Utkalmani Gopabandhu Institute of engineering, Rourkela
Department of mechanical Engineering

LESSON PLAN

Session :: Winter – 2025

Semester date::14/07/25 to 15/11/25

Course Type :: Theory

Semester/Branch :: 5Th Semester, Mechanical Engineering

Subject (with code) :: Hydraulic Machines & Industrial Fluid Power (Th.3)

Contact hours/week :: 4

Name of Faculty :: Kalebar Singh

week	class	topic
1st	1	Lesson plan, Syllabus importance and Course Outcomes, pattern of Internal assessment, class test Introduction to hydraulic machine.
	2	Hydro-electric power plant Layout and classification of hydraulic trbine
	3	Construction and working of impulse turbine(Pelton wheel)
	4	Velocity tringle diagram, work done and efficiencies of Pelton turbine
2nd	1	Problem solving on Pelton turbine
	2	Construction and working principle of Francis turbine
	3	Velocity diagram, work done and efficiencies of Francis turbine
	4	Problems on Francis's turbine
3rd	1	Construction and working principle of Kaplan turbine
	2	Velocity diagram, work done and efficiencies of Kaplan turbine
	3	Problems on Kaplan turbine
	4	Difference between impulse and reaction trbine
4th	1	Drat tube and its function

	2	Quiz test /Assignment
	3	Introduction to Centrifugal pump, Construction and working principle of centrifugal pump
	4	Velocity triangle diagram, work done and efficiencies of Centrifugal pump
5th	1	Numerical on Centrifugal pump
	2	Introduction to reciprocating pump, Classification. Application. Working Principle
	3	Construction and working principle of single acting reciprocating pump
	4	Construction and working principle of double acting reciprocating pump.
6th	1	discharge and Power required for the single & double acting reciprocating pump
	2	Define Slip, positive and negative slip, Relation between slip and coefficient of discharge
	3	Numerical on reciprocating pump
	4	Numerical on reciprocating pump
7TH	1	Class test-1(Unit 1,2,3)/Assignment
	2	Introduction to Industrial fluid power and its application and limitation
	3	Components of Pneumatic system: Air Filter, Air regulator and Air lubricator
	4	Pressure control valves: construction and working of pressure relief valve, pressure reducing valve
8th	1	construction and working of Unloading valve, sequence valve
	2	direction control valves: symbolic representation of DCV
	3	Construction and working of 3/2 DCV, 5/2 DCV
	4	Construction and working of 5/3 DCV, Throttle valve
9th	1	Construction and working of Flow control valves
	2	ISO Symbols of pneumatic components
	3	Direct control of single acting cylinder, double acting cylinder
	4	metering in and metering out pneumatic control circuit
10th	1	Introduction to hydraulic control system advantages and its application
	2	Components of hydraulic control system
	3	Hydraulic accumulators
	4	Pressure control valves: construction and working of pressure relief valve, pressure reducing valve
11th	1	construction and working of Unloading valve, sequence valve
	2	Construction and working of 3/2 DCV, 5/2 DCV
	3	Construction and working of 5/3 DCV, Throttle valve

	4	Introduction to Fluid power pumps, Working principle and uses of Gear Pumps
12th	1	Working of Vane Pump, Radial piston pumps
	2	Different types of hydraulic actuators, Function, types and working Working
	3	Operation and control of single acting cylinder and double acting cylinder
	4	Working of Metering in and Metering out hydraulic circuits
13th	1	Comparison of hydraulic and pneumatic systems
	2	Quizz test/Assignments
	3	Revision of hydraulic turbines and previous year question discussion
	4	Practice problems on turbines
14th	1	Revision of hydraulic pumps and previous year question discussion
	2	Practice problems on pumps
	3	Revision of hydraulic control system and previous year question discussion
	4	Revision of FCV,DCV, pressure control valve
15th	1	Revision of pneumatic control system and previous year question discussion
	2	Revision of fluid power pump, meter in meter out ciircuit
	3	Class test-2(Unit-4,5)
	4	extraDoubt solving class

Learning Resources

01. Dr.Jagdish lal (hydraulic machines)metropolitan book co.

02. K. shanmuga, Sundaram(hydraulic &pneumatic control) s.chand

03. Majumdar (hydraulic &pneumatic control) TMH

04. A.R. Basu(Fluidmechanics and hydraulics machine) Dhanpat rai and Co.

11/07/25