60927 - Electronic system design

Información del Plan Docente

Academic Year	2017/18
Subject	60927 - Electronic system design
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Year	1
Semester	Second semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on Project-based learning, where students are guided through the design, analysis, construction and experimental characterization of a medium complexity communication system. A wide range of teaching and learning tasks are implemented, such as

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- Theoretical background is reviewed to provide knowledge of components, circuits and design methods, which are sometimes supported with dynamic seminar-style presentations.
- Computer simulation tools.
- Laboratory sessions so the student can acquire skills in building and testing of RF electronics in a continuous mode.

5.2.Learning tasks

The course includes the following learning tasks:

- General description of the system.
- Specifications, planning and goals.
- Preliminary design: Blocks' diagram. Technologies review.
- Preliminary design: Legal requirements, Mechanical constraints. Other considerations (thermal, ergonomic, etc.).
- Preliminary design: Analysis for the application.
- Transmitter design: Components, schematic, layout and construction.
- Receiver design: Components, schematic, layout and construction.
- Tuning, final adjustments and communication checks.
- Elaboration of a datasheet of the system.
- Presentation to an audience (students, professors, etc.).

5.3.Syllabus

The course will address the following topics:

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.
6. Final presentation by students.

5.4.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.

5.5.Bibliography and recommended resources