M.TECH SECOND SEMESTER

EEPC2T5C **PLC CONTROLLERS AND ITS APPLICATIONS** **Credits: 4**

(ELECTIVE-III)

Lecture: 4 periods/week **Internal assessment: 30 marks**

Semester end examination: 70 marks

Objective: **This subject delas with PLC basics, PLC programming and functions, It emphasizes on PLC data handling functions, PLC register logic gates and some of the application examples.**

Learning outcomes:

1. **Students understand about the use of PLC (programmable logic controllers) and their applications used in industries, plant etc.,**
2. **They can able to write the program in PLC using ladder network for some of the examples**
3. **Understands the operation of PLC, functions handled and logic gates used in PLC.**

Unit 1:

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 2:

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

Unit 3:

Digital logic gates, programming in the Boolean algebra system, conversion examples. Ladder diagrams for process control: Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system.

Unit 4:

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

Unit 5:

PLC Functions: Timer functions and Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions.

Unit 6:

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

Unit 7:

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

Unit 8:

Analog PLC operation: Analog modules and 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.

Reference Books:

1. Programmable Logic Controllers – Principle and Applications by John W. Webb and Ronald A. Reiss, Fifth Edition, PHI
2. Programmable Logic Controllers – Programming Method and Applications by JR. Hackworth and F.D Hackworth Jr. – Pearson, 2004.