29906 - Physics II

Información del Plan Docente

Academic Year	2017/18
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.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

The learning methodology for Physics II will include:

Introductory readings. It is recommended that before each subject, the student reads a short introductory text (4/5 pages) to refresh previous basic concepts and to introduce, in some way, new ones.

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Lectures . Twice a week, a lecturer will introduce the theoretical framework of each subject and develop the more relevant concepts. Besides, the use and relevance of these concepts in different technologies are pointed out.

Laboratory practicals. Laboratory practicals have been designed to help the student get acquainted with the use of different measuring systems, emphasizing the experimental character of Physics, the use of SI units and the evaluation of the experimental errors involved, Moreover, an initiation to data analysis and the discussion of the theoretical-experimental comparisons is intended.

Small group workshops. For every subject, exercises will be proposed in advanced, which help students practice the concepts and applications introduced in the lectures. Every week the students will share and discuss with their mates in reduced groups the solutions of those exercises.

Personal Work. The continuous and constant work of the student throughout the semester is of great relevance because of the structure of the subject Electricity, Magnetism, Electromagnetism and Waves, where new concepts are based on previous ones introduced a few classes before.

Tutorial Work. Each lecturer has scheduled hours (six per weak) for the attendance to help students in their personal work, in particular to clarify concepts or ask about solving exercises and producing the practicals reports.

Evaluation. All the students have to sit a final written examination of a maximum of there hours. It will consist in solving a set of six exercises covering all the syllabus. In addition, students who have not attended or handed in all the practicals reports have to pass a laboratory skills evaluation of a maximum of two hours. The learning activities as small group workshops, questionnaires of introductory readings and practicals report will also be evaluated and their contribution to the final mark will not be above 40%.

5.2.Learning tasks

Introductory readings. Introductory texts to the subjects to be explained in the classroom will be available in the online learning platform. After reading (in Spanish), the student is encouraged to answer an online 5-items/5 minutes simple questionnaire. Reading and questionnaire are to be carried out before the corresponding class.

Lectures . The course syllabus is divided in 20 lessons and, from the first day, a full repository of pdf files of these lessons and exercises are available for the students. These lectures are given as one hour classes, twice a week.

Laboratory practicals. Seven laboratory practicals have been designed, which will be done by the students in six two-hour sessions. The required manuals to do the practicals are available on the OLP. Students will be distributed in laboratory

groups of a maximum of 15 students. During the sessions, a teacher will help solve technical problems and will make sure that health of safety regulations are followed. Before each practical class the student is encouraged to read the corresponding manual and answer a 5-items/ 5 minutes simple questionnaire. After the practical, the student should present a report (4 to 5 pages) with the analysis of the results and answers to questions.

Small group workshops. Throughout the semester the student will be proposed to solve sets of problems and practical cases chosen from a large on-line collection. Weekly, in one-hour sessions in small groups, the students should present, correct and discuss the results on the blackboard and give a copy on the homemade work to the lecturer that supervises the session.

5.3.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

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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

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

5.4.Course planning and calendar

5.5.Bibliography and recommended resources

Básica:
1.- P. A. Tipler y G. Mosca. Física para la ciencia y la tecnología. Vol. 1, Mecánica , oscilaciones y ondas, termodinámica - 6ª ed. Barcelona : Reverté, D.L. 2010.
2.- P. A. Tipler y G. Mosca. Física para la ciencia y la tecnología. Vol. 2, Electricidad y magnetismo, luz - 6ª ed. Barcelona : Reverté, D.L. 2010.
3.- H. D. Young y R. A. Freedman. Física universitaria. Volumen 1 y 2. 12ª ed. México [etc.] : Pearson Education, 2009.
Complementaria:
1.- M. Alonso y J. Finn. Física . México : Addison-Wesley Iberoamericana, cop. 2000.
2.- D. Halliday y J. W. Resnick. Fundamentos de física. Vol., 1 y 2 . 8ª ed.,. México : Grupo Editorial Patria, 2011.
3.- R. Feynman, R. B. Leighton y M. Sands. Física. Vol. II, Electromagnetismo y materia. 2ª ed. México : S.A. Alhambra Mexicana. 1998.
4.- R. Feynman, R. B. Leighton y M. Sands. Física. Vol. I, Mecánica, radiación y calor. 2ª ed. México : S.A. Alhambra

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Mexicana. 1998.