C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: Technology & Engineering
DEPARTMENT OF: Instrumentation & Control Engineering
SEMESTER: VII
CODE: 4TE07PLC1
NAME: Programmable Logic Controller

Teaching & Evaluation Scheme

Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
							Theory				Practical			
							Sessional Exam		University Exam		Internal		University	Total Marks
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE07PLC1	Programmable Logic Controller	3	0	2	5	4	30	1.5	70	3	--	20	30	**150**

OBJECTIVES:

1. To introduce the students about Programmable Logic Controller.
2. To make the students familiar with Process Automation.

PREREQUISITES:

1. Basics of Electrical Engineering
2. Fundamentals of Control System

COURSE OUTLINES:

Sr. No.	Course Contents	No of Hours
1	**PLC BASICS:** Introduction, definition & history of the PLC, Principles of Operation, Block diagram of PLC, PLCs versus Computers	4
2	**PLC Hardware Components:** The I/O section, Discrete I/O Modules, Analog I/O Modules, Special I/O Modules, I/O specifications, The CPU, Memory design, Memory Types, Programming Devices	2
3	**Fundamentals of Logic:** The Binary Concept, AND, OR and NOT functions, Boolean Algebra Developing Logic Gate Circuits from Boolean Expressions	4
4	**Basics of PLC Programming:** Processor Memory Organization, Program Scan, PLC Programming languages, Relay type instructions, Instruction addressing, Branch Instructions	6

5	**Various INPUT /OUTPUT Devices and its interfacing with PLC:** Different types of Input devices, Different types of Output devices	3
6	**Programming Timers:** Mechanical Timing relay, Timer instructions, ON delay timer instruction, Off-Delay timer instruction, Retentive Timer, Cascading Timers, examples of timer function industrial application, industrial process timing application.	3
7	**Programming Counters:** Counter Instructions, Up-counter, down counter, Up- Down counter, Cascading counters, Incremental encoder counter applications, Combining counter and timer functions, High Speed counter instruction, HSC, PLS, examples of counter function industrial application.	4
8	**Different Conversion Instructions :** Byte – Integer, Integer To Byte, Integer To Double Integer, Double Integer To Integer, Real To Integer, Real To Integer, Integer To String, String To Integer, Integer To ASCII , ASCII To Integer, Real To ASCII , ASCII To Real, ASCII To Hexadecimal, Hexa- Decimal To ASCII , Decode, encode, segment, Truncate.	3
9	**Different Comparison Instructions:** Data manipulation, data transfer operations, Data compare instructions, Data manipulation Programs, Numerical Data I/O interfaces, Set-point control.	3
10	**Program Control Instructions:** The PLC SKIP and MASTER CONTROL RELAY Functions. Introduction, the SKIP function & application, the MASTER CNTROL RELAY function & application. Introduction: Jump with non-return, jump with return.	4
11	**Alternative Programming Languages** Structured Text, Function block diagram, Instruction list, sequential function chart – Introduction and of few instructions with LD.	6

Learning outcomes:

1. The students would be able to program using various programming language.

Books recommended:

1. Programmable logic controller by Frank D. Petrusella, Tata McGraw-Hill publication
2. Programmable Logic Controllers by W. Bolton, Elsevier Newnes publication, 4th edition
3. Programmable Logic Controllers: Principles and Applications by John W. Webb and Ronald A. Reis, Prentice – Hall India publication, 5th edition