30311 - Analog Electronics

Información del Plan Docente

Academic Year	2018/19
Subject	30311 - Analog Electronics
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	438 - Bachelor's Degree in Telecomunications Technology and Services Engineering
ECTS	6.0
Year	2
Semester	First 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

Learning process will be developed through three main aspects: lectures, exercises solving and laboratory sessions, activities that will demand an increasing involvement from the students.

These activities will be supported by a recommended bibliography to be completed with some complementary materials that will be available in the virtual platform "Moodle" of the University of Zaragoza, from which the students will be able to download them.

These complementary materials will include different documents like, for example, the following ones:

- Presentation of the subject: showing contact data of the teacher, the description of the objectives and contents of the program, timetables of tutorials, scheduling of classes, dates of laboratory sessions, evaluation criteria and recommended bibliography.

- Conceptual schemes and drawings,

- Manuals for laboratory sessions and sheets for design activities,

- Notes about Power Electronics,

- Collection of exams of past courses.

4.2.Learning tasks

Classroom activities (M1 and M8) will be developed, as stated by the EINA scheduling, in different sessions covering three hours a week, including theoretical (M1) and practical (M8: questions and problems solving) activities.

On the one hand, M1 activities will present and develop the basic concepts and techniques related to the items proposed in the program.

On the other hand, M8 activities will be oriented to resolve some questions and problems proposed in previous exams about the subject, once individually analysed by the pupils, whose activity in these tasks will be adequately motivated and reinforced.

Laboratory activities (M9) will be developed in two hours and a half sessions every other week, so that there will be six of them in the semester, one every fortnight, according to the schedule stated by the EINA.

The personal concern of the pupils in the preparation and development of these activities will be of prime importance to adequately profiting them, a point to be systematically underlined by the professor.

The preparation by the pupils of laboratory activities must be individual, notwithstanding its development in groups of two, three or more pupils depending on both the nature and the difficulty of each specific session and the facilities of the laboratory where the activities are to be developed.

A systematic autonomous work of each pupil will be determinant in having a profitable return of his/her learning activities.

4.3.Syllabus

According to the EINA scheduling, the classroom activities (M1 and M8) will cover around fourteen weeks, that is why a total of 42 hours (14 weeks times 3 hours a week) is tentatively assigned to the lecturing activities of the proposed subject program.

This program is structured in several thematic blocks and sessions as follows (the amount of lecturing hours tentatively assigned to each of them are shown in brackets: M1+M8):

30311 - Analog Electronics

INTRODUCTION (2+0=2)

Electronic systems: a block diagram.

Systems and Electronics: a clasiffication.

Electronic design: specifications and procedures.

A) ANALOGUE SIGNALS PROCESSING (14+10=24):

A1.- ELECTRONIC FEEDBACK (2+1)

Basic concepts, parameters, types and topologies. Effects.

A2.- IDEAL OPERATIONAL AMPLIFIER (OA) CIRCUITS (9+7=16)

Basic amplifying, calculating and filtering circuits. Instrumentation and conversion basic blocks. Comparators, signal generators and oscillators: basics.

A3.- REAL AO (2+1=3)

Its characteristics: limitations and design implications.

A4.- TRANSISTOR STAGES (1+1=2)

BJTs/FETs in analogue signals processing.

B) ENERGY PROCESSING (8+4=12):

B1.- ELECTROTECHNICAL BASICS (2+0=2)

Energy sources and energy conversion. Power electronic devices. Power electronic design: device protections.

B2.- ENERGY CONVERSION SYSTEMS (4+2=6)

Conversion types. Conversion blocks: a clasiffication. Power amplifiers and energy conversion. Power sourcing systems.

B3.- POWER ELECTRONIC SOURCES (2+2=4)

30311 - Analog Electronics

Linear and switched power sources: basics. Linear power sources: typical blocks and characteristics.

C. ELECTRONIC DESIGN IN TELECOMMUNICATIONS (1+3=4):

C.1.- STAGES, CIRCUITS AND SYSTEMS (1+3=4)

Design specifications. Design goals, functions to be implemented and design architecture. Design levels and design procedure.

Then, M1 classroom activities will tentatively cover about two thirds of the assigned hours and the remaining third will be spent in M8 practical activities (questions and problem solving).

However, the aim is to transfer to M8 activities some of the hours tentatively assigned to M1 activities, depending on pupils assimilation of the presented concepts and techniques.

Finally, the laboratory sessions, two hours and a half long as previously stated, will be developed in due synchronization with classroom activities.

Five of them will cover the implementation and characterization of basic blocks presented in classroom lecturing.

The sixth one will cover the implementation and characterization of a number of small electronic systems, each of them previously designed by different groups of pupils.

4.4.Course planning and calendar

They will be as stated by the EINA

4.5.Bibliography and recommended resources

- 1. Navarro Artigas, Jesús : Electrónica analógica / J. Navarro Artigas . - 5ª ed. Zaragoza : Prensas de la Universidad de Zaragoza, 2013
- 2. Fiore, James M.. Amplificadores operacionales y circuitos integrados lineales : teoría y aplicación / James M. Fiore ; revisión técnica, Miguel Ángel Pérez García Madrid : Thomson, cop. 2002
- 3. Coughlin, Robert F.. Amplificadores operacionales y circuitos integrados lineales / Robert F. Coughlin, Frederick F. Driscoll ; traducción, Raúl Bautista Gutiérrez ; revisión técnica, Agustín Suárez Fernández . 5ª ed., [reimp.] México [etc.] : Pearson Educación, [2007]
- 4. Malik, Norbert R.. Circuitos electrónicos : análisis, diseño y simulación / N. R. Malik ; traducción, Miguel Angel Pérez García, Mª Antonia Menéndez Ordas, Cecilio Blanco Viejo ; revisión técnica, Juan Meneses Chaus ... [et al.] . - [1ª ed. en español], reimp. Madrid [etc.] : Prentice Hall, 2003
- 5. Mohan, Ned. Power electronics : converters, applications and design / Ned Mohan, Tore M. Undeland, William P. Robbins . - 3rd. ed. [New York] : John Wiley & Sons, cop. 2003
- 6. Brown, Marty. Power supply cookbook / Marty Brown . - 2nd. ed. Boston [etc.] : Newnes, cop. 2001
- J. M. Burdío. Fuentes de Alimentación (Apuntes de) Dpto. Ing. Electrónica y Comunicaciones. Universidad de Zaragoza, 1997.

30311 - Analog Electronics

Additionally, as stated in paragraph 5.1, the pupils will have access to some complementary materials, prepared by the lecturing professor of the subject, in a double way: via University of Zaragoza platform "Moodle" and via the reprography services of the EINA, which offer hardcopies of all the documents.