



**GOVERNMENT POLYTECHNIC, NABARANGPUR**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

Discipline: <b>MECHANICAL ENGG</b>	Semester: <b>5<sup>TH</sup></b>	Name of the Teaching Faculty: Deepak Ranjan Pattanaik
Subject: <b>HYDRAULIC MACHINES &amp; INDUSTRIAL FLUID POWER</b>	No. of days/per week class allotted: 04	Semester From date: <u>15.07.2022</u> To Date: <u>21/01/2023</u> No. of Weeks: <u>13</u>
<b>COURSE OUTCOMES</b>	CO 1. The working principle of pumps and turbines CO 2. The working of centrifugal pumps and gear pumps. CO 3. Compare pneumatic system with hydraulic system. CO 4. Draw pneumatic circuits for industrial application. CO 5. State the properties of hydraulic system. CO6. Develop hydraulic circuit for machine tool operation.	
<b>WEEK</b>	<b>CLASS DAY</b>	<b>THEORY TOPIC</b>
<b>1<sup>ST</sup></b>	1	<b>1.HYDRAULIC TURBINES</b> Definjtion and classification of hydraulic turbines
	2	To be continued...
	3	Construction and working principle of impulse turbine
	4	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine
<b>2<sup>ND</sup></b>	1	To be continued...
	2	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine
	3	To be continued...
	4	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine
<b>3<sup>RD</sup></b>	1	To be continued... Numerical on above
	2	Distinguish between impulse turbine and reaction turbine.
	3	
	4	Distinguish between impulse turbine and reaction turbine.
<b>4<sup>TH</sup></b>	1	<b>2.CENTRIFUGAL PUMPS</b> Construction and working principle of centrifugal pumps
	2	<b>QUIZ &amp; ASSIGNMENT-I</b>
	3	Work done and derivation of various efficiencies of centrifugal pumps.
	4	To be continued...
<b>5<sup>TH</sup></b>	1	Numerical on above
	2	<b>3.RECIPROCATING PUMPS</b> Describe construction & working of single acting reciprocating pump
	3	Describe construction & working of double acting reciprocating pump
	4	Derive the formula for power required to drive the pump (Single acting & double acting)
<b>6<sup>TH</sup></b>	1	To be continued...
	2	Define slip. State positive & negative slip & establish relation between slip & coefficient of discharge.
	3	<b>QUIZ &amp; ASSIGNMENT-II</b>
	4	<b>4.PNEUMATIC CONTROL SYSTEM</b> Elements –filter-regulator-lubrication unit

7 <sup>TH</sup>	1	Pressure control valves Pressure relief valves Pressure regulation valves
	2	Direction control valves
	3	3/2DCV, 5/2 DCV, 5/3DCV
	4	Flow control valves
8 <sup>TH</sup>	1	Throttle valves
	2	ISO Symbols of pneumatic components
	3	To be continued...
	4	Pneumatic circuits
9 <sup>TH</sup>	1	Direct control of single acting cylinder
	2	Operation of double acting cylinder
	3	To be continued...
	4	Operation of double acting cylinder with metering in and metering out control
10 <sup>TH</sup>	1	To be continued...
	2	<b>QUIZ &amp; ASSIGNMENT-II</b>
	3	<b>5.HYDRAULIC CONTROL SYSTEM</b> Hydraulic system, its merit and demerits
	4	Hydraulic accumulators
11 <sup>TH</sup>	1	Pressure control valves
	2	Pressure relief valves
	3	Pressure regulation valves Direction control valves (Hydraulics)
	4	3/2DCV,5/2 DCV,5/3DCV
12 <sup>TH</sup>	1	Flow control valves Throttle valves
	2	Fluid power pumps
	3	External and internal gear pumps Vane pump Radial piston pumps ISO Symbols for hydraulic components
	4	<b>QUIZ &amp; ASSIGNMENT-III</b>
13 <sup>TH</sup>	1	Actuators Hydraulic circuits
	2	Direct control of single acting cylinder
	3	Operation of double acting cylinder Operation of double acting cylinder with metering in and metering out control
	4	Comparison of hydraulic and pneumatic system REVISION Class

Reference books :

01. Dr.Jagdish Lal Hydraulic Machines Metropolitan Book Co

02. Andrew Hydraulics

- 03. K Shanmuga, Sundaram Hydraulic & Pneumatic Control S.Chand
- 04. Majumdar Hydraulic & Pneumatic Control Tmlh
- 05. J.F. Blackburn, G.Reethof & J.L Shearer Fluid Power Control

**WEBSITE RESOURCES:**

<https://youtu.be/8xd7cWvMrvE>

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15.09.2022  
CDIPAK ranjan pattnaik  
Sign. Of Faculty concerned

Sign. Of HOD

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15/09/2022

Academic coordinator

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15/09/22

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Principal, GP NABARANGPUR 15/09/22