Universidad Zaragoza

Year : 2019/20

26928 - Physical Electronics

Syllabus Information

Academic Year: 2019/20
Subject: 26928 - Physical Electronics
Faculty / School: 100 -

Degree: 447 - Degree in Physics

ECTS: 6.0
Year: 4
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

The methodology followed in this course is oriented towards achievement of the learning objectives. The learning process designed for this course is based on the acquisition of theoretical knowledge, problem solving and realization of the experimental part. A wide range of teaching and learning tasks are implemented, such as lectures, individual or group tutorials, problem-based learning, team work, practice sessions, autonomous work, laboratory sessions, reports and individual assignments.

4.2.Learning tasks

The course includes the following learning tasks:

- **Lectures**: (4 ECTS: 40 hours + 40 hours of autonomous work). Participative lectures to the whole group of students, combined with individual or .small groups tutorials.
- **Practice sessions**: (1 ECTS: 10 hours + 10 hours of autonomous work) Problem-solving tasks and analysis of case studies related to the contents of the course. Interaction between the teacher and students is encouraged.
- **Laboratory sessions** (1 ECTS: 10 hours + 20 hours of autonomous work). Observation, experimental characterization and measurement of semiconductor devices. This activity will be conducted in four sessions of two hours and a half each, combined with 20 hours of autonomous in which reports containing relevant results and

conclusions must be prepared.

- **Assignments** (20 hours). Assignments proposed by the teacher throughout the semester which students must complete autonomously, counting with specific follow-up tutorials. The evaluation will be included in the section of the continuous assessment system.

4.3.Syllabus

The course will address the following topics:

Lectures

- Topic 1. Crystalline solids.
- Topic 2. The electron distribution in semiconductors.
- Topic 3. Nonhomogeneous semiconductors.
- Topic 4. The pn junction.
- Topic 5. The pn junction diode.
- Topic 6. Enhancement-mode MOSFET (EMOS).
- Topic 7. Other field effect transistors.
- Topic 8. FET transistors: Applications.
- Topic 9. Bipolar Junction Transistor.
- Topic 10. BJT in the active region.

Laboratory sessions

- Session 1. Experimental characterization of the diode and extraction of its characteristic parameters.
- Session 2. Special diodes.
- Session 3. MOS transistors: Static characteristic and transfer functions.
- Session 4. BJT transistors: Models and applications

4.4.Course planning and calendar

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Faculty of Sciences website.

4.5.Bibliography and recommended resources