MECHANICAL ENGINEERING DEPARTMENT

Session 2024-2025(4th semester)

Subject:-H&P **Load:-3 hrs Theory ,4 hrs Practical**

Lesson Plan

Week	Theory		Practical	
	Lecture Day	Topic (including assignments /tests)	Practical Day	Topic
Week 1	1st	**Introduction:** Fluid, types of fluid; properties of fluid: mass density, weight density (specific weight)	1st	Measurement of pressure head by employing Piezometer tube
	2nd	specific volume, capillarity, specific gravity, viscosity, compressibility,		
	3rd	Surface tension, kinematic viscosity and dynamic viscosity and their units.		
Week 2	1st	Revision & Mock Test	1st	Measurement of pressure head by employing Simple U-tube manometer
	2nd	**Pressure and its Measurement:** Concept of pressure (Atmospheric Pressure, gauge pressure, absolutepressure), Pascal's Law, Static Pressure		
	3rd	Pressure measuring devices: peizometer tube manometers - simple U-tube, differential single column		
Week 3	1st	inverted U-tube, micro manometer including simple problems	1st	Measurement of pressure head by employing Bourdon.s tube pressure gauge
	2nd	Bourdon pressure gauge, Diaphragm pressure gauge, dead weight pressure Gauge		
	3rd	Assignment on Pressure measuring devices		
Week 4	1st	Test	1st	Verification of Bernoulli's theorem.
	2nd	Revision of Chapter 1		
	3rd	Revision of Chapter 2		

Week 5	1st	**Flow of Fluids:** Types of fluid flow – steady and unsteady, uniform and non-uniform, laminar and turbulent	1st	Measurement of flow by using venturimeter.
	2nd	Rate of flow and their units; continuity equation of flow; potential energy of a flowing fluid; total head		
	3rd	Bernoulli's theorem (statement and proof) and its applications		

Week 6	1st	Assignment on Bernoulli's theorem		To find out the value of coefficient of discharge for a venturimeter
	2nd	Discharge measurement with the help of venturi-meter, orifice meter, pitot-tube		
	3rd	limitations of Bernoulli's theorem		

Week 7	1st	Numerical Practice on simple problems	1st	To find coefficient of friction for a pipe (Darcy's equation).
	2nd	Assignments on Numerical & Revision		
	3rd	Test		
Week 8	1st	**Flow through Pipes:** Definition of pipe flow, wetted perimeter, hydraulic mean depth, hydraulicgradient loss of head due to friction; Chezy's equation and Darcy's equation of head loss (without proof)	1st	To study a single stage centrifugal pump and reciprocating pump for constructional details with the help of cut section models.
	2nd	Reynold's number and its effect on pipe friction; siphon, Nozzle - definition,		
	3rd	velocity of liquid flowing through the nozzle, power developed. Water hammer, anchor block, syphon, surge tank		
Week 9	1st	Loss of head in pipes due to sudden enlargement, sudden contraction	1st	Study the working of Pelton wheel, Francis and Kaplan turbine with the help of working model
	2nd	obstruction on flow path, change of direction and pipe fittings		
	3rd	Revision		
Week 10	1st	Assignment on loss of heads	1st	Study of hydraulic circuit of any available machine or working model
	2nd	Test		
	3rd	**Flow through Orifices** Cc, Cv, Cd, flow through drowned, partially drowned orifices		
Week 11	1st	time for emptying a tank through a circular orifice	1st	Study of pneumatic circuit of any available machine or working model
	2nd	Numerical practice		
	3rd	Assignment on Coefficient of discharges		
Week 12	1st	**Hydraulic Machines:** Description, operation and application of hydraulic systems – hydraulic ram, hydraulic jack, hydraulic brake	1st	Study of pneumatic circuit of any available machine or working model
	2nd	hydraulic accumulator, hydraulic door closer, hydraulic press, selection of specification of above systems for different applications.		
	3rd	Assignment on Hydraulic Machines		

Week 13	1st	**Water Turbines and Pumps:** Concept of a turbine, types of turbines –impulse and reaction type, Construction and working of pelton wheel, Francis turbine, Propeller and Kaplan turbines	1st	Viva question
	2nd	Unit speed, unit power, unit discharge, specific speed of turbines, selection of turbines based on specific speed.		
	3rd	Concept of hydraulic pump, single acting reciprocating pump, vane, screw and gear pumps		
Week 14	1st	6.1 Introduction to oil power hydraulics and pneumatic system. Relative Merits and Demerits as oil power hydraulic and pneumatic system.	1st	Viva question
	2nd	6.2 Industrial applications of oil power hydraulic and pneumatic system		
	3rd	. 6.3 Basic components of hydraulic system, definition and functions of each component in a hydraulic circuit. Hydraulic oils-Classification and their properties. Seals and packing- classification of seals, sealing materials.		
Week 15	1st	6.4 Maintenance of hydraulic system: common faults in hydraulic system, simple visual checks of oil, causes of contamination, preventive measures.	1st	Viva question
	2nd	Basic Components of Pneumatic Systems , definition and functions of each component in a Pneumatic circuit. Necessity of Filter, Regulator and Regulator(FLR). Common problems in pneumatic systems. Maintenance schedule of pneumatic systems.		
	3rd	Basic Components of Pneumatic Systems		
Week 16	1st	definition and functions of each component in a Pneumatic circuit	1st	Viva question
	2nd	,. Necessity of Filter, Regulator and Regulator(FLR).		

	3rd	Common problems in pneumatic systems. Maintenance schedule of pneumatic systems.		

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