

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B.E. SEMESTER : VIII**  
**MANUFACTURING ENGINEERING**

**Subject Name: Manufacturing Automation**

**Subject Code:183404**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam(E)	University Exam(P)	Mid Sem Exam(Theory) (M)	Practical (Internal)
3	2	0	5	70	30	30	20

Sr No	Course Contents
<b>1</b>	<b>Basics of Automation and Industrial Hydraulics</b> Principles of hydraulics, Hydraulic fluids, Filtration technology, Hydraulic pumps, Hydraulic valves, and hydraulic actuators, Proportional valves.
<b>2</b>	<b>Hydraulic Systems</b> Design considerations for hydraulic circuit, Standards in circuit diagram representation, Power pack design layout, Basic hydraulic circuits such as regenerative circuits, sequencing circuit, meter in and meter out circuit, Design of reservoir based on heat transfer considerations, Design of accumulators and intensifiers, Selection of standard components for hydraulic circuits.
<b>3</b>	<b>Pneumatic Systems</b> Operational principles and application, air compressors, Pneumatic cylinders and air motors, Pneumatic valves, Design of pneumatic circuits, hydro-pneumatic, Control in pneumatic system.
<b>4</b>	<b>Programmable Automation</b> Introduction to microprocessor, Microcontroller, Microcontroller based manufacturing systems, Logic gate and control, Computer process controls - any manufacturing case study.
<b>5</b>	<b>Control System</b> Data conversion (ADC/DAC), Programmable logic controller, Interfacing circuits, Actuating signals, relays, contactors, Types of control systems- P, PI, PID , Optimal control system.
<b>6</b>	<b>Factory Automation</b> Basic concepts of automated system, Advanced automated functions, Levels of automation, Transfer systems-Continuous, intermittent, Indexing mechanisms, vibratory bowl feeders, non-vibratory feeders, hopper feeders, rotary disc feeder, centrifugal, revolving feeder, assembly systems, Synchronous and non-synchronous material transfer, industrial robots, Automated Guided Vehicles and FMS, Automated warehouse.

**Text Books:**

1. Kuo B.C., "Automatic Control Systems", Prentice Hall India Pvt. Ltd., New Delhi
2. Peter Rohner, "Industrial Hydraulic Control", Wiley Edition, 1995
3. Mikell P Groover, "Automation, Production System and Computer Integrated Manufacturing", Prentice Hall Publications.
4. Mujumdar S.R., "Pneumatic System", Tata McGraw Hill 2002 Edition.
5. Gopal, "Control Systems Engineering", Willey Eastern Ltd.

**Reference Books:**

1. Doebelin E.O, "Measurement System, Application and Design", Tata McGraw Hill Publications Ltd.
2. Bolton W., "Mechatronics Electronic Control Systems in Mechanical and Electrical Engineering", Pearson Education.
3. Rangan C.S., Sharma G.R., Mani V.S., "Instrumentation - Devices and Systems", Tata McGraw Hill Publications Ltd.
4. Histand B.H., Alciatore D.G., "Introduction to Mechatronics and Measurement Systems", ISBN 0-07-052910-8.
5. Johnson C.D., "Process Control Instrumentation Technology", Prentice Hall of India Pvt. Ltd.,
6. HMT Mechatronics, HMT,
7. Vickers Manual on Hydraulics.
8. G. Boothroyd, C. Poli, L. Murch, "Automatic Assembly", Marcel Dekker Inc. 1982.
9. Werner Deport and Kurt Stool, "Mechanization by pneumatic control", Vol. I and II.
10. Date P. P., "Introduction to Manufacturing Technology, Principles and Practices", Jayco Publishers, Mumbai