SEMESTER S7

INDUSTRIAL HYDRAULICS & PNEUMATICS

Course Code	OEMRT722	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None/ (Course code)	Course Type	Theory

Course Objectives:

1. To understand various components of pneumatic and fluid power systems and their advantages
2. Applying the fundamental concepts of fluid power and pneumatic to obtain solution to engineering problems.

SYLLABUS

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Module No.	Syllabus Description	Contact Hours
1	Basics of fluid power system, Components, Advantages and applications of Fluid power systems Fluid properties: specific weight, density and specific gravity, Pascal's Law and its application Continuity equation, Conservation Of Energy, Frictional losses in hydraulic pipelines - laminar and turbulent flow, Fluid power symbols.	9
2	Hydraulic pumps: Gear, Vane and Piston pumps, Pump performance, Characteristics and Selection - Sizing of pumps Hydraulic Motors- Limited Rotation Hydraulic Motors, Gear Motors, Vane Motors, Piston Motors, Hydraulic Motor Theoretical Torque, Power, And Flow Rate, Hydraulic Motor Performance	9
3	Hydraulic Valves- Direction control valves: Three way valve, Four way valves, Check valve and shuttle valve Actuation mechanisms in DCV Pressure control valves: Pressure relief, Pressure Reducing, Counter balance, Sequencing and Unloading Valves Flow control valves and its types Proportional Valves Servo valves: Mechanical type and Electrohydraulic servo valves.	9

4	Pneumatics: Air compressors, air treatment: Air filters, Dryer, Lubricator, pressure regulation, Compressor types, Pneumatics and Hydraulics, Properties Of Air, The Perfect Gas Laws, Fluid Conditioners, Air Control Valves, Pneumatic Actuators, Fluid Logic Control Systems - Introduction To Boolean Algebra, Laws Of Boolean Algebra, Illustrative Examples Using Boolean Algebra	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Understand various components of fluid power systems, their advantages and select them for various applications.	**K2**
CO2	Design and simulate fluid power systems for automation of machine tools and other equipment's.	**K3**
CO3	Choose appropriate control valves for fluid power applications	**K3**
CO4	Select pneumatic components and fluid power actuators for low cost automation	**K2**
CO5	Apply the fundamental concepts of fluid power and to obtain solution to engineering problems.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1									3
CO2	3	2	2									3
CO3	3	2	2			2						3
CO4	3	2	2					1				3
CO5	3	2	2			2						3

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Hydraulics and Pneumatics	A. Parr	Elsevier	1999
2	Fluid Power with Applications	Anthony Esposito	Pearson New International Edition-Pearson	2013
3	Pneumatic System-Principles and Maintenance	S.R.Majumdar	McGraw Hill	2017.
4	Hydraulic and Pneumatics control	R.Srinivasan	McGraw Hill	2008

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Hydraulic control systems	H. E. Merritt	John Wiley& Sons, NewYork	1967
2	Basic fluid power	D. A. Peace	Prentice Hall	1987
3	Power Hydraulic	M. J. Pinches	Longman	1988

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