Universidad Zaragoza

Academic Year/course: 2021/22

28901 - Physics I

Syllabus Information

Academic Year: 2021/22
Subject: 28901 - Physics I
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 583 - Degree in Rural and Agri-Food Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject Type: Basic Education
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process used in this subject is based on the following methodology:

- **Interactive exposition** combining an expositive and a demonstrative method. All the contents explained in the theory classroom will be complemented by the problem-solving. It offers students opportunities to test their ideas and opinions against the ideas and opinions of their peers.
- **Cooperative working** in the laboratory sessions.
- **Autonomous work** of the student, especially regarding the study and comprehension of the theoretical concepts and problem-solving.

4.2. Learning tasks

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

- **Lectures**, including exposure of the theory and **problems resolution**. Students will have the content of each lecture as well as the collection of numerical exercises at the beginning of each session. One of the purposes of Physics I is to set the foundations needed for later courses, which have a more direct connection to the Sustainable Development Goals (SDG), particularly targets 6.4 (By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity) and 9.4 (By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities).
- **Laboratory sessions,** that include the presentation of the report elaborated from the results obtained. These laboratory sessions will take 2 hours, approximately every 15 days. Students will have the content before the session, which includes the practical procedure and the theoretical contents.

- **Individualized tutoring** will monitor the learning process development.

4.3. Syllabus

The course will address the following topics:

- UNIT I: STATICS
  - Topic I.1. Introduction to vector calculation.
  - Topic I.2 Introduction to Mechanics.
  - Topic I.3 Statics of the particle. Equilibrium of the rigid solid.
  - Topic I.4. Shared forces: centres of gravity and moments of inertia of areas.
  - Topic I.5. Analysis of structures.
  - Topic I.6. Dry friction.
- UNIT II: DYNAMICS
  - Topic II.1. Kinematics of particles.
  - Topic II.2. Kinetics of particles. Method of the energy of moments.
  - Topic II.3. Dynamics of rotation of the rigid solid.
- UNIT III: MECHANICS OF SOLIDS AND FLUIDS
  - Topic III.1. Elasticity.
  - Topic III.2. Statics of fluids.
  - Topic III.3. Dynamics of fluids.

Programme of practicals

- Practical 1.- Statics
- Practical 2.- The simple pendulum and the torsion pendulum
- Practical 3.- Elasticity: Hooke?s Law and Young?s modulus
- Practical 4.- Measurement of densities and viscosities
- Practical 5.- Physical properties of liquids

4.4. Course planning and calendar

It is estimated that an average student should devote to this subject, 6 ECTS, a total of 150 hours. This time must include both classroom and non-attendance activities. The student must ensure that the dedication is distributed evenly throughout the semester.

Type activity / Week	1	2	3 (1)	4	5	6 (2)	7	8	9	10 (3)	11	12	13	14	15	16	17	18 (4-5)	19	20	21	Total
Synchronous activities																						*60*
Theory	2	2	2	2		4	2	2	2	2	2	2		2	2							28
Problems	2	2	2	2		2		2	2	2	2			2								20
Lab sessions			2				2			2		2			2							10
Assessment									2													2
Non-synchronous activities																						*90*
Individual work	4	4	2	3,5	6	2,5	4	2,5	2	2	2,5	4	4	4	4	4,5	6	6	6	6	3	82,5
Group work				1,5				1,5			1,5		1,5			1,5						7,5
TOTAL	8	8	8	9	6	8,5	8	8	8	8	8	8	5,5	8	8	6	6	6	6	6	3	150

(1) Friday October 1st will have a Monday-schedule

(2) Friday 22nd October will have Tuesday-schedule

(3) Thursday 18th November will have Monday-schedule

(4) Monday 10th January will have Friday-schedule

(5) Tuesday 11th January will have Friday-schedule

4.5. Bibliography and recommended resources

BB Beer, Ferdinand P. Mecánica vectorial para ingenieros. Dinámica / Ferdinand P. Beer, E. Russell Johnston, jr., Phillip J. Cornwell ; revisión técnica, Miguel Ángel Ríos Sánchez, Felipe de Jesús Hidalgo Cavazos. 9ª ed. México D.F. : McGraw-Hill/Interamericana, cop. 2010

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 Burbano de Ercilla, Santiago. Problemas de física general. Tomo 1/ Santiago Burbano de Ercilla, Enrique Burbano García, Carlos Gracia Muñoz. 27ª ed. Madrid : Tebar, 2006

BB Burbano de Ercilla, Santiago. Problemas de física general. Tomo 2/ Santiago Burbano de Ercilla, Enrique Burbano García, Carlos Gracia Muñoz. 27ª ed. Madrid : Tebar, 2006

BB 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

BB Mecánica vectorial para ingenieros. Estática / Ferdinand P. Beer ... [et al.] ; revisión técnica, Javier León Cárdenas, Hidalgo Cavazos. 9ª ed. México D.F. : McGraw-Hill/Interamericana, cop. 2010

BB Meriam, J.L. Mecánica para ingenieros. [Volumen I], Estática / J.L. Meriam, L.G. Kraige. 3a. ed. en español. Barcelona [etc.] : Reverté, cop. 1998

BB Meriam, J.L. Mecánica para ingenieros. [Volumen II], Dinámica / J.L. Meriam, L.G. Kraige. 3ª ed. en español. Barcelona [etc.] : Reverté, D.L. 1998

BB TIPLER, P. A. et al.Física para la ciencia y la tecnología: Apéndices y respuestas. 6ª ed., 1ª reimp. [s. l.]: Reverté, 2011. ISBN 9788429144277.

BB 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 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 Lleó Morilla, Atanasio. Física para ingenieros / Atanasio Lleó. Madrid : Mundi-Prensa, 2001

BC Nelson, E.W. Mecánica vectorial : estática y dinámica / E.W. Nelson, Charles L. Best, W.G. McLean ; traducción y revisión técnica, Mª Rosa Dalmau, José Vilardell. Madrid [etc.] : McGraw-Hill/Interamericana, 2004

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

LISTADO DE URLs:

Física con ordenador. Curso Interactivo de Física en Internet
[http://www.sc.ehu.es/sbweb/fisica/default.htm]

Franco, A. (2015). Física para las energías renovables. Nuevo curso interactivo. Universidad del País Vasco
http://www.sc.ehu.es/sbweb/fisica3/
[http://www.sc.ehu.es/sbweb/fisica3/]

García, L.I. (2015). FisquiWeb. Espacio web dedicado a la enseñanza de la Física y de la Química. Dpto. De Física y Química del IES Juan A. Suanzes
[http://fisquiweb.es/]

Recopilación clasificada de enlaces de física en Internet
[http://www.galeon.com/filoesp/ciencia/fisica/index.htm]

The updated recommended bibliography can be consulted in:
http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28901