Centre	**University College of Engineering of Vitoria-Gasteiz**
Name of subject	**25994 – Power Electronics**
Qualification	**Degree in Industrial Electronic Engineering and Automatics**
Type	**Compulsory**
Credits	**6 ECTS**
Year	**3**
Term(s)	**2nd**
Department	**Electronic Technology**
Language	**Spanish**

Outcomes / Objectives

Power devices. Basic converter configurations. Applications

Syllabus

A Power Electronics perspective. A look at the problems of the discipline of Power Electronics and solutions provided presenting them at a blocks level with ideal elements. AC to DC conversion. Rectifiers. Study of rectifiers, particularly controlled rectifiers. Special emphasis will be put on the parameters that characterise the various types of rectifiers. Diodes will be studied in those aspects that are typical of the use of power, and semiconductors of the thyristor family will be studied for the first time, focusing in particular on SCRs. Students will study the applications of these converters, particularly direct current motor control applications. DC to DC conversion. Switched-mode power supplies. Students will study the basic topologies and the main isolated topologies for switched-mode power supplies. The subject will take a look at the specific switching behaviour of some semiconductor devices already known to the students (BJT and MOSFET) and introduce the IGBT. It will study magnetic components (chokes and transformers. DC to AC conversion. Inverters. Study of the topologies and control techniques of DC to AC converters. It will study the parameters that define the goodness of fit of these converters and the influence of control methods on achieving converters that provide the most suitable characteristics for the application. AC to AC conversion. Two types of AC converters will be presented: regulators and cycloconverters. The two types of cycloconverters will be studied: direct conversion and DC bus link cycloconverters. The study of regulators will explain the operation of Triacs. Applications. A sample of the multiple applications of power electronics will be presented. For most applications, the problem will be presented and several solutions will be shown using the various types of converters studied in previous chapters, looking at the advantages and inconveniences of each solution and observing that there is no single solution. Special attention will be paid to renewable energy applications.

Methodology

Teaching Method

Face-to-Face Teaching Hours								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
45			15					
Student Hours of Non Face-To-Face Activities								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
68			22					

Assessment System

General criteria

Clarification regarding assessment

Compulsory materials

Copy of slides used in class. Outlines of practicals. Set of problems.

Bibliography

Basic Bibliography

- Electrónica de Potencia. Daniel W. Hart. Prentice Hall, 2001
- Electrónica de Potencia. Muhammad H. Rashid. Editorial. Prentice Hall, 1995
- Power Electronics. Ned Mohan, Tore M. Undeland, Willian P, Robbins. Editorial: John Wiley & Sons, 1995

In-depth Bibliography

- Modern Power Electronics and AC Drivers. Bilmal K. Bose. Prentice Hall, 2002
- Elements of Power Electronics. Philip T. Krein. Oxford University Press, 1998
- Principles of Power Electronics. Kassakian, Schlencht, Verghese. Addison-Wesley, 1991
- Electrónica Industrial: Técnicas de Potencia. Juan Andrés Gualda Gil, Salvador Martínez García, Pedro Martínez Martínez. Editorial: Marcombo, 1992

Websites

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