GOVT. POLYTECHNIC, NAYAGARH

3RD SEMESTER, MECHANICAL ENGINEERING (2025-26)

SUBJECT:-TH:4- FLUID MECHANICS & FLUID POWER (Course Code: EEPC207)

Semester from 14.07.25 to 15.11.25	Total Periods -45, Theory- 3P/WEEK

NAME OF FACULTY:- Sri Saurav Ranjan Pradhan

Sl. No.	Week	Day	Topics to be covered
1	1st	1st day	**PROPERTIES OF A FLUID AND HYDROSTATICS:** Definition of a fluid, classification of fluids, various fluid properties such as density, specific weight, specific gravity
		2nd day	Viscosity and surface tension and state the units
		3rd day	Fluid pressure, total pressure (hydrostatic force)
Sl. No.	**Week**	**Day**	**Topics to be covered**
2	2nd	1st day	Location of centre of pressure on vertical, horizontal surfaces by fluid
		2nd day	Location of centre of pressure on inclined and curved surfaces by fluid
		3rd day	Working of various measuring devices for pressure, the principle of manometers (simple)
Sl. No.	**Week**	**Day**	**Topics to be covered**
3	3rd	1st day	Working of various measuring devices for pressure, the principle of manometers (differential and inverted types)
		2nd day	Principle of buoyancy and floatation
		3rd day	Simple numericals on Manometer, **Revision of Ch-I**
Sl. No.	**Week**	**Day**	**Topics to be covered**
4	4th	1st day	**KINEMATICS AND DYNAMICS OF FLUID MECHANICS** Various types of flow, circulation and vorticity, stream-line, path line and streak-line
		2nd day	Various energies of fluid, law of conservation of mass, energy equation -Bernoulli's theorem, the limitations of same-application of Bernoulli's equation
		3rd day	The working of venturimeter
Sl. No.	**Week**	**Day**	**Topics to be covered**
5	5th	1st day	Pitot tube, equation of flow rate and velocity with respect to venturimeter and pitot tube respectively
		2nd day	The working of flowmeter: current meter
		3rd day	Simple numericals, **Revision of Ch-II**
Sl. No.	**Week**	**Day**	**Topics to be covered**

6	6th	1st day	**FLOW THROUGH ORIFICES AND NOTCHES, PIPES;** Definition –orifice, orifice coefficient such as Cc, Cv, Cd, Relationship between orifice coefficients
		2nd day	Weir and notch, Discharge over rectangular notch and weir
		3rd day	Triangular notch
Sl. No.	**Week**	**Day**	**Topics to be covered**
7	7th	1st day	Simple numericals
		2nd day	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
		3rd day	Hydraulic gradient and total energy line
Sl. No.	**Week**	**Day**	**Topics to be covered**
8	8th	1st day	Nozzle and its application, Power transmission through nozzle
		2nd day	The condition of maximum power transmission through nozzle
		3rd day	Expression for diameter of nozzle for maximum power transmission, **Revision of Ch-III**
Sl. No.	**Week**	**Day**	**Topics to be covered**
9	9th	1st day	**Turbines and Pumps:** Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available
		2nd day	Construction and working principle of Pelton wheel turbines, Calculation of Work done, Power, efficiency of turbine. Simple numericals
		3rd day	Construction and working principle of Francis turbine, Calculation of Work done, Power, efficiency of turbine. Simple numericals
Sl. No.	**Week**	**Day**	**Topics to be covered**
10	10th	1st day	Construction and working principle of Kaplan turbine, Calculation of Work done, Power, efficiency of turbine. Simple numericals
		2nd day	Draft tubes – types and construction, Concept of cavitation in turbines
		3rd day	**Centrifugal Pumps**: Principle of working and applications
Sl. No.	**Week**	**Day**	**Topics to be covered**
11	11th	1st day	Types of casings and impellers, Concept of multistage, Priming and its methods
		2nd day	Manometric head, Work done, Manometric efficiency, Overall efficiency
		3rd day	Simple numericals
Sl. No.	**Week**	**Day**	**Topics to be covered**

12	12th	1st day	**Reciprocating Pumps:** Construction, working principle and applications of single and double acting reciprocating pumps
		2nd day	Concept of Slip, Negative slip, Cavitation and separation
		3rd day	Simple numericals, **Revision of Ch-IV**
Sl. No.	**Week**	**Day**	**Topics to be covered**
13	13th	1st day	**FLUID POWER:** Definition of fluid power, classification – hydraulic power and pneumatic power
		2nd day	Hydraulic Systems -Basic principle of enclosed hydraulic system – Pascal's law
		3rd day	Oil hydraulic system – reservoir, filter pressure limiting valves, direction control valves, flow control valves
Sl. No.	**Week**	**Day**	**Topics to be covered**
14	14th	1st day	Actuators (linear and rotary)
		2nd day	Accumulator, pipes and fittings, various positive displacement pumps-gear
		3rd day	Vane, piston, drawing of hydraulic circuits
Sl. No.	**Week**	**Day**	**Topics to be covered**
15	15th	1st day	Extension and retraction of linear actuator
		2nd day	Motion of rotary actuator
		3rd day	Holding a job, hydraulic press etc, **Revision of Ch-V**

REFERENCES:

1. Fluid Mechanics and Hydraulic Machines – R. K. Bansal, Laxmi Publications, New Delhi.
2. Fluid Mechanics and Hydraulic Machines, S.S. Rattan, Khanna Publishing House, New Delhi.
3. Hydraulics and fluid mechanics including Hydraulic machines – Modi P.N. and Seth S.M., Standard Book House. New Delhi.
4. Hydraulics and Fluid Mechanics - Jagadish Lal- Metropolitan Book
5. Fluid Power with Applications - Anthony Esposito -Pearson Education Limited.
6. Hydraulic, fluid mechanics and fluid machines – S. Ramamrutham, Dhanpat Rai and Sons, New Delhi.

10/07/25

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