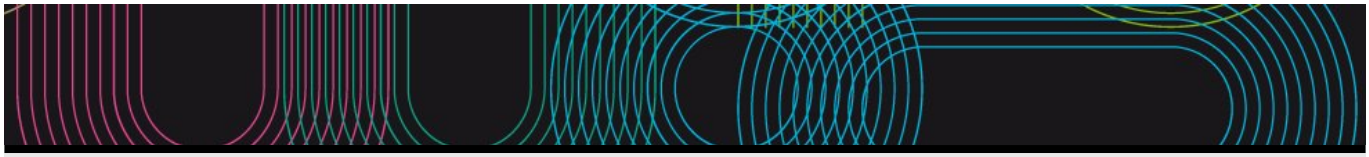

IDENTIFYING DATA				
Physics: Physics I				
Subject	Physics: Physics I			
Code	O07G410V01103			
Study programme	Grado en Ingeniería Aeroespacial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Lorenzo 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.			

Competencies	
Code	
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.
D4	Capability of autonomous learning and information management
D5	Capability to solve problems and draw decisions
D6	Capabiliity for interpersonal communication

Learning outcomes			
Expected results from this subject	Training and Learning Results		
- 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	3.5	4.5	8
Research based methodologies	0.5	3	3.5
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
Problem and/or exercise solving	0	10	10
Presentation	1	6	7

*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. (Optional)	10	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 15% of the final total marks. (Mandatory)	15	C2 D4 D6
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. (Mandatory)	60	B2 C2 D4 D5
Problem and/or exercise solving	The maximum marks of this part will be 15% of the final total marks. (Optional)	15	C2 D6

Other comments on the Evaluation

Assessment system in second call will be the same as explained before. Marks achieved in Laboratory, research based methodologies and Troubleshooting can be saved. Laboratory tasks should have been carried out in order to attend the second call.

Dates of evaluation:
the official dates can be found in
http : //aero.uvigo.es/gl/docencia/exames
Off-site students should notify the situation to the coordinator of the course. In this case the maximum marks of the exam will be 85% of the final total marks and 15% will correspond to laboratory.
In summary:
Assessment of on-site students:
- Exam up to 60% (a minimum of 5 over 10 has to be reached in the exam to pass the course)
- Troubleshooting up to 15%
- Research based methodologies up to 10%
- Laboratory tasks up to 15% (mandatory)

Evaluation for students who do not choose a continuous assessment.

- Exam up to 85% (a minimum of 5 over 10 has to be reached in the exam to pass the course).
- Laboratory tasks up to 15% (mandatory)
VERY IMPORTANT:
A minimum of 5 over 10 has to be reached in the exam to pass the course. In the case that the mark of 5 (over 10) is not reached in the exam, the mark that will appear in the record will be the mark of that exam. The duration of the exam will be approximately 2.5 hours.
Off-site students that do not pass in the first call can attend the assessment in second call by solving one unique exam with questions regarding all contents of the course (whenever they have done the laboratory practices)

In special cases, where for justified and previously notified reasons, the students can not attend the practices, or participate in continuous assessment. The 100% of the evaluation will correspond to a final exam in which all the competences of the course will be evaluated.

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

Contingency plan

Description

The laboratory of physics in modality mist will include face-to-face work in the laboratory and work out of the laboratory covering the total of hours of work of the student defined initially.
Some sessions of the laboratory will substitute by individual exercise owners. That is to say, the professor employing the use of Remote Campus will send all the necessary instructions to explain how to make several practices of physics at home. These instructions will include a list detailed of the material (that it can find home-like spherical objects, rope, chronometer of the mobile, meter or metric strip, etc.) and all the steps for the taking of data, as well as clear indications of the calculations that have to make and how to have to express the final results with his uncertainties.
The number of sessions of the laboratory that will substitute by these home-made practices will have to determine to take into account the norms of security imposed at this moment (distances of security, maximum capacity of people in the laboratories, etc) and the number of students by group (*HC).
The evaluation of the practices (15% of the final note) will base on the work in the laboratory and the delivery of a final memory including methodology, data, and final results.

In the case of the impossibility of realization of face-to-face proofs, these will be made through the telematic platforms of *Faitic.

The tutoring sessions may be carried out by telematic means (email, videoconference, forums FAITIC, ...) under the pre-concerted modality.