

25206 - Physical foundations of the environment

Información del Plan Docente

Academic Year	2017/18
Faculty / School	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences 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.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 process used in this subject is based on the following methodology:

- Autonomous work of the student, especially regarding the study and comprehension of the theoretical concepts.
- Working into groups, including three or four students, to develop practical aspects of the subject.

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5.2.Learning tasks

The learning process designed for this subject is based on the following activities:

- Theoretical sessions, including exposure of the theory and problems resolution.
- Laboratory sessions, that include the presentation of the report elaborated from the results obtained.
- Making of a work related with some environmental aspects of the subject.

5.3.Syllabus

THEORY

Section I: Physics of Fluids

Unit 1: Fluid Statics

Unit 2: Fluid Dynamics

Section II: Thermodynamics

Unit 3: Temperature and Heat

Unit 4: First law of Thermodynamics

Unit 5: Second law of Thermodynamics

Section III: Waves

Unit 6: Harmonic Oscillator

Unit 7: Ondulatory Movement

Section IV: Electromagnetism

Unit 8: Electrostatics

Unit 9: Electrokinetics

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Unit 10: Magnetism

Unit 11: Electromagnetic Induction

Unit 12: Alternating currents

Unit 13: Electromagnetic waves

OUTLINE OF LABORATORY PRACTICALS

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.

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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

5.4.Course planning and calendar

The estimated amount of work that the student must dedicate to this subject is about 150 h (6 ECTS), during 15 weeks, including holidays.

5.5.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

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- 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 Riberó . [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?id=10969>