Universidad Zaragoza

Year : 2019/20

29906 - Physics II

Syllabus Information

Academic Year: 2019/20
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: 435-First semester o Second semester
107-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)

The assessment of the course will be of global nature and will include the following activities:

Assessment activities during the teaching period:

Assistance and completion of laboratory practicals (A). The student must attend all the practical sessions on the dates assigned to him. If for justified reasons the student has not been able to attend any of the sessions, it may exceptionally be recovered in a special laboratory session at the end of the teaching period.

Reports of laboratory practicals (B). The student will present a report of each practical with the experimental results and the analysis of the data, answering the proposed questions. The student who has not attended all the sessions, or not delivered all the reports, or who has not obtained a grade equal to or higher than 4.0 out of 10, must necessarily concur, in order to pass the subject, to the test of evaluation of laboratory practices on the date scheduled by the center for the official call.

Questionnaires of basic theoretical aspects (C). At the end of each chapter, the student will respond to a brief questionnaire about basic concepts, for which the learning management system can be used.

Participation in problem sessions (D). The attendance and participation of the student will be valued, as well as the resolution of small written exercises that will be delivered within the session.

Assessment activities on the dates scheduled by the center for Official Calls:

Theoretical-practical final exam (E). This will consist of a theoretical-practical written exam of approximately three hours. To pass the course, the grade obtained in this exam must be equal to or higher than 4.0 out of 10.

Final examination of laboratory practicals (F). Only those students who have not met the necessary minima to pass activity B will attend this test. It will consist of a practical laboratory exam, lasting about two hours, in which the oral presentation, supported by a script, including the results obtained and their analysis will be evaluated. In the same way as for activity B, to pass the subject, the grade obtained in this exam must be equal to or higher than 4.0 out of 10.

Calculation of the final grade:

For those students who have regularly attended the evaluation activities during the teaching period and, in particular, have fulfilled condition A, the final grade of the course will be calculated based on the following percentage contributions: B = 20%; C = 10%; D = 10%; E = 60%

Those students who have NOT regularly attended the assessment activities during the teaching period, or if it is quantitatively favorable, may benefit from the computation of the final grade based on the following percentage contributions: B = 20% (alternately F = 20%); E = 80%

If during the development of the practical exam, which will be supervised by the instructor, the student has not complied with the safety standards in the laboratory, endangering the personal integrity or that of the available equipment, the exam will be interrupted immediately assigning the final grade of fail.

In those cases in which the student obtains the qualitative grade of fail due to non-compliance with any of the restrictions mentioned above, the quantitative grade will take into consideration the rest of the evaluation activities, not exceeding in any case the final grade of 4.0 .

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

The course includes the following learning tasks:

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. At the end of each chapter, the students will answer simple questionnaires in the classroom in approximately ten minutes.

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 with these sessions solved written exercises will be collected.

Study and personal work (90 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).

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

The course will address the following topics:

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

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