



Teaching Guide

Teaching Guide				
Identifying Data				2023/24
Subject (*)	Physics: Mechanics and Waves		Code	610G04002
Study programme	Grao en Nanociencia e Nanotecnoloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Física e Ciencias da Terra			
Coordinador	Segade Zas, Luisa Maria	E-mail	luisa.segade@udc.es	
Lecturers	Segade Zas, Luisa Maria	E-mail	luisa.segade@udc.es	
Web				
General description	The main objective of the course is the acquisition of basic concepts of classical mechanics and waves, which enable the understanding of Physics subjects or other subjects that are part of the curriculum.			

Study programme competences

Code	Study programme competences
A1	CE1 - Comprender los conceptos, principios, teorías y hechos fundamentales relacionados con la Nanociencia y Nanotecnología.
A2	CE2 - Aplicar los conceptos, principios, teorías y hechos fundamentales relacionados con la Nanociencia y Nanotecnología a la resolución de problemas de naturaleza cuantitativa o cualitativa.
A3	CE3 - Reconocer y analizar problemas físicos, químicos, matemáticos, biológicos en el ámbito de la Nanociencia y Nanotecnología, así como plantear respuestas o trabajos adecuados para su resolución, incluyendo el uso de fuentes bibliográficas.
B1	CB1 - Que los estudiantes hayan demostrado poseer y comprender conocimientos en un área de estudio que parte de la base de la educación secundaria general, y se suele encontrar a un nivel que, si bien se apoya en libros de texto avanzados, incluye también algunos aspectos que implican conocimientos procedentes de la vanguardia de su campo de estudio
B2	CB2 - Que los estudiantes sepan aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posean las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio
B5	CB5 - Que los estudiantes hayan desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía
B6	CG1 - Aprender a aprender
B7	CG2 - Resolver problemas de forma efectiva.
B8	CG3 - Aplicar un pensamiento crítico, lógico y creativo.
B9	CG4 - Trabajar de forma autónoma con iniciativa.
B10	CG5 - Trabajar de forma colaborativa.
B11	CG6 - Comportarse con ética y responsabilidad social como ciudadano/a y como profesional.
C1	CT1 - Expresarse correctamente, tanto de forma oral como escrita, en las lenguas oficiales de la comunidad autónoma
C2	CT2 - Dominar la expresión y la comprensión de forma oral y escrita de un idioma extranjero
C4	CT4 - Desarrollarse para el ejercicio de una ciudadanía respetuosa con la cultura democrática, los derechos humanos y la perspectiva de género
C7	CT7 - Desarrollar la capacidad de trabajar en equipos interdisciplinarios o transdisciplinarios, para ofrecer propuestas que contribuyan a un desarrollo sostenible ambiental, económico, político y social.
C8	CT8 - Valorar la importancia que tiene la investigación, la innovación y el desarrollo tecnológico en el avance socioeconómico y cultural de la sociedad
C9	CT9 - Tener la capacidad de gestionar tiempos y recursos: desarrollar planes, priorizar actividades, identificar las críticas, establecer plazos y cumplirlos

Learning outcomes



Learning outcomes	Study programme competences		
To know how to work with different coordinate systems	A1 A2 A3	B5 B7 B8	
To understand the fundamentals of classical Newtonian mechanics	A1 A2 A3	B1 B2 B5 B6 B7 B8 B9 B10 B11	C1 C2 C4 C7 C8 C9
To know the properties of waves and their analytical representation	A1 A2 A3	B1 B2 B5 B6 B7 B8 B9 B11	C1 C2 C4 C7 C8 C9
To know about damped and forced oscillations	A1 A2 A3	B1 B2 B5 B6 B7 B8 B9 B11	C1 C2 C4 C7 C8 C9
To understand the phenomenon of resonance and the formation of standing waves	A1 A2 A3	B1 B2 B5 B6 B7 B8 B9 B11	C1 C2 C4 C7 C8 C9

Contents	
Topic	Sub-topic
Introduction	1.1. Magnitudes 1.2. Vectors 1.3. Coordinate systems
Mechanics	2.1. Kinematics of a particle 2.2. Dynamics of a particle 2.3. Work and energy 2.4. Dynamics of a system of particles and rigid solids 2.5. Statics 2.6. Fluids



Waves	3.1. Oscillations 3.2. Waves
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Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	A1 A3 B5 B8 B9 B11 C4 C7 C8 C9	32	48	80
Seminar	A1 A2 A3 B1 B2 B7 B8	16	32	48
Supervised projects	A1 A2 A3 B1 B2 B5 B6 B7 B8 B9 B10 B11 C1 C2 C4 C7 C8 C9	0	16	16
Mixed objective/subjective test	A1 A2 A3 B1 B2 B5 B7 B8 B9 B11 C1 C4 C9	4	0	4
Personalized attention		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	
Methodologies	Description
Guest lecture / keynote speech	Presentation of the concepts and laws associated with the fundamentals of mechanics and waves.
Seminar	Application of the concepts presented in the lectures by solving exercises in an interactive way.
Supervised projects	A supervised work that will consist of developing a series of tasks in a collaborative manner within a group.
Mixed objective/subjective test	Individual tests on the theoretical and practical contents of the course.

Personalized attention	
Methodologies	Description
Supervised projects	Students should inform the lecturer throughout the semester regarding the progress of their projects.

