UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

FPGA Programming

2526-113R046

Title

Introduction to FPGA programming

Teacher(s)

Mirko Mariotti (Perugia University) and Andrea Triossi (Padova University)

Language

English

Short description

Prerequisites:

- Basic notions of digital electronics (combinatorial and sequential circuits)
- basic C++ programming with usage of templates
- basic python programming
- entry level knowledge of machine learning (not really needed, but it may help for the last part of the course)

Target skills and knowledge: The aim of the course is to provide a hands-on programming laboratory of Field-

Programmable Gate Arrays (FPGA) through the VHDL hardware description language.

Course unit contents:

- Introduction to FPGAs
- FPGA Architecture
- FPGA programming flow
- VHDL language by examples: Introduction to the Vivado programming framework and the Arty A7 board, Combinational circuits on FPGA, Sequential circuits on FPGA, Arithmetic operations on FPGA
- Case study: UART interface
- High Level Synthesis (HLS): Programming flow, Number representations and arithmetic, Understanding and optimizing loops

CFU / Hours

2 ECTS, with 4 days of lectures (MON-THU) with 2 hours of lectures and 2 hours of exercises in the afternoon every day

Teaching period

15-19 June 2026

Sustainable Development Goals

QUALITY EDUCATION | INDUSTRY, INNOVATION AND INFRASTRUCTURE | CLIMATE ACTION