

Course guide

220088 - F2 - Physics II

Last modified: 19/04/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 748 - FIS - Department of Physics.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: - JAUME CALAF ZAYAS

Others: CRINA MARIA COJOCARU - CARLES SERRAT JURADO - JAUME CALAF ZAYAS

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CE02-INDUS. Understanding and mastery of the basic concepts of the general laws of mechanics, thermodynamics, fields and waves, and electromagnetism and their application to the resolution of engineering problems. (Basic training module)

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, classes of problems, 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 different work as recommended readings and exercises proposed.

LEARNING OBJECTIVES OF THE SUBJECT

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

On overcoming the subject, students will have acquired:

Understanding and domain of cinematic and dynamics of the oscillatory movements, of particles as well as of solids.

Understanding and domain the wavy phenomena.

Understanding and domain the concepts and applications of the Temperature, Heat and Thermodynamics.

STUDY LOAD

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



Total learning time: 150 h

CONTENTS

1. Oscillations

Description:

(ENG) Moviments harmònics simples (MHS). Exemples.
Oscil·lacions amortides.
Oscil·lacions forçades.
Superposició de MHS.

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:

(ENG) Introducció general a les Ones.
Descripció física d'algunes ones.
Propagació de les ones.
Superposició d'ones.
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:

(ENG) Temperatura.
Calor i canvis d'estat.
Primer principi de la Termodinàmica.
Segon Principi de la Termodinàmica.

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

ACTIVITAT 5:

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

EXAMINATION RULES.

All the activities are compulsory.

BIBLIOGRAPHY

Basic:

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

Complementary:

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

RESOURCES

Hyperlink:

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