

Academic Year: ( 2019 / 2020 )

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

Coordinating teacher: RUIZ NAVAS, ELISA MARIA

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

## OBJECTIVES

In a generic manner, the student must develop the following skills:

- CG1, Understand the challenges associated to Materials Science and Engineering in an industrial and research environment
- CG2, Know the disciplines appropriated for working in a laboratory of materials and for optimizing the obtaining of results
- CG3, Develop team working skills in a research environment
- CE1, Discover the latest tendencies in development of new materials and be aware of their potential advantages with respect to more traditional materials
- CE2, Be able to design new ways of optimizing the properties of different materials for specific applications, through the modification of their structure and composition.
- CE3, Know processing systems and advanced synthesis that allow to obtain materials with improved properties.
- CE4 Acquire the ability of contributing to the optimization of processing technology for applications and specific problems.
- CE5 Be able to develop creative strategies and decision-making facing problems related to materials, manufacturing and behavior.

Learning results:

Overcoming this matter ensures that students have achieved the following learning outcomes:

- To identify the requirements for the selection of materials for biomedical applications.
- To be able to identify which materials are most commonly used today and to understand the alternatives that are contemplated at this time to achieve improved properties.
- To be familiar with the concepts of biological response and biocompatibility, as well as biocompatibility assays, cytotoxicity and cytocompatibility necessary to assess behavior of biomaterials and biological response.

## DESCRIPTION OF CONTENTS: PROGRAMME

- Introduction to Biomaterials and Biological Materials.
- Biological Response and biocompatibility.
- Testing of biocompatibility, cytotoxicity and cytocompatibility. Laboratory
- Hard and soft Biomaterials (Tissue Engineering).
- Metallic Biomaterials. Properties and main applications
- Polymeric Biomaterials. Properties and main applications
- Ceramic Biomaterials. Properties and main applications
- Biomaterials and Health Sciences: Biomaterials for bone regeneration
- Biomaterials and Health Sciences: Materials for gene transfer
- Biomaterials and health sciences: Biomaterials for diagnosis
- Biomaterials and health sciences: Composite Materials with antibacterial properties
- Biomaterials and Health Sciences: Applications / Case Studies

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Biomaterials and Health Sciences: Applications / Case Studies

#### LEARNING ACTIVITIES AND METHODOLOGY

Masterly classes, classes to solve doubts in reduced groups, individual tutorship and personal work of the student; oriented to acquire theoretical knowledge.

Laboratory classes, classes for solving problems in reduced groups; individual tutorship and personal work of the student; oriented to acquire practical knowledge related to subject program.

#### ASSESSMENT SYSTEM

<b>% end-of-term-examination/test:</b>	50
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	50

The assessment consists of a final test (50% of the final mark) and the continuous evaluation (50%).

The continuous assessment consists of:

- (I) Conducting laboratory is mandatory to be evaluated in the subject. The rating is 10% continuous assessment.
- (II) Making and / or exhibition of works individually and in groups. The rating is 40%.