NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B. Tech.in Electronics and Instrumentation Engineering
Semester:	IV
Course Code:	2EI104
Course Title:	Programmable Logic Controllers
Course Type:	Core
Year of Introduction:	2023-24

L	T	Practical component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLOs):

At the end of the course, students will be able to –

1. recognize the fundamental principles of programmable logic controller (BL1)
2. understand the basic instructions of PLC. (BL1)
3. program PLC using standard software. (BL3)
4. develop an application-oriented project using PLC (BL3)

Teaching hours: 30

Unit	Syllabus	Teaching hours
Unit-I	**Introduction** Introduction, Evolution History, Importance of PLC, Type of PLC's and basic architecture.	03
Unit-II	**Internal Architecture and Interfacing Module** CPU, Memory organisation, Power Supply, Input/ Output Interface, Analog and digital input-output modules.	03
Unit-III	**Basic Operation and programming** PLC operation, Ladder logic, Logic functions, Basic relay instructions, Timer/Counter Instructions.	06
Unit-IV	**PLC Programming instructions** Comparison, Arithmetic, Logical, Data handling, input-output instructions, Case study of different industrial applications	09
Unit-V	**PLC Project Development** PLC specification and selection criteria, Sensor/Actuator selection, wiring connection with sourcing and sinking module, Wiring diagram, Concept of Redundancy and Safety.	09

Laboratory Work:
This shall consist of at least 10 Practicals based on the above syllabus.

Suggested Reading/References:

1. Frank Petruzzula, Programmable Logic Controllers, Tata Mc-Graw Hill Edition
2. John W. Webb, Ronald A. Reis, Programmable Logic Controllers Principles and Applications, PHI publication
3. Madhuchannd Mitra and Samerjit Sengupta, Programmable Logic Controllers Industrial Automation an Introduction, Penram International Publishing Pvt. Ltd.
4. J. R. Hackworth and F. D. Hackworth, Programmable Logic Controllers Principles and Applications, Pearson publication

Suggested List of Experiments (not restricted to the following):
(Only for Information)

	Title of Experiment	Hrs.
1.	To understand the programming and architecture of PLC.	2
2.	Programming PLC with relay based instructions.	2
3.	Programming of PLC using Timer instructions.	2
4.	Programming of PLC using Counter instructions.	2
5.	Programming of PLC using Mathematical instructions.	2
6.	Programming of PLC using Comparison instructions	2
7.	Programming of PLC using LOGICAL instructions.	2
8.	Programming of PLC using data handling and move instructions.	2
9.	Programming of PLC using shift Instructions.	2
10.	Programming of PLC for Industrial process I.	2
11.	Programming of PLC for Industrial process II.	2
12.	To Prepare a demonstration of control system using PLC	2

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. the academic year 2023 - 24 and onwards