UNIVERSITÀ
DI PAVIA

Ph.D. Program in Electronics, Computer Science and Electrical Engineering

COURSE

Industrial Programming

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OBJECTIVES: The aim of this course is to deepen knowledge of programming languages and methods used in industry.

PROGRAM

Module 1: “Overview of Object-Oriented Programming”
This introductory course provides a foundation in Object-Oriented Programming (OOP) concepts. We’ll explore the core principles (like classes, objects, attributes, and methods). We’ll introduce more advanced topics such as encapsulation, abstraction, inheritance and polymorphism, highlighting their benefits. The course will cover both theoretical and practical aspects.

Module 2: "Introduction to Programmable Logic Controllers"
This lesson is a brief overview and orientation to the Programmable Logic Controller or PLC. The purpose and basic parts of a PLC will be discussed, as well as different types of PLCs and PLC specifications. In particular the main subject will be:

- PLC Basic training
- Overview: Technical features, Wiring.
- Basic Function: Analog, Ethernet, High Speed I/O
- Programming software: Memory, Label, Execution Type
- Programming Language: ST, FBD, Ladder (IEC1131)
- Simulation & Debug

Module 3: “Communication Between Devices”
This introductory course provides a foundation in communication between devices commonly encountered in industrial settings, such as Ethernet/IP, Modbus, Profibus, OPC-UA. Participants will gain a clear understanding of these communication methods, empowering them to effectively design and integrate devices within industrial automation systems. The course will cover both theoretical and practical aspects.

EVALUATION: Each student will be asked to choose a topic, and develop a short project.

ATTENDANCE: The course will take place in online mode, according to the following schedule:

- 22/05/2024 “Overview of Object-Oriented Programming” 14:00-19:00
- 05/06/2024 "Introduction to Programmable Logic Controllers" 14:00-19:00
- 19/06/2024 “Communication Between Devices” 14:00-19:00

LECTURES: 15h; CREDITS: 4 CFU
DATES: 22/05-05/06-19/06

Course coordinator

Prof. Hermes Giberti

Ph.D. Coordinator

Prof.ssa Ilaria Cristiani

Lectures in English