1. OVERVIEW

Subject area	Physics I
Degree	Bachelor's Degree in Industrial Organisation Engineering
School/Faculty	Faculty of Science, Engineering and Design
Year	Second
ECTS	6 ECTS
Type	Core
Language(s)	Spanish
Delivery Mode	On campus and Online
Semester	Second semester
Academic Year	2022/2023

2. INTRODUCTION

Fundamentals of Physics I is one of the basic subjects in the Degree in Engineering teaching syllabus at the Universidad Europea. This subject introduces students to basic concepts of classical physics and electromagnetism.

Students will learn about the historical evolution of physics and fundamental concepts such as the principles of thermodynamics and electromagnetic and mechanical waves.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

- CB1 - Students have shown their knowledge and understanding of a study area originating from general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB4 - Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT02 - Independent learning: skills for choosing strategies to search, analyse, evaluate and manage information from different sources, as well as to independently learn and put into practice what has been learnt.
- CT03 - Teamwork: ability to integrate and collaborate actively with other people, areas and/or organisations to reach common goals.

- CT04 - Written/spoken communication: ability to communicate and gather information, ideas, opinions and viewpoints to understand and be able to act, spoken through words or gestures or written through words and/or graphic elements.
- CT05 - Analysis and problem-solving: be able to critically assess information, break down complex situations, identify patterns and consider different alternatives, approaches and perspectives in order to find the best solutions and effective negotiations.
- CT06 - Adapting to change: be able to accept, consider and integrate different perspectives, adapting your own approach as required by the situation at hand, and to work effectively in ambiguous situations.

Specific skills (CE, by the acronym in Spanish):

- CE02 - Ability to solve physics-related problems in engineering using basic knowledge of the general rules of mechanics, thermodynamics, fields and waves, and electromagnetism.

Learning outcomes (RA, by the acronym in Spanish):

- RA1 - Effectively solve physics-related problems in engineering projects, be they related to mechanics, thermodynamics or electromagnetism.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes (RA, by the acronym in Spanish)
CB1, CB4, CT2, CT3, CT4, CT5, CT6, CE02	RA1

4. CONTENTS

Physical systems

- Scalar and vector magnitudes.

Kinematics

- Kinematics and motion composition.

Dynamics

- Newton's laws.
- Mass-point geometry.
- Statics of rigid bodies.
- Dynamics of rigid bodies.
- Fluid statics.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Master Lecture: presentations by the professor using the appropriate technological tools to facilitate understanding of the subject matter.
- Collaborative learning: students learn to work with other people (colleagues and professors) to find creative, comprehensive and constructive solutions to questions and problems that arise from the given case studies, using relevant knowledge and available resources in relation to each subject.
- Problem-based learning: students face problems they must solve either working as a team or independently.
- Project-based activities: more independent tasks (individual or in groups), involving search for information, written summaries, debates and public defence of work.
- Learning based on laboratory work (laboratory, workshop and simulation environments)
- Gamification

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On Campus/online:

Learning activity	Number of hours
Master lectures and practical seminars	27
Problem-solving	11.5
Case studies and field studies	7.5
Laboratory work	21
Debates and discussions	8
Independent working	62
Learning contract	2
Tutorials	9
Knowledge tests	2
TOTAL	**150**

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
On Campus tests to evaluate objectives of theory/practical learning (exam-type objective tests, written compositions, oral presentations, case studies/problem solving, debates, simulation tests)	50%
Off-site tests to assess theory/practical learning (case studies/problem-solving)	30%
Attitude assessment tests (attitude assessment rubrics, class participation)	10%
Self- and co-assessment	10%

Online:

Assessment system	Weighting
On Campus tests to evaluate objectives of theory/practical learning (exam-type objective tests, written compositions, oral presentations, case studies/problem solving, debates, simulation tests)	60%
Off-site tests to assess theory/practical learning (case studies/problem-solving)	30%
Attitude assessment tests (attitude assessment rubrics, class participation)	5%
Self- and co-assessment	5%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference publication to accompany this subject area is:

- Walter Savitch, A Course in Classical Physics 1 - Mechanics (Undergraduate Lecture Notes in Physics) (Springer 2016).
- Karaoglu, Bekir, Classical Physics, A Two-Semester Coursebook (Springer 2020)
- Victor Ilisie, Lectures in Classical Mechanics. With Solved Problems and Execises, (Springer 2020)

- Paul Allen Tipler, Gene Mosca, Física para la ciencia y la tecnología, Vol. 1: Mecánica, oscilaciones y ondas, termodinámica, 6ª Edicion (2010)
- Paul Allen Tipler, Gene Mosca, Física para la ciencia y la tecnología, Vol. 2: Electricidad y magnetismo / Luz, 6ª Edicion (2010)

The recommended bibliography is indicated below:

- Paul Allen Tipler, Gene Mosca, Física para la ciencia y la tecnología, Vol. 1: Mecánica, oscilaciones y ondas, termodinámica, 6ª Edicion (2010)
- Paul Allen Tipler, Gene Mosca, Física para la ciencia y la tecnología, Vol. 2: Electricidad y magnetismo / Luz, 6ª Edicion (2010)