Discipline : **MECHANICAL ENGG**	Semester : **5th**	Name of the Teaching Faculty: **SUBHRANSU SEKHAR BARIK**
Subject: **HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER**	No. of days/per week class allotted: **04**	Semester From date : **15.09.2022** To Date: **22.12.2022** No. of Weeks: **15**
Week	Class Day	Theory / Practical Topics
1ST	1ST	HYDRAULIC TURBINES. Definition and classification of hydraulic turbines
	2ND	Construction and working principle of impulse turbine
	3RD	Construction and working principle 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 Kaplan turbine
3RD	1ST	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine
	2ND	Numerical on above
	3RD	Numerical on above
	4TH	CLASSTEST
4TH	1ST	Numerical on above
	2ND	Numerical on above
	3RD	Distinguish between impulse turbine and reaction turbine
	4TH	**CENTRIFUGAL PUMPS** 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	**RECIPROCATING PUMPS** Describe construction & working of single acting reciprocating pump.
	2ND	Describe construction & working of double acting reciprocating pump.
	3RD	Derive the formula foe power required to drive the pump (Single acting & double acting).
	4TH	Derive the formula foe 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	CLASS TEST
	3RD	**PNEUMATIC CONTROL SYSTEM** Elements –filter-regulator-lubrication unit
	4TH	Pressure control valves
9TH	1ST	Pressure relief valves
	2ND	Pressure regulation valves
	3RD	Direction control valves 3/2DCV,5/2 DCV,5/3DCV
	4TH	Direction control valves 3/2DCV,5/2 DCV,5/3DCV
10TH	1ST	Direction control valves 3/2DCV,5/2 DCV,5/3DCV
	2ND	Flow control valves
	3RD	Throttle valves
	4TH	ISO Symbols of pneumatic components
11TH	1ST	Pneumatic circuit 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
12TH	1ST	Operation of double acting cylinder with metering in and metering out control
	2ND	**HYDRAULIC CONTROL SYSTEM** Hydraulic system, its merit and demerits.
	3RD	Hydraulic accumulators
	4TH	Pressure relief valves
13TH	1ST	Pressure control valves.
	2ND	Pressure regulation valves.
	3RD	Directioncontrolvalves3/2 DCV,5/2 DCV,5/3DCV.
	4TH	Directioncontrolvalves3/2 DCV,5/2 DCV,5/3DCV..
14TH	1ST	Fluid power pumps, External and internal gear pumps Vane pump Radial piston pumps.
	2ND	ISO Symbols for hydraulic components.
	3RD	Actuators
	4TH	Hydraulic circuits. Direct control of single acting cylinder.
15TH	1ST	Operation of double acting cylinder.
	2ND	Operation of double acting cylinder with metering in and metering out control.
	3RD	Operation of double acting cylinder with metering in and metering out control. Comparison of hydraulic and pneumatic system
	4TH	CLASS TEST

Learning Resouces:

01. Hydraulic Machines By Dr.Jagdish Lal , Metropolitanbook Co
02. Hydraulics By Andrew
03. Hydraulic &Pneumatic Control By K Shanmuga,Sundaram, S.Chand
04. Hydraulic &Pneumatic Control By Majumdar , Tmh
05. Fluid Power Control By J.F. Blackburn,G.Reethof &J.Lshearer