

29721 - Basic principles of electronics

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	330 - Complementos de formación Máster/Doctorado 434 - Bachelor's Degree in Mechanical Engineering
ECTS	6.0
Year	
Semester	Indeterminate
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 participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

29721 - Basic principles of electronics

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

Further information regarding the course will be provided on the first day of class.

5.2.Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.8 ECTS): 45 hours.
- Laboratory sessions (0.6 ECTS): 15 hours.
- Guided assignments (1.2 ECTS): 60 hours.
- Autonomous work (2.2 ECTS): 55 hours.
- Evaluation (0.2 ECTS): 5 hours.
- Tutorials

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Laboratory sessions: sessions will take place every 2 weeks (5 sessions in total) and last 3.0 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Guided assignments: students will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures. They will be submitted at the beginning of every laboratory sessions to be discussed and analyzed. If assignments are submitted later, students will not be able to take the assessment test.

Autonomous work: students are expected to spend about 55 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: the professor's office hours will be posted on the degree website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

5.3.Syllabus

0. Introduction. The functions of electronics in mechanical engineering. Electronic systems.

1. Sensing and conditioning. Electronic sensors used in mechanical engineering. Operational amplifier: linear stages.

29721 - Basic principles of electronics

2. Digital electronics and microprocessor systems.
3. Power supplies and batteries. Diodes, and voltaje regulators.
4. Electronic control of power systems. Bipolar transistors, MOS transistors, thyristors

Practical sessions

Session 1 - Laboratory instrumentation. Electrical measurements. Simulation of electronic circuits.

Session 2 - Sensing and amplification.

Session 3 - Sensing, control and visualizations using a microprocessor system.

Session 4 - Power supply and linear voltaje regulation.

Session 5 - Small project: control of a DC motor using a microprocessor based system

5.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the "Escuela de Ingeniería y Arquitectura " website (<https://eina.unizar.es/>)

5.5.Bibliography and recommended resources

[BB: Basic Bibliography / BC: Additional Bibliography]

- [BB] 1. Storey, Neil. Electrónica : de los sistemas a los componentes / Neil Storey Wilmington, Delaware : Addison-Wesley Iberoamericana, 1995
- [BB] 2. Pollán Santamaría, Tomás. Electrónica digital. I, Sistemas combinacionales / Tomás Pollán Santamaría. - 3ª ed. Zaragoza : Prensas Universitarias de Zaragoza, 2007
- [BB] 3. Pollán Santamaría, Tomás. Electrónica digital. II, Sistemas secuenciales / Tomás Pollán Santamaría. - 3ª ed. Zaragoza : Prensas Universitarias de Zaragoza, 2007
- [BB] 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 Chau... [et al.] . - [1ª ed. en español], reimp. Madrid [etc.] : Prentice Hall, 2003
- [BB] 5. Savant, Clement J., Jr.. Diseño electrónico : circuitos y sistemas / C.J. Savant Jr., Martin S. Roden, Gordon L. Carpenter ; traducción, Gabriel Nagore Cázares ; revisión técnica, Jorge Luis Sánchez-Téllez . - 3ª ed. México : Pearson Educación, 2000
- [BB] 6. Rashid, Muhammad H.. Circuitos microelectrónicos : análisis y diseño / Muhammad H. Rashid ; revisor técnico de la obra Ricardo García López Madrid [etc.] : Thomson, D.L. 2002