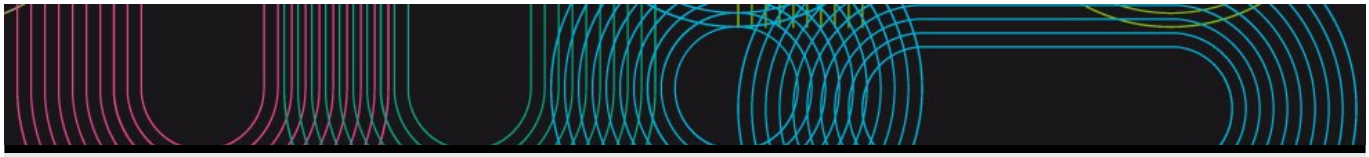

IDENTIFYING DATA				
Physics: Physics I				
Subject	Physics: Physics I			
Code	V10G061V01102			
Study programme	(*)Grao en Ciencias do Mar			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	Spanish Galician English			
Department				
Coordinator	Mato Corzón, Marta María			
Lecturers	Mato Corzón, Marta María Souto Torres, Carlos Alberto Varela Benvenuto, Ramiro Alberto			
E-mail	fammmc@uvigo.es			
Web				
General description	Physics, as a science, deals with the description of matter and its interactions, developing theories in accordance with empirical knowledge. From this definition one can study from the smallest scales (subatomic) to the macroscopic scale, hence the different branches of Physics. Physics is the base of an uncountable number of scientific and technological applications, and in particular for the Sea Sciences student it's a basic tool to understand other theories and subjects in the following years of the grade. The knowledge and application of laws and principles studied in Physics allows the interpretation of the marine enviroment and the development of models related with it. Furthermore, it is important to understand the fundamental physic concepts to understand how the instruments work and to know how to use and control them.			

Competencies	
Code	
A4	Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences
A5	Students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy
B3	Recognize and implement good practices in measurement and experimentation, and work responsibly and safely both in field surveys and in the laboratory.
C4	Know, analyze and interpret the physical properties of the ocean according to current theories, as well as to know the most relevant sampling tools and techniques.
D1	Develop the search, analysis and synthesis of information skills oriented to the identification and resolution of problems.
D2	Acquire the ability to learn autonomously, continuously and collaboratively, organizing and planning tasks over time.

Learning outcomes				
Expected results from this subject	Training and Learning Results			
1. Understand the need of a reference system to describe a movement. Understand the movement and his causes. Identify the different types of movements. Know how graph any observation to.	A4 A5	B3	C4	D1 D2
2. Identify the field of application of classical mechanics. Understand systems of particles and the rigid bodies. Solve mechanical problems using Newton's laws and conservation laws.	A4 A5	B3	C4	D1 D2
3. Understand and use in a quantitative way the concept of energy (non thermal). Recognize the transformations of energy to explain any daily phenomenon. Identify kinetic and potential energy in different situations. Explain and use the conservation of mechanical energy in simple situations. Understand work as a form of energy exchange. Solve problems related with work, power and conservation of mechanical energy. Evaluate the importance of energy saving.	A4 A5	B3	C4	D1 D2
4. Know and understand the basic equations of the kinematics and dynamics of a simple harmonic oscillator, damped harmonic oscillator and driven harmonic oscillator, and the phenomenon of resonance.	A4 A5	B3	C4	D1 D2

5. Know the evolution of the Universe along the history. Know Newton's law of Gravitation, and understand his application to celestial and terrestrial bodies' movements. Understand the relation between the properties of a planet and the weight of a body in his surface.	A4 A5	B3	C4	D1 D2
6. Understand the Earth as a reference system, his movement around the Sun, as well as those of the Moon. Apply that knowledge to explain phenomena like the tides, the different Moon phases, the calendar's stations, etc.	A4 A5	B3	C4	D1 D2
7. To know the basic characteristics of continuous bodies.	A4 A5	B3	C4	D1 D2

