GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering
Subject Code: 3731107
Semester – III
Subject Name: Hydraulic & Pneumatic systems in Automotive Vehicles

Type of course: Program Elective - V

Prerequisite: - Nil

Rationale: All automotive vehicles are equipped by hydraulic and pneumatic systems. Hence the fundamental knowledge of hydraulic and pneumatic systems is most essential for an automobile engineer. This course will help the students to get fundamental knowledge in working of various types of pumps, motors, air compressors and their different associative systems. Knowledge of this course will also be helpful to the students in recent advancements in electro pneumatics, hydro-pneumatic suspension, air brake and other associative systems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No	Course Content	Hours	% Weightage
1	**Unit 1:** Introduction to fluid properties, hydraulic fluids, hydraulic and pneumatic systems.	8	17%
2	**Unit 2:** Different elements of hydraulic system, constructional and working details of each component; Pumps and motors, characteristics, Maintenance of hydraulic system, Selection criteria for cylinders, valves, pipes etc.	14	31%
3	**Unit 3:** Different elements of hydraulic system, constructional and working details of each component; air compressor, air motor, control valves, actuators and mountings, filter, regulator and lubricator.	8	17%
4	**Unit 4:** Hydro-Mechanical servo systems, Electro pneumatics, ladder diagram, Servo and Proportional valves, PLC-construction, Hydraulic tipping mechanism, power steering, fort lift hydraulic gear, hydro-pneumatic suspension, air brake, maintenance and trouble shooting of pneumatic circuits.	16	35%

References Books:

1. Majumdar, S.R., "Oil Hydraulic Systems: Principles and Maintenance", TataMcGraw- Hill Publishing Company Ltd., New Delhi, Fourth Reprint, 2003.
2. Peter Rohner, "Fluid Power Logic Circuit Design – Analysis, Design Method and Worked Examples", The Macmillan Press Ltd., UK, 1979.
3. Festo KG, "Pneumatic Tips", Festo, Germany, 1987.
4. Andrew Parr, "Hydraulic and Pneumatics", Jaico publishing house, 1999.

5. Mc Clay Donaldson, "Control of fluid power analysis and design", Ellis HorwoodLtd.
6. Anthony Espisito, " Fluid Power with Application", Pearson Education Singapore)Pte.Ltd, Delhi, India, Fifth Edition, First Indian Reprint, 2003
7. Werner Deppert and Kurt Stoll, "Pneumatic Controls : An introduction to Principles", Vogel-Druck Wurzburg, Germany, 1975
8. Pippenger, J.J, "Industrial Hydraulic & Pneumatics", McGraw Hill, 2002.
9. Anderson B W "The analysis and design of pneumatic systems", John Wiley.
10. A. B. Goodwin, " Fluid Power Systems", McMillan Pub. Co.

Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO-1	Basic understanding of fluid properties, knowledge of different hydraulic and pneumatic systems	18
CO-2	Acquire constructional knowledge of Different elements of hydraulic system, and its , Maintenance	24
CO-3	Understanding construction and working of Different elements of hydraulic system, of an automobile	20
CO-4	Understanding Hydro-Mechanical servo systems, Electro pneumatics, ladder diagram,	18
CO-5	Knowledge of Hydraulic tipping mechanism, power steering, its , maintenance and trouble shooting of pneumatic circuits.	20