

60927 - Electronic system design

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Course	1
Period	Second semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

This course is based in a "learning by projects" technique. Students are guided through the design, analysis, construction and experimental characterization of a medium complexity communications system.

Some theoretical background is reviewed to provide content on components, circuits and design methods, which are sometimes supplemented with dynamic seminar-style exhibitions.

Computer simulation tools are integrated in the process.

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The course is developed in a laboratory so the student can acquire skills in building and testing of RF electronics in a continuous mode.

5.2.Learning activities

As explained in the Methodology part, this course is based in the design, analysis, construction and test of a communications system working in RF. Main activities for the process are:

- 1) General description of the system.
- 2) Specifications, planning and goals.
- 3) Preliminary design: Blocks diagram. Technologies review.
- 4) Preliminary design: Legal requirements, Mechanical constraints. Other considerations (thermal, ergonomic, etc.).
- 5) Preliminary design: Analysis for the application.
- 6) Transmitter design: Components, schematic, layout and construction.
- 7) Receiver design: Components, schematic, layout and construction.
- 8) Tuning, final adjustments and communication checks.
- 9) Elaboration of datasheet of the system.
- 10) Presentation to audience (students, professors, etc.).

5.3.Program

- 1.- Description of the system to be built.
- 2.- Presentation of laboratory instrumentation (scope, spectrum analyzer, power supply, probes, etc).
- 3.- Transmitter and receiver: block diagram and schematics.
- 4.- Analysis, simulation, construction and experimental characterization of each block. As an example (could be modified from year to year), the systems include: audio stages, mixers (upconverter and downconverter), modulator, demodulator, crystal filter, RF preamplifier and power amplifier, antenna filter, crystal oscillators (VXOs), attenuator, receiver filter, power supply, additional components (leds, relays, microphone, speaker, etc.). It is common to build and characterize some of the coils and matching transformers included in the design.
- 5.- Intercommunication between systems.

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6.- Final presentation by students.

5.4.Planning and scheduling

The calendar, schedules and rooms for any of the activities associated with this course will be made public in advance as required by current normative.

5.5.Bibliography and recommended resources