

Academic Year: (2022 / 2023)

Review date: 20/06/2022 10:23:34

Department assigned to the subject: Bioengineering Department

Coordinating teacher: GUERRERO ASPIZUA, SARA

Type: Electives ECTS Credits : 6.0

Year : Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

It is desirable, but not required, to have a good previous background on:

- Physics
- Chemistry
- Biology

DESCRIPTION OF CONTENTS: PROGRAMME

Obtain an overview of tissue engineering in clinical medicine and biomedical research

Understand the role of emerging technologies and engineering and life science disciplines in tissue engineering

1) Review of current status of tissue engineering and regenerative medicine

Introduction to TE and overview of course objectives

2) Tissues morphological and functional units

Organization of cell into higher ordered structures

Dynamics of Cell-ECM Interactions

Analysis of the physicochemical processes that affect limit and control cells and tissues function.

- Epithelial Tissue, Connective Tissue, Muscular Tissue and Nervous Tissue

3) Systems and Organs: morphological and functional units

Structural and dynamic interactions between mesenchyme and parenchyma

The role of tissue microenvironment, extracellular matrix and communication by growth factors

4) Tegumentary System

5) Designing tissue functional units

Stem cells and Genetic Engineering

6) Seminars on tissue recognition using virtual microscope.

7) "SPOC" about tissue engineering and regenerative medicine that will firm up the continuous evaluation contents.

LABORATORY EXPERIMENTS: (Every student will perform 15 hours of practical sessions in UC3M bioengineering laboratories)

- a. Use of conventional microscopy for the understanding of tissue structure.
- b. Understand microscopic organization of Tissues into Organs and systems.
- c. Tissue observation and image capture. Tissue engineering.
- d. Histology as a diagnostic tool.
- e. Use of Immunohistochemical techniques

LEARNING ACTIVITIES AND METHODOLOGY

AF1. THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems

AF2. TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on-site attendance.

AF3. STUDENT INDIVIDUAL WORK OR GROUP WORK. Subjects with 6 credits have 98 hours/0% on-site.

AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

AF9. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. It entails 4 hours/100% on-site

AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

MD1. THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning

MD2. PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group

MD3. TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor. Subjects with 6 credits have 4 hours of tutoring/100% on-site.

MD6. LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

ASSESSMENT SYSTEM

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

SE1. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 60% and 0%.

SE2. CONTINUOUS EVALUATION. Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. The percentage of the evaluation varies for each subject between 40% and 100% of the final grade.

BASIC BIBLIOGRAPHY

- Lanza RP, Langer R, Vacanti J Principles of Tissue Engineering. . Third edition, Academic Press, 2007
- Mescher AL JUNQUEIRA'S BASIC HISTOLOGY: TEXT AND ATLAS, Mc Graw Hill, 2013
- Saltzman MW Tissue Engineering: Engineering Principles for the Design of Replacement Organs and Tissues, Oxford University Press, 2004