

COURSE TITLE	PLC AUTOMATION
COURSE CODE	01EE1508
COURSE CREDITS	1

Objective:

- 1 To make student familiar with PLC Programming and industrial automation system to develop individuals thinking power to understand and solve the industrial automation problems by giving practical hands-on experience of PLC programming with hardware interfacing.

Course Outcomes: After completion of this course, student will be able to:

- 1 Describe typical components of a PLC.
- 2 Select PLC and other components based on requirements of application.
- 3 Interpret the use of timers, counters, and other programming functions.
- 4 Develop programs for different process control applications through ladder logic

Pre-requisite of course: Basic knowledge of electrical circuits

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	2	0	0	0	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction Automation overview, Requirement of automation systems, Architecture of Industrial Automation system, Introduction of PLC and supervisory control and data acquisition (SCADA)	4
2	Programmable Logic Controller (PLC) An overview of PLC, introduction, definitions and history of PLC, manufacturing and assembly processes, PLC advantages and disadvantages, overall PLC system, CPU, PLC, input and output modules, program recording devices, Input and Output module interfacing, relation of digital gate logic to contact / coil logic	6
3	PLC Programming General programming procedure, Introduction to PLC programming software, Addressing concepts. Introduction to bit, byte & word concept, Use of different blocks like Timer, Counter, MOVE, etc, Creating ladder diagrams from process control descriptions, Upload, download and Monitoring of programs	7

Contents : Unit	Topics	Contact Hours
4	PLC based Automation systems Different PLC operations, applications of PLCs in various applications like: lift/elevator control, water level control, Traffic control, mperature control, Stepper motor control, speed control of D.C. motor & Induction motor	11
Total Hours		28

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment No. 01 To get familiar with different components of PLC, its operation and interfacing with PC.	2
2	Experiment No. 02 To implement various logical function using ladder logic in PLC	2
3	Experiment No. 03 To implement various arithmetical operations using ladder logic in PLC	2
4	Experiment No. 04 To develop a ladder logic for traffic signal light control with the application of Timer.	2
5	Experiment No. 05 To develop a ladder logic program to implement the function of DOL starter and Star-Delta starter of three phase induction motor.	2
6	Experiment No. 06 To develop ladder logic to display status of parking area with the application of Counter.	2
7	Experiment No. 07 To implement PLC logic for sequential control of job pressing machine.	2
8	Experiment No. 08 To implement PLC logic for Bottle filling plant application.	2
9	Experiment No. 09 To develop ladder logic to implement control of liquid mixing tasks in a tank.	2
10	Experiment No. 10 To develop ladder logic to implement control of liquid mixing tasks in a tank.	2
Total Hours		20

Textbook :

- 1 Programmable Logic Controllers, John W. Webb, Ronald A. Reis, 5th Ed., PHI, 2012
- 2 Programmable Logic Controllers: Programming Methods and Applications, John R. Hackworth, Fredrick D. Hackworth Jr., Pearson, 2013

Textbook :

- 3 Programmable Logic Controllers, William Bolton, 4th Edition, Elsevier, 2006
- 4 Programmable Controllers – Theory and implementation, L.A. Bryan and E. A. Bryan, Second edition, An Industrial text company publication, USA, 1997

References:

- 1 Handbook of industrial automation, Handbook of industrial automation, Richard L. Shell and Ernest L. Hall, CRC press, 2002

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	25.00	25.00	20.00	0.00

Supplementary Resources:

- 1 https://pneumobil.hu/archivum/pneumobil_2017/letoltesek/plc_informaciok/
- 2 https://onlinecourses.nptel.ac.in/noc21_me67/preview
- 3 <https://archive.nptel.ac.in/courses/108/105/108105063/>