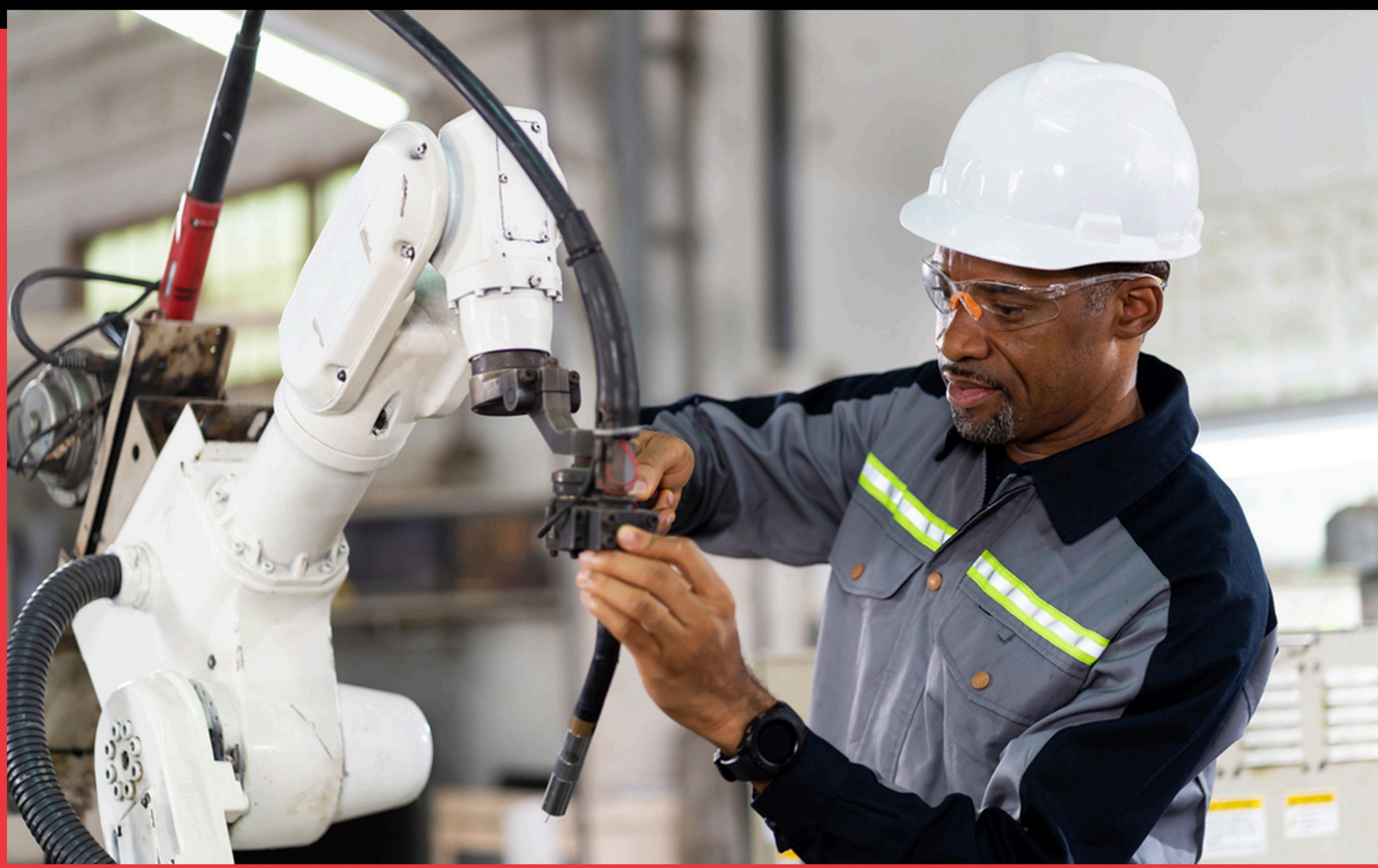
MAT
Madesoft Academy of Technology

FULL STACK INDUSTRIAL AUTOMATION & PLCS PROGRAMMING



Course Syllabus

FULL STACK INDUSTRIAL AUTOMATION & PLCS PROGRAMMING

A **Full Stack Industrial Automation & PLCs Programmer** is a specialist who can handle all the work of, systems engineering, PLCs programming, HMI development and Industrial Communication Networks. You stand to learn the following in this project-based training.

