



| Teaching Guide | | | | |
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| Identifying Data | | | | 2022/23 |
| Subject (*) | Física I | Code | 770G02003 | |
| Study programme | Grao en Enxeñaría Eléctrica | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Graduate | 1st four-month period | First | Basic training | 6 |
| Language | Spanish | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Física e Ciencias da Terra | | | |
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| Lecturers | Arias Ferreiro, Goretti Montero Rodríguez, María Belén Ramirez Gomez, Maria del Carmen | E-mail | goretti.arias@udc.es belen.montero@udc.es carmen.ramirez@udc.es | |
| Web | | | | |
| General description | The relationship between the subject and the different subjects in the degree is basic, post that provides the elementary concepts to be able to develop and learn about the subject. | | | |

| Study programme competences | |
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| Code | Study programme competences |
| A7 | Comprender e dominar os conceptos básicos sobre as leis xerais da mecánica, termodinámica, campos e ondas e electromagnetismo e a súa aplicación para resolver problemas propios da enxeñaría. |
| B1 | Capacidade de resolver problemas con iniciativa, toma de decisións, creatividade e razoamento crítico. |
| B2 | Capacidade de comunicar e transmitir coñecementos, habilidades e destrezas no campo da enxeñaría industrial. |
| B4 | Capacidade de traballar e aprender de forma autónoma e con iniciativa. |
| B6 | Capacidade de usar adecuadamente os recursos de información e aplicar as tecnoloxías da información e as comunicacións na enxeñaría. |
| C1 | Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma. |
| C3 | Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida. |
| C4 | Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común. |
| C6 | Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. |
| C8 | Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade. |

| Learning outcomes | | | |
|---|--|-----------------------------|----------|
| Learning outcomes | | Study programme competences | |
| The student knows the concepts and fundamental laws of mechanics, fields, waves and their application. | | A7 | C1 |
| Te student analyzes problems that integrate different aspects of physics, recognizing the varied physical fundaments that underlie a technical application, device or real system | | B1 B2 B6 | C4 C6 |
| The student knows the units, the orders of magnitude of the defined physical magnitudes and solves basic engineering problems, expressing the numerical result in the appropriate physical units. | | B1 B6 | |



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|---|----|----------------|----------------|
| The student correctly uses basic methods of experimental measurement or simulation and treats, presents and interprets the obtained data, relating them to the appropriate physical laws and magnitudes. | | B2 B4 B6 | C3 C6 C8 |
| The student correctly applies the fundamental equations of mechanics to various fields of physics and engineering: rigid solid dynamics, oscillations, elasticity, fluids, electromagnetism and waves. | A7 | B1 B4 B6 | C3 C8 |
| The student understands the meaning, utility and relationships between magnitudes, modules and fundamental elastic coefficients used in solids and fluids. | | B1 B6 | |
| The student performs mass and energy balances correctly in fluid movements in the presence of basic devices. | | B1 B4 | C8 |
| The student knows the wave equation, the characteristic parameters of its basic solutions and the energetic aspects of them. Analyze the propagation of mechanical waves in fluids and solids and know the basics of acoustics. | | B1 B6 | C3 C8 |

| Contents | |
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| Topic | Sub-topic |
| The contents of this subject included in the verification memory of the degree are structured in the following eight themes. In this paragraph the correlation between the contents mentioned with the corresponding theme. | Magnitudes, units and dimensions: Theme 1 Kinematics: Theme 2 Particle's static: Theme 6 Particle's dynamics: Theme 3 Dynamic of particles systems: Theme 4 Dynamic of rigid bodies: Theme 5 Fluid mechanics: Theme 8 Mechanical waves: Theme 7 |
| 1.- UNITS, PHYSICAL MAGNITUDES AND DIMENSIONS | 1.1 Physical magnitudes, Standards and Units 1.2 Dimensional analysis 1.3 Vector analysis |
| 2.- PARTICLE'S KINEMATICS | 2.1 Motion representation. Displacement, Time, and Average Velocity. Average and Instantaneous Acceleration 2.2 Motion in one dimension 2.3 Motion in two dimensions |
| 3.- PARTICLE'S DYNAMICS | 3.1 Newton's laws of motion 3.2 Applications of Newton's laws: Particles in Equilibrium. Dynamics of Particles 3.3 Work and Energy 3.4 Conservation of Energy |
| 4.- DYNAMICS OF PARTICLES' SYSTEM | 4.1 Center of Mass 4.2 Momentum and Impulse 4.3 Momentum Conservation 4.4 Collisions |
| 5.- RIGID BODIES DYNAMICS | 5.1 Rotation of Rigid Bodies. Moment-of-Inertia 5.2 Dynamics of rotational motion. Torque and Angular Acceleration for a Rigid Body 5.3 Conservation of Angular Momentum |
| 6.- EQUILIBRIUM AND ELASTICITY | 6.1 Conditions for Equilibrium 6.2 Center of Gravity 6.3 Elasticity |
| 7.- WAVES/ACOUSTICS | 7.1 Periodic Motion. Describing Oscillation 7.2 Mechanical waves. Types, mathematical description 7.3 The sound waves |
| 8.-FLUID MECHANICS | 8.1 Statics of fluids 8.2 Dynamic of Fluids 8.3 Viscous Fluids |



