UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2022/23
Subject (*)	Physics II		Code	730G03009
Study programme	Grao en Enxeñaría Mecánica			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	First	Basic training	6
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Naval e Industrial			
Coordinador	Tobar Vidal, María José	E-mail	maria.jose.tobar@udc.es	
Lecturers	Saavedra Otero, Emilio	E-mail	emilio.saavedra@udc.es	
	Tobar Vidal, María José		maria.jose.tobar@udc.es	
Web				
General description	General laws of thermodynamics and electromagnetism, and their application in the resolution of engineering problems.			

Study programme competences	
Code	Study programme competences
A2	FB2 - Comprensión e dominio dos conceptos básicos sobre as leis xerais da mecánica, termodinámica, campos e ondas e electromagnetismo e a súa aplicación para a resolución de problemas propios da enxeñaría.
B1	CB01 - Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita encontrarse a un nivel que, aínda que se apoia en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo
B2	CB02 - Que os estudantes saiban aplicar os seus coñecementos ao seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo
B3	CB03 - Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitiren xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética
B6	B3 - Ser capaz de concibir, deseñar ou poñer en práctica e adoptar un proceso substancial de investigación con rigor científico para resolver calquera problema formulado, así como de comunicar as súas conclusións ?e os coñecementos e razóns últimas que as sustentan? a un público tanto especializados como leigo dun xeito claro e sen ambigüidades
B7	B5 - Ser capaz de realizar unha análise crítica, avaliación e síntese de ideas novas e complexas
B8	B7 - Deseñar e realizar investigacións en ámbitos novos ou pouco coñecidos, con aplicación de técnicas de investigación (con metodoloxías tanto cuantitativas como cualitativas) en distintos contextos (ámbito público ou privado, con equipos homoxéneos ou multidisciplinares etc.) para identificar problemas e necesidades
B9	B8 - Adquirir unha formación metodolóxica que garanta o desenvolvemento de proxectos de investigación (de carácter cuantitativo e/ou cualitativo) cunha finalidade estratéxica e que contribúan a situarnos na vangarda do coñecemento
C1	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.
C5	C7 - Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.

Learning outcomes	
Learning outcomes	Study programme competences

Understand and master the basic concepts about the general laws of thermodynamics, fields and waves and electromagnetism and its application for the resolution of engineering problems	A2	B1 B2 B3 B6 B7 B8 B9	C1 C5

Contents	
Topic	**Sub-topic**
The following sections develop the contents established in the "Memoria de Verificación"	Principles of Thermodynamics. Fundamentals of processes and thermal machines. Electric and magnetic field. Electromagnetism. Maxwell's equations
THERMODYNAMICS	UNIT 1. Thermal properties of matter. UNIT 2. Zero principle of thermodynamics UNIT 3. Heat and work. First Law of thermodynamics. UNIT 4. Heat transfer processes. UNIT 5. Transformations in thermodynamic systems. Applications of the first principle. UNIT 6. Reversibility of processes. Second principle of thermodynamics.
ELECTROMAGNESTISM	UNIT 7. Electric field UNIT 8. Electric potential UNIT 9. Electrostatic applications UNIT 10. Electric current UNIT 11. Magnetostatic. Forces on moving charges. UNIT 12. Magnetic fields generated by currents. UNIT 13. Magnetic properties of matter. UNIT 14. Electromagnetic induction. UNIT 15. Alternating current circuits. UNIT 16. Maxwell's equations.

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A2 B1 B2 B3 C1 C5	26	41.6	67.6
Problem solving	B2 B6 B7 B8 B9 C1	22	26.4	48.4
Laboratory practice	B6 B8 B9 C1	8	12	20
Mixed objective/subjective test	A2 B1 B2 B3 B6 B7 B8	4	6	10
Personalized attention		4	0	4
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Guest lecture / keynote speech	Lecturing about main concepts of the subject.
Problem solving	Resolution of proposed problem asignements
Laboratory practice	3 practices + 1 exam must be completed in 8 hours, with delivering of reports.

