26928 - Physical Electronics

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	447 - Degree in Physics
ECTS	6.0
Course	4
Period	First semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

Considering the general objectives of the course, the learning process designed for this course is based on the acquisition of theoretical knowledge, problem solving and realization of the experimental part, according to the following scheduled activities:

*Participative lectures addressed to the entire group of students, plus individual or in small groups care tutorial for activity 1 (4 ECTS).

* Problem-based learning and team and individual work for Activity 2 (1 ECTS) *Laboratory work and reports for activity 3 (1 ECTS)
*Theoretical-practical works performed individually for activity 4

5.2.Learning activities

1:

Classroom lectures comprising the development and discussion of the content of the course, based on the notes and bibliography supplied by the teacher. It consists of 40 1-hour sessions and 40 hours of personal work of the student.

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

2:

Problem solving and analysis of case studies related to the contents of the subject. It consists of 10 classroom hours with the broadest possible interaction between teacher and
students, and involves 10 hours of personal work.

3:

Laboratory sessions: observation, experimental characterization and measurement of semiconductor devices. This Activity will be conducted in four sessions of two hours and a half. This means 10 classroom hours and 20 hours of personal work for the preparation of reports containing relevant results and conclusions.

4:

Theoretical-practical works, proposed by the teacher throughout the semester and that the student must complete individually, counting with specific follow-up tutorials. The evaluation will be included in the section of continuous assessment. The dedication of the student is equivalent to 20 hours.

5.3.Program

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

5.4.Planning and scheduling

The theoretical contents and the problems will be conducted according to the thematic sections listed above.
The experimental part consists of 4 sessions of 2 1⁄2 hours duration each one:

1.
   Experimental characterization of the diode and extraction of its characteristic parameters.

2.
   Special diodes.

3.
   MOS transistors: Static characteristic and transfer functions.

4.
   BJT transistors: Models and applications.

Lectures and problems will be taught in the classroom and schedule established by the Dean. The laboratory calendar will be set according to the number of students, the development of the course and the availability of laboratories.

5.5.Bibliography and recomended resources

Usually the bibliography is kept updated and can be consulted through the Library website (Search recommended bibliography in biblioteca.unizar.es)