

69305 - Scaffolds and tissue engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	547 - Master's in Biomedical Engineering
ECTS	3.0
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The teaching methodology is structured in three levels: theoretical classes where the main subject

contents are presented and discussed, student participation is encouraged; also computer lab sessions and

development of practical tasks based on a real application or specific research activity are proposed.

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5.2.Learning activities

There will be the following activities:

A01 Theoretical classes with the active involvement of the student (22 hours). The main course contents

are presented.

A03 Practical sessions (8 hours). Different lab sessions are carried out in order to fabricate and characterize a ceramic scaffold. Actually, the following tasks will be developed: fabrication of a ceramic scaffold (1h), measurements of density and porosity of the scaffold and preparation for in-vitro experiment (1 h), microstructural study by means of SEM and composition analysis (1 h), mechanical characterization (1 h). These practical sessions will be developed in the lab of Ciencia de Materiales e Ingeniería Metalúrgica. In the following days after

the lab session, the student should present a report of the corresponding lab session.

A05 Development of practical or research tasks . In this work, students in group of two persons, should develop an study of the state of the art of tissue engineering in one specific application. This work will be orally presented.

A06 Tutorship . Students may solve any questions they might have about unclear contents of the course and the preparation of practical and research tasks.

A08 Assessment . The student will take an exam and several reports derived from the lab

sessions and derived from the development of practical tasks will be evaluated.

5.3.Program

1. Introduction to Tissue Engineering
2. Tissue Mechanics
3. Cell Mechanics
4. Cell processes and interaction with biomaterials
5. Mass transport(nutrients y metabolitos: vascularization).
6. Scaffolds for Tissue Engineering
7. Computer modeling of scaffolds and its interaction with tissues
8. Use of cells and other regulators in Tissue Engineering

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9. Bioreactors

10. Applications in Tissue Engineering: bone and cartilage

5.4.Planning and scheduling

The course calendar is defined by the Escuela de Ingeniería y Arquitectura calendar.

5.5.Bibliography and recommended resources

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|-----------|---|
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Larry L. Hench & June Wilson Singapore :
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ed. London : Academic Press, 2000 |
| BB | Tissue Engineering of Cartilage and Bone /
Novartis Foundation . Wiley, 2003 |

LISTADO DE URLs:

Scaffolds for tissue fabrications. P.X. Ma.
En: Materials Today. Volume 7, Issue 5,
May 2004, Pages 30-40
[<http://www.sciencedirect.com/science/article/pii/S1369702104002330>]