

Academic Year/course: 2021/22

## 67237 - Advanced Control and Electronic Implementation

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 67237 - Diseño electrónico y control avanzado

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 622 - Master's in Electronic Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** First semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The student, for passing this subject, should demonstrate the following results...

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.

### 1.2. 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.

### 1.3. Recommendations to take this course

It is recommended that students have previously studied basic subjects of signals and systems and analog electronics. In particular, it is considered necessary to possess basic knowledge in modeling and control of single-input single-output linear systems, DC-DC converters, and electronic instrumentation.

## 2. Learning goals

## 3. Assessment (1st and 2nd call)

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. 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.

## 4.2. 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.

## 4.3. 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

## 4.4. 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.

## 4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=67237&Identificador=C71983>