5TH SEM, ME

LESSON PLAN FOR ADVANCED MANUFACTURING PROCESSES

Name of Teacher- **Abhay Thakur**	Subject-**ADVANCED MANUFACTURING PROCESSES**	August-December 2024	Class- 5th sem, ME

S.NO.	WEEK	CONTENTS	REMARKS
1	Week 1	Jigs & Fixtures: Definition of jig; Types of jigs: Leaf jig, Box and Handle jig, Template jig, Plate jig, Indexing jig, Universal jig, Vice jigs;	
2	Week 2	General consideration in the design of drill jigs; Drill bush; Types of fixtures: Vice fixtures, Milling fixtures, Boring fixtures,	
3	Week 3	Grinding fixtures; Basic principles of location; Locating methods and devices; Basic principles of the clamping;	
4	Week 4	Types of clamps: Strap clamps, Cam clamps, Screw clamps, Toggle clamps, Hydraulic and Pneumatic clamps.	
5	Week 5	Plastic Processing: Processing of plastics; Moulding processes: Injection moulding, Compression moulding, transfer moulding; Extruding; Casting;	
6	Week 6	Fabrication methods-Sheet forming, Blow moulding, Laminating plastics(sheets, rods & tubes),Reinforcing; Applications of Plastics.	
7	Week 7	Modern Machining Processes: Principle, Description and applications of Ultrasonic Machining, Electric Discharge Machining,	
8	Week 8	Wire cut EDM, Abrasive Jet Machining, Laser Beam Machining, Electro Chemical Machining.	
9	Week 9	CNC Milling Machines: Vertical and horizontal machining center: Constructional features,	
10	Week 10	Axis identification, Electronic control system. Automatic tool changer and tool magazine.	
11	Week 11	CNC programming: Preparatory functions (G code) , miscellaneous functions (M code), Part programming.	
12	Week 12	Special Purpose Machines (SPM): Concept, General elements of SPM, Productivity improvement by SPM, Principles of SPM design.	
13	Week 13	Maintenance of Machine Tools: Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records,	
14	Week 14	Housekeeping. Introduction to Total Productive Maintenance(TPM).	

26/08/2024

Abhay Thakur
Workshop Supdt.(Mechanical Engg.)
Govt. Polytechnic Kinnaur

HOD/OIC

LESSON PLAN FOR ELEMENTS OF REFRIGERATION & AIR CONDITIONING

Name of Teacher- Amandeep Sharma	Subject-Elements of RAC	August-December 2024	Class- 5th sem, ME

S.NO.	WEEK	CONTENTS	REMARKS
1	Week 1	Introduction to Refrigeration: Definition of Refrigeration; Refrigerating effect-unit of refrigeration Coefficient of performance;	
2	Week 2	Carnot refrigeration Cycle; Air refrigeration-Bell-Coleman cycle ,PV & TS diagram;	
3	Week 3	Advantage and disadvantages in air refrigeration;(Simple problems on Carnot refrigeration cycle only)	
4	Week 4	Refrigeration systems (Problems omitted): Basic Components, Flow diagram of working of Vapour compressioncycle;Representation ofthe vapour compression cycle onP-H & T-SDiagram	
5	Week 5	;Expression for Refrigerating effect, work done and power required; Types of Vapour Compression cycle; Effects of superheating and sub cooling,	
6	Week 6	its advantages and disadvantages; Simple Vapour absorptions cycle and its flow diagram; Comparison of Vapour absorption and vapour compression system.	
7	Week 7	Refrigeration equipments: Compressor - Hermetically sealed and Semi hermetically sealed compressor; Condensers - Air Cooled, water cooled, natural and forced draught cooling system;	
8	Week 8	Advantages and disadvantages of air cooled and water cooled condensers; Evaporators- natural convection, forced convection types. Refrigerants and lubricants: Introduction to refrigerants;	
9	Week 9	Properties of good refrigerants; Classification of refrigerants; Detection of refrigerants leakage; Charging the system with refrigerant; Lubricants used in refrigeration and their properties	
10	Week 10	Refrigerant flow controls: Capillary tube; Automatic Expansion valve; Thermo static expansion valve;	
11	Week 11	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.	
12	Week 12	Air conditioning: Introduction to Air conditioning; Factors affecting Air conditioning; Brief description of Dry Bulb Temperature, Wet bulb Temperature, Dew point temperature; Psychometric chart and its use;	
13	Week 13	Psychometric 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);	
14	Week 14	Equipment used in air conditioning cycle. Refrigeration and Air-conditioning tools: Tools used in refrigeration and Air conditioner installation; Installation procedure; Servicing procedure.	

