UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Digital Systems

Academic Year 2025/2026

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Digital Systems (L9005)

5. Scientific Area

6. Curricular Year

1st

7. Type of Curricular Unit / Semester

1st Semester

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8. Class type and workload (work time)

Theoretical classes:	
Practical classes:	
Theoretical-Practical Classes	30,00
Tutorial Guidance:	20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutor JOAQUIM MESQUITA DA CUNHA VIANA

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

Familiarize students with the basic elements of the development of digital circuits.
Analysis and design of combinational and sequential logical circuits.
To understand the digital logic at the level of the doors and the switching, in the context of combinatory and sequential circuits.
To gain experience in computer-based digital drawing tools.

15. Specific Objectives

Analysis and design of combinatorial and sequential logic circuits.

16. Skills to be acquired

Upon approval on this subject, students shall be able to:
- Identify the main components a circuits used in digital logic;
- To apply the priciples of Boolean Algebra to the simplification of circuits;
- To build and test combinatorial and sequencial circuits;
- Use computer simulators (ex.: Logisim, Circuit Maker, DEEDS) to draw and validate circuits;
- Create and analyze finite state machines and memory systems.

17. Teaching Methodology

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Lectures will include the oral transmission of information related to the themes being studied, followed by the resolution of exercises that lead the students to the physical implementation of the problems being addressed.

18. Course Unit Program

1. Introduction
2. Coding systems
3. Basic concepts
   - Logic gates
   - Boolean algebra
   - Simplification of Boolean expressions
   - Karnaugh diagrams
4. Combinatotial logic
   - Adders and Subtractors
   - Multipliers
   - Decoders and Coders
   - Multiplexers
5. Sequential logic
   - Latches and Flip-flops
   - Registers and Counters
6. Finite State Machines
7. Memory and Storage

19. Assessment Methods

According to the school's internal regulations, grading Will have a continuous component, as well as a frequency test. The continuous component will consist of:

2 theoretical tests
Practical assignments

In case the student benefits from it, the final grade will be limited to the one obtained in the frequency test, otherwise it will be the waged average of the grades achieved in the frequency test and the continuous component.

20. Didactic Resources

The following simulators:

- Circuit Maker
- Logisim
- DEEDS

21. Sustainability Objectives

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This course contributes to the following Sustainable Development Objectives(ODS):
-ODS 5 -Gender Equality: assuring an inclusive and fair transmission of knowledge related to technological areas;
-ODS 9 -Industry, inovation and infrastructure: through transmiting knowledge regarding technologies applied to the design and functioning of digital systems;
-ODS 11 -Sustainable Cities and Communities: By contributing for the eficiency of urban systems through the application of digital systems.

22. Keywords

Sequential Circuits
Combinatorial Circuits
Digital Logic
Boolean Algebra

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23. Main Bibliography

Author(s): Thomas L. Floyd
Title: Digital Fundamentals: Global Edition
Edition: 11 Year: 2025
Local:
Publisher: Pearson
ISBN Code:

Author(s): Morris Mano
Title: Digital Design Global Edition
Edition: 1 Year: 2018
Local:
Publisher: Pearson
ISBN Code:

Author(s): Morgado Dias
Title: Sistemas Digitais, Princípios e Prática
Edition: 3ª Year: 2010
Local:
Publisher: FCA
ISBN Code:

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24. Complementary Bibliography

Author(s): Arlindo Oliveira, Guilherme Arroz, José Santos
Title: Arquitectura de Computadores - dos Sistemas Digitais aos Microprocessadores
Edition: 6ª Year: 2024
Local:
Publisher: IST Press
ISBN Code:

Author(s): Acácio Amaral
Title: Eletrónica Digital - Fundamentos e Projeto
Edition: 1 Year: 2019
Local:
Publisher: Edições Sílabo
ISBN Code:

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Ficha técnica MIP / MIP Datasheet	
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Autor / Author	Prof. Doutor JOAQUIM MESQUITA DA CUNHA VIANA
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