GUJARAT TECHNOLOGICAL UNIVERSITY
ELECTRICAL & ELECTRONICS ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Industrial Automation**
Subject Code: **170802**

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

Sr. No	Course Content	Total Hrs.
1.	**General Concepts:** General concepts of the industrial production. Concepts of production systems and production processes. Automation production systems and their classification.	4
2.	**Process Control Loop and its Characteristic:** Controlled variable, controlling parameters, process equation load, transient, process, lag, self regulation, control lag, variable range, dead time, cycling.	4
3.	**Control Algorithms:** Characteristic of different discontinuous controller mode, two position mode, multi position mode, floating control mode, introduction of different continuous controller mode, proportional, integral, derivative, PI, PID controller mode	8
4.	**Programmable Logic Controller (PLC):** Architecture by block diagram, i/o modules & programming criteria-discrete state process control, analog controller, digital controller, and intelligent controller, serial communication port. Memory and storage, programming language- ladder diagram and its application.	12
5.	**Distributed Control System:** Evaluation of DCS, system architecture-hierarchical of DCS at function levels, Database organization, system implementation concepts System elements- fields, station, intermediate station, central computer system, Monitoring and communication facilities, data communication link-transfer of process data, SCADA.	6

Laboratory & Assignments:

- Introduction of PLC and PLC trainer system kit
- Introduction to PLC Programming
- Input/ Output specifications, wiring & configuration of PLC
- To develop a ladder diagram for a stepper motor based pick & place jig
- To develop a ladder diagram for an L.V.D.T. and lead screw type arrangement jig
- To develop a ladder diagram for a Bottle filling and Conveyor belt jig
- To develop a ladder diagram for temperature measurement and control jig
- To develop a ladder diagram for sequential lamp On/Off jig
- Interfacing of PLC to the PC and Real-time programming
- To Study of SCADA based industrial automation

Text Books:

1. Johnson, C. D., "Process Control Instrumentation Technology", Prentice Hall.
2. Liptak, B. G., "Instrument Engineers – Handbook", (Vol. – II), CRC Press.
3. Morriss, S. B., "Programmable Logic Controllers", Prentice hall.

Reference Books:

1. Webb, J. W., and Reis, R. A., "Programmable Logic Controllers: Principles & Applications", Prentice Hall, (2002).
2. Shinskey, F. G., "Process Control Systems: Application, Design and Tuning", McGraw-Hill Professional, (1996).
3. Thomas E. Marlin, "Process Control: Designing Processes and Control for Dynamic Performance", McGraw – Hill, International Edition
4. Dale E. Seborg, Thomas F. Edger, Duncan A. Mellichamp, "Process Dynamics and Control", Wiley India.
5. Surekha Bhanot, "Process Control: Principles and Applications", Oxford University Press.
6. Peter Harriot, " Pocess Control", Tata - McGraw Hill.
7. Patranabis, "Principles of Process Control", Tata - McGraw Hill.