INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (MECHANICAL ENGINEERING)**
SEMESTER	**6**
COURSE TITLE	**BASICS OF PNEUMATICS AND HYDRAULICS**
COURSE CODE	**01ME0612**
COURSE CREDITS	**1**

Objective:

1 To introduce the fundamentals of hydraulic and pneumatic systems, their components, and principles of operation, enabling students to design and analyze basic fluid power circuits

Course Outcomes: After completion of this course, student will be able to:

1 Student will be able to apply the principles of fluid power to evaluate the requirements of hydraulic and pneumatic systems in various applications.

2 Student will be able to analyze the function and operation of key components in hydraulic and pneumatic circuits.

3 Student will be able to design basic fluid power circuits to meet specific operational requirements using appropriate hydraulic and pneumatic components.

4 Student will be able to interpret and troubleshoot hydraulic and pneumatic schematics to identify and resolve operational issues effectively.

Pre-requisite of course: Fluid Mechanics, Fluid Power Engineering

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	2	0	0	0	50	50

Contents : Unit	Topics	Contact Hours
Total Hours		

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**The use of various standard symbols used for pneumatic and hydraulic components as per ISO1219-1.** The use of various standard symbols used for pneumatic and hydraulic components as per ISO1219-1.	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	**Analyzing the general lay out of pneumatic circuits and it's major components.** Analyzing the general lay out of pneumatic circuits and it's major components.	2
3	**Direct control of a single and double acting cylinder, extending and retracting in pneumatics.** Direct control of a single and double acting cylinder, extending and retracting in pneumatics.	2
4	**Indirect control of a single and double acting cylinder, extending and retracting in pneumatics.** Indirect control of a single and double acting cylinder, extending and retracting in pneumatics.	2
5	**Speed regulation of a single and double-acting cylinders in pneumatics.** Speed regulation of a single and double-acting cylinders in pneumatics.	2
6	**Controlling a double-acting cylinder with help of impulse valve in pneumatics.** Controlling a double-acting cylinder with help of impulse valve in pneumatics.	2
7	**Displacement-dependent control of a double-acting cylinder in pneumatics.** Displacement-dependent control of a double-acting cylinder in pneumatics.	4
8	**Time-dependent control of double-acting cylinder in pneumatics.** Time-dependent control of double-acting cylinder in pneumatics.	2
9	**Analyzing the general lay out of hydraulic circuits and it's major components.** Analyzing the general lay out of hydraulic circuits and it's major components.	2
10	**Hydraulic pump characteristic curve of displacement pump at various pressure.** Hydraulic pump characteristic curve of displacement pump at various pressure.	2
11	**Speed control and regenerative circuits in hydraulics.** Speed control and regenerative circuits in hydraulics.	4
12	**Application of 4/3 directional valves like tandem and closed centre in hydraulic circuits.** Application of 4/3 directional valves like tandem and closed centre in hydraulic circuits.	2
Total Hours		**28**

Textbook :

1 Basic Pneumatic Systems, Principle and Maintenance, S.R. Majumdar, McGrawHill, 2001

Textbook :

2 Pneumatic Systems and Circuits - Basic Level, Joji Parambath, AD Services LLC, 2020

3 Oil Hydraulic Systems, Principle and Maintenance, Majumdar, McGraw-Hill, 2007

4 Industrial Hydraulics, Eaton Hydraulics Training Services, Eaton , Eaton Corporation, 2017

References:

1 Fluid Power with Applications, Fluid Power with Applications, Fluid Power with Applications, Fluid Power with Applications, Anthony, Pearson, 2010

2 Control of Fluid Power Analysis and Design, Control of Fluid Power Analysis and Design, Control of Fluid Power Analysis and Design, Control of Fluid Power Analysis and Design, Mc Clay Donaldson, Ellis Horwood Ltd, 2007

3 Basic fluid power, Basic fluid power, Basic fluid power, Basic fluid power, Dudley, A. Pease and John J. Pippenger, Prentice Hall, 2007

4 Basic Hydraulics and Pneumatics, Basic Hydraulics and Pneumatics, M. A. Zahid, CBS Publishers & Distributors, 2015

5 The Analysis & Design of Pneumatic Systems, The Analysis & Design of Pneumatic Systems, Anderson, John Wiley, 2010

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
0.00	0.00	55.00	25.00	10.00	10.00

Instructional Method:

1 PPT

2 Videos

3 Animations

4 Hands on sessions

Supplementary Resources:

1 https://nptel.ac.in/courses/108105063

2 https://nptel.ac.in/courses/112105046

3 https://nptel.ac.in/courses/112105047