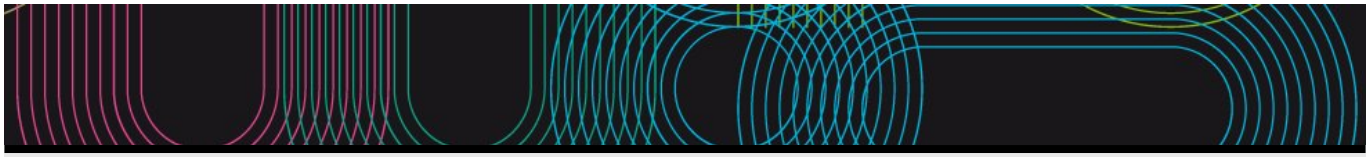

IDENTIFYING DATA				
Physics: Physics I				
Subject	Physics: Physics I			
Code	O07G410V01103			
Study programme	Grado en Ingeniería Aeroespacial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Lorenzo Gonzalez, Maria de las Nieves			
Lecturers	Cabrera Crespo, Alejandro Jacobo Lorenzo Gonzalez, Maria de las Nieves			
E-mail	nlorenzo@uvigo.es			
Web	http://aero.uvigo.es/			
General description	This course will provide the fundamental basis of mechanics, in particular, classical mechanics. Mechanics is the branch of the Physics focused on the study of the behaviour of bodies at rest or moving bodies. During the course of Physics I, the basis of classical mechanics will be studied, which will be extended in the next year in the course of Classical Mechanics. Both basics of the kinematics and the dynamics will be addressed in this Physics I. The kinematics is devoted to study the movement of the bodies, without considering the causes of that movement. That is, the kinematics gives answer to the question of How does a body move?. On the other hand, the dynamics is devoted to study the causes of the movement of the bodies and its evolution. That is, the dynamics, unlike the kinematics, gives answer to the question Why is this body moving? This course is fundamental since the principles of the phenomena related with the behaviour of the bodies (at rest or moving bodies) are based on this course. English Friendly subject: International students may request from the teachers: a) materials and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Skills	
Code	
A1	That the students demonstrate to possess and understand knowledge in an area of study that is part of the general education (second level), and often found at a level that, although based on advanced textbooks, also includes some aspects that involve knowledge from the avant-garde of the field of study
B2	Planning, documentation, project management, calculation and manufacturing in the field of aeronautical engineering (in accordance with what is established in section 5 of order CIN / 308/2009), aerospace vehicles, propulsion systems, aerospace materials, airport infrastructures, air navigation infrastructures and space management, air traffic and transport management systems.
C2	Understanding and mastery of the basic concepts about the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application to solve problems related to engineering.
D1	Capability of analysis, organization and planification.
D3	Capability of oral and written communication in native lenguage
D4	Capability of autonomous learning and information management
D5	Capability to solve problems and draw decisions
D6	Capabiliity for interpersonal communication
D8	Capabiliity for critical and self-critical reasoning

Learning outcomes	
Expected results from this subject	Training and Learning Results

Knowledge and understanding of the basic principles of physics and their application to the analysis and resolution of engineering problems.	A1	C2	D1 D3 D5 D8
Knowledge, understanding and application of the general laws of the Classical Mechanics, with special upsetting in the relative movements, the cinematic and dynamics of the point, the theorems of the quantity of movement and of the moment kinetical, and the cinematic, static and dynamics of the rigid solid.	B2	C2	D4 D5 D6

Contents	
Topic	
1) Basic vectorial Calculus	- Vectors and scalars - Coordinate system
2) Kinematics	- Reference system, trajectories, velocity and acceleration - Rectilinear and curvilinear motion - Tangential and normal accelerations
3) Relative movement	- Translation - Rotation - Components of the acceleration
4) Newton's laws	- Force - Newton's first law: inertia - Newton's second law: weight - Newton's third law: action-reaction - Linear momentum - Angular momentum - Work and energy
5) Particle system	- External and internal forces - Linear impulse. Collisions - Centre of mass. - Linear momentum, angular momentum, work and energy of a particle system
6) Rigid solids	- Concept of rig solid. Centre of mass - Moment of inertia - Translation - Rotation around a fixed axis - Rolling motion
7) Particle statics and rigid solid statics	- General equations of the equilibrium of rigid solid - System of forces - Stability
8) Fluid statics	- Density and hydrostatic pressure - Archimedes' principle - Surface tension. Capillarity

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	32	64	96
Autonomous problem solving	3	6.5	9.5
Research based methodologies	1	4	5
Programmed instruction	0	6	6
Laboratory practical	12	0	12
Essay questions exam	2.5	0	2.5
Report of practices, practicum and external practices	0	5	5
Self-assessment	0	12	12
Problem and/or exercise solving	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	The theory of the course will be presented and it will be applied to solve problems
Autonomous problem solving	The student should solve exercises following some instructions.
Research based methodologies	Improves information processing in specific domains by using scientific research activities.

