GANAPATI INSTITUTE OF ENGINERING & TECHNOLOGY(Polytechnic),JAGATPUR,CUTTACK
DEPARTMENT OF MECHANICAL ENGINEERING.
LESSON PLAN-2025 WINTER

Discipline: **MECHANICAL ENGG**	Semester: **3RD**	Name of the Teaching Faculty: **SUBHRANSU SEKHAR BARIK**	
Subject: **FLUID MECHANICS & FLUID POWER [MEPC-207 Th:4]**	No. of days/per week class allotted:03	Semester From date:14.07.2025 To Date :15.11.2025 No. of Weeks:15	
Week	Class Day	Theory/Practical Topics	
1ST	1ST	**1.0 PROPERTIES OF A FLUID AND HYDROSTATICS:** Definition of a fluid, classification of fluids,	
	2ND	Various fluid properties such as density, specific weight, specific gravity, viscosity and surface tension and state the units,	
	3RD	Various fluid properties such as density, specific weight, specific gravity, viscosity and surface tension and state the units,	
2ND	1ST	Fluid pressure, total pressure (hydrostatic force)and location of centre of pressure on vertical, horizontal by fluid	
	2ND	Total pressure (hydrostatic force)and location of centre centre of pressure on inclined and curved surfaces by fluid	
	3RD	Working of various measuring devices for pressure, the principle of simple manometers. Simple numericals	
3RD	1ST	Working of various measuring devices for pressure, the principle of differential manometers. Simple numericals	
	2ND	Working of various measuring devices for pressure, the principle of inverted type manometers. Simple numericals	
	3RD	Principle of buoyancy and floatation.	
4TH	1ST	**2.0 KINEMATICS AND DYNAMICS OF FLUID MECHANICS** Various types of flow, circulation and vorticity, stream-line, path line and streak-line, various energies of fluid.	
	2ND	Law of conservation of mass. Simple numericals.	
	3RD	Energy equation -Bernoulli's theorem, the limitations of same-application of Bernoulli's equation.	
5TH	1ST	Simple numerical on Bernoulli's theorem.	
	2ND	The working of venturimeter, pitot tube, equation of flow rate and velocity with respect to venturimeter and pitot tube respectively. Simple numerical	
	3RD	The working of flow meter: current meter. Simple numerical.	
6TH	1ST	**3.0:-FLOW THROUGH ORIFICES AND NOTCHES,PIPES** Definition–orifice,Orifice coefficient such as Cc, Cv, Cd.	
	2ND	Relationship between orifice coefficients, weir and notch.	

	3RD	Discharge over rectangular notch and weir, triangular notch. Simple numericals.
7TH	1ST	Definition of a pipe. laws of fluid friction, Equation of loss of head through pipe due to friction, Darcy's formula and Chezy's formula.
	2ND	Equation of loss of head through pipe due to friction, Chezy's formula.
	3RD	Hydraulic gradient and total energy line, Nozzle and its application.
8TH	1ST	Power transmission through nozzle The condition of maximum power transmission through nozzle.
	2ND	Expression for diameter of nozzle for Maximum power transmission.
	3RD	Simple numericals.
9TH	1ST	**4.0 Turbines and Pumps:** Classification of hydraulic turbines and pumps.
	2ND	Selection of turbine on the basis of head and discharge available.
	3RD	Construction and working principle of Pelton wheel.
10TH	1ST	Calculation of Work done, Power, efficiency of turbines. Simple numerical.
	2ND	Construction and working principle of Francis and Kaplan turbines.
	3RD	Calculation of Work done, Power, efficiency of turbines. Simple numerical.
11th	1ST	Draft tubes – types and construction, Concept of cavitation in turbines.
	2ND	**Centrifugal Pumps:** Principle of working and applications, Types of casings and impellers.
	3RD	Concept of multistage, Priming and its methods, Manometric head.
12th	1ST	Work done, Manometric efficiency, Overall efficiency. Simple numerical.
	2ND	**Reciprocating Pumps:** Construction, working principle and applications of single acting reciprocating pumps, Concept of Slip, Negative slip,. Simple numerical.
	3RD	Construction, working principle and applications of double acting reciprocating pumps,Cavitation and separation. Simple numerical.
13th	1ST	**5.0:- FLUID POWER:** 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.
	2ND	Actuators (linear and rotary), accumulator, pipes and fittings.
	3RD	Various positive displacement pumps-gear, vane, piston.
15th	1ST	Drawing of hydraulic circuits - extension and retraction of linear actuator.
	2ND	Drawing of hydraulic circuits - motion of rotary actuator.
	3RD	Drawing of hydraulic circuits - holding a job, hydraulic press etc.

Learning Resources:

SL.NO.	Name of the Book	Author Name	Publisher
01.	Fluid Mechanics and Hydraulic Machines	R.K.Bansal	Laxmi
02.	Fluid Mechanics and Hydraulic Machines	S.S.Ratan	khanna
03.	Fluid Power with Applications	Anthony Esposito	Pearson Education ltd.
04.	Hydraulics and Fluid Mechanics	Jagadish Lal	Metropolitan Book.
05.	Hydraulic,fluid mechanics and fluid machines.	S.Ramamrutham	Dhanpat Rai and Sons.

11.07.2025.
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