Department of Mechanical Engineering
Raajdhani Engineering College, Bhubaneswar, Odisha-751017
LESSON PLAN

Faculty Name	**Sadik Iqbal**			Name of the Program	**Diploma in Mechanical Engineering**
Course Name	**HYDRAULIC MACHINES & INDUSTRIAL FLUID POWER**			Course Code	**[Th-3]**
Course Year	**3nd year**	Semester	**5th**	Academic Period	**2023-24**
No. of Classes allotted per Week	**4**	Planned Classes Required to Complete the Course			**60**

Sl. No.	Topics to be covered	Module	No. of hours Required	Mode of Teaching	CO	BOOK	CHAPTER (PAGES)	OTHER SOURCE(IM)
1	Definition and classification of hydraulic turbines	I	1	LM/ IM	CO1	R1	18(853)	https://www.youtube.com/watch?v=u54poNsnuWo
2	Construction and working principle of impulse turbine.	I	1	LM/ IM	CO2	R1	18(857)	https://www.youtube.com/watch?v=fMMnamVdW94
3	Velocity diagram of moving blades for Impulse turbine	I	1	LM/ IM	CO2	R1	18(859)	https://www.youtube.com/watch?v=CvbHCMIQP2Q
4	work done and derivation of various efficiencies of impulse turbine.	I	1	LM/ IM	CO3	R1	18(860)	https://www.youtube.com/watch?v=P92kj62q6iE
5	Numerical from Impulse Turbine	I	1	LM/ IM	CO4	R1	18(862)	https://www.youtube.com/watch?v=iuSRl7z1-lQ
6	Velocity diagram of moving blades for Francis turbine	I	1	LM/ IM	CO3	R1	18(895)	https://www.youtube.com/watch?v=96nRY53JlE8
7	Work done and derivation of various efficiencies of Francis turbine.	I	1	LM/ IM	CO3	R1	18(896)	https://www.youtube.com/watch?v=2qfWlWPvqWs
8	Numerical from Francis Turbine	I	1	LM/ IM	CO4	R1	18(897)	https://www.youtube.com/watch?v=fXe-CzucFMk
9	Numerical from Francis Turbine	I	1	LM/ IM	CO4	R1	18(898)	https://www.youtube.com/watch?v=fXe-CzucFMk

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10	Velocity diagram of moving blades for Kalpan turbine	I	1	LM/ IM	CO3	R1	18(903)	https://www.youtube.com/watch?v=PCZ5g_XFpPM
11	work done and derivation of various efficiencies of Kaplan turbine	I	1	LM/ IM	CO3	R1	18(904)	https://www.youtube.com/watch?v=OrxSZnETRyE
12	Numerical from Kaplan Turbine.	I	1	LM/ IM	CO4	R1	18(905)	https://www.youtube.com/watch?v=5BR1enSjqWE
13	Numerical from Kaplan Turbine.	I	1	LM/ IM	CO4	R1	18(907)	https://www.youtube.com/watch?v=nzlnvdrSpLY
14	Draft tube	I	1	LM/ IM	CO3	R1	18(915)	https://www.youtube.com/watch?v=ItEaOddaNqM
15	Surprise Test-1	I	1	LM/ IM	CO5			
16	Construction centrifugal pumps	2	1	LM/ IM	CO3	R1	19(945)	https://www.youtube.com/watch?v=DmJCDOTIDRY
17	Working principle of centrifugal pumps	2	1	LM/ IM	CO3	R1	19(946)	https://www.youtube.com/watch?v=XpcCUtYzwy0
18	work done of centrifugal pumps	2	1	LM/ IM	CO3	R1	19(947)	https://www.youtube.com/watch?v=ZuqaEN4IJ5w
19	Derivation of various efficiencies of centrifugal pumps	2	1	LM/ IM	CO4	R1	19(948)	https://www.youtube.com/watch?v=w1-5U2jbEVQ
20	Surprise Test-2	2	1	LM/ IM	CO5			
21	Describe construction & working of single acting reciprocating pump.	3	1	LM/ IM	CO3	R1	20(993)	https://www.youtube.com/watch?v=AY7fn57HPNM
22	Describe construction & working of double acting reciprocating pump.	3	1	LM/ IM	CO3	R1	20(995)	https://www.youtube.com/watch?v=vAwIob0OIEM

23	Derive the formula foe power required to drive the pump (Single acting & double acting)	3	1	LM/ IM	CO3	R1	20(996)	https://www.youtube.com/watch?v=n_eiSFc_WO8
24	Quiz test-1	3	1	LM/ IM	CO5			
25	Define slip &Numerical from Single acting and double acting reciprocating pump	3	1	LM/ IM	CO2	R1	20(996-997)	https://www.youtube.com/watch?v=Gfz_lOGV9zk
26	State positive & negative slip & establish relation between slip & coefficient of discharge	3	1	LM/ IM	CO2	R1	20(996-997)	https://www.youtube.com/watch?v=dYyR-M4G-zs
27	Numericals from reciprocating pump	3	1	LM/ IM	CO4	R1	20(998)	https://www.youtube.com/watch?v=c3kGd1p8WnU
28	Elements –filter-regulator-lubrication unit	4	1	LM/ IM	CO2			https://www.youtube.com/watch?v=fu08KCospiY
29	Pressure control valves	4	1	LM/ IM	CO2	R3	3(44)	https://www.youtube.com/watch?v=WzMFbOKyZ-o
30	Pressure relief valves, Pressure regulation valves	4	1	LM/ IM	CO3	R3	3(45)	https://www.youtube.com/watch?v=oFXW-rJQJrA
31	Direction control valves-3/2DCV	4	1	LM/ IM	CO2	R3	3(51)	https://www.youtube.com/watch?v=iFhG57-dTaM
32	Direction control valves-5/2 DCV, 5/3DCV	4	1	LM/ IM	CO2	R3	3(59)	https://www.youtube.com/watch?v=CzbVGDOd0GY
33	Quiz test-2	4	1	LM/ IM	CO4			https://www.youtube.com/watch?v=jbOdnEwUYOw
34	,Throttle valves, Flow control valves	4	1	LM/ IM	CO4	R3	3(64)	https://www.youtube.com/watch?v=jbOdnEwUYOw
35	ISO Symbols of pneumatic components	4	1	LM/ IM	CO2	R4	4(196)	https://www.youtube.com/watch?v=Cw6RBRc2ga0

