



**GANAPATI INSTITUTE OF ENGINEERING AND
TECHNOLOGY(POLYTECHNIC),JAGATPUR,CUTTACK**

LESSON PLAN

Discipline – MECHANICAL ENGG.	Semester – 4 th	Name of Teacher – SUBHIRANSU SEKHAR BARIK
Subject –TH:4(c)- HYDRAULICS & PNEUMATICS	No. of days/week Class allotted -3	Semester from date 22.12.2025 to date 18.04.2026 No. of weeks - 15
Week	Class Day	Theory Topics
1st	1 st	1. Fluid Power Principles and Hydraulic Pumps: Introduction to Fluid Power– Advantages and Applications –Fluid power systems – Types of fluids Properties of fluids and selection.
	2 nd	Basics of Hydraulics –Pascal’s Law– Principles of flow –
	3 rd	Friction loss – Work, Power, and Torque-
2nd	1 st	Numerical.
	2 nd	Sources of Hydraulic power: Pumping Theory.
	3 rd	Pump Classification–Construction, Working, Design,
3rd	1 st	Advantages, Disadvantages, Performance, Selection criteria of pumps.
	2 nd	Fixed and Variable displacement pumps.
	3 rd	Fixed and Variable displacement pumps.
4th	1 st	Numerical.
	2 nd	2-Hydraulic Actuators and Control Components: - Hydraulic Actuators: Cylinders – Types and construction, Application.
	3 rd	Hydraulic cushioning – Rotary Actuators-Hydraulic motors.
5th	1 st	Control Components: Direction Control, Flow control and pressure control.
	2 nd	Valves – Types, Construction, and Operation.
	3 rd	Valves – Types, Construction, and Operation.
6th	1 st	Accessories: Reservoirs, Pressure Switches–Filters.
	2 nd	Accessories: Reservoirs, Pressure switches– Filters–types and selection- Applications.
	3 rd	Fluid Power ANSI Symbols
7th	1 st	Fluid Power ANSI Symbols .Numerical.
	2 nd	Class Test-1
	3 rd	3-Hydraulic Circuits and Systems- Accumulators, Intensifiers, Industrial hydraulic circuits.
8th	1 st	Regenerative, Pump Unloading.
	2 nd	Double-Pump, Pressure Intensifier,

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		Air-over oil, Sequence
	3 rd	Reciprocation, Synchronization, Fail-Safe, Speed Control.
9 th	1 st	Deceleration circuits, Sizing of hydraulic systems.
	2 nd	Hydrostatic transmission, Electro-hydraulic circuits.
	3 rd	Servo and Proportional valves – Applications.
10 th	1 th	Mechanical, hydraulic servo systems.
	2 nd	4-Pneumatic and Electro Pneumatic Systems: - Properties of air, Air preparation and distribution.
	3 rd	Filters, Regulator, Lubricator.
11 th	1 st	Muffler, Air Control Valves.
	2 nd	Quick Exhaust Valves, Pneumatic actuators.
	3 rd	Design of Pneumatic circuit.
12 th	1 st	Classification -single cylinder and multi-cylinder circuits.
	2 nd	Cascade method– Integration of fringe circuits.
	3 rd	Electro Pneumatic System – Elements – Ladder Diagram. Timer circuits-Problems.
13 th	1 st	Introduction to fluidics and pneumatic logic circuits.
	2 nd	5-Trouble Shooting and Applications: - Installation, Selection of Hydraulic and Pneumatic systems.
	3 rd	Maintenance, Trouble Shooting and Remedies in Hydraulic and Pneumatic systems.
14 th	1 st	Conditioning of hydraulic fluids. Design of hydraulic circuits for Drilling, Planning, Shaping, Surface grinding.
	2 nd	Press and Fork lift applications-mobile hydraulics.
	3 rd	Design of Pneumatic circuits for metal working, handling, clamping Counter and timer circuits.
15 th	1 st	Low-cost Automation–Hydraulic and Pneumatic power packs.
	2 nd	IOT in Hydraulics and pneumatics.
	3 rd	Class Test-2

Learning Resources:

REFERENCES:

1. Fluid Power with Applications-Anthony Esposito, PrenticeHall, 2009.
2. Fluid Power Theory and Applications-James A. Sullivan, Fourth Edition, PrenticeHall, 1997.
3. Pneumatics Concepts, Design and Applications-Jagadeesha.T. UniversitiesPress, 2015.
4. Oil Hydraulics Systems–Principles and Maintenance S.R. Mujumdar-Tata McGraw Hill, 2001
5. Hydraulic and Pneumatic Controls-R., Srinivasan. Vijay Nicole Imprints, 3rd edition, 2019.

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