

Name of the course: FPGA programming for real time applications

Teacher: Andrea Formentini; e-mail: andrea.formentini@unige.it

Duration of the course: 36 hours (12 lectures: 1 hour frontal lecture + 2 hours lab)

Credits: 9

Language: Italian; in the presence of a request by foreign students, the course will be held in English.

Aims of the course: The aim of the module is to teach the basic of FPGA programming with a special focus on real time applications.

Module outline:

1. Introduction
 - a. Module structure
 - b. FPGA elements
 - c. Basic syntax and example
 - d. Vivado
2. Combinational circuit
 - a. Components
 - b. Test benches and simulation
 - c. Concurrent assignment
3. Types and arithmetic
 - a. Data types and conversion
 - b. Constants and generics
 - c. Arithmetic operation
4. Q Format
5. Sequential circuit 1
 - a. Processes
6. Sequential circuit 2
 - a. Buffering inputs
7. Time constraints
8. FSM
9. FSMD (with Datapath)
10. Memories
11. Serial communication
12. Examples

Exam modality:

Project with a short report

Bibliography:

Slides (in English) provided by the teacher.

Chu, P.P., 2018. *FPGA Prototyping by SystemVerilog Examples: Xilinx MicroBlaze MCS SoC Edition*. John Wiley & Sons.