

Course guide 220009 - F2 - Physics II

Last modified: 02/04/2024

Unit in charge: Teaching unit:	Terrassa School of Industrial, Aerospace and Audiovisual Engineering 748 - FIS - Department of Physics.
Degree:	BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject). BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).
Academic year: 2024	FCTS Credits: 6.0 Languages: Catalan

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LECTURER	
Coordinating lecturer:	Carles Serrat Jurado
Others:	AMADOR ALVAREZ JIMENEZ JUAN GANCIO VAZQUEZ NACHO LOPEZ MANRESA IACOPO TORRE

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. Understanding and mastery of basic concepts about the general laws of mechanics, thermodynamics and electromagnetism fields and waves and their application to solving problems in engineering.

Basic:

CB01-GREVA. (ENG) Que els/les estudiants hagin demostrat posseir i comprendre coneixements en una àrea d'estudi que parteix de la base de l'educació secundària general i se sol trobar a un nivell que, malgrat recolzar-se en llibres de text avançats, inclou també alguns aspectes que impliquen coneixements provinents de la vanguardia del seu camp d'estudi.

TEACHING METHODOLOGY

The directed learning consists of several processes. At first, it is necessary to consider the theory classes which develop in a big group. The teaching staffs introduce, in a brief way, general objectives of the chapter. Later, it is attempted to involve students with exercises for their active participation. The material of this part is in ATENEA: objectives, concepts, examples, evaluated programmed activities and bibliography. In second place, resolution of exercises, which develop in medium groups, are carried out. People work in reduced groups doing problems and exercises related with the objectives of the subject. This is an opportunity to develop transversal competences of work in team and to introduce, for the first time, concepts of cooperative learning. In last place, laboratory practices allow to develop basic concepts of methodology, objectives, experimental material, results and conclusions. Also it is a way to know the scientific method for the resolution of technological challenges. These practices are made in groups small, teams of two persons. Students have to prepare some part of work out of the laboratory classroom. This work could be individual or in group. Finally, it is necessary to stand out a time dedicated to autonomous learning dedicated to recommended readings and exercises proposed.

LEARNING OBJECTIVES OF THE SUBJECT

If the Physics I course provides an understanding and domain of basic principles of Physics in its Mechanics aspect, the Physics II course will extend this domain to Oscillations, Waves and Thermodynamics.

On overcoming the subject, students will have acquired:

Understanding and mastery of kinematics and dynamics of the oscillations of particles as well as of solids.

Understanding and mastery of wave phenomena.

Understanding and mastery of the concepts of Temperature and Heat, and their applications in Thermodynamics.



STUDY LOAD

Туре	Hours	Percentage
Hours small group	14,0	9.33
Hours large group	32,0	21.33
Hours medium group	14,0	9.33
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

1. Oscillations
Description: Simple harmonic motion (SHM). Examples. Damped oscillations. Forced oscillations. Superposition of SHMs.
Related activities: (ENG) 1,2,3,4,6,7,8
Full-or-part-time: 44h Theory classes: 10h Practical classes: 4h Laboratory classes: 4h Self study : 26h

2. Waves

Description:

General introduction to wave motion. Physical description of some waves. Wave propagation. Superposition of waves. Acústica.

Related activities: (ENG) 1,2,3,4,5,6,7,8

Full-or-part-time: 71h Theory classes: 14h Practical classes: 7h Laboratory classes: 6h Self study : 44h



3. Thermodynamics

Description: Temperature. Heat and changes of phase (or state). First law of Thermodynamics. Second law of Thermodynamics.

Related activities: (ENG) 1,2,3,5,6,7,8

Full-or-part-time: 35h Theory classes: 8h Practical classes: 3h Laboratory classes: 4h Self study : 20h

ACTIVITIES

ACTIVITY 1: THEORY SESSIONS

Full-or-part-time: 78h Theory classes: 28h Self study: 50h

ACTIVITY 2: PRACTICAL SESSIONS

Full-or-part-time: 37h Practical classes: 14h Self study: 23h

ACTIVITY 3: LABORATORY

Full-or-part-time: 26h Laboratory classes: 12h Self study: 14h

ACTIVITY 4: FIRST EVALUATION TEST

Full-or-part-time: 2h Theory classes: 2h

ACTIVITY 5: SECOND EVALUATION TEST

Full-or-part-time: 2h Theory classes: 2h



ACTIVITY 6: LABORATORY EVALUATION TEST

Full-or-part-time: 2h Laboratory classes: 2h

ACTIVITY 7: ATENEA EVALUATION TEST

Full-or-part-time: 3h Self study: 3h

ACTIVITY 8: DELIVERING WORKS

Full-or-part-time: 8h Self study: 8h

GRADING SYSTEM

The final grade is the weighted sum of the various grades.

- If the final exam has chosen the modality of the Second Partial (explained in Activity 5): Final Grade = 0.32 * N1A + 0.43 * N2A + 0.15 * NL + 0.10 * NAC

- If the final exam has chosen the modality of the Global Exam (explained in Activity 5): -If the Global Examination grade, NEG, is greater than the grade of the First Partial, N1A: Final Grade = 0.32 * NEG + 0.43 * NEG + 0.15 * NL + 0.10 * NAC-If the Global Examination grade, NEG, is smaller than the grade of the First Partial, N1A: Final Grade = 0.32 * N1A + 0.43 * NEG + 0.15 * NL + 0.10 * NAC

N1A: First Partial score (activity 4)N2A: Second Partial score (activity 5);NEG: Global Exam grade (activity 5);NL: grade of the laboratory (activity 6);NAC: continuous evaluation grade (activity 7);

EXAMINATION RULES.

BIBLIOGRAPHY

Basic:

- Calaf, Jaume. Oscil·lacions: teoria i problemes [on line]. Barcelona: Iniciativa Digital Politècnica, 2012 [Consultation: 19/05/2020]. Available on: <u>http://hdl.handle.net/2099.3/36604</u>. ISBN 9788476539101.

- Tipler, Paul Allen [et al.]. Física para la ciencia y la tecnología, vol. 1 [on line]. 6a ed. Barcelona: Reverté, 2010 [Consultation: 17/06/2022]. Available on:

https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=10372.

Complementary:

- Serway, Raymond A [et al.]. Física. 3a ed. Madrid: International Thomson, 2003. ISBN 8497321685.



RESOURCES

Hyperlink:

- Apunts de l'assignatura a Atenea. <u>http://atenea.upc.edu/moodle</u>- Controls i notes en Aransa. <u>http://aransa.upc.es</u>- Física con ordenador (Ángel Franco García). <u>http://www.ehu.es</u>