30107 - Physics II

Información del Plan Docente

Academic Year	2018/19
Subject	30107 - Physics II
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.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

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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 critical thinking, analysis and synthesis. A wide range of teaching and learning tasks are implemented, such as theory sessions, laboratory sessions and assignments.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course sillabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

4.2.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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This is a 6 ECTS course organized as follows:

- **Lectures.** Lecture notes and a set of problems (and their corresponding solutions) will be available for the students. At the end of each topic, some of the problems will be solved in class by the teacher and the rest will be done individually.
- **Laboratory sessions.** Two-hour sessions that take place in the Physics Lab. Students are provided in advance with task guidelines for each session.
- **Autonomous work:** involves activities such as homework provided by the teacher, lab reports...
- **Office hours for assistance**: either individually or in small groups of students.

4.3.Syllabus

30107 - Physics II

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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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The course will address the following topics:

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.

30107 - Physics II

2.5 Capacitance.

2.6 Dielectrics.

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.

30107 - Physics II

6.2 Poynting's vector and energy density.

7 Optics.

7.1 Reflection, refraction. Snell's law.

7.2 Optical elements.

4.4.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	I	II	II	II	II	III	III	III	IV	IV	IV	R
Exams				1º					2º					3º	

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Provisional course planning:

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Topic	1	1	1	2	2	2	2	3	4	4	5	5	6	7	R

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Moodle platform http://moodle.unizar.es

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

4.5.Bibliography and recommended resources

30107 - Physics II

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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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Resources:

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