



Course guides

820345 - SECAD - Electronic Systems for Control and Data Acquisition

Last modified: 10/06/2015

Unit in charge: Barcelona East School of Engineering
Teaching unit: 710 - EEL - Department of Electronic Engineering.

Degree: BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2015 **ECTS Credits:** 6.0 **Languages:** Catalan, English, Spanish

LECTURER

Coordinating lecturer: HERMINIO MARTÍNEZ GARCÍA.

Others: HERMINIO MARTÍNEZ GARCÍA and other Professors. Their names will be announced to the whole students the first day of the course.
Nescolarde Selva, Lexa Digna

PRIOR SKILLS

Basically, those associated with the following courses:

- Electronic Systems / Sistemes Electrònics (820017).
- Electrical Systems / Sistemes Eléctrics (820016).

REQUIREMENTS

- Electronic Systems / Sistemes Electrònics (820017).
- Electrical Systems / Sistemes Eléctrics (820016).

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. Design an energy saving system using different processes and technologies.
2. Select the components of a control system.

Transversal:

3. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
4. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

TEACHING METHODOLOGY

There are two 1.5-hour class sessions every week for theory and problems, and a 2-hour class session for laboratory.

LEARNING OBJECTIVES OF THE SUBJECT

Please, see Spanish or Catalan version.



STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	30.00
Hours small group	15,0	10.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

1.- Introduction to Electronic Systems for Mechatronics, Control, and Data Acquisition.

Full-or-part-time: 13 h

Theory classes: 3h

Self study : 10h

2.- Sensors and Transducers Used in Electronic Systems for Mechatronics, Control, and Data Acquisition.

Full-or-part-time: 17 h

Theory classes: 6h

Laboratory classes: 1h

Self study : 10h

3.- Signal Conditioning in Mechatronics, Control, and Data Acquisition.

Full-or-part-time: 17 h

Theory classes: 6h

Laboratory classes: 1h

Self study : 10h

4.- Data Reporting Systems.

Full-or-part-time: 16 h

Theory classes: 6h

Self study : 10h

5.- Actuation Systems in Mechatronics, Control, and Data Acquisition: Pneumatics, Hydraulics, Mechanical and Electrical.

Full-or-part-time: 16 h

Theory classes: 6h

Self study : 10h



6.- Modeling and Simulation of Electronic Systems for Mechatronics, Control, and Data Acquisition.

Full-or-part-time: 18 h

Theory classes: 6h

Laboratory classes: 2h

Self study : 10h

7.- Control Based on Microcontrollers for Mechatronics, Control, and Data Acquisition.

Full-or-part-time: 20 h

Theory classes: 6h

Laboratory classes: 4h

Self study : 10h

8.- Design and Development Example of a Electronic System for Control, and Data Acquisition.

Full-or-part-time: 33 h

Theory classes: 6h

Laboratory classes: 7h

Self study : 20h

GRADING SYSTEM

The evaluation of the course will be weighted as follows:

- 1 or 2 partial controls: 20%.
- Oral presentation and final exam: 20%.
- Supervised Activities: Implementation of an electronic prototype related to the world of electronic systems addressed to the control and data acquisition (electronic control system of a DC motor or similar): 20%.
- Assessment of the generic abilities assigned to the course, thanks to the implementation of the aforementioned electronic prototype: 20%.
- Activities, and laboratory tests: 20%.

EXAMINATION RULES.

The performance of the different tests consist of:

- Partial Control: Written test , theoretical and/or analysis problems and/or synthesis of an electronic system for control and data acquisition.
- Oral presentation or final test (decide by the student): Oral o written task of a topic related to the course, or theoretical problem based on an electronic system applied to the world of electronic systems addressed to the control and data acquisition.
- Supervised activity: To evaluate transversal (generic) abilities assigned to the course. It will consist of the implementation, individually or in groups of two, of an electronic prototype related to the subject (electronics system for the control of a small DC motor or similar).
- Activities, and laboratory tests: Laboratory activities within the field of electronics focused on the world of electronic systems for control and data acquisition.



BIBLIOGRAPHY

Basic:

- Bolton, W. Mecatrónica: sistemas de control electrónico en la ingeniería mecánica y eléctrica. 4ª ed. Barcelona ; México D.F: Marcombo : Alfaomega, cop. 2010. ISBN 9788426716323.
- Mechatronic systems, sensors, and actuators : fundamentals and modeling. 2nd ed. Boca Raton: CRC Press/Taylor & Francis, cop. 2008. ISBN 9780849392580.
- Pérez García, M. A. [et al.]. Instrumentación electrónica. 2ª ed. Madrid: Thomson, cop. 2004. ISBN 8497321669.

Complementary:

- Alciatore, D. G.; Hstand, M. B. Introducción a la mecatrónica y los sistemas de medición. 3ª ed. México [etc.]: McGraw-Hill, cop. 2007. ISBN 9789701063859.
- Johnson, C. D. Process control instrumentation technology. 8th ed. Upper Saddle River: Prentice Hall, cop. 2006. ISBN 0131976699.