Universitat de Lleida

DEGREE CURRICULUM

POWER ELECTRONICS

Academic year 2013-14

POWER ELECTRONICS 2013-14

Subject's general information

Subject name	Power Electronics
Code	102122
Semester	1r Q Avaluació Continuada
Typology	Obligatòria
ECTS credits	6
Theoretical credits	3
Practical credits	3
Department	Informàtica i Enginyeria Industrial
Important information on data processing	Consult this link for more information.
Language	Idioma Percentatge d'ús Català 20.0 Castellà 80.0
Distribution of credits	Juan Antonio Garriga Castillo 6
Office and hour of attention	Jueves de 17:00 a 19:00 h / Despatx 2.18 entrada pel 2.19 Dijous de 17:00 a 19:00 h / Despatx 2.18 entrada pel 2.19

POWER ELECTRONICS 2013-14

Juan Antonio Garriga Castillo

Subject's extra information

Power Electronics requires other skills acquired in areas such as subjects of Electrical Technology, Circuit Theory and Fundamentals of Electronic Engineering. Computer skills are interesting and practical use of advanced applications in personal computers since it offers good support for mathematical analysis and systems simulation

Power Electronics is a course of six mandatory ECTS credits, taught in the first quarter of the third course of Engineering Degree in Industrial Electronics and Automation. This course introduces students to the analysis and design of power electronic systems for industrial applications with emphasis on semiconductors power most used, switched power converters (ac / dc, dc / dc, dc / ac, ac / c) in its various topologies and feeding different loads, as well as provide a comprehensive overview of the many fields of application of this discipline.

Learning objectives

Without translate-

Objectius

- Adquirir una perspectiva de l'electrònica de potència. Adquirir una perspectiva de diversos tipus de dispositius semiconductors de potència i les seves característiques de commutació. Aprendre les classes de convertidors de potència.
- Utilitzar les tècniques bàsiques d'anàlisi de circuits per analitzar el funcionament de circuits en electrònica de potència. Entendre de manera gràfica i analítica el funcionament dels circuits electrònics de potència.

Competences

Degree-specific competences

- Applied knowledge of high-power electronics.

  Goals

  - - Acquire a perspective on power electronics. - Gain perspective of different types of power semiconductor devices and their switching characteristics. - Types of power converters

- Knowledge of the principles and applications of analogical electronics.
- Knowledge of the principles and applications of digital electronics and microprocessors.
- Applied knowledge of electronic instrumentation.

Degree-transversal competences

- Ability to resolve problems and elaborate and defend arguments inside their field of study.

  Goals

  - - Use the basic techniques of circuit analysis to analyze the performance of power electronics circuits. Understand graphically and analytical performance of power electronic circuits.

- Ability to analyse and synthesize.

Subject contents

1. Introduction to Power Electronics

2. Power Semiconductors

    2.1. Diode.
    2.2. Thyristor.
    2.3. GTO
    2.4. TRIAC
    2.5. Bipolar Transistor
    2.6. MOSFET
    2.7. IGBT

3. Converters

    3.1. Conversion of alternating current-direct current (AC / DC)
    3.2. Conversion of alternating current-alternating current (AC / AC)
    3.3. Conversion of direct current-direct current (DC / DC)
    3.4. Conversion of direct current-alternating current (DC / AC)

4. Applications of Power Electronics

Methodology

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Se explicaran los contenidos teoricos del tema tratado, posteriormente se resolveran problemas y se analizaran todas las cuestiones teoricas y practicas sobre el tema trabajado.

Se procedera a hacer practicas sobre los conocimientos adquiridos.

Finalmente se realizara un examen en las fechas establecidas.

En este periodo se valoran los conocimientos teoricos y practicos adquiridos en la asignatura.

Evaluation

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Per aprovar l'assignatura cal aprovar les pràctiques.

Teoria (Exàmens) 60%, nota mínima en cada examen per poder fer mitjana 4 sobre 10

Pràctiques (Assistència + Informes) 30%, els informes hauran de contenir les anàlisis corresponents de la pràctica, la simulació i les dades empírics obtinguts.

Treball no presencial (Col · leccio de problemes resolts) 10%

Bibliography

Título: ELECTRÓNICA DE POTENCIA: CIRCUITOS, DISPOSITIVOS Y APLICACIONES.
Autor/es: Muhammad H. Rashid;

POWER ELECTRONICS 2013-14

Editorial: : PEARSON / PRENTICE HALL

Título: FUNDAMENTALS OF POWER ELECTRONICS
Autor/es: Erickson, Robert W. ; Maksimovic, Dragan ;
Editorial: Springer

Título: ELECTRÓNICA DE POTENCIA
Autor/es: Hart, Daniel ;
Editorial: PEARSON

Título: ELECTRÓNICA DE POTENCIA. COMPONENTES, TOPOLOGÍAS Y EQUIPOS
Autor/es: Martínez García, Salvador ; Gualda Gil, Juan Andrés;
Editorial: THOMSON PARANINFO,S.A.

Título: PROBLEMAS DE ELECTRÓNICA DE POTENCIA
Autor/es: Andres Barrado, Antonio Lázaro ;
Editorial: : PRENTICE HALL