KLS Vishwanathrao Deshpande Institute of Technology

(Accredited by NAAC with "A" Grade)
(Approved by AICTE, New Delhi. Affiliated to VTU, Belagavi)
(Recognized Under Section 2(f) by UGC, New Delhi)
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SYLLABUS

Academic Year :	**2023-24 (Odd)**
Semester :	**7th**
Title :	**Add-on Course on Programmable Logic Controller (PLC)**
No. of Lecture Hours :	**30 Hours**

Course Objectives:

- To explain advantages and disadvantages, main parts and their functions, basic sequence of operation of PLC.
- To describe the hardware components: I/O modules, CPU, memory devices, other support devices and the functions of PLC memory map.
- To describe program scan sequence, the communication of information to the PLC using different languages, internal relay instruction.
- To explain identification of common operating modes found in PLCs, writing and entering the ladder logic programs.
- To define the functions of Relays, Contactors, Motor Starters, Switches, Sensors and Output Control Devices
- To explain the functions of PLC timer and counter instructions, applying combinations of counters and timers to control systems.

COURSE CONTENT

Module 01	**Programmable Logic Controllers:** Introduction, Parts of a PLC, Principles of Operation, Modifying the Operation, PLCs versus Computers, PLC Size and Application. **PLC Hardware Components:** The I/O Section, Discrete I/O Modules, Analog I/O Modules, Special I/O Modules, I/O Specifications, The Central Processing Unit (CPU), Memory Design, Memory Types, Programming Terminal Devices, Recording and Retrieving Data, Human Machine Interfaces (HMIs)	10 Hours
Module 02	**Basics of PLC Programming:** Processor Memory Organization, Program Scan, PLC Programming Languages, Relay-Type Instructions, Instruction Addressing, Branch Instructions, Internal Relay Instructions, Programming	10 Hours

	Examine If Closed and Examine If Open Instructions, Entering the Ladder Diagram, Modes of Operation. Developing Fundamental PLC Wiring **Diagrams and Ladder Logic Programs:** Electromagnetic Control Relays, Contactors, Motor Starters, Manually Operated Switches, Mechanically Operated Switches, Sensors, Output Control Devices	
Module 03	**Programming Timers:** Mechanical Timing Relays, Timer Instructions, On Delay Timer Instruction, Off-Delay Timer Instruction, Retentive Timer, Cascading Timers. **Programming Counters:** Counter Instructions, Up-Counter, Down-Counter, Cascading Counters, Incremental Encoder-Counter Applications, Combining Counter and Timer Functions.	10 Hours
Total Hours		**30 Hours**

Course Outcomes:

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

- Discuss history of PLC and describe the hardware components of PLC: I/O modules, CPU, memory devices, other support devices and operating modes.
- Understand the basics of PLC programming and develop ladder logic programs for field devices such as Relays, Contactors, Motor Starters, Switches, Sensors and Output Control Devices commonly used with I/O module.
- Understand the PLC timer and counter instruction, their types and able to simulate ladder logic programs in LogixPro simulation software based on them.

Text Book:

- Programmable Logic Controllers, Frank D. Petruzella, Mc Graw Hill Education, 4th edition, 2011.

Reference Book:

- Programmable Logic Controllers, W. Bolton, Elsevier, 5th edition, 2010.

Course Instructor:

Prof. Kirankumar N. Hittanagi

Kiarkumar N.H.

05/09/23