Connected Buildings

Academic Year: (2022 / 2023)   **Review date: 19-01-2023**

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

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

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

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