

Academic Year: ( 2022 / 2023 )

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Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: AMARIS DUARTE, HORTENSIA ELENA

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Requirement is not required

## OBJECTIVES

### Basic skills

CB6 Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.

CB7 That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

CB8 That students can integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.

CB9 That the students know to communicate their conclusions and the knowledge and last reasons that sustain them to specialized and non-specialized public in a clear and unambiguous way.

### General skills

CG1 Ability to identify, define and formulate the problems to solve related to IOT applications. This capacity includes the simultaneous assessment of all the factors at stake, not only technical, but also environmental and civil liability.

CG5 Capacity of public communication of the concepts, developments and results, related to activities in IOT, adapted to the profile of the audience.

CG6 Ability to apply the knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts, with the ability to integrate knowledge.

### Specific competences

CE6 Ability to apply mathematical, statistical and artificial intelligence methods to model, design and develop applications, services and intelligent systems in the field of IoT.

CE7 Ability to apply different methods of treatment and massive support of dynamic data in energy facilities.

CE8 Ability to design, plan and control industrial applications through IoT technologies.

## LEARNING RESULTS

The learning outcomes that students should have are:

- Analysis and synthesis capacity for advanced systems control: methods of identification, systems with learning, etc.
- Design capacity of a low and medium complexity control system with its ability to interact with the user.
- Analysis skills and massive data processing in digital energy networks: operation and security.
- Know and apply the techniques of automatic learning for IoT.
- Ability to process the usual errors in the data to be able to use them.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Digitization of the energy sector: current situation, challenges, and trends.
2. Energy consumption in IoT installations.
3. Power sources in IoT installations
4. demand response for energy consumers.
5. Big data and cybersecurity in energy networks

#### LEARNING ACTIVITIES AND METHODOLOGY

- Lectures, classes for resolution of doubts in small groups, student presentations, tutorials and individual work of students; aimed at the acquisition of knowledge (9 sessions).
- Laboratory practices and sections of problems in small groups, individual tutorials and individual work of students, aimed at the acquisition of practical skills related to the syllabus of the subject (5 sessions).

#### ASSESSMENT SYSTEM

<b>% end-of-term-examination/test:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

100% continuous evaluation, based on works, class participation and assessment tests of skills and knowledge.

#### BASIC BIBLIOGRAPHY

- Chakraborty, A., & Ilić, M. D. Control and Optimization Methods for Electric Smart Grids (1st ed. 2012.), Springer, 2012
- Gates Energy Products Rechargeable batteries applications handbook (1st edition.). , Butterworth-Heinemann., 1998
- Murtala Zungeru, A. Green Internet of Things sensor networks: applications, communication technologies, and security challenges 2nd ed. 2020.), Springer, 2020