3EL44: PROGRAMMABLE LOGIC CONTROLLERS
CREDITS -3 (LTP: 3,0,0)

Course Objective:

1. The goal of this course is learn how to use PLC in automation system.
2. The course aims understand Basic block diagram and software and hardware part of PLC. Practical implementation of small automation system using PLC is focused. It deals with different i/o device interface also.The knowledge of this controller thoroughly enables students to design automation system for industries.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				
L	T	P	C	Theory Marks		Practical Marks		Total Marks
				ESE	CE	ESE	CE	
3	0	0	3	60	40	0	0	100

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction to Programmable Logic Controllers (PLCs):** Block diagram based PLC programming, Basics for PLC programming architecture, Processor memory organisation, Programme files and data files, Input and output file operations, Scan process, PLC programming languages.	10
2	**Programming Languages for PLCs.:** Instructions set of PLC, Programming Language, Support, Ladder Diagram programming requirements, Symbols of ladder syntaxes	10
3	**Automation using PLC:** Automation challenges in Industries, PLC based automation system, PLC requirements in SCADA based automation systems, PLC Architectures, Operation of PLCs, Logic Control And Sequencing, Timer and counter implementations using PLC.	10
4	**Case Studies for PLCs:** Global Process Automation system.	05
5	**Application of PLCs:** Continuous Bottle-filling system, Batch mixing system , Speed control of dc motor, 3-stage air conditioning system, Control of planar machine, Automatic frequency control of Induction heating, PLC in Industry 4.0.	10
	Total	**45**

List of References:

1. Curtis Johnson, "*Process Control Instrumentation Technology*", Prentice Hall India
2. Garry Dunning, "*Introduction To Programmable Logic Controller*", Thomson Publication.
3. John w Webb, "*Programmable Logic Controllers: Principles and Applications*", Macmillan Publishing.

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	30	20	20	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels **(Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (COs):

At the end of this course, students will be able to:

1. Apply the knowledge of control system in Electronics engineering, formulate, review literature, and analyze industrial automation problems.
2. Apply reasoning informed by the contextual knowledge to assess societal, safety issues and the consequent responsibilities relevant to the Electronics engineering practice.
3. Apply principles and application toward fulfillment of professional responsibilities of the Electronics engineering practices in industries.
4. Create, and apply appropriate techniques, resources, and modern engineering and software tools for complex engineering activities with an understanding of the limitations