Teaching guide

IDENTIFICATION DETAILS

Degree:	Biomedicine
Scope	Biology and Genetics
Faculty/School:	Experimental Sciences
Course:	NANOMEDICINE
Type:	Compulsory
ECTS credits:	3
Year:	4
Code:	2164
Teaching period:	Seventh semester
Subject:	Biomedical Research Tools
Module:	Experimental Methodology in Biomedicine
Teaching type:	Classroom-based
Language:	Spanish
Total number of student study hours:	75

SUBJECT DESCRIPTION

Nanomedicine is increasingly widespread in Biomedical Research because it has highly specific tools and, therefore, could provide solutions to different health problems through more personalized medicine.

The course of Nanomedicine, taught in the seventh semester of the Degree in Biomedicine, aims to introduce the basic concepts that allow us to understand the possibilities of nanosystems for the study, prevention, diagnosis and treatment of many diseases.

GOAL

The objective of the Nanomedicine course is for students to know and understand the general pillars on which it is based, its potential as a tool to offer innovative solutions to different health problems and the basic requirements that must be met to achieve effective translational research. The specific objectives of the course are: To know the general scientific basis of Nanotechnology and its main advantages as a biomedical tool. Learn about the different types of existing nanosystems and the fundamentals on which their structure is based. Learn about the methodologies for obtaining nanostructures, possible in vitro and in vivo tests that determine their biocompatible and toxicological profile, and the most commonly used characterization tools and techniques. Know and understand the applications of Nanomedicine, its possibilities and limitations. The specific purposes of the course are: To acquire the skills of analysis, criticism and synthesis applied to issues pertaining to the field of Biomedicine. Develop work and collaboration capacities in multidisciplinary teams comprised of healthcare personnel of diverse profiles.

PRIOR KNOWLEDGE

In order to obtain optimal use of the subject, prior knowledge of the fundamental bases of Pathophysiology, Genetics and Pharmacology is recommended.

COURSE SYLLABUS

Topic 1. Introduction to Nanomedicine.
Theme 2. Types of nanomaterials.
Theme 3. Main processes for the synthesis of nanoparticles and loading of drugs and/or diagnostic agents.
Topic 4. Nanosystem administration routes.
Topic 5. Advanced nanoplatform design for targeted transport to the biological target.
Theme 6. Characterization of materials. Instruments for the visualization and manipulation of nanomaterials.
Topic 7. Nanotoxicity.
Topic 8. News of Nanomedicine in the clinic. Topic 9. Future Perspectives of Nanomedicine.

EDUCATION ACTIVITIES

- Expository classes (participatory master classes) and practical classes (work sessions in small groups supervised by the teacher).
- Teamwork based on cooperative learning.
- Tutoring. The virtual platform will be essential for effective communication between students and the teacher. The student will find the information, planning and teaching material to support the subject.

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
30 Horas	45 Horas

LEARNING RESULTS

Know the basic concepts, principles, methods of engineering and design of nanomaterials applied to problem solving in the area of health sciences (diagnosis, regenerative medicine and drug delivery).

SPECIFIC LEARNING RESULTS

To be able to design the structure of nanosystems taking into account the main physiological barriers to be crossed until the desired biological target is reached.
Plan generally the synthesis, characterization and toxicity studies of nanomaterials
Explain the features and advantages of nanotechnological tools in diagnostics, regenerative medicine and drug delivery

LEARNING APPRAISAL SYSTEM

The subject evaluation system seeks to assess the acquisition of all the competencies provided for in the teaching guide.
To this end, the student's final grade is distributed as follows:
- Evaluation of the theoretical content of the subject through oral or written tests with development, short answer or test-type questions (68%)
- Realization and resolution of exercises and practical cases (14%)
- Evaluation of teamwork based on cooperative learning (18%)
Alternative evaluation system for students in second enrollment or later:
- Evaluation of the theoretical content of the subject through oral or written tests with development, short answer or test-type questions (80%)
- Evaluation of teamwork based on cooperative learning (20%) To take advantage of this evaluation system, the student must contact the teacher.
Minimum grade to pass the subject: it is essential to obtain a minimum of 45% of the maximum grade in each part of the final exam and 50% of the maximum grade for the entire exam.
In addition, it will be mandatory to obtain at least a 5 in the overall rating.
Deadline for delivery of exercises and practical cases and teamwork based on cooperative learning: for the evaluation of these, they must be delivered within the deadline indicated by the teacher at the beginning of the course.
Attendance at classes for carrying out and solving exercises and practical cases is mandatory for evaluation.
Extraordinary call evaluation system: the previously indicated evaluation system will be maintained, keeping the score obtained in the ordinary call for exercises and practical cases, of teamwork based on cooperative learning. Only the repetition of the final written test will be possible.
Plagiarism, as well as the use of illegitimate means in evaluation tests, will be sanctioned in accordance with the university's Evaluation Regulations and Coexistence Regulations.

ETHICAL AND RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE

1.- The use of any Artificial Intelligence (AI) system or service shall be determined by the lecturer, and may only be used in the manner and under the conditions indicated by them. In all cases, its use must comply with the following

principles:
a) The use of AI systems or services must be accompanied by critical reflection on the part of the student regarding their impact and/or limitations in the development of the assigned task or project.
b) The selection of AI systems or services must be justified, explaining their advantages over other tools or methods of obtaining information. The chosen model and the version of AI used must be described in as much detail as possible.
c) The student must appropriately cite the use of AI systems or services, specifying the parts of the work where they were used and describing the creative process followed. The use of citation formats and usage examples may be consulted on the Library website(https://www.ufv.es/gestion-de-la-informacion_biblioteca/).
d) The results obtained through AI systems or services must always be verified. As the author, the student is responsible for their work and for the legitimacy of the sources used.
2.- In all cases, the use of AI systems or services must always respect the principles of responsible and ethical use upheld by the university, as outlined in the Guide for the Responsible Use of Artificial Intelligence in Studies at UFV. Additionally, the lecturer may request other types of individual commitments from the student when deemed necessary.
3.- Without prejudice to the above, in cases of doubt regarding the ethical and responsible use of any AI system or service, the lecturer may require an oral presentation of any assignment or partial submission. This oral evaluation shall take precedence over any other form of assessment outlined in the Teaching Guide. In this oral defense, the student must demonstrate knowledge of the subject, justify their decisions, and explain the development of their work.

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

James F. Leary Principles of Nanomedicine Cambridge University press