

Academic Year: (2021 / 2022)

Review date: 09-06-2021

Department assigned to the subject: Physics Department

Coordinating teacher: SANCHEZ FERNANDEZ, LUIS RAUL

Type: Electives ECTS Credits : 6.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Basic knowledge of general physics

OBJECTIVES

The aim of this course is to develop the basic knowledge on the structure, types and properties of materials. The fundamentals on crystalline and non-crystalline materials will be reviewed and essential topics on degradation including radiation damage- and processing will be treated.

The course will provide the student with a general knowledge of the structure of materials and its influence on their properties.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Chemical bonding & microscopic structure.
2. Lattices and crystal structure.
3. Defects in solids. Diffusion.
4. Phase diagrams.
5. Types of Materials.
6. Thermal properties of materials.
7. Electronic properties of materials.
8. Optical properties of materials.
9. Magnetic properties of materials.
10. Mechanical properties of materials.
11. Degradation of Materials.

LEARNING ACTIVITIES AND METHODOLOGY

* Teaching Methods:

Classroom lectures (65%) and classroom problem solving sessions (35%). Homework assignments.

* Course Material:

Course material will be available on a dedicated web page. It will consist on the ppt files to be used during the course and a list of questions and problems to be solved during the lectures or as homework.

ASSESSMENT SYSTEM

Evaluation shall take into account attendance, in-class quizzes and problems periodically proposed along the course (30% of the final mark). A written-closed book exam will take place at the end of the semester (70% of the final mark).

% end-of-term-examination:	70
% of continuous assessment (assignments, laboratory, practicals...):	30

BASIC BIBLIOGRAPHY

- D.R. Askeland and P.P. Puhlé THE SCIENCE AND ENGINEERING OF MATERIALS, Thomson, 2006
- J.D. Tilley Understanding solids: the science of materials, Wiley, 2004

- W.D. Callister Jr MATERIALS SCIENCE AND ENGINEERING. AN INTRODUCTION, John Wiley and Sons, 2003

ADDITIONAL BIBLIOGRAPHY

- Brian S. Mitchell AN INTRODUCTION TO MATERIALS ENGINEERING AND SCIENCE FOR CHEMICAL AND MATERIALS ENGINEERING, John Wiley and Sons, 2004