25/08/2024

Amandeep Sharma
HOD (Mechanical Engg.)
Govt. Polytechnic Kinnaur

HOD/OIC

LESSON PLAN FOR FLUID MECHANICS AND HYDRAULIC MACHINERY

Name of Teacher-Akshay Rana	Subject-Fluid Mechanics and Hydraulic Machinery	August-December 2024	Class- 5th Sem, ME

S.NO.	WEEK	CONTENTS	REMARKS
1	Week 1	Properties of fluid : Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity, Surface tension,	
2	Week 2	Capillarity, Vapour Pressure, Compressibility. Fluid Pressure & Pressure Measurement: Fluid pressure, Pressure head, Pressure intensity,	
3	Week 3	Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure, Simple and differential manometers, Bourdan pressure gauge, (Simple problems on Manometers only).	
4	Week 4	ideal fluid, Principle of operation of Venturimeter, Orifice meter and Pitot tube,	
5	Week 5	Derivations for discharge, coefficient of discharge and simple numerical problems.	
6	Week 6	Flow Through Pipes: Laminar and turbulent flows; Darcy's equation and Chezy's equation for frictional losses (Formula for the above terms withoutproof), Minor losses in pipes, Hydraulic gradient and total gradient line, Simple Numerical problems to estimate losses only.	
7	Week 7	Impact of jets: Impact of jet on fixed vertical, moving vertical flat plates, Impact of jet on curved vanes with special reference to turbines ,	
8	Week 8	Simple Numerical on work done and efficiency.	
9	Week 9	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	
10	Week 10	Construction and working principle of Pelton wheel, Francis and Kaplan turbines, Draft tubes – types and construction,	
11	Week 11	Concept of cavitation in turbines, Calculation of Work done, Power, efficiency of turbines, Unit quantities (Formula only) and simple numerical	
12	Week 12	Centrifugal Pumps (Problems omitted): Principle of working and applications, Types of casings and impellers, Concept of multistage,	
13	Week 13	Concept of Priming and, Cavitation, Manometric head, Work done, Manometric efficiency, Overall efficiency.	
14	Week 14	Reciprocating Pumps (Problems omitted): Construction, working principle and applications of single and double acting reciprocating pumps, Concept of Slip, Negative slip, Cavitation and separation.	

25/06/2024

Akshay Rana
Sr. Lecturer (Mechanical Engg.)
Govt. Polytechnic Kinnaur

HOD/OIC

LESSON PLAN FOR THEORY OF MACHINES & MECHANISMS

Name of Teacher-Akshay Rana	Subject-Theory of Machines & Mechanisms	August-December 2024	Class- 5th Sem, ME

S.NO.	WEEK	CONTENTS	REMARKS
1	Week 1	Cams and Followers: Concept; Definition and application of Cams and Followers; Classification of Cams and Followers;	
2	Week 2	Different follower motions and their displacement diagrams like uniform velocity, SHM, uniform	
3	Week 3	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).	
4	Week 4	Power Transmission (Derivations omitted): 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;	
5	Week 5	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)	
6	Week 6	(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.	
7	Week 7	Flywheel and Governors(Problems omitted): Flywheel - Concept, function and application of flywheel with the help of turning moment diagram for single cylinder 4-Stroke I.C. Engine;	
8	Week 8	Co-efficient of fluctuation of energy, Coefficient of fluctuation of speed and its significance;	
9	Week 9	Governors-Types and explanation with neat sketches (Centrifugal, Watt and Porter); Concept, function & Terminology of Governors; Comparison between Flywheel and Governor.	
10	Week 10	Brakes, Clutches & Bearings(Problems and derivations omitted): Function of brakes; Types of brakes; Comparison between brakes and dynamometers;	
11	Week 11	Construction and working of i) shoe brake, ii) Band Brake, iii) Disc Brake; Concept of Self Locking & Self energizing brakes;	
12	Week 12	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.	
13	Week 13	Balancing & Vibrations(Problems omitted): Concept of balancing; Balancing of single rotating mass; Graphical method for balancing of several masses revolving in same plane;	
14	Week 14	Vibrations, its type and concept of damping ;Causes of vibrations in machines; their harmful effects and remedies.	

25/06/2024

Akshay Rana
Sr. Lecturer (Mechanical Engg.)
Govt. Polytechnic Kinnaur

HOD/OIC

LESSON PLAN FOR RENEWABLE ENERGY TECHNOLOGIES

Name of Teacher- Rohit Tiwari	Subject-Renewable Energy Technologies	August-December 2024	Class- 5th Sem, ~~ME~~ CIVIL

