

Government Polytechnic for Women, Faridabad

Lesson Plan

Name of Faculty : Mr. Sandeep Kumar(Theory / Practical)

Discipline : Mechanical Engineering

Semester : 4th

Subject : Hydraulics and Pneumatics

Lesson Plan Duration : 15 weeks (from January 2020 to April 2020)

Work Load (Lectures / Practical) per week (in hours): Lectures-03, Practicals-02

WEEK	THEORY		PRACTICAL	
	Lecture Day	Topic (Including Assignment/Test)	Practical Day	Topic
1 st	1 st	1.Introduction Fluids: Types and properties: mass density, weight density, specific volume, capillarity	1 st	1.Measurement of pressure head by employing i) Piezometer tube ii) Single and double column manometer.
	2 nd	Specific gravity, viscosity, compressibility	2 nd	do
	3 rd	Surface tension, kinematic viscosity and dynamic viscosity and their units		
2 nd	4 th	Test of chapter-1	3 rd	do
	5 th	2. Pressure and its measurement Concept of pressure (Atm. Pressure, gauge and absolute pressure)	4 th	do
	6 th	Pascal's law and static pressure		
3 rd	7 th	Pressure measuring device Assignment Topic: Piezometer tube manometer, simple U-tube, differential single column, inverted U-tube	5 th	2. To find out the value of coefficient of discharge for a Venturimeter.
	8 th	Micrometer including simple problems	6 th	do

	9 th	Pressure gauge • Bourdon • Diaphragm • Dead weight		
4 th	10 th	Test of chapter-2	7 th	do
	11 th	3. Flow of fluids Types of fluids flow: steady and unsteady	8 th	do
	12 th	• Uniform and non-uniform • Laminar and turbulent flow		
5 th	13 th	Rate of flow and their units Continuity equation of flow	9 th	3. Measurement of flow by using Venturimeter
	14 th	Potential energy of a flowing fluid Total head	10 th	do
	15 th	Bernoulli's theorem (statement and proof) and its applications		
6 th	16 th	Discharge measurement with the help of • Venturimeter • Orifice meter	11 th	do
	17 th	• Pitot-tube Limitations of Bernoulli's theorem simple problems	12 th	do
	18 th	Test of chapter-3		
7 th	19 th	4. Flow through pipes Definition of pipe flow, wetted perimeter, hydraulic mean depth, hydraulic gradient	13 th , 14 th	4. Verification of Bernoulli's theorem.
	20 th	Loss of head due to friction • Chezy's equation • Darcy's equation		
	21 st	Re number and its effect on pipe friction, siphon.		
8 th	22 nd	Nozzle Velocity of liquid flowing through nozzle, power developed	15 th	do
	23 rd	Water hammer, anchor block, siphon and surge tank	16 th	do
	24 th	Assignment Topic: • Loss of head in pipes due to sudden enlargement • Sudden contraction		

9 th	25 th	Obstruction on flow path Change of direction and pipes fittings	17 th	5. To find coefficient of friction for a pipe (Darcy's friction)
	26 th	Test of chapter-4	18 th	do
	27 th	5. Flow through orifices C_c , C_v and C_d flow through drowned or partially drowned orifices		
10 th	28 th	Time for emptying a tank through a circular orifice Simple problems	19 th	do
	29 th	Test of chapter-5	20 th	do
	30 th	6. Hydraulic Machines Description, operation and applications of hydraulic system		
11 th	31 st	Hydraulic ram, jack and brake	21 st , 22 nd	6. To study hydraulic circuit of an automobile brake and hydraulic ram.
	32 nd	Hydraulic accumulator, door closer and press		
	33 rd	Selection of specification of above systems for different applications		
12 th	34 th	Test of chapter-6	23 rd	do
	35 th	7. Water turbines and pumps Concept of turbine Types of turbine Impulse turbine /Reaction turbine Difference between them	24 th	7. Study the working of a Pelton wheel and Francis turbine.
	36 th	Assignment Topic: Construction and working of - Pelton and Francis turbine - Propeller and Kaplan turbine		
13 th	37 th	Unit speed, unit power, unit discharge and specific speed of turbines	25 th	do
	38 th	Selection of turbine based on specific speed	26 th	do
	39 th	Concept of hydraulic pump Single acting reciprocating pump		

14 th	40 th	Vane, screw and gear pumps	27 th	8. To study a single stage centrifugal pump for constructional details and its operation to find out its normal head and discharge.
	41 st	Construction and working of Centrifugal pumps		
	42 nd	• Performance • Efficiencies • Specifications	28 th	do
15 th	43 rd	Trouble shooting and problems in centrifugal pump Remedial measures	29 th	do
	44 th	Pitting Cavitations' priming	30 th	do
	45 th	Test of chapter-7		