

Utkalmani Gopabandhu Institute of engineering, Rourkela
Department of mechanical Engineering

LESSON PLAN

Session :: Winter - 2023

Semester date::01/08/23 to 30/11/23

Course Type :: Theory

Semester/Branch :: 5Th Semester, Mechanical Engineering

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

No of hours/week :: 4

Name of Faculty :: Kalebar Singh

week	class	topic
1 st	1	Lesson plan, Syllabus importance and Course Outcomes, pattern of Internal assessment, classtest Introduction to hydraulic machine.
	2	Hydro-electric power plant Layout and classification of hydraulic turbine
	3	Construction and working of impulse turbine (Pelton wheel)
	4	Velocity triangle diagram, work done and efficiencies of Pelton turbine
2 nd	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
3 rd	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 turbine
4 th	1	Draft 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
5 th	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.
6 th	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
7 TH	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
8 th	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
9 th	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
10 th	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
11 th	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
12 th	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
13 th	1	Comparison of hydraulic and pneumatic systems
	2	Quiz test/Assignments
	3	Revision of hydraulic turbines and previous year question discussion
	4	Practice problems on turbines
14 th	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
15 th	1	Revision of pneumatic control system and previous year question discussion
	2	Revision of fluid power pump, meter in meter out circuit
	3	Class test-2(Unit-4,5)
	4	Extra Doubt solving class

LEARNING RESOURCES

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	