Lesson Plan on

(TH-3) HYDRAULIC MACHINE & INDUSTRIAL FLUID POWER

(5th sem)

Prepared by

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Discipline: MECHANICAL ENGG	Semester: ~~3RD~~ 5th	Name of the Teaching Faculty: Mrs SUSHRI PRIYANKA PANIGRAHI, W/S SUPTD.
Subject:TH.3 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
PRE-REQUISITE	Basic knowledge about hydraulic machine and use of hydraulic control and pneumatic control system in automation	
COURSE OUTCOMES	CO1:Distinguish the working principle of pumps and turbines. CO2:Explain the working of centrifugal pumps and gear pumps CO3:Compare pneumatic system with hydraulic system. CO4:Draw pneumatic circuits for industrial application. CO5:State the properties of hydraulic system&develop hydraulic circuit for machine tool operation.	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	HYDRAULIC TURBINES.	Whiteboard
	2ND	Construction and working principle of impulse turbine.	Whiteboard
	3RD	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	Whiteboard
	4TH	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	Whiteboard
2ND	1ST	Numerical based on impulse turbine	Whiteboard
	2ND	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	Whiteboard
	3RD	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	Whiteboard
	4TH	Numerical based on Francis turbine.	Whiteboard
3RD	1ST	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	Whiteboard
	2ND	Numerical based on Kaplan turbine.	Whiteboard
	3RD	Distinguish between impulse turbine and reaction turbine.	Whiteboard
	4TH	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain.	PPT
4TH	1ST	QUIZ & ASSIGNMENT-I	
	2ND	CENTRIFUGAL PUMPS	PPT
	3RD	Construction and working principle of centrifugal pumps	Whiteboard
	4TH	work done and derivation of various efficiencies of centrifugal pumps	Whiteboard
5TH	1ST	work done and derivation of various efficiencies of centrifugal pumps	Whiteboard
	2ND	Numerical on Centrifugal pump.	Whiteboard
	3RD	Numerical on Centrifugal pump.	Whiteboard
	4TH	RECIPROCATING PUMPS	Whiteboard
	1ST	Describe construction & working of single acting reciprocating pump	Whiteboard
	2ND	Describe construction & working of double acting reciprocating pump.	Whiteboard
	3RD	Derive the formula foe power required to drive the pump(Single acting & double acting)	PPT

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6TH	4TH	Derive the formula foe power required to drive the pump(Single acting & double acting)	Whiteboard
7TH	1ST	Define slip	Whiteboard
	2ND	State positive & negative slip&amp	Whiteboard
	3RD	Establish relation between slip & coefficient of discharge.	Whiteboard
	4TH	Solve numerical on reciprocating pump.	Whiteboard
8TH	1ST	**QUIZ & ASSIGNMENT-II**	Whiteboard
	2ND	PNEUMATIC CONTROL SYSTEM	PPT
	3RD	Elements –filter-regulator-lubrication unit	Whiteboard
	4TH	Pressure control valves(Pressure relief valves&Pressure regulation valves)	Whiteboard
9TH	1ST	Direction control valves(3/2DCV,5/2 DCV,5/3DCV)	Whiteboard
	2ND	Direction control valves(3/2DCV,5/2 DCV,5/3DCV)	Whiteboard
	3RD	Flow control valves	Whiteboard
	4TH	Throttle valves	PPT
10TH	1ST	ISO Symbols of pneumatic components	Whiteboard
	2ND	**QUIZ & ASSIGNMENT-III**	Whiteboard
	3RD	Pneumatic circuits Direct control of single acting cylinder.	PPT
	4TH	Operation of double acting cylinder	PPT
11TH	1ST	Operation of double acting cylinder with metering in and metering out control	
	2ND	Hydraulic system, its merit and demerits	Whiteboard
	3RD	Hydraulic accumulators (Pressure control valves,Pressure relief valves,Pressure regulation valves)	Whiteboard
	4TH	Direction control valves(3/2DCV,5/2 DCV,5/3DCV,Flow control valves&Throttle valves)	Whiteboard
12TH	1ST	External and internal gear pumps	PPT
	2ND	Vane pump&Radial piston pumps	Whiteboard
	3RD	ISO Symbols for hydraulic components.	Whiteboard
	4TH	Actuators	Whiteboard
13TH	1ST	**QUIZ & ASSIGNMENT-IV**	Whiteboard
	2ND	Direct control of single acting cylinder	Whiteboard
	3RD	Operation of double acting cylinder	Whiteboard
	4TH	Operation of double acting cylinder with metering in and metering out control	Whiteboard
14TH	1ST	Operation of double acting cylinder with metering in and metering out control	Whiteboard
	2ND	Comparison of hydraulic and pneumatic system	Whiteboard
	3RD	Comparison of hydraulic and pneumatic system	Whiteboard
	4TH	REVISION	Whiteboard
15TH	1ST	**QUIZ & ASSIGNMENT-V**	
	2ND	**REVISION**	
	3RD		
	4TH		

LEARNING RESOURCES:

01. HYDRAULIC MACHINES BY DR.JAGDISH LAL
02. HYDRAULIC &PNEUMATIC CONTROL BY K SHANMUGA,SUNDARAM,S.CHAND PUBLICATION
03. FLUID POWER CONTROL BY J.F. BLACKBURN,G.REETHOF &J.LSHEARER

WEBSITE RESOURCES:

https://www.youtube.com/playlist?list=PL0b9qDcBZ_Xu_JXKrVfzp6oOQODoaOyf0

https://www.youtube.com/watch?v=JXJc0m_AgR0&list=PL1xA-pZWMKpNPSMRZa0TVpszM7VUAdhrw

17/09/22 — **Sign. Of Concerned Faculty**

17/9/22 — **Principal**
G.P. Puri

15/09/22 — **Sign. Of HOD**

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