Assessment			
Methodologies	Competencies	Description	Qualification
Supervised projects	A1 A2 A3 B1 B2 B5 B6 B7 B8 B9 B10 B11 C1 C2 C4 C7 C8 C9	It will be proposed the realization of one project to be carried out in groups.	30
Mixed objective/subjective test	A1 A2 A3 B1 B2 B5 B7 B8 B9 B11 C1 C4 C9	There will be a partial exam (PART 1) that could release material from the final exam (both the first and the second opportunity) in case of reaching the minimum required punctuation. The final exam, composed by PART 1 and PART 2, computes up to 70% of the final qualification.	70

Assessment comments



FIRST OPPORTUNITY Approximately in the middle of the term, a partial exam (PART 1) will be held, which could free up content for the final exam in case the student reaches a minimum qualification of 1.4 points out of 3.5.

During the teaching period, it will be proposed the realization of a tutored work that will be elaborated in group. This work will have a weight in the qualification of a maximum of 3.0 points out of 10 and no minimum qualification will be required.

Coinciding with the official evaluation date of the first opportunity, a final exam will be held, which will consist of two parts (PART 1 + PART 2).

In order to pass the subject, students will have to achieve a minimum of 5.0 points after adding all the grades of the evaluation activities and, in addition, they will have to obtain a minimum qualification of 1.4 points out of 3.5 in each of the two parts of the final exam.

SECOND OPPORTUNITY There will be a final exam consisting of two parts (PART 1 + PART 2).

Those students who in the first opportunity have achieved in any of the two partial exams a minimum of 1.4 points out of 3.5 will have the option of not repeating it in the second opportunity and, therefore, keep the qualification previously obtained. The qualification obtained for the tutored group work will be retained in the second opportunity.

In order to pass the course, students must achieve a minimum of 5.0 points after adding all the qualifications of the evaluation activities (work and partial exams) and, in addition, they must obtain a minimum qualification of 1.4 points out of 3.5 in each of the two partial exams.

PART-TIME AND ACADEMIC DISPENSATION

The evaluation of students with recognition of part-time dedication and academic dispensation of exemption from attendance will follow the same criteria, and will consist of the same evaluation activities as the rest of the students.

FRAUD IN EVALUATION ACTIVITIES

During the realization of the exam, in any of the two opportunities, unless otherwise indicated, the use of any device with Internet access is prohibited.

If during the performance of the exam there is evidence of unauthorized use of these devices, the student will be dismissed from the classroom, and will proceed according to the Law 3/2022, of February 24, of university coexistence and the disciplinary regulations of the student body of the UDC.

The fraudulent performance of the exams and/or activities will directly imply the grade of failure ("0") in the subject in the corresponding call, invalidating any qualification obtained in all activities for the next opportunity, if any, within the same academic year. It is considered fraudulent the completion of activities, proposed to be completed in person in the classroom, which are made from outside the classroom, proceeding according to the Law 3/2022, of February 24, of university coexistence and the disciplinary regulations of the student body of the UDC.

QUALIFICATION AT THE END OF THE EVALUATION PROCESS 1. Those students who meet the minimum requirements and achieve a minimum of 5.0 points will have passed the subject.

2. Those students who do not reach the minimum qualification established in any of the parts of the final exam (1.4 points/part), this will not be included in the final qualification and in addition, after the sum of the qualifications, will only be able to obtain a maximum final qualification of 4.5 points.

The qualification of "Not Presented" will be given to those students who do not take the exams.

Sources of information

Basic	- Paul A. Tipler, Gene Mosca (2011). Física para la ciencia y la tecnología. Reverté - Raymond A. Serway, John W. Jewett (2005). Física para ciencias e ingenierías. Thomson
Complementary	- Santiago Burbano de Ercilla, Enrique Burbano Garcia, Carlos Gracia Muñoz (2006). Física general. Tébar - Santiago Burbano de Ercilla, Enrique Burbano Garcia, Carlos Gracia Muñoz (2006). Problemas de física. Tébar - José María De Juana Sardón (2007). Física General. Volumen 1. Pearson - Marcelo Alonso, Edward J. Finn (2000). Física. Addison-Wesley - Hugh D. Young (2007). Sears & Zemansky college physics. Pearson - Raymond A. Serway, John W. Jewett, Jr. (2014). Physics for scientists and engineers. Brooks/Cole, Cengage Learning - Richard P. Feynman, Robert B. Leighton, Matthew Sands (1975). The Feynman lectures on physics Feynman física. Fondo Educativo Interamericano

Recommendations

Subjects that it is recommended to have taken before



Subjects that are recommended to be taken simultaneously
Fundamentals of Mathematics/610G04001
Subjects that continue the syllabus
Other comments
PREVIOUS KNOWLEDGEA knowledge of high school physics is recommended.FACULTY OF SCIENCE GREEN CAMPUS PROGRAMGreen Campus Program of the Faculty of Science to help achieve a sustainable immediate environment and comply with point 6 of the "Environmental Declaration of the Faculty of Science (2020)", the documentary work to be carried out in this subject will be requested:a) Mostly in virtual format and computer support.b) If on paper:- No plastics will be used.- Double-sided printing shall be used.- Recycled paper shall be used.- Drafts shall be avoided.GENDER PERSPECTIVEAs stated in the transversal competences of the degree (C4), the development of a critical, open and respectful citizenship with diversity in our society will be encouraged, highlighting the equal rights of students without discrimination based on gender or sexual condition.

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.