SUBJECT TEACHING GUIDE

G268 - Digital Systems

Degree in Computer Systems Engineering

Academic year 2016-2017

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Core. Year 1
Faculty	Faculty of Sciences				
Discipline	First Year Subjects Subject Area: Fundamentals of Computer Science Basic Training Module				
Course unit title and code	G268 - Digital Systems				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
Name of lecturer	JOSE ANGEL GREGORIO MONASTERIO
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Other lecturers	PABLO ABAD FIDALGO PABLO PRIETO TORRALBO

3.1 LEARNING OUTCOMES
- To know the basic postulates of Boolean Algebra.
- To know how to represent and minimize logic functions using different types of operators.
- To know how to represent and minimize logic functions using different types of operators. Analyze and synthesize a logic circuit, ie, getting the logical expression from its scheme as well as obtaining the circuit from a set of specifications.
- To know basic concepts of finite-state machines, including time management in digital design.
- To understand the behaviour of flip-flops, both its triggering configuration and its internal architecture.
- To synthesize sequential circuits, ie, obtain a circuit from its natural language description.
- To know the internal structure and behaviour of different types of counters and shift registers.

4. OBJECTIVES
This subject introduces students to the basic blocks available for building digital systems, focusing on circuits that can be part of a computer. Its main objective is that students know and understand the functional blocks that they will found while studying each unit that makes Von Neumann model.

6. COURSE ORGANIZATION

	CONTENTS
1	Introduction - Computer - Logic Circuits - Information - Coding - Analog and Digital Signals - Languages - Programs
2	Natural Numbers - Numbering system and basic operations - Integers
3	Combinational logic circuits (CLC) - Introduction, definition - Mathematical model - Logic Gates - Big CLCs connecting small ones - CLC Analysis - Boolean Algebra - Analysis and Synthesis using Boolean Algebra - Sum of minterms - Decoder - ROM
4	Sequential logic - Introduction, basic definitions - Memory needs, D flip-flop - Synchronization needs, clock - Mealy model, specification - More model, specification - Synthesis of sequential circuits - Analysis of sequential circuits
5	Basics of a general-purpose processor - General Processing Unit - Adding Data Memory - Explicit and Implicit Sequencing - Coding Control Signals - Instruction format - General Control Unit

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Core Themes Exams (End of third and fifth theme)	Written exam	No	Yes	30,00
Exams of lab work (end of each practice session)	Laboratory evaluation	No	Yes	35,00
Final Exams (February and September)	Written exam	Yes	Yes	35,00
TOTAL				100,00

Observations

Observations for part-time students

Students verifying these conditions and that do not take the exams and/or do not pass the practices during the course, need to take a global test.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Digital Design and Computer Architecture (ARM ed.), D. Money Harris & S. Harris, ed. Morgan Kaufmann, 2016.