3. CNC Machine by Bharaj	Satya Publications	New Delhi

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LESSON PLAN

INSTITUTE NAME: GOVT. POLYTECHNIC PAONTA SAHIB BRANCH : MECHANICAL
 SUBJECT NAME: PRODUCTION PLANING AND CONTROL SEM:6th
 SESSION : 2023 -2024 SUBJECT CODE:N-2017(6.1)

S.NO	LECTUR E NO.	Date	CONTENTS	Refronce
1	4		Types of production. - Job, batch and mass production Concept of planning, scheduling, routing, dispatching and follow up Break even analysis and Gantt chart	1 Industrial Engineering and Management by T.R Banga and SC Sharma; Khanna Publishers, Delhi
2	7		Definition Factors affecting the site selection of plant Factors affecting plant layout Types of layout - Process, product, combination and fixed position, layout patterns Techniques of making layout - Flow diagram, templates, distance volumematrix, travel chart	2. Industrial Engineering and Management by O.P. Khanna; Dhanpat Rai and Sons, New Delhi
3	10		Definition, advantages and procedure of Work study Difference between production and Productivity, measures to improve productivity. Method study - Definition, Objectives and Procedure Symbols, Flow process chart, Flow diagram, Machine chart, Two hand chart. Principles of motion economy, Therblig symbols, Simo chart Work Measurement - Time study, definition, principle and method of time study Stop watch study - Number of readings, calculation of basic time, rating techniques, normal time, allowance, standard time	3. Production Management by C.L. Mahajan; Satya Parkashan Company Limited, New Delhi 4. Mechanical Costing, Estimation and Project Planning by CK Singh, Standard Publishers, New Delhi
4	8		Material purchasing, store keeping, functions and duties of store department. Definition of inventory, Types of inventory ABC analysis Procurement cost, carrying charges, lead-time, reorder point, Economic ordering quantity, simple numerical problems. Codification and standardization Concept of JIT	5. A Text Book of
5	7		Inspection needs, types of inspection, stages of inspection Statistical quality control Process capability Control charts for variables - X and R chart, control chart for fraction defectives (P chart), control chart for number of defects (C chart) Concept of ISO 9000, ISO 14000 and TQM	
6	6		Principles of material handling Hoisting equipment - Fork lift truck, cranes Conveying equipment - Package conveyor, gravity roller conveyors, screw conveyors, flight or scraper conveyors, bucket conveyors, bucket elevators, belt conveyors, and pneumatic conveyors. Work station design	
7	6		Objectives and importance of maintenance Different types of maintenance Nature of maintenance problem Range of maintenance activities Procedure of preventive maintenance Schedules of preventive maintenance Advantages of preventive maintenance	
8	8		Functions of cost estimation Estimation procedure Elements of cost, ladder of costs Depreciation-concept and methods of calculating depreciation Overhead expanses Cost control - capital cost control (planning and scheduling) operating cost control.	

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