

GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Discipline: Mechanical Engineering	Semester: 5th	Name of the Teaching Faculty: CHINMAYA BRAHMADARSHI MISHRA	
Subject: HMRT	No. of days/week class allotted 4	Semester From date: No. of Week: 15	To date:
PRE-REQUISITE	HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER		
Course Outcomes	<ol style="list-style-type: none"> 1. Distinguish the working principle of pumps and turbines 2. Explain the working of centrifugal pumps and gear pumps 3. Compare pneumatic system with hydraulic system. 4. Draw pneumatic circuits for industrial application. 5. State the properties of hydraulic system. 6. Develop hydraulic circuit for machine tool operation. 		
Week	Class Day	Theory/Practical Topics	
1st	1st	Definition and classification of hydraulic turbines	
	2nd	Construction and working principle of impulse turbine.	
	3rd	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	
	4th	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	
2nd	1st	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	
	2nd	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	
	3rd	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	
	4th	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	
3rd	1st	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	
	2nd	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	
	3rd	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	
	4th	Numerical on above	
4th	1st	Numerical on above	
	2nd	Numerical on above	
	3rd	Distinguish between impulse turbine and reaction turbine.	
	4th	Construction and working principle of centrifugal pumps	
5th	1st	work done and derivation of various efficiencies of centrifugal pumps.	
	2nd	work done and derivation of various efficiencies of centrifugal pumps.	
	3rd	Numerical on above	
	4th	Numerical on above	
6th	1st	Describe construction & working of single acting reciprocating pump.	
	2nd	Describe construction & working of double acting reciprocating pump	
	3rd	Derive the formula for power required to drive the pump (Single acting & double acting)	
	4th	Derive the formula for power required to drive the pump (Single acting & double acting)	
7th	1st	Define slip.	
	2nd	State positive & negative slip & establish relation between slip & coefficient of discharge.	
	3rd	State positive & negative slip & establish relation between slip & coefficient of discharge.	

	4th	Solve numerical on above
8th	1st	Solve numerical on above
	2nd	Solve numerical on above
	3rd	Elements –filter-regulator-lubrication unit
	4th	Pressure control valves Pressure relief valves Pressure regulation valves
9th	1st	Direction control valves 3/2DCV,5/2 DCV,5/3DCV
	2nd	Flow control valves
	3rd	Throttle valves
	4th	ISO Symbols of pneumatic components
10th	1st	Pneumatic circuits 4 .5.1 Direct control of single acting cylinder
	2nd	Operation of double acting cylinder
	3rd	Operation of double acting cylinder with metering in and metering out control
	4th	Operation of double acting cylinder with metering in and metering out control
11th	1st	Hydraulic system, its merit and demerits
	2nd	Hydraulic accumulators Pressure control valves
	3rd	Hydraulic accumulators Pressure control valves
	4th	Pressure relief valves
12th	1st	Pressure regulation valves
	2nd	Pressure regulation valves
	3rd	Direction control valves 3/2DCV,5/2 DCV,5/3DCV
	4th	Flow control valves Throttle valves
13th	1st	Fluid power pumps External and internal gear pumps
	2nd	Vane pump Radial piston pumps
	3rd	ISO Symbols for hydraulic components
	4th	Actuators
14th	1st	Hydraulic circuits
	2nd	Direct control of single acting cylinder
	3rd	Operation of double acting cylinder
	4th	Operation of double acting cylinder with metering in and metering out control
15th	1st	Operation of double acting cylinder with metering in and metering out control
	2nd	Operation of double acting cylinder with metering in and metering out control
	3rd	Comparison of hydraulic and pneumatic system
	4th	Comparison of hydraulic and pneumatic system

Learning Resources:

- 1.DR.JAGDISH LAL, - HYDRAULIC MACHINES
- 2.ANDREW,- HYDRAULICS
- 3.J.F. BLACKBURN,G.REETHOF &J.L SHIARER,-FLUID POWER CONTROL
- 4.S.MAJUMDAR,- HYDRAULIC &PNEUMATIC CONTROL

Chinmaya Brahmadashti
Mishra

Signature
of Faculty

Signature of HOD/

Signature of Academic
Coordinator

Signature of Principal