30107 - Physics II

Información del Plan Docente

Academic Year	2017/18
Faculty / School	175 - Escuela Universitaria Politécnica de La Almunia 179 - Centro Universitario de la Defensa - Zaragoza
Degree	425 - Bachelor's Degree in Industrial Organisational Engineering 457 - Bachelor's Degree in Industrial Organisational Engineering 563 - Bachelor's Degree in Industrial Organisational Engineering
ECTS	6.0
Year	1
Semester	Second semester
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

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The learning process that is designed for this subject is based on the following:
The subject consists of 6 ECTS credits, which represents 150 hours of student work on the subject during the semester. 40% of this work (60 h .) Will take place in the classroom, and the rest will be autonomous . One semester consist of 15 teaching weeks . To make the timing is used to measure the school week , in which the student must devote to the study of the subject 10 hours.

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This is a general physics course on electromagnetism and optics. It provides students with background knowledge about the physical laws relevant for solving problems in engineering, in particular those related to wave motion, electrostatic, magnetism or optics. Previous knowledge on vector field analysis and calculus is a fundamental prerequisite. Overall, Physics II helps to develop technical skills necessary to overcome some of the subjects in higher courses like Fundamentals of Electrical Engineering and Fundamentals of Electronics.

This course provides the basis of scientific and technological knowledge and application of scientific method. Therefore, the activities and methodology are oriented to the development of thinking skills, analysis and synthesis, problem solving of engineering problems about the matter, and introduction to experimental procedures.

5.2.Learning tasks

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The program includes the following activities:

- Theoretical classes: theoretical activities so fundamentally expository given by the teacher .
- Practical classes: practical discussion activities and conducting exercises conducted in the classroom and requiring high student participation.
- Laboratory Practice : Practical activities in laboratories.
- Group tutorials .
- individual tutoring .

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Classroom teaching: involves lectures, solving problems and laboratory sessions.

Individual work: involves activities such as homework provided by the teacher, lab reports...

Office hours for assistance : either individually or in small groups of students.

5.3.Syllabus

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The program of the subject includes six topics:
I. Electrostics fiel
II. Capacity, dielectrics and electric currenet
III. Margnetic field
IV. electromagnetic field: Maxwell's equations

V. wave motion

VI Optics

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1 Mechanical waves.

1.1 Wave equation.

1.2 Speed of elastic waves.

1.3 Properties of acoustic waves.

1.4 Superposition, interference and beating.

1.5 Doppler's effect.

2 Electrostatics.

2.1 Charge and electric Field (Coulomb's law).

2.2 Gauss's law.

2.3 Electric potential.

2.4 Electrostatics with conductors.

2.5 Capacitance.

2.6 Dielectrics.

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3 Electric circuits.

3.1 Ohm's law.

3.2 Resistance and resistivity.

3.3 Steady-state direct current circuits with batteries and resistors only.

3.4 Electromotive force.

4 Magnetic fields.

4.1 Lorentz's force.

4.2 Biot-Savart's law.

4.3 Forces on current-carrying wires in magnetic fields.

4.4 Ampère's law.

5 Electromagnetic induction.

5.1 Faraday's law and Lenz's law.

5.2 Ampère-Maxwell's law.

5.3 Maxwell's equations of electromagnetism.

6 Electromagnetic waves.

6.1 Wave equation and properties of electromagnetic waves.

6.2 Poynting's vector and energy density.

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7 Optics.

7.1 Reflection, refraction. Snell's law.

7.2 Optical elements.

5.4.Course planning and calendar

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Planning for weeks about the subject is as follows:

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Topic	I	I	I	II	II	II	II	III	III	III	IV	IV	IV	R	
Exams			1º					2º						3º	

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Timetabled activities will be available on Moodle platform at the beginning of term at http://moodle.unizar.es

To check the school calendar and timetable visit http://cud.unizar.es/calendarios

5.5.Bibliography and recommended resources

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Resources:

Students will have the Moodle virtual platform where you will find notes, powerponit slides , corollary of exercise, laboratoy practices manuals and any other material.

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BB	Burbano de Ercilla, Santiago. Física general. Tomo 1, Estática, cinemática y dinámica / Santiago Burbano de Ercilla, Enrique Burbano García, Carlos Gracia Muñoz. - 32ª ed. Madrid: Tébar, D.L. 2006.
BB	Tipler, Paul A.. Física para la ciencia y la tecnología. Vol. 1, Mecánica, oscilaciones y ondas, Termodinámica / Paul A. Tipler, Gene Mosca ; [versión española por Albert Bramón Planas [et al.]. - 5ª ed., reimp. Barcelona : Reverté, imp. 2006.
BB	Tipler, Paul A.. Física para la ciencia y la tecnología. Vol. 2, Electricidad y magnetismo, luz / Paul A. Tipler, Gene Mosca ; [coordinador y traductor José Casas-Vázquez ; traductores Albert Bramon Planas ... et al.]. - 6ª ed. Barcelona : Reverté, D.L. 2010
BC	Burbano de Ercilla, Santiago. Problemas de Física / Santiago Burbano de Ercilla, Enrique Burbano García, Carlos Gracia Muñoz . - 27ª ed., [reimp.] Madrid : Tébar, D. L. 2007.
BC	Resnick, Robert. Física / Robert Resnick, David Halliday, Kenneth S. Krane. - 4ª ed. México: Compañía Editorial Continental, 2002.
BC	Serway, Raymond A. Física para ciencias e ingenierías con física moderna / Raymond A. Serway, John W. Jewett, Jr.; traducción, Víctor Campos Olguín; revisión técnica, Misael Flores Rosas. - 7ª ed. México [etc.]: Cengage Learning, imp. 2008.

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Resources:

Class materials will be available on Moodle platform at the beginning of term at http://moodle.unizar.es

Bibliography:

- Colección de problemas resueltos de Física II : ondas, electromagnetismo y óptica geométrica / Laura Cañadillas

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Delgado, Julia Herrero Albillos ... [et al.] . 1ª ed. Zaragoza : Centro Universitario de la Defensa, 2014.

- Física universitaria / Francis W. Sears ... [et al.] ; contribución de los autores, A. Lewis Ford ; traducción, Roberto Escalona García ; revisión técnica, Jorge Lomas Treviño ... [et al.] . - 11ª ed. México : Pearson Educación, cop. 2004.

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BC Alonso, Marcelo. Física / Marcelo Alonso, Edward J. Finn ; versión en español de Homero Flores Samaniego. Wilmington, [USA] : Addison-Wesley Iberoamericana, cop. 1995.

- Serway, Raymond A. Física para ciencias e ingeniería / Raymond A. Serway, John W. Jewett, Jr. ; traducción, Víctor Campos Olguín ; revisión técnica, Misael Flores Rosas . - México [etc.] : Cengage Learning, imp. 2008.

- W. Bauer y G. D. Westfall. Física para ingeniería y ciencias McGraw-Hill, 2011