

Academic Year: ( 2022 / 2023 )

Review date: 01-04-2022

Department assigned to the subject: Materials Science and Engineering and Chemical Engineering Department

Coordinating teacher: MARTINEZ CISNEROS, CYNTHIA SUSANA

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Chemistry

**OBJECTIVES**

Upon the successful completion of this subject, students will have acquired the following skills:

1. Knowledge, understanding and correlation skills regarding the fundamentals of science, technology and chemistry of materials.
2. Ability to apply the knowledge acquired to identify, formulate and solve problems of science, technology and chemistry of materials.
3. Ability to design and carry out experiments to solve problems of science, technology and chemistry of materials, interpret data and draw conclusions.
5. Ability to select and use appropriate equipment, tools and methods to solve problems of science, technology and chemistry of materials.
7. Ability to combine theory and practice to solve problems of materials science, technology and chemistry of materials.
8. Understanding methods and techniques applicable to science, technology and chemistry of materials and their limitations.
9. Acquisition of technical and laboratory skills in materials science, technology and chemistry of materials.

**DESCRIPTION OF CONTENTS: PROGRAMME**

- Topic 0: Presentation of the course
- Topic 1: Bonding in solids
- Topic 2: Structure of materials
- Topic 3: Defects in crystalline structures
- Topic 4: Diffusion in solids. Mass transport
- Topic 5: Mechanical properties
- Topic 6: Phase diagrams
- Topic 7: Metallic materials
- Topic 8: Ceramic materials
- Topic 9: Polymer materials
- Topic 10: Composite materials
- Topic 11: Magnetic and electrical properties
- Topic 12: Selection of materials

**LABORATORY PRACTICES**

1. Crystalline structures
2. Cold working of metals
3. Thermal treatments of steels
4. Determination of polymers

**LEARNING ACTIVITIES AND METHODOLOGY**

Master classes, reduced-group classes, individual tutorship and personal work of the student; focused on acquiring theoretical knowledge.

Laboratory sessions, classes focused on solving problems, individual tutorships and personal work of the student; oriented to the acquisition of practical skills related to the program of the subject.

## ASSESSMENT SYSTEM

The assessment consists of a final test (60% of the final mark) and a continuous evaluation system (40%). For the continuous evaluation to be considered, it is required to obtain a minimum of 4/10 in the final exam.

The continuous assessment consists of:

- (i) Three individual tests, with a 30% weight
- (ii) Laboratory: execution of four practices. The final laboratory mark will consist of solving a questionnaire or test at the beginning of each one, to check the student's knowledge, and a final report. Final laboratory weight: 10%.

The assistance to the laboratory sessions is MANDATORY. The entrance to the laboratory is enabled once the student has watched the general security video and the specific video for chemistry/materials lab and answered both tests correctly. THE STUDENT CAN NOT ENTER THE LABORATORY IF HE/SHE HAS NOT ANSWERED THE TESTS. THE NON-ASSISTANCE TO THE LABORATORY WITHOUT JUSTIFIED CAUSE IMPLIES SUSPENDING THE CONTINUOUS EVALUATION.

Laboratories take place during october and november, according to the corresponding ongoing academic calendar.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

## BASIC BIBLIOGRAPHY

- M.F. Ashby Engineering materials., Elsevier, 2006
- S. Kalpakjian Manufacturing engineering and technology., Pearson Education, 2014
- W.D. Callister, Jr. Materials Science and Engineering: an introduction., Ed. John Wiley & Sons, 2003
- W.F. Smith Foundations of materials science and engineering., McGraw-Hill Higher Education, 2010