Universidad Zaragoza

Academic Year/course: 2022/23

30398 - Digital electronics for communications

Syllabus Information

Academic Year: 2022/23
Subject: 30398 - Digital electronics for communications
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 581 - Bachelor's Degree in Telecomunications Technology and Services Engineering
ECTS: 6.0
Year: 4
Semester: Second semester
Subject Type: Optional
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

This course covers the systematic design of advanced digital systems using Field programmable gate arrays (FPGAs) and an introduction to ASIC design.

We will first review in detail the basic building blocks of FPGA programming. Second, we focus on architecture, design methodologies, best design practices, and optimization techniques for performance (frequency, latency, area, power, etc). Finally, we will cover testbench development, simulation for bit-true design verification, and synthesis of complete digital systems.

The emphasis is on FPGA technology, but most of the design techniques can also be applied to ASIC devices.

4.2. Learning tasks

The course includes the following learning tasks:

- **Lectures** (30 hours). Students are expected to attend all lectures, pay attention and participate in class discussions.
- **Lab sessions** (30 hours). The course will include 10 lab sessions that allow students to design, implement, test, and evaluate several small communication blocks. Students are expected to work in pairs. It is suggested that students from a group at the beginning of the course and keep in the same group throughout the semester.

4.3. Syllabus

The course will address the following topics:

- Advanced VHDL coding
- Fixed point VHDL description.
- FPGA architectures
- High-performance FPGA design

- CMOS Technology
- Introduction to ASIC design
- Testbench development

4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30398