Mixed objective/subjective test	In continuous assesment: intermediate exam with partial content (1/3 approximately) and final exam of the rest (2/3) of contents of the subject. It will consist of a theoretical part and another of problem solving. Alternatively: Final exam with all the content of the subject. It will consist of a theoretical part and another of problem solving

Personalized attention	
Methodologies	**Description**
Laboratory practice	Discussion about the different aspects of the subject: theory, problems, lab assigments. In the case of academic exemption, the student can solve doubts during tutoring time in the same way as the rest of the students.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Laboratory practice	B6 B8 B9 C1	Mandatory: No unexcused absences.	10
Mixed objective/subjective test	A2 B1 B2 B3 B6 B7 B8	Theory accounts for 40% and problems for 60% of the total points obtained.	90

Assessment comments
Two objetive tests, partial and final will be held. Both will be celebrated according to exam dates approved by the School Board. They consist of theory and practice (problems) with a maximum duration of 4 hours. Partial test will cover contents revised up to the date of the exam. Points obtained will account for the 30% of the overall mark. Final test will cover all the contens of the subject. It will represent 90% of the overall mark for students which have not attended the partial exam. Those who have attended may be examined of the remaining part. The points obtained will represent 60& of the overall mark. Alternatively, they may choose to be examined of the whole subject material in order to raise their partial mark. On second opportunity, examination will cover the whole contents. Partial results and laboratory practice will preserve their validity as in first opportunity. Assistance to laboratory practise is mandatory and to be done in first year enrolment. Points obtained will be kept for 3 consecutive courses. No unexcused absences allowed. Student must attend 3 laboratory practices and a final (individual) examination Part-time students as defined by "Norma que regula o réxime de dedicación ao estudo dos estudantes de grao na UDC" must inform the coordinator professor. Assesment will be perfomed on the same basis as that of full-time students. Exemption of class attendance will not be applied to Laboratory practices, which must be attended on scheduled days including the final examination.

Sources of information	
Basic	- Francis W. Sears, Mark. W. Zemansky (2009). Física universitaria. Addison-Wesley - Giancoli, Douglas C. (2009). Física para ciencias e ingeniería. Pearson educación - Giancoli, Douglas C. (2002). Física para universitarios. Pearson Educación - Serway, Raymond A. (2008). Física : para ciencias e ingenierías. Cengage Learning - Paul A. Tipler, Gene Mosca. (2011). Física para la ciencia y la tecnología. Reverté - Alcaraz i Sendra, Olga (2006). Física : problemas y ejercicios resueltos. Pearson - Burbano de Ercilla, Santiago (1991). Física General: problemas. Mira Editores - M. R. Fernández, J. A. Fidalgo (1994). 1000 Problemas de física general. Everest, Madrid - Oliver Pina, Ramón (1987). Problemas de física: resueltos y explicados. ETSII , Madrid
Complementary	- Zemanski, Dittman (). Calor y Termodinámica. McGraw-Hill - Roald K. Wangsness (). Campos Electromagnéticos. Limusa - Francis Sears, Gerhard Salinger (). Termodinámica, Teoría Cinética y Termodinámica Estadística. Reverté

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Calculus /730G03001 Physics I /730G03003 Linear Algebra/730G03006
Subjects that continue the syllabus
Fundamentals of Electricity/730G03012 Thermodynamics /730G03014 Fundamentals of Electronic Circuits/730G03016 Industrial Heat Transfer/730G03020
Other comments
1. The delivery of the documentary works for this subject:1.1. Will be requested in virtual format and / or computer support.1.2. Will be done through Moodle, in digital format avoiding the need of printing.1.3. If made on paper:-Do not use plastics.-Double sided printing will be made. -Recycled paper will be used.-The printing of drafts will be avoided. 2. Sustainable use of resources and prevention of harm to the natural environment must be observed.

(*)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.