SUBJECT TEACHING GUIDE

G1006 - Design of Digital Electronic Systems

Degree in Industrial Electronic Engineering and Automatic Control Systems
First Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Industrial Electronic Engineering and Automatic Control Systems First Degree in Industrial Electronic Engineering and Automatic Control Systems			Type and Year	Compulsory. Year 3 Compulsory. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Further Digital Electronics Module: Further Specific Technology				
Course unit title and code	G1006 - Design of Digital Electronic Systems				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	https://moodle.unican.es/course/view.php?idnumber=G1006_1819				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA
Name of lecturer	EUGENIO VILLAR BONET
E-mail	eugenio.villarb@unican.es
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO PROFESOR (S3098)
Other lecturers	PABLO PEDRO SANCHEZ ESPESO VICTOR MANUEL FERNANDEZ SOLORZANO

3.1 LEARNING OUTCOMES
- Ability to describe the desired behavior of digital electronic systems, simulate the description, implement the system and prepare the test.
- Capacity to manage existing CAD tools to solve complex problems using FPGAs.
- Ability to operate the necessary instrumentation in an advanced digital electronics laboratory and critically interpret the results.
- Ability to design and apply digital test and analyze and interpret results.

4. OBJECTIVES

To provide students with ability to apply the concepts of digital electronics to solve practical problems and work independently.

To provide students the knowledge and skills required to develop industrial applications based on digital electronic systems using FPGA's design environments.

Ability to operate laboratory equipment to verify the performance of the digital system designed and critically interpret the results.

6. SUBJECT PROGRAM

CONTENTS	
1	Introduction to the design of digital systems Aproaches to the design of electronic systems Design process
2	Hardware Description Languages at Register-Transfer level Introduction to the VHDL language: CAD tools. Basic elements of the language: structural description, data flow description and behavior description. Design units and VHDL statements. description of Digital Electronic Systems. Management of memories, multipliers and IP blocks.
3	Verification of Digital Systems Introduction to the Testing of Digital Systems Design for Testability. Reliability of Digital Systems.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Lab practical exercises	Laboratory evaluation	Yes	No	50,00
Class Exercises	Others	No	Yes	50,00
Writen exam	Written exam	Yes	No	0,00
TOTAL				100,00

Observations

The subject is passed in the Ordinary Call if the average of the Class Exercises and the Laboratory Practices is greater than or equal to 5.
In the Extraordinary Call the average will be made between the Written Exam and the Laboratory Practices
The evaluation of the laboratory practices will be:
35% (performance in the laboratory and grade of the practice report)
Laboratory exam (provided that the final practice has been completed):
15% (The exam on the work done in the laboratory.)

Observations for part-time students

The student will be able to do the exercises that he/she has missed throughout the course at an agreed time.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Lluís Terés, Yago Torroja, Serafín Olcoz, Eugenio Villar: "VHDL Lenguaje estándar de diseño Electrónico". Mc. Graw Hill
Pong P. Chu: "FPGA Proyotyping by VHDL examples". Wiley Interscience.