Universidad Zaragoza

Year : 2019/20

25206 - Physical foundations of the environment

Syllabus Information

Academic Year: 2019/20
Subject: 25206 - Physical foundations of the environment
Faculty / School: 201 -

Degree: 571 - Degree in Environmental Sciences

ECTS: 6.0
Year: 1
Semester: Second Four-month period
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 methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, problem-solving, laboratory sessions, assignments, autonomous work and study, group work and exams.

4.2.Learning tasks

This 6 ECTS course (150 hours) is organized as follows:

- **Lectures**. They include the explanation of the theory as well as problem-solving.
- **Laboratory sessions**. They include the presentation of the report elaborated from the results obtained.
- **Assignment**. It consists on the elaboration of an assignment related to some environmental aspects of the subject.

4.3.Syllabus

This course will address the following topics:

Lectures

Section I: Physics of Fluids

- Topic 1: Fluid Statics
- Topic 2: Fluid Dynamics

Section II: Thermodynamics

- Topic 3: Temperature and Heat
- Topic 4: First law of Thermodynamics
- Topic 5: Second law of Thermodynamics

Section III: Waves

- Topic 6: Harmonic Oscillator
- Topic 7: Ondulatory Movement

Section IV: Electromagnetism

- Topic 8: Electrostatics
- Topic 9: Electrokinetics
- Topic 10: Magnetism
- Topic 11: Electromagnetic Induction
- Topic 12: Alternating currents
- Topic 13: Electromagnetic waves

Laboratory sessions

- Exercise 1.- Mechanics of solids and fluids
    a. Expansion of solids.
    b. Solving/checking the basic equation of fluid statics and the Archimedes' principle. Measuring the density of a cylinder.
    c. Measurement of average speed of fluids using the continuity equation.
    d. Proving Bernoulli's Principle.
    e. Measuring speeds in turbulent liquids.
- Exercise 2.- Calorific Energy
    a. Determining the heat capacity of a calorimeter.
    b. Determining the specific heat (capacity) of liquids.
    c. Determining the specific heat (capacity) of solids.
- Exercise 3.- Harmonic oscillator: The simple pendulum
    a. Determining the period and the acceleration of gravity.
    b. Study of the variation of the period of a simple pendulum with length.
    c. Determining the period of a simple pendulum for large oscillations.
- Exercise 4.- Ohm's Law. Association of Resistors.
    a. Resistant measurement and the calculation of error.
    b. Graphic representation of Ohm's Law.
    c. Determining the voltage distribution in a series circuit.
    d. Determining current and power distributions in a parallel series circuit.
- Exercise 5- Charging and discharging a capacitor in an RC series circuit
    a. Varying the intensity and voltage according to timing
    b. Determining the relaxation time of a circuit

4.4.Course planning and calendar

Information concerning the timetable, office hours, assessment dates and other details regarding this course will be provided by the teacher on the first days of class.

4.5.Bibliography and recommended resources

BB Burbano de Ercilla, Santiago. Física general / Santiago Burbano de Ercilla, Enrique Burbano García, Carlos Gracia Muñoz . 32ª ed. Madrid : Tébar, D.L. 2003

BB Burbano de Ercilla, Santiago. Problemas de física general / Santiago Burbano de Ercilla , Enrique Burbano García, Carlos Gracia Muñoz. 26ª ed. Zaragoza : Mira Editores, D.L.1994

BB Español Garrigós, Pep. Bases físicas del medio ambiente / Pep Español, Javier García Sanz, Ignacio Zúñiga . 1ª reimp. Madrid : UNED, 2004 (reimp.2005)

BB Jaque Rechea, Francisco. Bases de la Física Medioambiental / Francisco Jaque e Íñigo Aguirre de Cárcer . Barcelona : Ariel , 2002

BB Problemas y cuestiones de física / Atanasio Lleó...[et.al] . Madrid [etc] : Mundi-Prensa, 2002

BC 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

BC Gettys, W. Edward. Física para ciencias e ingeniería / W. Edward Gettys, Frederick J. Keller, Malcolm J. Skove ; traducción, Luis Arizmendi López, José A. García Sole, Carlos E. Zaldo Luezas ; revisión técnica, Ángel Hernández Fernández, Sergio Saldaña Sánchez, María del Carmen Enriqueta Hano Roa. 2a ed. México : McGraw Hill Interamericana, cop. 2005

BC González, Félix A.. La física en problemas / Félix A. González . Nueva ed. actualizada Madrid : Tébar Flores, D.L. 2000

BC Serway, Raymond A. Física para ciencias e ingeniería / Raymond A. Serway, Robert J. Beichner . 5ª ed. México [etc.] : McGraw-Hill, cop. 2002

BC Smith, C. (2001). Environmental physics. London: Routledge

BC Spiegel, Murray R.. Manual de fórmulas y tablas matemáticas : 2400 fórmulas y 60 tablas / Murray R. Spiegel ; traducción y adaptación Orlando Guerrero Ribero . [1a ed. en español, reimp.] Madrid [etc] : McGraw-Hill, imp. 2003

BC Tipler, Paul A.. Física para la ciencia y la tecnología. Vol. 1, Mecánica , oscilaciones y ondas, termodinámica / 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 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

The updated recommended bibliography can be consulted in:
http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=25206&Identificador=C70900