COURSE OBJECTIVES

- The Course enables participants to become a ready-to-hire Automation or PLCs Engineer in just 10 Months.
- Build strong foundations in PLCs Programming, Human Machine Interface (HMI) Design, Industrial Communication.
- With this course you are able to design and develop a complete automation project from scratch start from I/O selection to programming and testing the solution.

COURSE FLOW

This is a 10 Months based course whereas student you will spend 7 Months of intensive training learning the overall Automation concepts, engage in Practical Programming Exercise, Labs, Case study and Assignments.

After that you will spend 3 Months on Workshops and Project Based Learning where you will learn the fundamentals of participating in a real-life project.

In addition, your learning will be based on using Factory IO, Automation Direct PLC Designer for Do-More PLC, Allen Bradley Connected Component Workbench, Siemens Simatic TIA Portal for Siemens S7 PLCs & RS Logix 5000 for Allen Bradley ControlLogix.

DELIVERY METHODS

This Program Consist of Classes, Mentorship, Workshops, Modularized lessons managed by Learning Management System with Assignments, Lab exercise, Practical case study, Downloadable study resources and Video lectures to fully engage the student.

Student will be involved in practical lab Exercise and Assignment after each key concept is taught, the lab work shall be in the form of practical with guide from instructors, each assignment and lab work shall be used as part of performance and assessment grading.

PREREQUISITE

Applicant for this course must have a minimum of Diploma in any of the sciences or currently in an institution of Higher learning. Also, Applicant without qualification but have 1+ year working experience in the field of electrical/electronic or computer shall be considered for a place in the program.

COURSE OUTCOME

The expected learning outcome for each student participating in the Full-stack Industrial Automation Course are listed below.

1. Student should have a complete overview of the Industrial Automation Technologies as it applies in the world of the industries.
2. Student should know how Sensors and Actuators work, used industrially, and how they are connected to industrial processes for measurement monitoring and control purposes.
3. Student should develop knowledge of the working of PLC – with examples of a typical vendor PLCs.
4. Student Should be able to write PLC program logic following IEC standard and download to PLC and carry out troubleshooting and functional test of the Logic developed.
5. Student should develop ability to read process control narrative or process functional description and convert same into Control Logic using ladder logic diagram or Function block diagram.
6. Student should be able to design and develop HMI screen following industry standard and connect the develop HMI to processed data from the PLCs.
7. Student should develop practical understanding of industrial protocols with emphasis on OPC, Modbus, HART, RS232/485, TCP/IP.
8. Student should develop practical understanding of control Network with emphasis on Ethernet Networks.
9. Student should be able to develop the required skill to troubleshoot PLC systems irrespective of the vendor product.
10. Student Should be able to feature in any Industrial Automation project after learning the industry base concept involved in a project by taking part in the project outline for the course with intensive guide from an industry mentor. Some key concept to learn during this phase will be :

- Functional Design Specification Development
- I/O Database Analysis
- System Sizing and Calculations
- I/O segregation and Allocation
- Control System Network & Architecture
- Control typical Development
- Control Narrative & philosophy
- Concept behind System integration and FAT

MODULES

1. **Module 1** - Fundamentals of Industrial Automation
2. **Module 2** - Sensing and Actuating Elements (Sensors, Actuators)
3. **Module 3** - Control System Elements (Controllers 'PLCs', IOs)
4. **Module 4** - Fundamentals of Programming Industrial Systems
5. **Module 5** - Industrial Control Network & Communication Protocols
6. **Module 6** - Supervisory Control Elements (HMI, SCADA, Consoles, Servers)
7. **Industrial Automation Final Project**

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FUNDAMENTALS OF INDUSTRIAL AUTOMATION- MODULE 1

MODULE OBJECTIVES

At the end of this module participant would have built strong Industrial Automation fundamentals.

