

ME -310 Automation in Manufacturing

L	T	P	Credit	Area		CWS	PRS	MTE	ETE	PRE
3	0/1	2/0	4	DEC/GEC		15/25	25	20/25	40/50	-

Objective: To enable the students to understand the fundamentals of introduction to automation, hydraulic principles. hydraulic pumps. To understand concept of Logic Circuits, Electro Pneumatic, Electro Hydraulic, Robotic Circuits, Automatic machine tool control.

Syllabus							Contact Hours	
Unit-1	Basic Principles: Introduction to Automation. Productivity v/s automation materials handling systems. Evaluation of automatic production. Designing for automation.							6
Unit-2	Hydraulic System: Hydraulic Principles. Hydraulic pumps: Characteristics, Pump Selection, Pumping Circuits. Hydraulic Actuators: Linear, Rotary, Selection, Characteristics. Hydraulic Valves: Pressure, Flow, Direction Controls, Applications. Servo and Proportional Valves, Hydraulic Fluids: Symbols.							8
Unit-3	Pneumatic Systems: Pneumatic fundamentals. Production of compressed air. Types of cylinders. Control valves: direction, pressure and flow-air hydraulic equipment's Actuators. General approach to control system design. Symbols and drawing. Schematic layout. Cascade, Karnaugh, Veitch mapping method. air hydraulic control.							8
Unit-4	Pneumatic and hydraulic circuits: Hydraulic circuits: Reciprocating, Quick return, Sequencing synchronizing. Accumulator circuits. Safety circuits. Pneumatic circuits: Classic, Cascade, Step-counter, Karnaugh-Veitch mapping, Combination Methods. Electrical control of fluid power: components and circuits. Micro-electronic control of fluid power: PLC-Microprocessors uses and selection criteria for components.							8
Unit-5	Logic Circuits: Position, Pressure Sensing, Switching, Electro Pneumatic, Electro Hydraulic, Robotic Circuits. Case studies: conveyor feed system, power pack, Bunker automatic circuits, etc.							6
Unit-6	Automation in machine tools, Mechanized feeding. Automatic assembly. Automatic machine tool control. Transfer lines. Factory automation							6
Total								42

Reference Book:

1	Hydraulic and Pneumatic Controls, R Srinivasan, Vijay Nicole imprints Pvt. Ltd., Chennai.
2	Introduction to Hydraulic and Pneumatic S. Ilango and V. Soundararajan, Prentice- Hall of India, Delhi
3	Oil Hydraulic Systems: Principles and Maintenance”, S. R. Majumdar, “Tata McGraw-Hill, Delhi
4	“Pneumatic Systems: Principles and Maintenance”, S. R. Majumdar, Tata McGraw-Hill, Delhi
5	Power Hydraulics “J. Michael, Pinches and John G. Ashby, “Prentice Hall
6	Hydraulics and Pnematics (HB) “, Andrew Parr, “Jaico Publishing House
7	Basic Fluid Power “, Dudley A. Pease and John J. Pippenger, “Prentice Hall
8	Fluid Power with Applications “, Anthony Esposite, Prentice Hall

Course Outcomes

CO1	Implement concepts of automation in machine tools and plant
CO2	Students will understand the fundamentals of control in automation as they apply to Manufacturing
CO3	Design of Pneumatic Circuit for manufacturing application
CO4	Design of Hydraulic Circuit for manufacturing application
CO5	Ability to apply PLC timers and counters for the control of industrial processes
CO6	Application of automation in industries

CO-PO/PSO Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2
CO6	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1