Programmed instruction	It consists of the presentation of a matter divided into several teaching units, of smaller size, with issues at the end of each teaching unit in order to strengthen the acquired knowledge. These activities can be performed in person or virtually.
Laboratory practical	Tasks related with the contents of the course will be carried out in the laboratory. The realisation of these tasks is mandatory to pass the course

Personalized assistance

Methodologies	Description
Laboratory practical	During the tasks in the laboratory, a personal follow-up will be carried out to guide the students to achieve the objectives
Research based methodologies	Tutoring sessions will be scheduled to solve any doubt of the students

Assessment

	Description	Qualification	Training and Learning Results		
Research based methodologies	Students will present the results of their research. The maximum marks of this part will be 10% of the final total marks.	10			D3 D4 D6
Laboratory practical	In order to pass the course, laboratory tasks should be carried out. Continuous assessment will be used during the realisation of the tasks. The maximum marks of this part will be 10% of the final total marks.	10	A1	C2	D1 D3 D4 D6 D8
Essay questions exam	There will be an exam that include questions and exercises. The maximum marks of this part will be 60% of the final total marks. However, a minimum of 5 over 10 has to be reached in the exam to pass the course.	60		B2 C2	D4 D5
Self-assessment	At the end of each topic, students will be able to answer a multiple-choice questionnaire which may account for up to 10% of the final mark.	10		C2	D6
Problem and/or exercise solving	In the middle of the syllabus there will be a short evaluation test consisting of solving problems and/or questions. This test can count for up to 10% of the final mark. The mark for the developmental exam may be 4 out of 10 to be averaged with the rest of the marks if the student passes the exercise resolution test with at least 50% of the mark.	10		C2	D6

Other comments on the Evaluation

The second chance assessment system is the same as the first chance assessment system, maintaining the grades obtained for research-based methodologies, problem solving and/or exercises and practicals.

Assessment dates:

The exam calendar officially approved by the Xunta de Centro is published on the website:

http://aero.uvigo.es/gl/docencia/exames

The laboratory practicals must have been completed in order to be able to sit the second chance exam.

Students who are unable to attend classes must inform the teacher. In this case, the exam will count for 90% of the mark and the practicals for 10%.

In summary:

Out of the 100% of the mark of the subject we have:

- Exam: up to 60%. It is necessary to get a 5 out of 10 in the exam to pass the subject.

- Self-assessment test: up to 10%.

- Laboratory practicals: up to 10%. It is compulsory to pass the internship in order to pass the subject.

- Research work: up to 10%.

-Evaluation test of problems and/or exercises: up to 10%.

Assessment for students who do not opt for continuous assessment.

- Examination/exams: up to 90%, a minimum of 5 out of 10 must be obtained to pass the course.

- Laboratory practicals: up to 10%. It is compulsory to pass the internship in order to pass the subject.

VERY IMPORTANT:

In order to add up all the percentages, the student must get at least 5 out of 10 in the exam grade. In the case of not getting a 5 in the exam, the grade that will appear in the minutes will be the exam grade. The duration of the final exam will be approximately 2.5 hours.

In the event that the student obtains 50% or more of the mark in the evaluation test of problem solving and/or exercises, he/she will have to obtain at least a 4 out of 10 in the exam mark to be able to add up all the percentages. In the case of not achieving a 4 in the exam, the mark that will appear in the minutes will be the exam mark.

Students who fail at the first opportunity and do not attend class may sit the second opportunity exam covering all the content of the subject, provided that they have completed the laboratory practicals.

In special cases in which, for justified and previously notified reasons, students cannot attend the practicals or take part in the continuous assessment 100% of the mark will correspond to a final exam in which all the competences of the subject will be evaluated.

Final exam: students who choose to take the final exam will be assessed only with the exam (which will be worth 100% of the mark). If they do not attend the exam, or do not pass it, they will be assessed in the same way as the rest of the students".

If plagiarism is detected in any of the tests, the final grade will be SUSPENSED (0) and the fact will be communicated to the management of the Centre for the appropriate effects.

Sources of information

Basic Bibliography

Sears-Zemansky, **Física Universitaria Volumen I**, 12ª, Addison-Wesley, 2009

Alcaraz i Sendra O., López López J., López Solana Vicente, **Física. Problemas y ejercicios resueltos**, 1ª, Pearson Prentice Hall, 2006

Complementary Bibliography

Serway R.A., Jewett J.W., **Física para ciencias e ingeniería**, 7ª, Cengage Learning, 2008

Tipler, Paul Allen, **Física**, 5ª, Reverte, 2003

Ferdinand P. Beer ; E. Russell Johnston, Jr. ; Elíiot R. Eisenberg, **Mecánica vectorial para ingenieros (Estática)**, 8ª, McGraw-Hill Interamericana, 2007

Ferdinand P. Beer ; E. Russell Johnston, Jr. ; Phillip J. Cornwell, **Mecánica vectorial para ingenieros (Dinámica)**, 9ª, McGraw-Hill Interamericana, 2010

Burbano de Ercilla, Santiago, Burbano García, Enrique y Carlos Gracia Muñoz, **Problemas de Física**, 27ª, Tébar, 2006

Hugh D. Young, Roger A. Freedman, **Sears and Zemansky's university physics : with modern physics**, 13ª, Addison-Wesley, 2012

Recommendations

Subjects that continue the syllabus

Physics: Physics II/O07G410V01202

Subjects that are recommended to be taken simultaneously

Mathematics: Linear algebra/O07G410V01102
Mathematics: Calculus I/O07G410V01101