



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Digital Systems

Academic Year 2026/2027

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 RAUL EDUARDO CAPELA TELLO RATO

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 sequential circuits;
- Use computer simulators (ex.: Logisim, Circuit Maker, DEEDS) to draw and validate circuits;
- Create and analyze finite state machines and memory systems.



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17. Teaching Methodology

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. Combinatorial 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

The present Complementary Regulation for Knowledge and Competencies shall be applied. Continuous evaluation consists of oral interventions and a final written test, both with factor 3, not excluding the possibility of other evaluation elements, as defined by the Continuous evaluation Plan. The frequency test and the determination of the final information shall obey the present active Regulation.

In case the student benefits from it, the final grade will be limited to the one obtained in the

20. Didactic Resources

The teaching resources shall be based on the suggested bibliography, on several pertinent technical papers, on the set of slides used during classes, and on some videos of interest for the studied themes and the following simulators shall be used:

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, innovation and infrastructure: through transmitting knowledge regarding technologies applied to the design and functioning of digital systems;
- ODS 11 -Sustainable Cities and Communities: By contributing for the efficiency 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:

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 RAUL EDUARDO CAPELA TELLO RATO
Classificação / Classification	-
Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
Data Hora / Date Time	
Formato de dados / Data Format	Texto / Text, PDF
Estatuto de utilização / Usage	Acesso público / Public Access
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