



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Electrical and Electronic Circuits

Academic Year 2023/2024

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Electrical and Electronic Circuits (L9024)

5. Scientific Area

6. Curricular Year

3rd

7. Type of Curricular Unit / Semester

2nd 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 BEREND WILLEM MARTIJN KUIPERS

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

- I. The Overview of the Internet of Things, Functional Model and Its Architecture
- II. Things as embedded systems for sensorization and the challenges associated with sensing and actuation
- III. Low-power wireless communications infrastructure and protocols
- IV. Integration with the cloud, protocols and programmatic interfaces for receiving data
- V. Processing of sensor data
- VI. Building a business model associated with an IoT use case

15. Specific Objectives

Students who successfully complete this course unit will be able to:

- (1) Understand Internet of Things (IoT) fundamentals;
- (2) Characterize the components that make up a "thing" as an embedded system (sensor / actuator, microcontroller and communications interface);
- (3) Understand the challenges associated with the design and optimization of an embedded sensor / actuation system;
- (4) Understand the different low-power wireless technologies and the different protocols associated with IoT;



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16. Skills to be acquired

The students will acquire theoretical and practical knowledge of IoT systems, including the use of microcontrollers and I/O to sensors.

17. Teaching Methodology

The theoretical and practical classes will be given in an interactive way, presenting all the components of IoT systems: hardware and software.

Tutorial-oriented classes consist of laboratory exercises and micro-controller programming.

18. Course Unit Program

- Basic elements of electronics; Ohms' and Kirchhoff's laws
- Components of IoT systems
- I/O with sensors
- Communications in IoT systems

19. Assessment Methods

The continuous assessment methodology is expressed in the General Regulation for Continuous Assessment in force, it consists of a minimum of 2 tests/projects.

20. Didactic Resources

slides
PDFs with support material
NodeMCU
Sensors

21. Sustainability Objectives

- 4. Quality Education
- 5. Gender Equality
- 9. Industry, Innovation and Infrastructure

22. Keywords

IoT
low power
Embedded Systems



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23. Main Bibliography

Author(s): Arshdeep Bahga and Vijay Madisetti
Title: Internet of Things: A hands-on approach.
Edition: 1 Year: 2014
Local:
Publisher: VPT

Author(s): Hwaiyu Geng
Title: Internet of Things and Data Analytics Handbook
Edition: 1 Year: 2017
Local:
Publisher: John Wiley

Author(s):
Title:
Edition: Year:
Local:
Publisher:

24. Complementary Bibliography

Author(s):
Title:
Edition: Year:
Local:
Publisher:

Author(s):
Title:
Edition: Year:
Local:
Publisher:



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Autor / Author	Prof. Doutor BEREND WILLEM MARTIJN KUIPERS
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