4/4 B.Tech. FIRST SEMESTER

EE7T6B   PROGRAMMABLE LOGIC CONTROLLERS (ELECTIVE-II)   Credits: 4

Lecture: 4 periods/week   **Internal assessment: 30 marks**
Tutorial: 1 period /week   **Semester end examination: 70 marks**

Objectives:
It provides both fundamental and cutting-edge coverage on programmable logic controllers; today a billion dollar industry. Offering a broad-based foundation aspect of controller usage with a basic layout, programming techniques, Applications are discussed for each PLC and PID functions

Learning outcomes :
1. Upon completion of study of the course, student should be able to understand different PLCs used in industry and operational procedures of PLCs.
2. Upon completion of the course, student should be able to program PLCs for process control and other industrial applications
3. Upon completion of the course, student should be able to use PLC functions such as Timer functions, counters, Arithmetic functions and Data handling functions.
4. Upon completion of the course, student should be able to control two-axis and three-axis robots with PLC and PID controllers with PLC.

Unit I
PLC Basics: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

Unit II
PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

Unit III
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 IV
PLC Registers: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

Unit V
PLC Functions: Timer functions & Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions

Unit VI
Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep functions and their applications

Unit VII

Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis Robots with PLC, Matrix functions.

Unit VIII

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, Fifth Edition, PHI
2. Programmable Logic Controllers- Programming Method and Applications –JR.Hackworth &F.D Hackworth Jr. –Pearson, 2004