29906 - Physics II

Información del Plan Docente

Academic Year	2018/19
Subject	29906 - Physics II
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	435 - Bachelor's Degree in Chemical Engineering
ECTS	6.0
Year	1
Semester	Half-yearly
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

The learning methodology for Physics II will include:

Onsite activities: Lectures, open discussions, problems solving, case assessments and laboratory practicals.

Offsite activities: Readings and before-class study of the documents supplied by the instructor, study of theory and problem solving. Preparation of laboratory reports and solved problems.

4.2.Learning tasks

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Introductory readings (20 offsite hours).

Before working in the classroom the different topics, the student will be supplied with related document material. After reading and observing this material, the student will answer simple questionnaires in approximately five minutes.

Lectures (30 onsite hours).

In this activity the concepts and contents of the subject together with their interconnections will be presented. Exercises to facilitate their comprehension will be carried out.

Laboratory practicals (12 onsite hours).

Laboratory practicals will be carried out by subgroups of one or two students. Since the beginning of the course, complete instructions of the practicals, including their theoretical foundations and practical guidelines, will be available. An instructor, introducing the practicals, supervising their execution and controlling the fulfilment of the security regulations will be present all the time.

Before each laboratory session, the student must have read the corresponding instructions. After the session the student will work on a report presenting clearly the performed measurements, interpreting the results and the possible incidents, and answering with accuracy to the questions required.

Problem solving and case assessment (15 onsite hours).

Along the semester, the student will receive instructions in order to solve in a continuous and progressive manner a collection of problems and practical cases selected from a repository available with sufficient advance. Weekly one-hour sessions will allow the students to present, exchange and analyse their findings, eventually attaining the correct results. Along these sessions solved written exercises will be collected.

Study and personal work (70 offsite work).

The student is required to carry out in a continuous and regular way along the whole semester a personal effort on the study of the theoretical foundations of the subject and their application to specific problem solving and case assessment.

Guided assignments (offsite).

Along the semester, the instructor will propose and supervise small voluntary assignments, with no repercussions on the final grade, but useful to the student in order to attain a better comprehension of the subject.

Tutorials (onsite).

The student may contact the instructor to ask questions and pose problems on the subject. To this end specific and published timings will be available.

Evaluation. (3 onsite hours).

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The final exam will consist of a written answer for a maximum of 3 hours to a set of problems and theory-practice exercises and a test covering the different topics and aspects of the subject learning. An additional exam of about 2 hours will be available for those students that had not attended the laboratory sessions or had not presented the corresponding reports.

4.3.Syllabus

Physics II - Electric, Magnetic and Electromagnetic Fields and Waves

Part I Electric fields and potentials

Field theory: Fields and field sources

Electric fields in vacuum: Coulomb's Law

Electric field Flux: Gauss's Law

Electric potential and electric potential energy

Electric fields in conductors and conductor's surroundings

Capacity and electric potential energy

Electric fields on dielectrics

Part II Currents and electric Resistance

Electric charge motions and electric currents: Ohm's and Joule's Laws

Direct current -DC- Circuits: Kirchhoff's rules

Part III Magnetic fields

Magnetic forces and induction field B: Lorentz's Law

Magnetic field sources: Biot -Savart's and Ampere's Laws

Effects of the magnetic fields on materials

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Part IV Induction and electromagnetic fields

Faraday's law of induction and Lenz's Law

Inductance and Magnetic field energy

Alternating Currents -AC- Circuits

Maxwell's Equations and Electromagnetic waves

Part V Undulatory motion and wave propagation

Kinematics of undulatory motions: Doppler effects

Generation of mechanical waves in solids and fluids: Acoustics

Wave propagation- Reflection and transmission- Snell's Law

Wave interference and diffraction phenomena

4.4.Course planning and calendar

The schedule of the course will be defined by the EINA in the academic calendar of the corresponding academic year. This calendar is available in the EINA web site.

4.5.Bibliography and recommended resources