36	Pneumatic circuits	4	1	LM/ IM	CO2	R3	6(118)	https://www.youtube.com/watch?v=-l5MrpvtuR8
37	Direct control of single acting cylinder	4	1	LM/ IM	CO2	R3	6(120)	https://www.youtube.com/watch?v=8rTFzeBMJhg
38	Operation of double acting cylinder	4	1	LM/ IM	CO2	R3	6(121)	https://www.youtube.com/watch?v=9uPtNkWjtQE
39	Operation of double acting cylinder with metering in control	4	1	LM/ IM	CO4	R2	6(211)	https://www.youtube.com/watch?v=eH-qMFTsLpc
40	Operation of double acting cylinder with metering out control	4	1	LM/ IM	CO4	R2	6(214)	https://www.youtube.com/watch?v=4eCuPVxezzY
41	Hydraulic system, its merit and demerits	5	1	LM/ IM	CO2	R2	6(227)	https://www.youtube.com/watch?v=-lYyCWuoPGY
42	Hydraulic accumulators	5	1	LM/ IM	CO2	R4	4(148)	https://www.youtube.com/watch?v=KLuKn03VVVQ
43	Pressure control valves, Pressure relief valves	5	1	LM/ IM	CO2	R4	4(152)	https://www.youtube.com/watch?v=j1B3zeFyPUw
44	Surprise Test-3	5	1	LM/ IM	CO5			
45	Pressure regulation valves	5	1	LM/ IM	CO2	R4	4(152)	https://www.youtube.com/watch?v=sFAYW_D3G_g
46	Direction control valves	5	1	LM/ IM	CO2	R4	4(164)	https://www.youtube.com/watch?v=CQPwvWXbV3w
47	Direction control valves-3/2DCV	5	1	LM/ IM	CO4	R4	4(165)	https://www.youtube.com/watch?v=iFhG57-dTaM&t=13s
48	Direction control valves-5/2 DCV , 5/3DCV	5	1	LM/ IM	CO4	R4	4(166)	https://www.youtube.com/watch?v=HlRDmDE38R8
49	Flow control valves	5	1	LM/ IM	CO2	R4	4(166)	https://www.youtube.com/watch?v=jbOdnEwUYOw&t=24s
50	Throttle valves	5	1	LM/ IM	CO2	R4	4(177)	https://www.youtube.com/watch?v=TgTjXT-a2vg
51	Fluid power pumps	5	1	LM/ IM	CO2	R4	4(153)	https://www.youtube.com/watch?v=3u-mROr0Wkg
52	External and internal gear pumps	5	1	LM/ IM	CO3	R4	4(154)	https://www.youtube.com/watch?v=cMmwb3JmL00
53	Vane pump	5	1	LM/ IM	CO2	R4	4(155)	https://www.youtube.com/watch?v=IxIio2r_bQE

54	Radial piston pumps	5	1	LM/ IM	CO2	R4	4(155)	https://www.youtube.com/watch?v=2T-6jDm_ebI
55	ISO Symbols for hydraulic components.	5	1	LM/ IM	CO2	R4	4(157)	https://www.youtube.com/watch?v=sJneQk4sI1A
56	Actuators	5	1	LM/ IM	CO2	R4	4(160)	https://www.youtube.com/watch?v=7VBJxLrp1GM
57	Hydraulic circuits- Direct control of single acting cylinder	5	1	LM/ IM	CO2	R4	4(156)	https://www.youtube.com/watch?v=LUnYDR5lbKc
58	Operation of double acting cylinder	5	1	LM/ IM	CO2	R4	4(158)	https://www.youtube.com/watch?v=9uPtNkWjtQE
59	Operation of double acting cylinder with metering in and metering out control	5	1	LM/ IM	CO3	R4	4(159)	https://www.youtube.com/watch?v=E4xzyhzpwik
60	Comparison of hydraulic and pneumatic system	5	1	LM/ IM	CO3	R4	4(170)	https://www.youtube.com/watch?v=LTaDBl265Mg

LM: Learner Mode: Chalk & Talk, Lecture **IM: Interactive Mode:** PPT, VIDEO and Animation

T1: Dr.Jagdish Lal Hydraulic Machines Metropolitan Book Co
T2: K Shanmuga,Sundaram,Hydraulic&Pneumatic Control S.Chand
T3: J.F. Blackburn,G.Reethof&J.L Shearer Fluid Power Control
R1.A Text Book of Fluid Mechanics and Hydraulic Machines by Dr.R.K.Bansal.Laxmi Publications Pvt ltd
R2.Indusrial Hydraulics and Pnumatics nu Purusottam Power
R3-Fluid Power and control by Ahmed Abu Haneih
R4-Notes

Signature of the Faculty **Signature of the HOD**