

340604 - SEAI-R1010 - Advanced Electronic Systems and Integration of Electrical Energy Sources

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering
 Teaching unit: 710 - EEL - Department of Electronic Engineering
 Academic year: 2017
 Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012).
 (Teaching unit Compulsory)
 ECTS credits: 5 Teaching languages: Spanish

Teaching staff

Coordinator: José Luis García de Vicuña
 Others: José Luis García de Vicuña
 Miguel Castilla Fernández

Degree competences to which the subject contributes

Specific:
 1. CC07 -Apply power electronic systems and power blocks. Identify energy management systems.

Teaching methodology

Model of problem based learning (PBL)

Learning objectives of the subject

The course is oriented to the study of power electronics systems , the analysis and design of power electronics systems , and the description of the main industrial applications. The objectives include: 1) to know the main of power electronics systems, 2) modeling, control and simulation the different kind of power electronics systems , 3) Modeling, Analysis, and Control of Electric Power Converters for Power System Applications

Study load

| | | | |
|---------------------------|---------------------|---------|--------|
| Total learning time: 125h | Hours large group: | 22h 30m | 18.00% |
| | Hours medium group: | 0h | 0.00% |
| | Hours small group: | 22h 30m | 18.00% |
| | Guided activities: | 0h | 0.00% |
| | Self study: | 80h | 64.00% |

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Content

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| Modeling Power Electronics Systems | Learning time: 4h Theory classes: 4h |
| <p>Description: Modeling converters: DC-DC converters. Single and three-phase DC-AC and AC-DC power converters. Modeling power electronics systems : UPS Systems, back to back converters, active filters, PV systems.</p> | |
| Simulation and Control of Power Electronics Systems | Learning time: 8h Theory classes: 8h |
| <p>Description: Description of a power electronic system: Converters, drivers, signal conditioning circuits, modulators and controllers. Description of a project in power electronics systems: methodology description, simulation tools. Project example: specifications, controllers design, simulation results, and implementation proposal. Simulation of the system described in the example. Projects Proposal.</p> | |
| Voltage-Sourced Converters in Power Systems: grid integration and operation of distributed energy resource units | Learning time: 1h Theory classes: 1h |
| <p>Description: Voltage-Sourced Converters in Power Systems: control design and simulation</p> | |
| Applications of Electronics Converters in Power Systems | Learning time: 8h Theory classes: 8h |
| <p>Description: Voltage-Sourced Converters in Power Systems: application to an industrial case and results discussion</p> | |

Qualification system

50% Simulation and lab exercises
10% Skills assessment
50% Exams

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Bibliography

Basic:

Yazdani, Amirnaser; Iravani, Reza. Voltage-sourced converters in power systems [on line]. Hoboken [etc.]: Wiley & Sons, 2010 [Consultation: 18/09/2014]. Available on: <<http://onlinelibrary.wiley.com/book/10.1002/9780470551578>>. ISBN 9780470551578.

Teodorescu, Remus; Liserre, Marco; Rodríguez Cortés, Pedro. Grid converters for photovoltaic and wind power systems [on line]. Chichester, West Sussex: John Wiley & Sons, 2011 [Consultation: 18/09/2014]. Available on: <<http://onlinelibrary.wiley.com/book/10.1002/9780470667057>>. ISBN 9780470667057.