



Year : 2018/19

60805 - Advanced Control and Electronic Implementation

Syllabus Information

Academic Year:	2018/19
Subject:	60805 - Advanced Control and Electronic Implementation
Faculty / School:	110 -
Degree:	532 - Master's in Industrial Engineering
ECTS:	6.0
Year:	
Semester:	Half-yearly
Subject Type:	Compulsory
Module:	---

General information

Aims of the course

The student, for passing this subject, should demonstrate the following results... Develop an electronic project with parts of specification, design, installation and project documentation . Build blocks using analog, digital and power circuits. The verified in the laboratory. Knows the basic rules and know how to write the documentation associated with an electronic project. Applies the techniques of computer control design for multivariable systems. Knows and knows how to apply the techniques of analysis and design based on the state space and observers. Knows and applies identification techniques to extract dynamic models of real systems systems and simulate their behavior. Can design a control architecture of a complex system and choose the right technology for each component associated implementing regulations.

Context and importance of this course in the degree

The subject and its expected results meet the following approaches and objectives: This course provides an integrated view, where advanced techniques are developed two disciplines: the control theory and design of electronic systems based on analog, digital and power circuits.

Recommendations to take this course

This subject is raised in the Master of Industrial Engineering to complement the knowledge and skills of students in the fields of Electronics and Control Systems. Students of this master are graduates who have completed courses in which the bases of these materials are presented. Students who by their degree of origin have not completed are required to study two subjects related 6ECTS each one with digital and power electronics and the other with the control and automation systems.

Learning goals

Competences

Learning goals

Importance of learning goals

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Methodology, learning tasks, syllabus and resources

Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It provides an integrated view of advanced techniques used in two fields: the control theory and design of electronic systems based on analog, digital and power circuits.

Learning tasks

The course includes the following learning tasks:

- **Lectures.** Presentation of the main theoretical contents illustrated with examples.
- **Practice sessions.** Problem-solving and implementation of the lecture contents.
- **Laboratory sessions.** In small groups, the students will assemble and check the circuit operation.

Syllabus

The course will address the following topics:

Section 1. Advanced control skills

1. Modelling of systems with internal description
2. Multivariable continuous and sampled systems
3. Stability. Controllability and observability
4. linear control based on internal description
5. Observers. Control design variables estimation
6. Nonlinear control

Section 2. Advanced electronic design skills

1. Top- Down methodology for electronic design
2. Prototyping techniques in digital and analog systems
3. Implementation of control systems in electronics (instrumentation, A/D conversion, microprocessor hardware implementation)
4. Documentation and debugging an electronic design

Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

A detailed analysis of the various activities to develop will be established once the University and the Center have approved the academic calendar (which can be consulted on the website of the EINA).

Bibliography and recommended resources