Advanced Management of Smart Grids

Academic Year: (2023 / 2024) **Review date: 07/06/2023 14:52:12**

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: ALONSO MARTINEZ, MONICA

Type: Electives ECTS Credits : 3.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Transmission and distribution of energy

LEARNING OUTCOMES

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.
CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.
CB3. Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.
CB4. Students should be able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
CB5. Students will have developed the learning skills necessary to undertake further study with a high degree of autonomy.
CG4. Being able to do design, analysis, calculation, manufacture, test, verification, diagnosis and maintenance of energetic systems and devices.
CG10. Being able to work in a multi-lingual and multidisciplinary environment
CE7 Módulo TE. Ability for the calculus and design of electric power lines for energy transmission.
CE8 Módulo TE. Applied knowledge on renewable energies.
CT1. Ability to communicate knowledge orally as well as in writing to a specialized and non-specialized public.
CT2. Ability to establish good interpersonal communication and to work in multidisciplinary and international teams.
CT3. Ability to organize and plan work, making appropriate decisions based on available information, gathering and interpreting relevant data to make sound judgement within the study area.
CT4. Motivation and ability to commit to lifelong autonomous learning to enable graduates to adapt to any new situation.

By the end of this content area, students will be able to have:
RA1.4 awareness of the wider multidisciplinary context of engineering.
RA4.1 the ability to conduct searches of literature, and to use data bases and other sources of information;
RA4.2 the ability to design and conduct appropriate experiments, interpret the data and draw conclusions;
RA5.1 the ability to select and use appropriate equipment, tools and methods;
RA5.2 the ability to combine theory and practice to solve energy engineering problems;
RA5.3 an understanding of applicable techniques and methods, and of their limitations;
RA6.1 function effectively as an individual and as a member of a team;
RA6.5 recognise the need for, and have the ability to engage in independent, life-long learning.

OBJECTIVES

The aim of this multidisciplinary course is to focus in the advanced operation of smart grids emphasizing the management of electricity networks through the application of Information and Communication Technologies (ICT) .

To achieve this goal , students must acquire a body of knowledge , and capabilities.
-knowledge about smart grids , its application and development in the electricity networks of the future.
-knowledge about the mechanisms of energy storage management and integration of renewable energies.
-knowledge about automation and measurement technologies used in Smart Grids .
-knowledge about energy data management commonly used in smart grids .

DESCRIPTION OF CONTENTS: PROGRAMME

1. New technological developments in smart grids .
2. Energy storage management and integration of renewable energies.
3. Management of electric mobility in smart grids .
4. Automatization Architectures for Smart Grid
5. Smart grids projects (National and International), Regulation and practical examples

LEARNING ACTIVITIES AND METHODOLOGY

The training activities include:
master -classes , classes resolution of questions in small groups , individual tutorials and personal work , including research , tests and examinations ; aimed at the acquisition of theoretical knowledge.
-classes Exercices in small groups , individual tutorials and exercises by the student -oriented acquisition of practical skills related to the program for each subject.
-Tests And laboratory tests .

ASSESSMENT SYSTEM

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

The evaluation system includes continuous assessment (100 %) of student work (papers, reports of laboratory tests and evaluation of skills and theoretical knowledge and practical) .

BASIC BIBLIOGRAPHY

- Borlase, Stuart Smart grids: infrastructure, technology, and solutions, CRC Press, 2012

- David Elliott Energy Storage Systems, IOP Publishing Ltd, 2017