SUBJECT TEACHING GUIDE

G826 - Digital Electronic Systems

Degree in Telecommunication Technologies Engineering

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	Optional. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Electronic Systems Design				
Course unit title and code	G826 - Digital Electronic Systems				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	http://personales.unican.es/solanaj/				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
Name of lecturer	JOSE MANUEL SOLANA QUIROS
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Office	Facultad de Ciencias. Planta: + 2. DESPACHO PROFESORES (2045)
Other lecturers	

3.1 LEARNING OUTCOMES
- Knowing methodologies and alternatives for the design and implementation of digital circuits and systems.
- Use of some CAD tools widely used in digital electronic design.
- Mastering the use of hardware description languages for describing and synthesizing digital electronic systems with some complexity.
- Use of the electronic equipment for checking the operation of digital circuits.
- Properly use of EDA tools for the implementation of digital electronic systems using configurable electronic devices.

4. OBJECTIVES

Introducing guidelines and methodologies to address the design of digital electronic systems.
Knowing the alternatives for digital circuit design, rating different aspects such as consumption, operating frequency, cost, reusability, time-to-market, etc.
Getting confident in handling CAD tools for the design and synthesis of digital systems based on programmable logic devices.
Knowing design optimization techniques in aspects such as consumption or operating speed.
Knowing strategies for verification of digital systems, as well as design techniques to make possible this task.
Learn techniques, develop skills, and use tools for design, implementation and verification of complex digital circuits suitable to be synthesized using programmable devices.

6. COURSE ORGANIZATION

CONTENTS	
1	Design methodologies and implementation alternatives. Integrated digital circuits. Design methodologies. Automation in the digital electronic design.
2	Hierarchical design and circuit description using HDLs. Control and Data Path. Design verification.
3	Synthesis of sequential and combinational subsystems. Arithmetic subsystems. Synthesis using FPGAs. IP modules.
4	Digital systems. Subsystem integration. Optimization. Clock signals and synchronisation. Introduction to the systems-on-chip (SoC).
5	Introduction to the digital integrated circuits testing. Test pattern generation. Structured Design for Testability (DFT) and Self Test (Built-In Self-Test).

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Laboratory work	Laboratory evaluation	No	No	30,00
Partial exams: problem sessions in lecture room	Written exam	No	Yes	45,00
Tutored work	Work	No	Yes	25,00
TOTAL				100,00

Observations

Observations for part-time students

Part-time students who are not able to attend the continuous assessment sessions of Laboratory Practices, should, instead, make unrecoverable partial examinations, with the same percentage value in the score.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Ercegovac, M., Lang, T. & Moreno, J.H. (1999). Introduction to Digital Systems. John Wiley & Sons, Inc.

Roth Jr., C.H. (2004). Fundamentos de Diseño Lógico. Thomson/Paraninfo, 5ª Edición.