Contents

Topic	
1. Kinematics of particles.	1.1. The position vector and the path. Celerity, velocity and acceleration (medium and instantaneous). 1.2. Intrinsic components of acceleration (normal and tangential) and his interpretation. 1.3. Movement of the particle in space. Analysis of different types of movements. 1.4. Change of the reference system. Relative movement. Translation and rotation of the reference axes. Drag velocity and relative velocity. Drag acceleration and relative acceleration
2. Newtonian dynamics.	2.1. Introduction: Dynamics as a part of physics. 2.2. Dynamics of the particle: Dynamic's principles or Newton's laws of motion. Linear momentum. Mechanical impulse. Linear momentum conservation theorem. Angular momentum and his conservation. Central forces. Dynamics of the circular movement. 2.3. Dynamics of systems of particles: Types of systems; internal and external forces. Centre of mass of a system of particles. Movement of a system of particles. Newton's second law for a system of particles. Linear momentum of a system of particles. Principle of conservation of linear momentum of a system of particles and applications. Angular momentum of a system of particles. Conservation of angular momentum in a system of particles. 2.4. Dynamics of the rigid solid: Dynamics of rotation. Momentum of inertia of rigid body. Calculation of momentums of inertia. Steiner's theorem. Kinetic momentum of rotation. Angular impulse. Conservation principle.
3. Work and energy	3.1. The different forms of energy. Definitions of work, power and energy. 3.2. Mechanical, kinetic and potential energy. Theorem of live forces. Conservation mechanical energy. 3.3. Mechanical, kinetic and potential energy of a system of particles. 3.4. Theorem of live forces and conservation of energy for a system of particles. 3.5. Kinetic rotational energy.
4. Simple harmonic motion.	4.1. The simple harmonic motion. Kinematics of the harmonic oscillator. Representation as rotating vectors. 4.2 Dynamics of the harmonic oscillator and his physical interpretation. Energy of a harmonic oscillator. 4.2. The simple pendulum. 4.3. Notion of forced oscillator. Resonance. 4.4. Fourier analysis of the periodic movement.
5. Gravitation. Applications to the Earth.	5.1. Historical evolution. 5.2. Newton's law of Gravitation. 5.3. Gravitational field and potential on Earth. The local gravitational field. 5.4. Movement of the planets and satellites
6. The Earth as a reference system.	6.1. The movements of the Earth in space. The stations. The phases of the Moon. 6.2. Dimensions and terrestrial coordinates. 6.3. The local reference system. Accelerations of inertia. 6.4. The Coriolis acceleration. 6.5. The centrifugal and terrestrial acceleration. The geopotential. 6.6. Newtonian theory of tides. The tidal ellipsoid.
7. Continuous media	7.1. Introduction, qualitative ranking of the material. 7.2. Elasticity and shear deformation. 7.3. The stress tensor.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practical	15	1	16
Lecturing	30	50	80
Seminars	7	25	32
Problem and/or exercise solving	0	15	15
Report of practices, practicum and external practices	0	7	7

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

Methodologies

	Description
Laboratory practical	Realization of different laboratory experiments with which the students will get basic knowledge in the experimental procedure in physics, as well as in the calculation of the error of a measurement. The attendance to the laboratory and the delivery in time and form of the corresponding report is a must for this subject in the year in course.
Lecturing	Exhibition and explanation of the diverse physical concepts and his motivation, of the distinct laws with which relate, as well as the demostration of the required theorems. Resolution of some practical examples to support the theoretical explanations.
Seminars	Resolution of different problems related with the theory, doubts and concepts of difficult understanding. Exercises that the student must solve autonomously will be proposed. The attendance at the seminars and the delivery of the proposed exercises, is mandatory to pass the subject in the current year.