| Planning | | | | |
|--------------------------------|----------------------|----------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies | Ordinary class hours | Student?s personal work hours | Total hours |
| Laboratory practice | A7 B2 B4 B6 C3 C4 C8 | 10 | 10 | 20 |
| Objective test | B1 B2 B6 C1 C4 C6 | 4 | 0 | 4 |
| Guest lecture / keynote speech | A7 C3 | 30 | 30 | 60 |
| Multiple-choice questions | A7 B1 B4 C3 C6 | 1 | 2 | 3 |
| Problem solving | A7 B1 C3 C6 | 20 | 40 | 60 |
| Personalized attention | | 3 | 0 | 3 |

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

| Methodologies | |
|--------------------------------|---|
| Methodologies | Description |
| Laboratory practice | Compulsory analysis in the laboratory. Results presentation. The sessions will be face to face and online. |
| Objective test | Two objective written tests based on the contents of the subject will be made. The first about items 1-4 in November and the second about the items 5-8 in January. |
| Guest lecture / keynote speech | Oral presentation of basic concepts for understanding the subject. The agenda that appears in Step 3: Contents of this Guide is followed. |
| Multiple-choice questions | Multiple-choice test will be proposed to students about theoretical concepts of the matter. |
| Problem solving | Reading of the proposed statements. Interpretation, formulation and resolution using the available mathematical tools. Analysis of the obtained result. |

| Personalized attention | |
|---|---|
| Methodologies | Description |
| Laboratory practice Problem solving Multiple-choice questions | The laboratory practices are compulsory to overcome the subject. The student´s will develop the proposed practices. The whole time they will have the follow-up of the teacher. During problem solution sessions, some typical problems will be solved in the classroom, selected from among the previously delivered bulletins. For students with part-time dedication and academic assistance, the most appropriate methodologies will be taken into account for the specific needs required by each student. |

| Assessment | | | |
|---------------------------|----------------------|--|---------------|
| Methodologies | Competencies | Description | Qualification |
| Laboratory practice | A7 B2 B4 B6 C3 C4 C8 | They are compulsory. The understanding of the laboratory work and the report presented of the same and other proposed related works will be valued. There will be face-to-face and online sessions. | 10 |
| Objective test | B1 B2 B6 C1 C4 C6 | Two objective tests will be carried out. The first will take place in November and will cover topics 1-4 and the second will take place in January and will cover topics 5-8. Each test will have a rating of 30% over 100%. | 60 |
| Multiple-choice questions | A7 B1 B4 C3 C6 | Multiple-choice test will be proposed about theoretical concepts that the student must solve in the expository teaching classes. | 30 |

| Assessment comments |
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Incoming students:

For a student to be evaluated, it must be taken into account that class attendance is mandatory. There exceptional cases must be documented.

The laboratory practice are mandatory to pass the subject.

It is mandatory to reach a qualification of 33% in each of the objective tests and in the multiple-choice questions section to pass the subject.

The students with grades of "not presented" are those who did not show up for the objective test.

Students with part-time dedication:

The criteria and evaluation activities for the first opportunity will depend on the amount of dedication to said part-time. The students, who for justified reasons (employment, illness, ...) do not perform the continuous evaluation, the objective test in person represents 90% of the score. The remaining 10% corresponds to the score of the laboratory practices, which are obligatory. An student who have not made the laboratory practice will not be able to pass the subject.

Repeating students:

The repeating students who had have done the laboratory practice the last academic year, will be able to choose between taking the laboratory practices again and being evaluated, or not doing them and keeping the laboratory score of this previous course. It will represent the 10% of the final qualification.

Second opportunity:

The whole subject (topics 1-8) will be evaluated and it will have a value of 60% of the final qualification.

Qualifications obtained for Laboratory practice and Multiple-choice questions will be maintained.

In general, the delivery of written documentary works will preferably be done in virtual format and / or computer support. If this is not possible, recycled paper, double-sided printing will be used preferably and prints of drafts and the use of plastics will be avoided.

Sources of information

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| Basic | <ul style="list-style-type: none"> - M. Alonso y F.J. Finn (). Física. Ed. Addison - Wesley Iberoamericano - P.A. Tipler y G. Mosca (). Física para la Ciencia y la Tecnología . Ed. Reverté - F.W. Sears, M.W. Zemansky, H.D. Young y R.A. Freeman (). Física Universitaria . Addison-Wesley Iberoamericana Libro |
| Complementary | <ul style="list-style-type: none"> - R.A. Serway (). Física . Ed. Mc. Graw ? Hill /Ed. Thomson - O. Alcaraz, J. López, V. López (). Física. Problemas y ejercicios resueltos . Ed. Pearson-Prentice Hall - F.A. González (). La Física en Problemas. Ed. Tebar Flores - S. Burbano, E. Burbano, C. Gracia (). Problemas de Física. Ed. Tébar S.L. |

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Cálculo/770G02001

Subjects that continue the syllabus

Física II/770G02007

Mecánica de Fluidos/770G02016

Other comments

(*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.