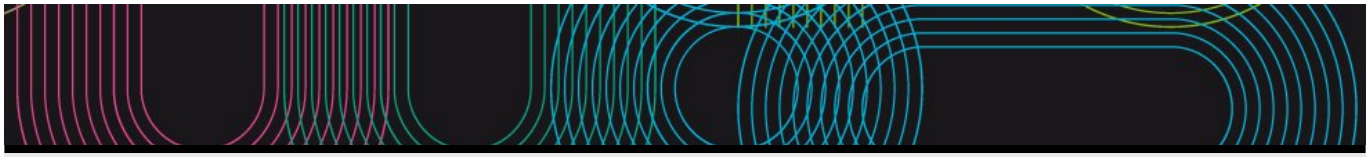

IDENTIFYING DATA				
Physics: Fundamentals of Mechanics and Thermodynamics				
Subject	Physics: Fundamentals of Mechanics and Thermodynamics			
Code	V05G300V01102			
Study programme	(*)Grao en Enxeñaría de Tecnoloxías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Chiussi , Stefano			
Lecturers	Chiussi , Stefano Fernández Doval, Ángel Manuel Fernández Fernández, José Luís Mato Corzón, Marta María Salgueiriño Maceira, Verónica Stefanov , Stefan Val García, Jesús del Vijande López, Javier			
E-mail	schiussi@uvigo.es			
Web	http://faitic.uvigo.es			
General description	Introduction to the basic concepts on the general laws of Mechanics and Thermodynamics as well as to their application to the resolution of problems in engineering.			

Competencies	
Code	
A3	CG3: The knowledge of basic subjects and technologies that capacitates the student to learn new methods and technologies, as well as to give him great versatility to confront and update to new situations
A5	CG5: The knowledge to perform measurements, calculations, assessments, appraisals, technical evaluations, studies, reports, task scheduling and similar work to each specific telecommunication area.
A6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
A12	CE3/FB3: Comprehension and command of basic concepts about the general laws of mechanics, thermodynamics, electromagnetic fields and waves and electromagnetism and their application to solve Engineering problems.

Learning aims	
Expected results from this subject	Training and Learning Results
Understanding and mastering of the basic concepts on the general laws of Mechanics and Thermodynamics as well as of their application to solving problems in engineering.	A12
Knowledge of fundamental and technological subjects which enable the students to learn new methods and technologies, as well as to endue them with versatility to get adapted to new situations.	A3
Knowledge to perform measurements, calculations, assessments, valuations, expert's reports, surveys, reports, task planning and other similar labours into their specific scope of Telecommunications.	A5
Skilfulness to handle specifications, regulations and legally binding standards.	A6

Contents
Topic

1.- Physical magnitudes and units. The International System.	(*)
2.- Vectorial tools for Mechanics.	(*)
3.- Point Kinematics.	(*)
4.- Point Kinetics.	(*)
5.- Point Statics.	(*)
6.- Oscillations.	(*)
7.- Wave motion.	(*)
8.- Zero principle of Thermodynamics. Temperature.	(*)
9.- First principle of Thermodynamics.	(*)
10.- Second principle of Thermodynamics.	(*)
Lab 1.- Measurement instruments. Error and uncertainty. Estimation of uncertainties in direct measurements.	(*)
Lab 2.- Measurement of the reaction time to a given stimulus. Measurement of the gravitational acceleration by means of a pendulum. Estimation of uncertainty in indirect measurements.	(*)
Lab 3.- Verification of Hooke's Law. Linear fit.	(*)
Lab 4.- Longitudinal and transversal standing waves. Measurements by linearization of non-linear relations and linear fit. Graphical representation of measurement results.	(*)
Lab 5.- Simple harmonic motion. Free standing oscillation of a spring. Measurements by linearization of non-linear relations and linear fit. Graphical representation of measurement results.	(*)

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	22	22	44
Case studies / analysis of situations	6	12	18
Troubleshooting and / or exercises	15.5	46.5	62
Laboratory practises	9	13.5	22.5
Multiple choice tests	0.5	0	0.5
Short answer tests	1	0	1
Practical tests, real task execution and / or simulated.	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
Master Session	Prior personal work: -Preliminary reading of the proposed bibliography on the subject. During the lectures: -Presentation of theoretical concepts. -Experimental demonstrations. -Audiovisual presentations. Ulterior personal work: -Revision of theoretical concepts. -Weak-point identification. -Consult the bibliography.
Case studies / analysis of situations	Application of the theoretical concepts to simple cases and situations. During the lectures: -Solving of examples. Ulterior personal work: -Solving of cases and situations from the bibliography. -Identification of weak points which require tutorial aid.
Troubleshooting and / or exercises	Solving of average-difficulty problems involving one or more theoretical concepts. During the lectures: -Presentation of solving strategies and techniques by solving example-problems. Personal work: -Solving of problems from the bibliography. -Identification of weak points which require tutorial aid.

