

Academic Year: ( 2023 / 2024 )

Review date: 26-04-2023

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: ANTOLIN ARIAS, MANUEL

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

## 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 are able to 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

CB10 That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.

### General skills

CG3 Proactive capacity to address and solve problems posed under new or unfamiliar environments, within the context of IoT.

CG4 Ability to work as a team, integrating multidisciplinary approaches.

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.

CG7 Ability to know how to communicate (orally and in writing) the conclusions - and the knowledge and ultimate reasons that sustain them - to specialized and non-specialized audiences in a clear and unambiguous way.

CG8 Capacity for continuous, self-directed and autonomous learning.

## LEARNING RESULTS

The learning outcomes that students should have are: Know the IoT tools for energy efficiency in buildings and smart homes.

## DESCRIPTION OF CONTENTS: PROGRAMME

### Section 1:

#### Energy measurement and control

##### 1.1.Lighting

###### 1.1.1 Basic concepts

###### 1.1.2 LED technology

###### 1.1.3 Lighting control

##### 1.2 Comfort

###### 1.2.1 Air conditioning systems

###### 1.2.2 Control of air conditioning systems.

- 1.3 Security
- 1.3.1 Basic elements of building security systems.
- 1.3.2 Control of security system elements

## Section 2

### Energy efficiency and management

- 2.1 Renewable generation technologies applied to buildings.
- 2.2 Self-consumption
- 2.3 Energy management in Smart Homes and smart buildings

## LEARNING ACTIVITIES AND METHODOLOGY

Throughout the course the following activities will be carried out:

- 1.- Theoretical classes
- 2.- Laboratory practices: design of a self-consumption facility
- 3.- Visits to companies in the IoT sector specialized in building
- 4.- Development of group work
- 5.- Participation in presentations given by companies in the IoT sector specialized in building

## ASSESSMENT SYSTEM

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

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

## BASIC BIBLIOGRAPHY

- John T. Wen      Sandipan Mishra Intelligent Building Control Systems, Springer International Publishing, 2018
- Shengwei Wang Intelligent Buildings and Building Automation, CRC Press Taylor and Francis Group, 2009

## ADDITIONAL BIBLIOGRAPHY

- Joost van Hoof      George Demiris      Eveline Wouters Handbook of Smart Homes, Health Care and Well-Being, Springer International Publishing, 2017
- Paola Sansoni      Luca Mercatelli      Alessandro Farini Sustainable Indoor Lighting, Springer-Verlag London, 2015
- Nilesh Y. Jadhav Green and Smart Buildings, Springer Singapore, 2016
- Suryadevara, Nagender Kumar ; Mukhopadhyay, Subhas Chandra Mukhopadhyay, Subhas Chandra Smart Homes: Design, Implementation and Issues (Smart Sensors, Measurement and Instrumentation), Springer International Publishing, 2015