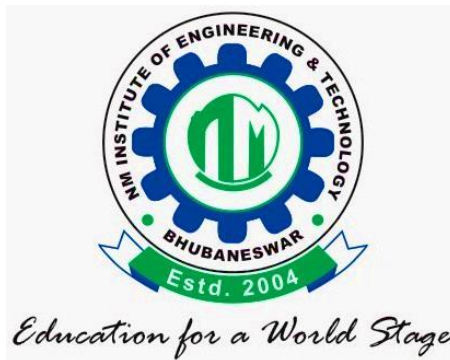


**NM INSTITUTE OF ENGINEERING & TECHNOLOGY
BHUBANESWAR**

Mechanical Engineering Department



**LESSON PLAN
Session 2022-2023**

Semester: 5TH

Subject: HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER

Faculty Name: GOPABANDHU SAHU

Subject: HMIFP

No of Days/per week class allotted: 4

Semester from date: 15/09/2022 to date: 21/01/2023

No. of Weeks: 15

Week	Class Day	Theory topics
1	1	Introduction to Hydraulic Turbines.
	2	Definition and classification of hydraulic turbines.
	3	Construction of impulse turbine.
	4	Working principle of impulse turbine.
2	1	Explain about Velocity diagram of Pelton wheel.
	2	Work done of Pelton wheel turbine.
	3	Derivation of various efficiencies of impulse turbine (Pelton).
	4	Velocity diagram of Francis turbine.
3	1	Work done by Francis turbine.
	2	Derivation of various efficiencies of Francis turbine.
	3	Velocity diagram of Kaplan turbine.
	4	Work done by Kaplan turbine.
4	1	Derivation of various efficiencies of Kaplan turbine.
	2	Distinguish between impulse turbine and reaction turbine.
	3	Numerical solving related to Pelton wheel, Francis, Kaplan turbine.
	4	Introduction to Centrifugal Pumps.
5	1	Construction and working principle of centrifugal pumps.
	2	Work done by centrifugal pumps.
	3	Derivation of various efficiencies of centrifugal pumps.
	4	Numerical solving related to Centrifugal Pumps.
6	1	Introduction to Reciprocating Pumps.
	2	Describe construction of single acting reciprocating pump.
	3	Describe working of single acting reciprocating pump.
	4	Describe construction double acting reciprocating pump.
7	1	Describe working of double acting reciprocating pump.
	2	Derive the formula for power required to drive the Single acting pump.
	3	Derive the formula for power required to drive the double acting pump.
	4	Define slip, State positive & negative slip & establish relation between slip & coefficient of discharge.

Gopabandhu Sahu
Signature of Faculty

Subject: HMIFP

No of Days/per week class allotted: 4

Semester from date: 15/09/2022 to date: 21/01/2023

No. of Weeks: 15

Week	Class Day	Theory topics
8	1	Numerical solving related to Reciprocating Pumps.
	2	Introduction to Pneumatic Control System.
	3	Elements –filter-regulator-lubrication unit.
	4	Pressure control valves.
9	1	Pressure relief valves.
	2	Pressure regulation valves.
	3	Direction control valves.
	4	3/2DCV, 5/2 DCV, 5/3DCV.
10	1	Flow control valves.
	2	Throttle valves.
	3	Actuators.
	4	FRL units.
11	1	ISO Symbols of pneumatic components.
	2	Direct control of single acting cylinder.
	3	Operation of double acting cylinder.
	4	Operation of double acting cylinder with metering in and metering out control.
12	1	Introduction to Hydraulic Control System.
	2	Hydraulic system, its merit and demerits.
	3	Hydraulic accumulators.
	4	Pressure control valves.
13	1	Pressure relief valves.
	2	Pressure regulation valves.
	3	Direction control valves.
	4	3/2DCV, 5/2 DCV, 5/3DCV.
14	1	Flow control valves & Throttle valves.
	2	External and internal gear pumps, Vane pump, Radial piston pumps.
	3	Actuators.
	4	ISO Symbols for hydraulic components.
15	1	Direct control of single acting cylinder.
	2	Operation of double acting cylinder.
	3	Operation of double acting cylinder with metering in and metering out control.
	4	Comparison of hydraulic and pneumatic system.

Gopabandhu Sahu
Signature of Faculty