Laboratory practises	Prior personal work: -Preparation of the practical session by studying the corresponding guide and reviewing the theory. During the practical session: -Description of the experiment highlighting which theoretical concepts are involved. -Training on material and instrumentation handling. -Execution of the experiment. -Preliminary result processing. Ulterior personal work: -Processing and analysis of the results. -Weak-point identification. -Consult the bibliography.

Personalized attention

Methodologies	Description
Master Session	- During the practical sessions the lecturers will solve the questions that may arise as the experiments are executed. - The questions related to the theory, its application to the analysis of cases and situations, problem solving, the theory involved in the experiments and the processing of the resulting data, will be solved by the lecturers in their respective tutorial-aid time. - Tutorial aid will be given: = Individually or in small groups (typically of two or three students). = Unless stated otherwise, by appointment to the corresponding lecturer. The appointment will be arranged either by e-mail or in person at the beginning or end of a lecture. = Preferably, in the place and tutorial-aid hours of the corresponding lecturer that will be published in the subject's web page at the beginning of each semester.
Case studies / analysis of situations	- During the practical sessions the lecturers will solve the questions that may arise as the experiments are executed. - The questions related to the theory, its application to the analysis of cases and situations, problem solving, the theory involved in the experiments and the processing of the resulting data, will be solved by the lecturers in their respective tutorial-aid time. - Tutorial aid will be given: = Individually or in small groups (typically of two or three students). = Unless stated otherwise, by appointment to the corresponding lecturer. The appointment will be arranged either by e-mail or in person at the beginning or end of a lecture. = Preferably, in the place and tutorial-aid hours of the corresponding lecturer that will be published in the subject's web page at the beginning of each semester.
Troubleshooting and / or exercises	- During the practical sessions the lecturers will solve the questions that may arise as the experiments are executed. - The questions related to the theory, its application to the analysis of cases and situations, problem solving, the theory involved in the experiments and the processing of the resulting data, will be solved by the lecturers in their respective tutorial-aid time. - Tutorial aid will be given: = Individually or in small groups (typically of two or three students). = Unless stated otherwise, by appointment to the corresponding lecturer. The appointment will be arranged either by e-mail or in person at the beginning or end of a lecture. = Preferably, in the place and tutorial-aid hours of the corresponding lecturer that will be published in the subject's web page at the beginning of each semester.
Laboratory practises	- During the practical sessions the lecturers will solve the questions that may arise as the experiments are executed. - The questions related to the theory, its application to the analysis of cases and situations, problem solving, the theory involved in the experiments and the processing of the resulting data, will be solved by the lecturers in their respective tutorial-aid time. - Tutorial aid will be given: = Individually or in small groups (typically of two or three students). = Unless stated otherwise, by appointment to the corresponding lecturer. The appointment will be arranged either by e-mail or in person at the beginning or end of a lecture. = Preferably, in the place and tutorial-aid hours of the corresponding lecturer that will be published in the subject's web page at the beginning of each semester.

Assessment

	Description	Qualification
Multiple choice tests	Multiple-choice questions about theoretical concepts. Solving of elementary cases and situations related to the topics in both the classroom and laboratory syllabi.	25
Short answer tests	Short answer questions about theoretical concepts. Solving of elementary cases and situations related to the topics in both the classroom and laboratory syllabi.	25
Practical tests, real task execution and / or simulated.	Practical tests: Solving of problems involving one or more theoretical topics. Execution of real and simulated measurements. Real- and simulated-measurement result processing.	50

Other comments on the Evaluation

Following the particular guidelines of this degree, the students taking this subject will be offered two alternative assessment systems: continuous assessment and end-of-semester assessment.

It will be assumed that a student chooses continuous assessment if he or she takes the 3rd test (see below). Once this test is taken, it will be understood that the student has taken the current term's examination call and he or she will be qualified according to the following criterion regardless of whether he or she takes the final test or not.

1)CONTINUOUS ASSESSMENT

Continuous assessment consists of the tests detailed below in this guide which are not retakeable, i.e, if a student is not able to take them in the scheduled date the teaching staff will not be required to repeat them.

The publication date of the marks and the corresponding checking procedure will be given before the tests. As a general rule, the marks of each test will be published before the next one.

The marks obtained in the tests will be only valid for the academic term they have been obtained.

1st test:

a1) Experimental laboratory test comprising the execution of actual measurements and the processing of the results (mark: 0-1 point).

Length: 30 minutes at the end of experimental laboratory session number 3. Its date will appear in the assessment test schedule that the Academic Board of the Degree will approve.

