

Academic Year: ( 2020 / 2021 )

Review date: 12-09-2020

Department assigned to the subject:

Coordinating teacher: GARCIA DIEZ, MARTA

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

#### COMPETENCES AND SKILLS THAT WILL BE ACQUIRED AND LEARNING RESULTS.

This course provides an updated perspective of the major developments in biomedical engineering, and introduces the way biology, mathematics and engineering can be applied to biomedical problems. The fundamental principles that underlie biomedical engineering design, analysis, and modelling procedures will be developed in addition to practical examples of the techniques commonly used to solve them. Students will thus acquire an overview of most of the major fields of activity in which biomedical engineers are engaged.

#### DESCRIPTION OF CONTENTS: PROGRAMME

Introduction to bioengineering

0.- Bioengineering, biotechnology, biomedicine and clinical engineering. Biomedical engineering as the interface between engineering and biomedicine.

Biology module

- B1. Molecular Biology I: Basic concepts of chemistry applied to Biology
- B2. Molecular Biology II: Proteins, Lipids, Polysaccharides, Nucleic Acids
- B3. Cell Biology I: Cell structure and function
- B4. Cell Biology II: Cell metabolism, signalling, communication
- B5. Stem Cells: What are they, how are they obtained, what is their current utility and future potential?
- B6. Regenerative Medicine / Tissue Engineering I: Is it possible to produce organs or tissues? Basic Methods and principles
- B7. Regenerative Medicine II: State of the art, and examples of organ and tissue generation

Engineering module

- E1. Bioelectricity: the language of our cells
- E2. Bioinstrumentation: how to measure what is going on
- E3. Implants and brain machine interfaces: talking to the machine
- E4. Medical Imaging: seeing and understanding form
- E5. Molecular imaging: discovering and measuring the function
- E6. Surgical Room, the last frontier: Bringing technology to the surgeon.

#### BASIC BIBLIOGRAPHY

- M. Saltzman Biomedical Engineering: Bridging Medicine and Technology, Cambridge University Press, 2009