

BLACK DIAMOND SCHOOL OF ENGINEERING, JHARSUGUDA

LESSON PLAN

Session (2022-2023)

Discipline: Mechanical	Semester: 5 th , Winter/2022	Name of the Teaching Faculty: Sri Ajay Kumar Sahoo(Lecturer)
Subject: Hydraulic Machine & Industrial Fluid Power, Theory-3	No. of Days/Week: 04	Start Date: 14/09/2022 End Date: 21/01/2023

Week	Class Day	Theory/Practical Topics
1st	1st	Introduction to hydraulic machine - Hydraulic turbine and Hydraulic pump, their importance, and applications.
	2nd	Classification of hydraulic turbines
	3rd	Construction and working principle of impulse turbine (Pelton wheel)
	4th	Velocity diagram of moving blades. Determination of work done.
2nd	1st	Efficiencies of Pelton turbine. Numerical for Pelton turbine
	2nd	Numerical based on Pelton turbine.
	3rd	Construction and working principle of Francis turbine
	4th	Velocity diagram of moving blades. Determination of work done and efficiencies of Francis turbine.
3rd	1st	Numerical based on Francis turbine.
	2nd	<i>Doubt Clearing class</i>
	3rd	Construction and working principle of Kaplan turbine
	4th	Velocity diagram of moving blades. Determination of work done and efficiencies of Kaplan turbine.
4th	1st	Numerical based on Kaplan turbine
	2nd	Difference between Impulse and Reaction turbine, Draft tube
	3rd	<i>Doubt Clearing class</i>
	4th	<i>Class Test</i>
5th	1st	What is Centrifugal pump? Construction and working principle of centrifugal pump.
	2nd	Velocity diagram of moving blades, work done and efficiencies of Centrifugal pump
	3rd	Numerical based on Centrifugal pump
	4th	<i>Doubt Clearing class</i>
6th	1st	<i>QUIZ Test-1</i>
	2nd	<i>Class Test/Assignment-01</i>
	3rd	Reciprocating pump: Classification, application & working Principle
	4th	Construction and working principle of single acting and double acting reciprocating pump.
7th	1st	Determination of discharge and Power required for the pump (single & double acting). Define Slip, positive and negative slip, Relation between slip and coefficient of discharge
	2nd	Numerical on above

	3rd	<i>Doubt Clearing class</i>
	4th	Introduction to Pneumatic system, Application
8 th	1st	Elements of Pneumatic system: Air Filter, Air regulator and Air lubricator
	2nd	Pressure control valves:
	3rd	Direction control valves: 3/2 DCV, 5/2 DCV. 5/3 DCV
	4th	Flow control valves, Throttle valves
9 th	1st	ISO symbols for pneumatic circuits
	2nd	Pneumatic circuits
	3rd	Operation and Control of single acting cylinder
	4th	Operation and Control of double acting cylinder
10 th	1st	Operation of double acting cylinder with Metering in and Metering out control
	2nd	<i>Doubt Clearing class</i>
	3rd	<i>Class Test</i>
	4th	Hydraulic system - its merit and demerit, Elements of Hydraulic system
11 th	1st	Hydraulic Accumulators
	2nd	Pressure control valve, Relief valve, Regulation valve
	3rd	Direction control valve: 3/2 DCV, 5/2 DCV. 5/3 DCV
	4th	Flow control valves, Throttle valves
12 th	1st	Gear Pumps – Working principle and their uses. External and Internal gear pumps.
	2nd	Vane pump – Working principle and uses
	3rd	Radial piston pump – Working principle and uses
	4th	Actuators: Function, types, Working of Actuators
13 th	1st	ISO symbols for hydraulic components. Hydraulic circuits
	2nd	Operation and Control of single acting cylinder
	3rd	Operation and Operation of double acting cylinder
	4th	Operation of double acting cylinder with Metering in and Metering out control
14 th	1st	Comparison of hydraulic and pneumatic system
	2nd	<i>Doubt Clearing class</i>
	3rd	<i>QUIZ Test-2</i>
	4th	<i>Class Test/Assignment-02</i>
15 th	1st	<i>Revision: Chapter-1</i>
	2nd	<i>Revision: Chapter-2</i>
	3rd	<i>Revision: Chapter-3</i>
	4th	<i>Revision: Chapter-4</i>