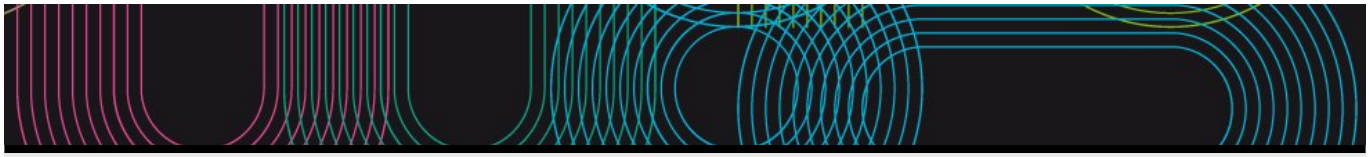

IDENTIFYING DATA				
(*)Nanomateriais para biomedicina				
Subject	(*)Nanomateriais para biomedicina			
Code	V04M192V01304			
Study programme	Máster Universitario en Ingeniería Biomédica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	4.5	Optional	2nd	1st
Teaching language	Galician			
Department				
Coordinator	Pérez Juste, Jorge Pérez Lorenzo, Moisés			
Lecturers	Pérez Juste, Jorge Pérez Lorenzo, Moisés			
E-mail	juste@uvigo.es moisespl@uvigo.es			
Web				
General description				

Training and Learning Results	
Code	
A1	Knowledge and understanding that provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context.
A5	Students must possess the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.
B1	Ability to design, develop, implement, manage and improve products and processes in the different areas of the biomedical engineering, by means of appropriate analytical, computational or experimental techniques.
B3	Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.
D3	Sustainability and environmental commitment. Equitable, responsible and efficient use of resources.

Expected results from this subject	Training and Learning Results
I handle of basic terminology in the field of the *nanobiomedicina, understanding of the different concepts and capacity to relate them	A1 B1 B3
Acquisition of basic knowledge on the applications of the *nanociencia in the biomedicine, from the synthesis of nanomaterials to his characterisation and finally, his application in therapy and diagnosis	A1 B1 B3
Perception, inside the global context of the applications *biomédicas, of the fundamental paper played by the *nanociencia and the nanotechnology.	A1 A5 B3 D3

Contents	
Topic	
1. Introduction to nanomaterials and their importance in biomedicine.	In this section, we will address the fundamental concepts of nanomaterials and their significance in the field of biomedicine. We will delve into the ways in which nanomaterials present novel opportunities for research and their application in the diagnosis and treatment of various conditions.

2. Synthesis and properties of nanomaterials.	We will examine the unique properties of nanomaterials, such as size and structure, that give them distinct characteristics. Additionally, we will analyze various synthesis methods used to create nanomaterials with specific properties.
3. Characterization of nanomaterials for biomedical applications.	We will explore the characterization techniques employed to analyze the physical and chemical properties of nanomaterials used in biomedicine. We will delve into the analytical tools that enable the evaluation of their structure, morphology, and interaction with biological systems.
4. Interaction of nanomaterials with biological systems.	We will investigate the interaction between nanomaterials and cells, as well as biological tissues. We will analyze the mechanisms through which nanomaterials interact with biological components and how this interaction can impact their applications in the diagnosis and treatment of various conditions.
5. Applications of nanomaterials in biomedical diagnostics.	We will explore the applications of nanomaterials in the field of diagnostics. We will analyze their use in imaging techniques and the detection of biomarkers, as well as their role in the development of highly sensitive biosensors.
6. Applications of nanomateriais in therapy and treatment of different conditions.	We will study the various applications of nanomaterials in therapy and the treatment of different conditions. We will analyze their utilization in drug delivery, gene therapy, and the treatment of cancer and other medical conditions.
7. Recent advances and future perspectives in nanomaterials for biomedicine.	We will explore the recent advances in the field of nanomaterials for biomedicine and examine the future perspectives of this technology. We will analyze the current trends and the remaining challenges in the development of novel nanomaterials and their applications in diagnostics and the treatment of various conditions.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	16	20	36
Laboratory practical	6	20	26
Presentation	4	20	24
Case studies	4	20.5	24.5
Essay questions exam	2	0	2

