

LESSON PLAN FOR HYDRAULIC & INDUSTRIAL FLUID POWER

Discipline: Mechanical Engg Semester: 5TH Name of the Teaching Faculty: TRUPTI MOHANTY
 Subject: HM&IFP (TH-3) No. of Days/week class allotted=4 Semester From date: 14.07.2025 To Date: 15.11.2025

Week	Period	Topic	Details
1	1	Introduction to Hydraulic Machines	Importance, applications, fluid power overview
	2	Classification of Turbines	Impulse vs reaction, axial, radial flow types
	3	Pelton Wheel - I	Construction, working principle
	4	Pelton Wheel - II	Velocity diagram, work done
2	5	Efficiencies – Pelton Wheel	Hydraulic, mechanical, overall efficiency
	6	Francis Turbine – I	Construction & working
	7	Francis Turbine – II	Velocity diagram, energy transfer
	8	Kaplan Turbine – I	Propeller vs Kaplan; blade pitch mechanism
3	9	Kaplan Turbine – II	Velocity diagram, work done
	10	Comparison of Turbines	Impulse vs reaction, specific speed
	11	Numericals – Turbines	Based on velocity triangles & power
	12	Recap & Problem Solving	Consolidation of turbine concepts
4	13	Centrifugal Pump – I	Construction, principle
	14	Centrifugal Pump – II	Velocity diagram, head, work done
	15	Pump Efficiencies	Hydraulic, manometric, overall
	16	Numericals – Pumps	Power, head, discharge
5	17	Reciprocating Pump – I	Single-acting: construction & working
	18	Reciprocating Pump – II	Double-acting, components, operation
	19	Power Calculation	Work done, power required
	20	Slip in Pumps	Positive & negative slip, coefficient of discharge
6	21	Numerical – Reciprocating Pump	Discharge, power, slip calculations
	22	Intro to Pneumatics	Compressed air systems, advantages
	23	Pneumatic FRL Unit	Filter, regulator, lubricator
	24	Pneumatic Valves – I	Pressure relief & regulation valves
7	25	Pneumatic Valves – II	Direction control valves: 3/2, 5/2, 5/3
	26	Pneumatic Flow Control	Throttle valves, speed regulation
	27	ISO Symbols	Standard symbols for pneumatic components
	28	Pneumatic Circuits – I	Single & double-acting cylinder
8	29	Pneumatic Circuits – II	Metering in and metering out
	30	Circuit Practice – I	Drawing + explanation
	31	Circuit Practice – II	Design questions
	32	Revision – Pumps & Pneumatics	Summary of Units 2 & 3
9	33	Class Test Review – I	Turbines & Pumps
	34	Class Test Review – II	Pneumatics
	35	Mixed Numericals – Review	Turbines, pumps, slip, efficiency
	36	Introduction to Hydraulic Systems	Merits, demerits, applications
10	37	Accumulators	Types and working principles
	38	Hydraulic Valves – I	Pressure control valves
	39	Hydraulic Valves – II	Direction & flow control valves
	40	Hydraulic Pumps	Gear, vane, piston pumps

Week	Class No.	Topic	Details
11	41	Internal Assessment Test 1	Chapters 1–3
	42	Hydraulic ISO Symbols	For all key components
	43	Hydraulic Actuators	Cylinder and motor types
	44	Hydraulic Circuits – I	Single & double-acting cylinder
12	45	Hydraulic Circuits – II	Metering in/out, quick return
	46	Comparison	Hydraulic vs pneumatic systems
	47	Circuit Drawing Practice	Based on given functions
	48	Circuit Design Questions	Common exam-style design problems
13	49	Review: Complete Hydraulics	Summary of Unit 4
	50	Class Test 2	Unit 4: Hydraulics
	51	Test Feedback & Discussion	Clarify tricky parts
	52	Mixed Practice Set	Objective + numerical questions
14	53	Final Recap – I	Formula sheet & velocity diagrams
	54	Final Recap – II	Pumps, turbines summary
	55	Final Recap – III	Circuits: pneumatic + hydraulic
	56	MCQ & Concept Quiz	Exam pattern questions
15	57	Model Test – Full Paper	2-hour timed test
	58	Solution Discussion	Doubts & guidance
	59	Formula Bank Revision	Class exercise
	60	Final Tips & Q&A	Last-minute revision and encouragement

Treupti Mohanty,
Concerned faculty

Basis
11/07/2025
HOD Mechanical
Govt. Polytechnic Kandhamal