69312 - Nano-biomedicine: Fundamentals and applications

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 learning method used is based on the cooperative work of the teacher and the student. The method will follow the traditional approach based on lectures but supported by the active participation of the students. Therefore, participation and discussion during the lectures will be promoted.

5.2.Learning activities

The learning activities used during the lectures will be based on:

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A02 (classroom lectures) 26 hours of class where the student will learn through their participation in the attainment of knowledge by gathering information and processing it and by solving problems and answering questions that the teacher will propose during the lectures. The professor will describe the main contents of the course during those lectures. This activity will take place in the classroom. Student's attendance is strongly recommended.

A01 Students activities including assignments, evaluations, elaboration of projects, public defenses and personal study will be required 49 hours of work. Those training activities will be proposed in order to reach the learning results above proposed achieving the designed abilities that the student must acquire.

The research project will have the structure of a scientific paper with the following structure:

-Title

-Author

-Abstract: With no more than 250 words the student should summarize the content described in the paper and its implications in the Nanobiomedical field.

-Introduction: 1 or 2 paragraphs, between 250 to 750 words defining and describing the topic of the review paper.

- Review of the state-of-the-art: There is not wording limitation in this section. This section will review the most relevant advances in the field related to the topic, highlighting those that supposed a breakthrough in the area. Future directions and implications for the coming years should also be described.

-Conclusions: A summary of the main conclusions of the work. A total of 1 or 2 paragraphs with a maximum of 250-750 words will be required.

-Bibliography: Main, relevant references used for the preparation of the manuscript.

The student will give a talk summarizing the main aspects of his/her work in a public defense.

A3: Tutorship: Tutoring time to discuss with the professor in charge of the course all the contents and aspects related to the course in order to solve any question or doubt that he/she might have will be at the student's disposal.

A4: Evaluation assessment. Writing exam. The relevant information about the exam is described in section 4 (Global evaluation).

5.3.Program

Theory and contents of the course:

Section 1. Nanoscience overview. Historical background, physics at the nanoscale. Materials manipulation and atomic

and molecular scale.

Section 2. Synthesis and characterization of nanostructured materials. Physical and chemical synthesis of nanomaterials. Nanomaterials characterization techniques.

Section 3. Biochemistry applied in Nanomedicine. Basic background in Biology (structure, biomolecules function: DNA beacons, enzymes, antibodies, etc.)

Section 4. Main aspects for the correct immobilization of the recognition moiety. The different functionalization protocols for the proper biomolecule attachment will be discussed depending on the biomolecule to be immobilized (i.e., nucleic acids, enzymes, antibodies, etc.) Other aspects including the stoichiometry control will also be discussed.

Section 5. Introduction to the therapeutic and diagnostic applications of Nanomedicine.

Section 6. Future and social, ethic and environmental aspects of Nanotechnology. Nanotoxicology.

5.4.Planning and scheduling

The course calendar is defined by the EINA (Engineering School calendar) and they will be posted in the EINA website as well as in the Master website (http://www.masterib.es). Deadlines for project presentation or to submit the required assignments will be posted in the learning platform moodle (https://moodle.unizar.es/) or in the Alfresco server.

5.5.Bibliography and recomended resources

BB	Nanobiotechnology Inorganic Nanoparticles vs Organic Nanoparticles / Edited by Jesus M. de la Fuente and V. Grazu Elsevier, 2012
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