

GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Discipline: Mechanical Engineering	Semester 3rd	Name of the Teaching Faculty: SATYABAN KOPE
FLUID MECHANICS & FLUID POWER	No. of days/week class allotted 3	Semester From date: _____ To date: _____ No. of Week: 15
PRE-REQUISITE	FLUID MECHANICS & FLUID POWER	
Course Outcomes	<ol style="list-style-type: none"> 1. Identify the properties of a fluid and hydrostatics. 2. Explain the basic kinematics and dynamics of fluid mechanics 3. Describe the flow through orifices, notches and pipes. 4. Classify different types of turbines and pumps. 5. Apply the knowledge of fluid power. 	
Week	Class Day	Theory/Practical Topics
1st	1st	Definition of a fluid, classification of fluids,
	2nd	various fluid properties such as density, specific weight, specific gravity,
	3rd	viscosity and surface tension and state the units, fluid pressure
2nd	1st	total pressure (hydrostatic force) and location of centre of pressure on vertical, horizontal
	2nd	Inclined and curved surfaces by fluid,
	3rd	working of various measuring devices for pressure,
3rd	1st	the principle of manometers of simple
	2nd	differential and inverted types,
	3rd	principle of buoyancy and floatation. Simple numericals on Manometer.
4th	1st	Various types of flow, circulation and vorticity, stream-line, path line and streak-line, various energies of fluid
	2nd	law of conservation of mass, energy equation -Bernoulli's theorem,
	3rd	the limitations of same-application of Bernoulli's equation,
5th	1st	the working of venturimeter, pitot tube,
	2nd	equation of flow rate and velocity with respect to venturimeter and pitot tube respectively,
	3rd	the working of flowmeter: current meter, Simple numericals
6th	1st	Definition -orifice orifice coefficient such as C_c , C_v , C_d , Relationship between orifice coefficients
	2nd	weir and notch, Discharge over rectangular notch and weir,
	3rd	triangular notch. Simple numericals.
7th	1st	Definition of a pipe. laws of fluid friction, Equation of loss of head through pipe due to friction,
	2nd	Darcy's formula and Chezy's formula
	3rd	hydraulic gradient and total energy line,
8th	1st	Nozzle and its application
	2nd	Power transmission through nozzle The condition of maximum power transmission through nozzle
	3rd	Expression for diameter of nozzle for maximum power transmission.
9th	1st	Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available
	2nd	Construction and working principle of Pelton wheel,
	3rd	Francis and Kaplan turbines.
10th	1st	Draft tubes - types and construction
	2nd	Concept of cavitation in turbines, Calculation of Work done, Power, efficiency of turbines. Simple numericals
	3rd	Principle of working and applications, Types of casings and impellers
11th	1st	Concept of multistage, Priming and its methods,
	2nd	Manometric head, Work done, Manometric efficiency, Overall efficiency. Simple numericals
	3rd	Construction, working principle and applications of single and double acting reciprocating pumps
12th	1st	Construction, working principle and applications of single and double acting reciprocating pumps
	2nd	Concept of Slip, Negative slip,
	3rd	Cavitation and separation. Simple numericals
13th	1st	Definition of fluid power, classification - hydraulic power and pneumatic power
	2nd	Hydraulic Systems -Basic principle of enclosed hydraulic system - Pascal's law
	3rd	Oil hydraulic system - reservoir, filter pressure limiting valves,
14th	1st	direction control valves, flow control valves, actuators (linear and rotary),
	2nd	accumulator, pipes and fittings,
	3rd	various positive displacement pumps-gear
15th	1st	vane, piston, drawing of hydraulic circuits
	2nd	extension and retraction of linear actuator, motion of rotary actuator
	3rd	holding a job, hydraulic press etc.

Learning Resources:

- 1. R.K. BANSAL - FLUID MECHANICS AND HYDRAULIC MACHINES
- 2. S.S. RATTAN, KHANNA - FLUID MECHANICS AND HYDRAULIC MACHINES
- 3. MODI P.N AND SETH S.M., - DESIGN OF MACHINE ELEMENTS
- 4. S. JAGADISH LAL - HYDRAULICS AND FLUID MECHANICS

Satyaban Tope
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of Faculty

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