

Converters in the industry, more electric transport and renewable energy

Academic Year: (2021 / 2022)

Review date: 01-07-2021

Department assigned to the subject: Electronic Technology Department

Coordinating teacher: OLIAS RUIZ, EMILIO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Course on Electronic & Photonic Devices.
- Course on Electronic Power Converters optimization.

OBJECTIVES

COMPETENCIES

Basic skills

-Be in contact with and understand knowledge that can provide a base or opportunity to be original in the development and/or application of ideas, often in a context of research.

-That students know how to apply the acquired knowledge and ability to problem solving in new environments or little known within broad (or multidisciplinary) contexts related to their field of study.

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

General competencies:

-Acquiring skills for the understanding of new technologies for use in electronic systems and their proper use and integration to solve new problems or applications.

-CG4: Acquire teamwork capabilities by integrating multidisciplinary approaches.

Specific skills:

-Ability to perform effective searches for information as well as identify the State of the art of a technological problem in the field of electronic systems and their possible application to the development of new systems.

-Know the status of current technology and future trends in some of the following areas: components and subsystems of power, photonic, integrated circuits, circuit of integrated optics, microsystems, nanoelectronics, identification systems and systems applied to the people with disabilities.

-Ability to identify from a conceptual, but also practical point of view, what are the main scientific and technological challenges in different applications of electronic systems, as well as its integration and use.

LEARNING OUTCOMES

At the overcoming of this subject students must be able to identify from a conceptual point of view, but also practical, what are the main scientific and technological challenges in different applications of electronic systems, as well as its integration and use. Proposed applications offer will be dynamic based on the State of the art in every moment. At the end of the course, students will be handled:

-Architectures of industrial converters in the fields of renewable energy sources (in particular applied to PV systems and also ocean energy - waves-), electric vehicles (with concepts and general schemes, as well as access to electric cars, electric bikes, electric trains and electric planes) and applications to biomedical engineering of industrial converters.

-Quantitative calculations relating to previous architectures.

-Complex systems at block diagram level.

-Information to establish forward-looking technology oriented to future applications or lines of interest.

-Knowledge solutions that arise to the energy problems, with vision for the future, within a framework energy with limited resources and increasing energy demand.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Renewable Energies

1.1. Photovoltaic systems (Sun).

1.2. Wind systems (Wind).

1.3 Ocean energy systems (Waves).

2. Electric Vehicles

2.1 General concepts on electrical transport.

2.2 Electric Car.

2.3 Electric Motorbike.

2.4. Electric Railway Traction.

2.5 Electric Planes.

3. Bioengineering

Power applied to Biomedical Systems and others electronics approaches.

LEARNING ACTIVITIES AND METHODOLOGY

TRAINING ACTIVITIES

- Theoretical class.
- Theoretical and practical classes.
- Tutorials.
- Working group.
- Individual student work

TEACHING METHODOLOGIES:

- Exhibitions in class of professor with audiovisual and computer support, in which the main concepts of matter develop and bibliography is provided to complement the learning of students.
- Resolution of case studies, problems, etc. raised by Professor individually or in a group.
- Development works and reports individually or in a group.

ASSESSMENT SYSTEM

ORDINARY CONVOCATION

- Individual or group work, done during the course, which will be valued as 60% of the final grade.
- Exam of the subject, which requires a minimum note of 4 over 10 to overcome the subject. It will be valued as 40% of the final note.

EXTRAORDINARY CONVOCATION:

- The evaluation shall be by means of continuous assessment with the same weightings as in the regular ordinary convocation or an exam with 100% rating.

% end-of-term-examination:	40
% of continuous assessment (assignments, laboratory, practicals...):	60

BASIC BIBLIOGRAPHY

- Chakraborty, Sudipta Power electronics for renewable and distributed energy systems , Springer, 2013
- Pérez-Pinal, Francisco J. El vehículo eléctrico : consideraciones y etapas de su diseño, Editorial Academica Española, 2011

ADDITIONAL BIBLIOGRAPHY

- Alonso Abella, Miguel Sistemas fotovoltaicos : introducción al diseño y dimensionado de instalaciones solares fotovoltaicas , S.A.P.T. Publicaciones Técnicas, 2005
- Carmona Suárez, Manuel Sistemas de alimentación a la tracción ferroviaria, FormaRail, 2013
- El-Hawary, M.E. Principles of electric machines with power electronic applications, Wiley, 2002