Lok Jagruti Kendra University
University with a Difference

Diploma
in
Automobile Engineering

LJ Polytechnic

Course Code: 025010513
Hydraulics and Pneumatics

Programme / Branch Name			Diploma in Automobile Engineering			
Course Name	Hydraulics and Pneumatics				**Course Code**	025010518
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week					**Evaluation Scheme**				
L	**T**	**P**	**Total Teaching Hours**	**Total Credit**	**CA**	**CCE**	**SEE (TH)**	**SEE (PR)**	**Total**
3	2	0	5	5	10	40	50	-	100

Legends: L: Lectures T: Tutorial P: Practical
CA: Continuous Assessment (Attendance + Activity)
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisite

- ✓ Applied Physics

3. Rationale

The course aims to impart basic skills for understanding of hydraulic and pneumatic system fundamentals and its application in Automobile Industry

4. Objectives

- ✓ Understand function and applications of Hydraulics
- ✓ Identify and learn components of Hydraulic System and its circuit.
- ✓ Understand function and applications of Pneumatics
- ✓ Understand the necessity of peripheral systems of Automobile.
- ✓ Identify and learn components of Pneumatic System and its circuit

5. Contents

Unit No.	Unit Name	Topics	Learning Outcome	% Weightage	Hours
1.	**Introduction to Fluid Mechanics**	1.1 Classification of Fluids and Properties of Fluids 1.2 Pascal's law 1.3 Concept of atmospheric pressure, gauge pressure, vacuum and absolute pressure 1.4 Types of fluid flow- steady, unsteady, laminar, turbulent, one, two- and three-dimensional flow, uniform and non-uniform flow 1.5 Working of Pressure gauges, Piezometer tube, simple and differential manometer. Bourdon's tube pressure gauge. 1.6 Bernoulli's theorem and its applications	• Understanding fundamentals of Fluid Mechanics and Behavior of fluids.	20	08
2.	**Hydraulic Pumps**	2.1 Centrifugal Pump: Construction and function, Types of casing and Need of Priming for Centrifugal Pump. 2.2 Reciprocating Pump: Construction and function, Types of casing and Need of Priming for Centrifugal Pump. 2.3 Hydraulic Jack: Working Principle, Constructional details and working. 2.4 Types of Positive Displacement pump such as Swash plate type, Bend Axial type, Vane type and Rotor type. 2.5 Comparison of above pumps for various characteristics and their applications	• Identify different parts of hydraulic machines and its constructional details.	30	13
3.	**Basic Components of Hydraulic and Pneumatic Systems**	3.1 Hydraulic actuators - hydraulic cylinders (single, double acting and telescopic) construction and working, hydraulic motors (gear and piston type) -construction and working 3.2 Pneumatic Actuators - Pneumatic cylinders (single and double acting) -construction and working, air motors (vane and piston type) • construction and working	• Identify various actuators of Hydraulic and Pneumatic systems.	20	08

		3.3 Construction of valves, poppet, ball, needle, throttle, pressure control, directional control, sequencing, rotary spool, sliding spool two position, multi position, non-return valves and proportionating valve.			
4.	**Miscellaneous Parts of Hydraulic and Pneumatic System**	4.1 Hydraulic filters and strainers - full flow and proportional types, function and working, difference between filters and strainers 4.2 Pneumatic filters -screen type and mechanical type, function and working, FRLunit. 4.3 Seals and gaskets for hydraulic and pneumatic systems-Types, function and construction of commonly used seals and gasket materials	• Identify the importance of miscellaneous parts such as seals and gaskets in hydraulics and Pneumatics.	15	7
5.	**Hydraulic and Pneumatic Circuits and System.**	5.1 Hydraulic symbols. 5.2 Meter in and Meter out circuit. 5.3 Applications of hydraulic circuits in power steering, hydraulic press, hydraulic brake etc. 5.4 Pneumatic symbols 5.5 Speed control circuit, Sequencing circuit and time delay circuit 5.6 Applications of pneumatic circuits and electropneumatic.	• Understand the circuit diagram of hydraulics and pneumatics along with its application.	15	6
				Total Hours	**42**

6. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1.	Introduction to Fluid Mechanics	40	40	10	0	10	0
2.	Hydraulic Pumps	35	45	10	0	10	0
3.	Basic Components of Hydraulic and Pneumatic Systems	30	50	10	0	10	0
4.	Miscellaneous Parts of Hydraulic and Pneumatic System	30	50	10	0	10	0
5.	Hydraulic and Pneumatic Circuits and System.	40	40	10	0	10	0

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

7. Reference Books

1) Hydraulic and Fluid Mechanics by P.N Modi, Standard Book House, Delhi, 2017
2) Fluid Mechanics by R.K Bansal, Laxmi Publications New Delhi.
3) Industrial Hydraulics by S.M Pippenger and Hicks, ISBN-13: 978-8189401269 McGraw Hill Int.Mumbai, 1979.
4) Introduction to Hydraulics and Pneumatics by Ilango, S. Soundararajan, ISBN-13: 978-0070501409 PHI Leeming Private Limited, New Delhi, 2011
5) Hydraulic and Pneumatic Control by Sundaram S.K ISBN-13: 978-8177585803 S. Chand, Pune, 2006.

8. Open Sources (Website, Video, Movie)

1) https://www.youtube.com/watch?v=06hWnWnNOFE
2) https://www.youtube.com/watch?v=c6gwU7IHtlo
3) https://www.youtube.com/watch?v=8CRMUKwrhUQ
4) https://www.youtube.com/watch?v=KgphO-u7MIQ
5) https://www.youtube.com/watch?v=YeYd0htafwo
6) https://www.youtube.com/watch?v=jsMJbJQkGTs
7) https://www.youtube.com/watch?v=K5B7uZpOHNQ i)
8) https://www.youtube.com/watch?v=zl gVx YfiSr0&pbjreload=l 0
9) https://www.youtube.com/watch?v=BEpQFZ5BG8c
10) https://www.youtube.com/watch?v=RjLaU8nFnzE
11) https://www.youtube.com/watch?annotation_id=annotation_2640300455&feature=iv &src_vid=O_ktD2pRghQ&v=iLAcfilXsQw