S.NO.	WEEK	CONTENTS	REMARKS
1	Week 1	World Energy Use; Reserves of Energy Resources	
2	Week 2	Environmental Aspects of Energy Utilization; Renewable Energy Scenario in India and around the World	
3	Week 3	Potentials; Achievements/Applications; Economics of renewable energy systems.	
4	Week 4	Solar energy: Solar Radiation; Measurements of Solar Radiation; Flat Plate and Concentrating Collectors	
5	Week 5	Solar direct Thermal Applications; Solar thermal Power Generation,	
6	Week 6	Fundamentals of Solar Photo Voltaic Conversion	
7	Week 7	Solar Cells; Solar PV Power Generation; Solar PV Applications	
8	Week 8	Wind Energy: Wind Data and Energy Estimation; Types of Wind Energy Systems	
9	Week 9	Performance; Site Selection; Details of Wind Turbine Generator; Safety and Environmental Aspects.	
10	Week 10	Bio-Energy: Biomass direct combustion; Biomass gasifiers	
11	Week 11	Biogas plants; Digesters; Ethanol production; Biodiesel; Cogeneration; Biomass Applications.	
12	Week 12	Other Renewable Energy Sources: Tidal energy; Wave Energy	
13	Week 13	Open and Closed OTEC Cycles	
14	Week 14	Small Hydro-Geothermal Energy; Hydrogen and Storage; Fuel Cell Systems; Hybrid Systems	

25/06/24

Rohit Tiwari
Lecturer (Mechanical Engg.)
Govt. Polytechnic Kinnaur

HOD/OIC 25/06/2024

GOVT POLYTECHNIC KINNAUR, CAMP AT ROHRU DISTT. Shimla (H.P)

PLANNED SYLLABUS COVERAGE

SESSION- AUG-DEC 2024	Department : Mechanical Engineering	Faculty Name : Pankaj Chatanta
	Subject : AUTOMOTIVE LAB, 5th SEM, ME	Designation: Lecturer Mechanical
SYLLABUS COVERAGE	Total Periods :- 28 Practical: 28	No. of Pages: 3

Sr. no	Week	Topic/practical	Details of topic/practical	Assignment details	Practical Details	Remarks
1	Week 1				Study of different types of clutches and adjust the clutch pedal play	
2	Week 2				Study of front axle, rear axle and differential of an automobile	
3	Week 3				Study of front axle, rear axle and differential of an automobile	
4	Week 4				Study of different types of gear box.	

5	Week 5				Study of different types of gear box.	
6	Week 6				Study of steering system of the automobile	
7	Week 7				Study of hydraulic brake system of an automobile, bleeding of hydraulic brakes.	
8	Week 8				Study of hydraulic brake system of an automobile, bleeding of hydraulic brakes.	
9	Week 9				Procedure of rotation of wheels, balancing of wheels and alignment of wheels.	
10	Week 10				Procedure of rotation of wheels, balancing of wheels and alignment of wheels.	

11	Week 11				Study of drive train of Electric Vehicles and its various parts	
12	Week 12				Spark plug cleaning and gap setting.	
13	Week 13				**HOUSE TEST**	
14	Week 14				Driving practice on four wheelers one hour/student in the semester.	

Signature of Teacher

Countersigned by HOD/ OIC

GOVT POLYTECHNIC KINNAUR, CAMP AT ROHRU DISTT. Shimla (H.P)

PLANNED SYLLABUS COVERAGE

SESSION- AUG-DEC 2024	Department : Mechanical Engineering	Faculty Name : Pankaj Chatanta
	Subject : FLUID MECHANICS &HYDRAULIC MACHINERY LAB, 5th SEM, ME	Designation: Lecturer Mechanical
SYLLABUS COVERAGE	Total Periods :- 28 Practical: 28	No. of Pages: 3

Sr. no	Week	Topic/practical	Details of topic/practical	Assignment details	Practical Details	Remarks
1	Week 1				Measurement of pressure head by employing. i) Piezometer tube ii) U- tube manometer iii) Differential U- tube Manometer.	
2	Week 2				Measurement of pressure head by employing. i) Piezometer tube ii) U- tube manometer iii) Differential U- tube Manometer.	
3	Week 3				Verification of Bernoulli's theorem	

4	**Week 4**				Determination of Coefficient of Discharge of Venturimeter.	
5	**Week 5**				Determination of Coefficient of Discharge, coefficient of contraction and coefficient of velocity of Orifice meter.	
6	**Week 6**				Determination of coefficient of friction of flow through pipes.	
7	**Week 7**				Determination of minor losses of flow through pipes.	
8	**Week 8**				Calibration of pressure gauge using dead weight pressure gauge tester	
9	**Week 9**				Calibration of pressure gauge using dead weight pressure gauge tester	
10	**Week 10**				Conduct performance test on centrifugal pump	

11	Week 11				Study a single acting reciprocating pump.	
12	Week 12				Study a single acting reciprocating pump.	
13	Week 13				**HOUSE TEST**	
14	Week 14				Study of Pelton wheel and Francis/Kaplan turbine with the help of models	

Signature of Teacher

Countersigned by HOD/ OIC