

Faculty of Sciences

SUBJECT TEACHING GUIDE

G268 - Digital Systems

Degree in Computer Systems Engineering First Degree in Computer Systems Engineering

Academic year 2023-2024

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

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA	
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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.

- Analyze and synthesize a logic circuit, i.e., 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, i.e., 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 Large 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	Туре	Final Eval.	Reassessn	%				
Core Themes Exams	Written exam	No	Yes	10,00				
Exams of lab work	Laboratory evaluation	No	Yes	40,00				
Final Exams (February and September)	Written exam	Yes	Yes	50,00				
TOTAL								
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.