60923 - Advanced analog systems and electronic intrumentation

Información del Plan Docente

Academic Year	2018/19
Subject	60923 - Advanced analog systems and electronic intrumentation
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.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

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. A wide range of teaching and learning tasks are implemented, such as

- Teaching sessions will have a predominantly practical orientation. In the lectures, the concepts of the advance analog design will be presented, setting out the fundamental aspects of the design flow. In the practice sessions, the focus will be put on the methodology which will be applied in the laboratory sessions, encouraging the active participation of the student.
- Laboratory sessions will be in small groups, where the autonomous work of the student will be encouraged to achieve results in the design of advanced analog systems. The required material to develop these lab sessions will be provided to the student in advance.

60923 - Advanced analog systems and electronic intrumentation

- Assignments (T6) encourage the autonomous work of the student. The required material to develop these activities will be provided to the student in advance.

Students are expected to participate actively in the class throughout the semester.

4.2.Learning tasks

The course includes the following learning tasks:

- **Lectures** (A01) and **practice sessions** (A02) (30 hours). The fundamental contents of the course will be presented, with a practical orientation based on the design of electronic systems. The necessary materials will be available on the virtual platform Moodle (ADD).
- **Laboratory sessions** (A03) (20 hours). The instructions will be available to students on Moodle in advance. In these sessions, simulation tools and electronic instrumentation will be used so that students will acquire the skills and abilities necessary to address the design and experimental verification of advanced analog systems and electronic instrumentation.
- **Assessment** (A08). A set of theoretical and experimental tests and reports. The assessment includes the final test.
- **Assignments and/or seminars** (T6). Both assignments (T6) and lab reports are included. In order to meet the expected results, students will have the material provided by the teacher, manufacturers of integrated circuits, and on-line resources. The student's autonomy, the quality of the solution, and the participation of each of the group members will be considered in the assessment criteria.
- **Autonomous work** (T7). It includes autonomous work and study aimed at achieving the learning objectives, conducting lab sessions, preparing assignments and tutorials.

4.3.Syllabus

The course will address the following topics:

- Topic 1: Introduction
- Topic 2: Integrated Circuits (CIs): submicronic technologies
- Topic 3: Amplification
  - Feedback: stability and compensation
  - Single-supply operation
  - Application-specific AOs
- Topic 4: Active filters
- Topic 5: Analog-digital interface

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

1. Basic teaching materials. Available at http://add.unizar.es (To access this resource, the student must be enrolled in the course).

- **Slides.** They are considered the notes of the subject.
- **Laboratory instructions.**
- **Supplementary teaching materials.** Set of useful materials for the course: catalogues of manufacturers, component data sheets, CAD tools manuals, etc.

2. Reference books:

- Analysis and Design of Analog Integrated Circuits; P.R. Gray, P.J. Hurst, S.H. Lewis and R.G. Meyer; John Wiley &

60923 - Advanced analog systems and electronic intrumentation

Sons, 2010.
- Analog Integrated Circuit Design; D. Johns, K. Martin; John Wiley & Sons, Inc., New York, 1997.
- Design of Analog Filters: Passive, Active RC and Switched Capacitor; R. Schauman, M.S. Ghausi and K.R. Laker; Prentice-Hall, 1990.
- Switched Capacitor Circuits; P.E. Allen, E. Sanchez-Sinencio; Van Nostrand Reinhold Company, 1984.
- Microelectronics Circuits; S. Sedra and K. C. Smith; Oxford University Press, 5th Edition, 2005.
- CMOS Circuit Design, Layout and Simulation; R. Jacob Baker; Wiley-IEEE Press, 3rd Edition, 2010.
- Design of Analog CMOS Integrated Circuits; B. Razavi; McGraw-Hill, 2000.
- Analog Design for CMOS VLSI Systems; F. Maloberti, Kluwer Academic Publishers, 2001.
- Operation and Modeling of the MOS Transistor; Y. Tsividis; Oxford University Press, 2nd Edition, 1999.
- CMOS Sigma-Delta Converters: Practical Design Guide; J.M. de la Rosa, R. del Río; Wiley-IEEE Press, 2013; ISBN 978-1-119-97925-8.