

Subject Code: 01ME0609

Subject Name: Basic & Electro Hydraulics Course

B. Tech. Year - III (Semester - 6)

Course Objectives : Introduce students to a typical hydraulic system and its associated components providing them a better understanding of the function of the various parts. Make Students aware of the principles on which hydraulic systems operate. Describe the function of components found in a basic hydraulic circuit. Explain the structure and operation of basic hydraulic components.

Course Outcome :

Prepare drawing of hydraulic circuit diagram and understand the basic elements.

1. Knows the symbols of the basic elements in hydraulic systems.
2. Know the properties of the basic elements used in the hydraulic system.
3. Application of Directional control, pressure control valves, and flow control valves.
4. Perform Experiments on hydraulic circuits and analyze results and draw graphs.
5. Analyze Piston speed of any machine, hydraulic circuits force, torque and angular rotation.

Teaching and Examination Scheme :

Teaching Scheme			Credits C	Examination Marks					Total Marks
Theory	Tutorial	Practical		Theory Marks			Practical Marks		
				ESE(E)	IA	CSE	Viva (V)	Term Work (TW)	
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Content :

Sr. No.	Content	Total Hrs.
1	<p>Basic of Hydraulic Energy Introduction to Hydraulics, Its Knowledge and scope Important basic terms Characteristics of Industrial Hydraulics, advantages and limitations Comparisons of Hydraulics over other technology like Pneumatics, Electrical/ Electronic and Mechanical drives (Systems Comparison), Applications Basic physical properties like force and weight, pressure, its definition, formula, Pascal's Law, Flow rate and Flow law, Gas law, compressed air</p>	04
2	<p>Hydraulic components and circuit Basic elements, Commonly used symbols, Circuit Symbols Hydraulic oil management system. Types of pumps, Distribution of Hydraulic oil. Hydraulic power pack construction - Filter, Pressure relief valve, oil level indicator Direction Control Valve - Design Principle, construction, Symbols, Operations 4/2 & 4/3 Directional control valve, Manual operated, pilot</p>	11

	<p>operated, electrically operated</p> <p>Hydraulic Drives - Design Principle, construction, Symbols, Operations, Different types of hydraulic linear and rotary actuators - hydraulic motor.</p> <p>Flow valves - Check Valve, Throttle and Throttle check valve, fixed throttle and variable throttle valve</p> <p>Pressure Valves - Pressure relief valve, Pressure sequence valve, hydraulic accumulator</p> <p>Construction of basic hydraulic circuits</p>	
3	<p>Electro Hydraulic components and circuit</p> <p>Electro Hydraulics: Electro – mechanical Relays, NO and NC contacts, magnetic proximity switch & Cylinder switch - construction and working principle, Symbols of electrical components like switch, contacts, solenoid, relay, LED etc,</p> <p>Solenoid working principle, Solenoid operated valves.</p> <p>Construction of Electrical circuits</p>	05
4	<p>Utilization of all components and preparation of different Hydraulic and electro Hydraulic circuits</p> <p>Project 01: Direct control of a single- acting cylinder, extending</p> <p>Project 02: Direct control of a single acting cylinder, retracting</p> <p>Project 03: Indirect control of a single acting cylinder</p> <p>Project 04: Regulating the speed of a single- acting cylinder</p> <p>Project 05: Direct control of a double- acting cylinder with push button</p> <p>Project 06: Indirect control of a double- acting cylinder</p> <p>Project 07: Speed regulation of a double- acting cylinder</p> <p>Project 08: Rapid traverse and feed circuit</p> <p>Project 09: Controlling a double-acting cylinder, impulse valve, 2 push-buttons</p>	11

Distribution of Theory Marks

R Level	U Level	A Level	N Level	E` Level	C Level
10	20	25	25	10	10

Legends: R: Remember; **U:** Understand; **A:** Apply; **N:** Analyze; **E:** Evaluate; **C:** Create