Universidad Zaragoza

Year : 2020/21

26926 - Solid State I

Syllabus Information

Academic Year: 2020/21
Subject: 26926 - Solid State I
Faculty / School: 100 - Facultad de Ciencias
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 the achievement of the learning objectives. The course is organized by combining lectures and practice lessons (problem solving and simulations). In order to achieve the intended goals, the strategy chosen by the teaching staff consists of using lectures for presenting to the students the basic knowledge required to face the solving problem and laboratory sessions.

Specifically:

? Lectures: CE1, CE2, CE3, CE4, CE5, CE6, CE10

? Problem solving: CE1, CE2, CE3, CE5, CE6, CE10

? Laboratory sessions: CE8, CE9

? Exam: covering all the contents of the course, in order to evaluate the degree of acquisition of all competences and objectives.

The CE's have been defined in the following document (in Spanish):
https://academico.unizar.es/sites/academico.unizar.es/files/archivos/ofiplan/memorias/grado/ciencias/mv_124.pdf

4.2.Learning tasks

This 6 ECTS course includes the following learning tasks:

- Lectures (4.5 ECTS: 45 hours).
- Interactive solving problems sessions (1 ECTS: 10 hours).
- Laboratory sessions (simulations in computer lab, 0.5 ECTS: 5 hours).

4.3.Syllabus

This course will address the following topics:

- 0: Introduction

PART I: CRYSTRAL STRUCTURE. DIFFRACTION. COHESION

- 1. Crystal structure
- 2. Determination of crystal structures
- 3. Crystal binding

PART II: PHONONS. THERMAL PROPERTIES

- 4. Lattice dynamics
- 5. Lattice thermal properties

PART III: ELECTRONS. ELECTRONIC TRANSPORT

- 6. Drude and Sommerfeld theories
- 7. Electrons in a periodic potential
- 8. Semiclassical dynamics of Bloch electrons

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 Faculty of Science web page at https://ciencias.unizar.es/grado-en-fisica-0.

4.5.Bibliography and recommended resources