

<b>Branch Name:</b>	Mechanical Engineering
<b>Semester/Year:</b>	Semester VII / Forth Year
<b>Subject Title:</b>	Oil Hydraulics and Pneumatics
<b>Subject Code:</b>	1ET1010708
<b>Pre-requisite:</b>	Fluid Mechanics, Thermodynamics

**Course Objectives:**

1. The course elaborates principles of hydraulic and pneumatic devices.
2. It gives an overview of control systems associated with hydraulic applications.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	00	00	03	70	30	00	00	100

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	<b>Introduction:</b> Introduction, Global fluid power Scenario, Basic system of Hydraulics-Major advantages and disadvantages, Principles of Hydraulic Fluid power, Hydraulic Symbols, Electrical Elements used in hydraulic circuits.	05	12
2	<b>System Components, Hydraulic Oils, Fluid Properties and Filter:</b> Hydraulic & Pneumatic Symbols as per ISO/ANSI, Types, Properties, physical characteristics & functions of hydraulic Oils, Classification- Mineral based, Fire resistant& Biodegradable Oils, Filters, Contaminations, location of filter.	05	12
3	<b>Hydraulic Pumps, Motors and Actuators:</b> Construction, working principle and operation of rotary & reciprocating pumps like Gear, Vane, Generated-Rotor, Screw, Axial Piston, Radial Piston, Pump characteristics, Linear and Rotary Actuators, Hydrostatic Transmission Systems. Selection of components for applications.	06	16
4	<b>Hydraulic Valves and Hydraulic System Accessories:</b> Direction control valves, Pressure control valves, Flow control valves, Non-return valves, Reservoirs, Accumulators, Heating & cooling devices, Hoses. Selection of valves for circuits.	06	16
5	<b>Design of hydraulic circuits:</b> Basic hydraulic circuits, Industrial hydraulic circuits, Power losses in flow control circuits.	06	12
6	<b>Introduction to Pneumatic Systems:</b> Basic Requirements for Pneumatic System, Applications, Pneumatic fundamentals, Construction, working principle and operation of pneumatic power transmission system components like Power source, FRL unit, Actuators and control valves like DCV, FCV, PCV, time delay, quick exhaust, twin pressure, shuttle.	06	16
7	<b>Pneumatic circuits:</b> Basic pneumatic circuits, Development of single Actuator	06	12

	Circuits, Development of multiple Actuator Circuits, Cascade method for sequencing.		
8	Introduction to Automation in hydraulic and Pneumatic Systems.	02	04

**Course Outcomes:**

**The student will be able to**

1. Identify and analyze the functional requirements of a power transmission system for a given application. (Application involving fluid power transmission)
2. Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application. Develop a circuit diagram.
3. Visualize how the hydraulic/pneumatic circuit will work to accomplish the function.
4. Selection and sizing of components of the circuit.

**List of Reference Books:**

1. Majumdar, S. R. Oil hydraulic systems: principles and maintenance. McGraw-Hill, 2003.
2. Majumdar, S. R. Pneumatic systems: principles and maintenance. Tata McGraw-Hill Education, 1996.
3. Shanmugasundaram.K, “Hydraulic and Pneumatic controls”, Chand & Co, 2006 .
4. Esposito, Anthony. Fluid power with applications. Prentice-Hall International, 2005.
5. Srinivasan.R, “Hydraulic and Pneumatic controls”, Vijay Nicole, 2006 .

**E-Resources:**

1. [nptel.ac.in/courses/112105047](http://nptel.ac.in/courses/112105047)