DETAILED COURSE CONTENT

Lesson 1
What is Industrial Automation

Lesson 2
Types of Industrial Automation

Lesson 3
Equipment's used in Industrial Automation

SENSING AND ACTUATING ELEMENTS (SENSORS, ACTUATORS) - MODULE 2

MODULE OBJECTIVES

At the end of this module participant would have built strong and practical application knowledge in the use of Sensors and Actuators.

DETAILED COURSE CONTENT

Lesson 1
Overview of Sensor and Actuator

Lesson 2
Application of Sensors in Industrial Automation

Lesson 3
Application of Actuators in Industrial Automation

Lesson 4
Instruments and Electronic Communications

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CONTROL SYSTEM ELEMENTS (PLCS, IOS) - MODULE 3

MODULE OBJECTIVES

At the end of this module participant would have built strong understanding on functioning of PLCs and practical understanding of the working principles of the component parts e.g CPU, I/O Modules, Power Supply of PLC system.

DETAILED COURSE CONTENT

Lesson 1
Overview Control System Elements

Lesson 2
Introduction to Programmable Logic Controllers (PLCs)

Lesson 3
Understanding the Working Fundamentals of PLCs Components

FUNDAMENTALS OF PROGRAMMING INDUSTRIAL SYSTEMS - MODULE 4

MODULE OBJECTIVES

At the end of this module participant would have built strong knowledge on the IEC software model and industry-based standards for programming industrial systems. Student will engage and program practical industrial process examples to further enhance their logical thinking and programming skills using IEC standard programming language.

DETAILED COURSE CONTENT

Lesson 1
Number Systems and Codes

Lesson 2
IEC 1131-3 Program Representation

Lesson 3
Typical IEC Functions & Function Blocks

Lesson 4
Programming with Ladder Diagram (LAD)

Lesson 5
Programming with Function Block Diagram (FBD)

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INDUSTRIAL CONTROL NETWORK & COMMUNICATION PROTOCOLS - MODULE 5

MODULE OBJECTIVES

At the end of this module participant would have built strong knowledge to design and troubleshoot industrial networks and have clear understanding of the communication protocols used in the industrial automation space.

DETAILED COURSE CONTENT

Lesson 1
Fundamentals of Industrial Networks

Lesson 2
Hierarchical Levels in Industrial Networks

Lesson 3
Industrial Communication Protocol
(RS-232/485, TCP/IP, Modbus, OPC, etc)

Lesson 4
Fundamentals of Industrial Data Exchange

SUPERVISORY CONTROL ELEMENTS (HMI, SCADA, CONSOLES, SERVERS) - MODULE 6

MODULE OBJECTIVES

At the end of this module students will be able to integrate programs written in Module 4 to HMI and SCADA software's. Student will also have clear understanding of how HMI/SCADA are designed and built.

DETAILED COURSE CONTENT

Lesson 1
Introduction to Human Machine Interface (HMI)

Lesson 2
HMI Design Principles & Guidelines

Lesson 3
Fundamentals of Supervisory Control and Data Acquisition (SCADA)

Lesson 4
Introduction & Configuration of a Typical SCADA Software

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FINAL PROJECT

Some of the learning outcome for the final projects are,

- Functional Design Specification Development
- I/O Database Analysis
- System Sizing and Calculations
- I/O Segregation and Allocation
- Control System Network & Architecture
- Control Typical Development
- Control Narrative & Philosophy
- Concept Behind System Integration and FAT

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Ready To Take The Next Step?

APPLY NOW

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