

GOVT. POLYTECHNIC, NAYAGARH
LESSON PLAN

DISCIPLINE: MECHANICAL ENGINEERING	SEMESTER: 5 th (2025-26)	NAME OF THE FACULTY: Mr. ABINAS NAYAK, Lecturer Stage I
SUBJECT: HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER (TH.3)	NO. OF DAYS/WEEK CLASS ALLOTTED: 4P/WEEK	Semester from : 14/07/2025 to 15/11/2025 NO. OF WEEKS: 15 TOTAL PERIODS: 60

Sl No.	week	Day	Topics to be covered
1	1st	1st day	HYDRAULIC TURBINES.
		2nd day	Definition and classification of hydraulic turbines
		3rd day	Construction and working principle of impulse turbine.
		4th day	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.
2	2nd	1st day	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.
		2nd day	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.
		3rd day	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.
		4th day	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine
3	3rd	1st day	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine
		2nd day	Numerical on above
		3rd day	Numerical on above
		4th day	Numerical on above
4	4th	1st day	Distinguish between impulse turbine and reaction turbine.
		2nd day	CENTRIFUGAL PUMPS
		3rd day	Construction and working principle of centrifugal pumps
		4th day	work done and derivation of various efficiencies of centrifugal pumps.
5	5th	1st day	work done and derivation of various efficiencies of centrifugal pumps.
		2nd day	Numerical on above

		3rd day	Numerical on above
		4th day	RECIPROCATING PUMPS
6	6th	1st day	Describe construction & working of single acting reciprocating pump
		2nd day	Describe construction & working of double acting reciprocating pump.
		3rd day	Derive the formula for power required to drive the pump (Single acting & double acting)
		4th day	Derive the formula for power required to drive the pump (Single acting & double acting)
7	7th	1st day	Define slip.
		2nd day	State positive & negative slip & establish relation between slip & coefficient of discharge.
		3rd day	State positive & negative slip & establish relation between slip & coefficient of discharge.
		4th day	Solve numerical on above
8	8th	1st day	Solve numerical on above
		2nd day	PNEUMATIC CONTROL SYSTEM
		3rd day	Elements –filter-regulator-lubrication unit
		4th day	Pressure control valves
9	9th	1st day	Pressure relief valves
		2nd day	Pressure regulation valves
		3rd day	Direction control valves 3/2DCV, 5/2 DCV, 5/3DCV
		4th day	Flow control valves
10	10th	1st day	Throttle valves
		2nd day	ISO Symbols of pneumatic components
		3rd day	Pneumatic circuits
		4th day	Direct control of single acting cylinder
11	11th	1st day	Operation of double acting cylinder
		2nd day	Operation of double acting cylinder with metering in and metering out control

		3rd day	HYDRAULIC CONTROL SYSTEM
		4th day	Hydraulic system, its merit and demerits
12	12th	1st day	Hydraulic accumulators : Pressure control valves
		2nd day	Pressure relief valves
		3rd day	Pressure regulation valves
		4th day	Direction control valves 3/2DCV, 5/2 DCV, 5/3DCV
13	13th	1st day	Flow control valves
		2nd day	Throttle valves
		3rd day	External and internal gear pumps
		4th day	Vane pump
14	14th	1st day	Radial piston pumps
		2nd day	ISO Symbols for hydraulic components.
		3rd day	Actuators
		4th day	Direct control of single acting cylinder
15	15th	1st day	Operation of double acting cylinder
		2nd day	Operation of double acting cylinder with metering in and metering out control
		3rd day	Comparison of hydraulic and pneumatic system
		4th day	Doubt clearance and Revision

REFERENCES:

SL.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER
01	DR. JAGDISH LAL	HYDRAULIC MACHINES	METROPOLITAN BOOK CO
02	ANDREW	HYDRAULICS	
03	K SHANMUGA, SUNDARAM	HYDRAULIC & PNEUMATIC CONTROL	S. CHAND
04	MAJUMDAR	HYDRAULIC & PNEUMATIC CONTROL	TMH
05	J.F. BLACKBURN, G. REETHOF & J. L SHEARER	FLUID POWER CONTROL	

Abinas Nayak
11/8/25
Lecturer Stage I