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	In the lecture sessions, the professors will present and explain the theoretical contents of the subject. Through oral presentations and the use of audiovisual resources, students will gain knowledge about nanomaterials and their applications in biomedicine. These sessions serve as a strong foundation for understanding the fundamental concepts related to the topics covered.
Laboratory practical	The lab sessions provide students with the opportunity to conduct experiments related to nanomaterials in biomedicine. During these activities, students will have the chance to apply their theoretical knowledge, perform synthesis and characterization of nanomaterials, and analyze their results. The lab sessions promote a more practical and experimental understanding of the concepts covered in the subject.
Presentation	Presentations serve as a means to assess students' understanding of specific subjects related to nanomaterials for biomedicine. Students will be required to prepare oral or audiovisual presentations to share their knowledge, explore recent advances, or present works related to the topics covered in the subject. These presentations enhance communication skills and encourage students to delve deeper into the subject matter through research and effective presentation techniques.
Case studies	In the case studies, students will analyze real or hypothetical scenarios where nanomaterials are applied in biomedicine. Through this methodology, students can apply their theoretical knowledge to practical contexts and make informed decisions. This approach fosters critical analysis, teamwork, and problem-solving skills by applying the knowledge acquired in the subject.

Personalized assistance

Methodologies	Description
Case studies	In the case studies, students will analyze real or hypothetical situations where nanomaterials are applied in biomedicine. This methodology allows students to apply their theoretical knowledge to practical contexts and make informed decisions. It provides an opportunity for students to develop critical thinking skills and gain experience in applying their knowledge to real-world scenarios.

Assessment			
	Description	Qualification	Training and Learning Results
Laboratory practical	During the lab sessions, the evaluation will primarily assess the students' ability to apply their theoretical knowledge to practical situations. Students will be evaluated based on their proficiency in performing lab tasks accurately and safely, interpreting and analyzing the obtained results, and preparing appropriate technical reports. The evaluation aims to gauge the students' practical skills, understanding of experimental procedures, data analysis capabilities, and their ability to effectively communicate their findings.	20	A1 B1 D3
Presentation	The evaluation of the presentations will primarily focus on the students' ability to effectively communicate their acquired knowledge on nanomaterials for biomedicine. Students will be evaluated based on the clarity and structure of their presentations, their ability to summarize and explain key concepts, the quality of the discussions presented, and their skills in responding to questions and actively participating in the discussion. The evaluation aims to assess the students' communication skills, their grasp of the subject matter, their ability to engage in critical thinking, and their proficiency in engaging with the audience.	20	A5 B3 D3
Case studies	In the case studies, the evaluation will primarily focus on the students' ability to apply theoretical knowledge to real or hypothetical situations related to nanomaterials for biomedicine. Students will be evaluated based on their skills in analyzing and solving problems, making informed decisions, and engaging in discussions from their acquired knowledge. The evaluation aims to assess the students' ability to think critically, apply their theoretical understanding to practical scenarios, demonstrate problem-solving skills, and effectively communicate their perspectives and reasoning.	20	A5 B3 D3
Essay questions exam	The exam will assess the overall understanding of the theoretical content covered in the subject. Students will be required to answer open-ended questions, where they must provide clear and precise responses, applying their theoretical knowledge and using appropriate terminology. The evaluation will focus on the comprehension of key concepts, the ability to analyze information, and the coherence of the discussion. The exam aims to gauge the students' depth of understanding, critical thinking skills, and their ability to articulate and support their ideas effectively.	40	A1 B3 D3

Other comments on the Evaluation

Sources of information

Basic Bibliography

Hossein Hosseinkhani, **Nanomaterials in Advanced Medicine**, Wiley-VCH Verlag GmbH & Co. KGaA, 2019

Sourav Bhattacharjee, **Principles of Nanomedicine**, Wiley-VCH Verlag GmbH & Co. KGaA, 2019

Ajay Kumar Mishra, **Nanomedicine for Drug Delivery and Therapeutics**, Wiley-VCH Verlag GmbH & Co. KGaA, 2013

Complementary Bibliography

Recommendations