2nd test:

b1) Combined test with multiple-choice and short-answer questions. Questions about theoretical concepts. Solving of elementary cases and situations related to the topics in the classroom syllabus (mark: 0-1 point).

Length: 30 minutes at the end of one of the problem-solving lectures. Its date will appear in the assessment test schedule that the Academic Board of the Degree will approve.

3rd test:

c1) Experimental laboratory test comprising the execution of actual measurements and the processing of the results (mark: 0-1 point).

Length: 30 minutes at the end of experimental laboratory session number 5. Its date will appear in the assessment test schedule that the Academic Board of the Degree will approve.

4th test, continuous assessment final test:

Combined test with:

d1) 8-12 multiple-choice and short-answer questions, (mark: 0-5 points distributed among them)

e1) solving of one or two problems, (mark: 0-3.4 points distributed between them)

f1) solving of a problem comprising the execution of real or simulated measurements and the processing of the results (mark: 0-1.6 points).

Length: 2 hours in the subject's official examination date.

Overall mark calculation.

g1) will be calculated as the sum of the marks obtained in blocks b1), d1) and e1) plus the lowest of 2 points and the sum of blocks a1), c1) and f1)

$g1 = b1 + d1 + e1 + \min\{ 2 , a1 + c1 + f1 \}$

The overall mark will be the lowest of 10 points or g1)

$\text{overall mark} = \min\{ 10, g1 \}$

2) END-OF-SEMESTER ASSESSMENT

Final overall test:

Combined test with:

d2) 8-12 multiple-choice and short-answer questions, (mark: 0-5 points distributed among them)

e2) solving of one or two problems, (mark: 0-3.4 points distributed between them)

f2) solving of a problem comprising the execution of real or simulated measurements and the processing of the results (mark: 0-1.6 points).

Length: 2 hours in the subject's official examination date.

Overall mark calculation:

g2) will be calculated as the sum of the marks obtained in blocks d2), e2) and f2)

g2 = d2 + e2 + f2

The overall mark will be g2)

overall mark = g2

3) JULY RESIT

Makeup exam:

Combined test with:

d3) 8-12 multiple-choice and short-answer questions, (mark: 0-5 points distributed among them)

e3) solving of one or two problems, (mark: 0-3.4 points distributed between them)

f3) solving of a problem comprising the execution of real or simulated measurements and the processing of the results (mark: 0-1.6 points).

Length: 2 hours in the subject's official resit date.

Final mark calculation:

The students who take the July resit will lose the mark of the previous final test and will get a new mark according to the following criteria:

3A) Students who have chosen continuous assessment

g3A) will be calculated as the sum of the marks obtained in blocks b1), d3) and e3) plus the lowest of 2 points and the sum of blocks a1), c1) and f3)

g3A = b1 + d3 + e3 + min{ 2 , a1 + c1 + f3 }

The overall mark will be the lowest of 10 points or g3A)

overall mark = min{ 10, g3A }

3B) Students who have chosen end-of-semester assessment

g3B) will be calculated as the sum of the marks obtained in blocks d3), e3) and f3)

g3B = d3 + e3 + f3

The overall mark will be g3B)

overall mark = g3B

The marks g1), g2), g3A) and g3B) will be considered instead of the corresponding overall marks to assign the "matricula de honor" distinction.

-Distribution of the learning aims of the subject which are assessed within each block:

ASSESSMENT	LEARNING AIMS			
a1			A5	A6
b1	A12	A3		A6
c1			A5	A6
d1, d2, d3	A12	A3		A6
e1, e2, e3	A12			
f1, f2, f3			A5	A6

-Particulars of the learning aims which are assessed:

A12: Understanding of basic concepts on the general laws of Mechanics and Thermodynamics as well as of their application to problem solving.

A3: Knowledge of fundamental subjects which enable the students to learn new methods and technologies, as well as to endue them with versatility to get adapted to new situations.

A5: Knowledge to perform measurements and calculations.

A6: Knowledge and skill to handle specifications of measuring instruments as well as basic standards (SI and ISO80000 parts 1 to 5).

Sources of information

H.D. Young y R.A. Freedman, **Sears-Zemansky. Física Universitaria**, 12,

I.N. Bronshtein, K.A. Semendiaev, **Manual de Matemáticas para Ingenieros y Estudiantes**, 1,

Recommendations

Subjects that continue the syllabus

Fundamentals of Sound and Image/V05G300V01405
Power Electronics/V05G300V01625
Fundamentals of Acoustics Engineering/V05G300V01531

Subjects that are recommended to be taken simultaneously

Mathematics: Linear Algebra/V05G300V01104
Mathematics: Calculus I/V05G300V01105

Other comments

To adequately follow this subject, it is highly advisable to master the contents of high-school subjects on Mathematics and Physics.