Universidad Zaragoza

Academic Year: 2025/26

61077 - Advanced digital systems

Teaching Plan Information

Academic year: 2025/26
Subject: 61077 - Advanced digital systems
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 658 - Master in Telecommunications Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The objective of the subject is to train the student in the design methodology of digital electronic systems. It does not only study the basics to implement high-performance digital systems efficiently with FPGAs and ASICs, but also aims to achieve analysis and design capabilities.

2. Learning results

HA_01: Ability to project, calculate, and design products, processes, and installations in all areas of telecommunications engineering.

HA_04: Ability for mathematical modeling, calculation, and simulation in technological centers and corporate engineering, particularly in research, development, and innovation tasks in all areas related to Telecommunications Engineering and affiliated multidisciplinary fields.

HA_07: Ability to implement, manage, and oversee manufacturing processes of electronic and telecommunications equipment, ensuring safety for people and property, the final quality of products, and their approval.

HA_19: Ability to design and manufacture integrated circuits.

HA_20: Knowledge of hardware description languages for high-complexity circuits.

HA_21: Ability to use programmable logic devices, as well as to design advanced electronic systems, both analog and digital. Capability to design communication components such as routers, switches, hubs, transmitters, and receivers in different bands.

CP_03: Critical thinking.

CP_06: Lifelong self-learning.

CP_07: Ability to effectively communicate (both orally and in writing) conclusions and the knowledge and reasons supporting them to specialized and non-specialized audiences clearly and unambiguously.

3. Syllabus

The contents to be developed are the following:

- Advanced description of digital systems using VHDL.
- High-level synthesis.
- System on Chip (SoC) design.
- ASIC design flow.

4. Academic activities

The program offered to the student to help them achieve the expected results comprises the following activities:

1) Master class (30 classroom hours).

Expository and explanatory sessions of contents. The concepts and fundamentals of digital electronic systems will be presented and illustrated with real examples. Student participation will be encouraged through questions and brief discussions.

2) Laboratory practices (20 classroom hours).

It will consist of the implementation of digital circuits, where the design methodology, the operation of the circuit, the handling of the instruments and the software tools of the laboratory will be evaluated

5. Assessment system

The student must demonstrate that they has achieved the intended learning results through the following assessment activities:

Laboratory Practice (CL) (50%)
They will be graded by observation of the students' work in the laboratory and by analysis of the previous preparatory work and of the practical reports prepared by the students.
Grading from 0 to 10 points will represent 50% of the student's overall grade.

Theoretical-practical exam (CT) (50%)
Composed of theoretical-practical questions and problems, to be taken on the official calls. The student

6. Sustainable Development Goals

4 - Quality Education
8 - Decent Work and Economic Growth
9 - Industry, Innovation and Infrastructure