Personalized assistance

Methodologies	Description
Seminars	The teacher will solve any doubts that are presented to the students in solving the problems. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated (Mondays and Tuesdays from 11:00 a.m. to 2:00 p.m.). To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation.
Lecturing	The teacher will solve any doubts that are presented to the students in the lecturing. Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated (Mondays and Tuesdays from 11:00 a.m. to 2:00 p.m.). To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation.
Laboratory practical	The teacher will solve any doubts that are presented to the students in the laboratory about the material used, what is used and how is used correctly, the experimental procedure used, the analysis of results, the necessary computer tools, ... Students willing so could attend personal tutorials to solve doubts and/or uncertainties, which will mainly take place during the timetables indicated (Mondays and Tuesdays from 11:00 a.m. to 2:00 p.m.). To better optimise the procedure, the student is requested to previously contact his/her teacher with reasonable anticipation.

Assessment

	Description	Qualification	Training and Learning Results			
Seminars	It will be a test with problems similar to the ones solved during the seminars' sessions.	10	A4 A5		C4	D1 D2
Problem and/or exercise solving	It will qualify the assimilation of knowledge of the students with a written proof with a diversity of problems related with the theory and seminars.	70	A4 A5		C4	D1 D2
Report of practices, practicum and external practices	It will evaluate the students ability to implement the laboratory procedure, successfully finish the experiments, and elaborate a proper report with all the information required.	20	A4 A5	B3	C4	D1 D2

Other comments on the Evaluation

Date, time and place of exams will be published in the official web of Marien Sciencies Faculty:
http://mar.uvigo.es/index.php/en/alumnado-actual-2/examenes-3

Students are strongly requested to fulfil a honest and responsible behaviour. It is considered completely unacceptable any alteration or fraud (i.e., copy or plagiarism) contributing to modify the level of knowledge and abilities acquired in exams, evaluations, reports or any kind of teacher□s proposed work. Fraudulent behaviour may cause failing the course for a whole academic year. An internal dossier of these activities will be built and, when reoffending, the university rectorate will be asked to open a disciplinary record.

Sources of information

Basic Bibliography

M. Alonso y E.J. Finn, **Física, Vol. 1**, Ed.Addison Wesley Iberoamericana, 2000

R. A. Serway y J. W. Jewett, **Física para Ciencias e Ingeniería**, Ed. Thomson, 2005

P. A. Tipler y G. Mosca, **Física para la Ciencia y la Tecnología, Vol. 1**, Ed.Reverté, 2006

S. Burbano de Ercilla, E. Burbano y C. Gracia, **Problemas de Física**, Ed. Tébar, 2006

Complementary Bibliography

Recommendations

Subjects that continue the syllabus

Physics: Physics II/V10G061V01203

Subjects that are recommended to be taken simultaneously

Statistics/V10G061V01107
Mathematics: Mathematics I/V10G061V01104

Other comments

It is recommended to attend and use the tutorial groups to resolve any questions related to the subject, to clarify the concepts of the theory and to help solving problems. The schedule will be Monday and Tuesday from 11:00 a.m. to 2:00 p.m.

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===
Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

=== ADAPTATION OF THE METHODOLOGIES ===
* Teaching methodologies maintained: ALL

* Teaching methodologies modified: None. All methodologies will be given by telematic means through the use of the utilities integrated in the Remote Campus of the University of Vigo and the FAITIC platform as reinforcement, without prejudice to other measures that can be adopted to guarantee the accessibility of the students to the teaching content.

* Non-attendance mechanisms for student attention (tutoring): The tutoring sessions may be carried out by telematic means (institutional email of the teaching staff involved in the subject available on the website of the Faculty, videoconference using the telematic applications integrated in the Remote Campus of the University of Vigo, forums in FAITIC, ...) under the arrangement of prior appointment.

* Modifications (if applicable) of the contents: Not applicable.

* Additional bibliography to facilitate self-learning: None.

* Other modifications: None.

=== ADAPTATION OF THE TESTS ===
* Tests already carried out: Percentages are maintained.

* Pending tests that are maintained: ALL
* Tests that are modified: NONE
* New tests: NONE

* Additional Information:
The telematic controls, tests and/or exams in the remote campus will be done with audiovisual monitoring of the students. If there are technical or personal impediments that prevent it, the tests will be oral. All tests will be recorded for documentary evidence. This will also happen with exam review sessions.