

(ELECTIVE – B/II)**4/4 B.Tech. SEVENTH SEMESTER****EE7T6B****PROGRAMMABLE LOGIC CONTROLLERS****Credits: 3****Lecture: 3 periods/week****Internal assessment: 30 marks****Tutorial: 1 period /week****Semester end examination: 70 marks****Course Objective:**

This course concentrates on the fundamental concepts, methods of analysis of programmable logic control and systems including basic concepts, programming, applications, troubleshooting of ladder logic, and interfacing of equipment.

Course Outcomes:

After completing this course, student is able to

1. Understand the purpose, functions, and operations of a PLC
2. Identify the basic components of the PLC and how they function.
3. I/O configuration of PLC.

UNIT I**PLC - An Introduction**

Definition & history, advantages and disadvantages, PLC overall system and CPU processor, input output modules and interfacing, PLC as a computer.

PLC programming procedure: programming equipment, programming formats, construction of PLC ladder diagrams, devices connected to input output modules.

UNIT II**PLC Programming**

Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation, digital logic gates, programming in the boolean algebra system, conversion examples.

Ladder Diagrams for process control: ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

UNIT III**Basic PLC Functions**

PLC Registers: characteristics of registers, module addressing, holding registers, input registers, output registers.

PLC Functions: Timer functions & industrial applications, counters, counter function industrial applications.

UNIT IV**Intermediate and Data Handling Functions**

Arithmetic functions: Number comparison functions, number conversion functions. Data handling functions: SKIP, master control Relay, jump, move, FIFO, FAL, ONS, CLR & sweep functions and their applications.

UNIT V**PLC Functions Working with Bits and Advanced PLC Functions**

Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis robots with PLC, matrix functions. Analog PLC operation: analog modules & systems, analog signal processing, multi bit data processing, analog output

application Examples, PID principles, position indicator with PID control, PID modules, PID tuning, PID functions.

Learning Resources

Text Books:

1. “Programmable Logic Controllers- Principles and Applications” by John W.Webb & Ronald A. Reiss”, PHI publications-Fifth Edition.
2. “Programmable Logic Controllers- Programming Method and Applications” by ‘J.R.Hackworth &F.D Hackworth Jr.’, Pearson, 2004.

Reference Book:

“Programmable Logic Controllers” by W.Bolton”, Newnes publications -Fourth Edition