Universidad Europea

Feb. 2023

1. BASIC INFORMATION

Course	Physical Foundations of Engineering II
Degree program	Degree in Aerospace Engineering in Aircraft
School	Architecture, Engineering and Design (STEAM School)
Year	1
ECTS	6 ECTS
Credit type	Degree Requirement
Language(s)	Spanish and English
Delivery mode	Campus based
Semester	2
Academic year	2023-2024
Coordinating professor	José Manuel López López
Professor	José Manuel López López

2. PRESENTATION

The basic subject "Physics" is made up of two courses: Physical Foundations of Engineering I & II. They both together provide a solid foundation in the fundamental aspects of classical applied Physics. While the first-term course focuses on Mechanics; this second-term course covers mainly electric and magnetic phenomena. Additional topics include oscillations, waves, and an introduction to physical fields. The course is focused so that the student incorporates the scientific method into their way of working, always according to the “Project Based School” model, the hallmark of our School.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- **CB01** - That students have demonstrated that they possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of your field of study.
- **CB02** - That students know how to apply their knowledge to their work or vocation in a professional way and possess the competencies that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.
- **CB03** - That students have the ability to gather and interpret relevant data (usually within their study area) to make judgments that include a reflection on relevant social, scientific or ethical issues.
- **CB04** – That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.
- **CB05** - That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

Cross-curricular competencies:

- **CT12** - Knowledge of basic subjects and technologies, which enables them to learn new methods, theories and technologies, as well as giving them great versatility to adapt to new situations (Autonomous learning).
- **CT14** - Solve problems with initiative, decision-making, creativity, and critical reasoning, in a professional way, and defend arguments (Problem solving).
- **CT16** - Communicate and transmit information, ideas, abilities and skills in the field of their specialization, whether in writing or orally, both to a specialized and non-specialized audience (Communication skills).

Specific competencies:

- **CE02** - Understanding and mastery of the basic concepts on the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application to solve engineering problems.

Learning outcomes:

- **RA01** - Solve applied physics problems.
- **RA02** - Produce structured and rigorous engineering reports (based on laboratory practices).

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB01, CB02, CB03, CB05, CT14, CT16, CE02	RA01
CB03, CB04, CB05, CT12, CT16, CE02	RA02

4. CONTENT

The contents of the subject cover three fields of classical physics:

- Introduction to Field theory
- Electrostatics and Magnetostatics in vacuum and material media
- Fundamentals of Waves

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Survey of objectives and interests
- Master class
- Laboratory practices
- Group research or group problem solving
- Field experiences, conferences, visits to companies and institutions

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Learning activity	Number of hours
Lectures / masterclasses	25 hours
Laboratory and integrative group work	55 hours
Self-study	50 hours
Tutorials, academic monitoring and evaluation	20 hours
TOTAL	**150 hours**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Assessment system	Weight
Exams and tests	35%
Essays, articles and reports	25%
Alternative assessment techniques	20%
Field experiences, conferences and other happening events	10%
Soft skills	10%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must meet all of the following requirements:

- Obtain at least a grade larger or equal 5 in a scale up to 10 marks in the final weighted average.
- Obtain at least a grade larger or equal 4 in a scale up to 10 marks in the final exam.

In the event that any of the above requirements are not met, the final grade may not exceed 4.0 points - failure.

7.2. Second exam period

The requirements to pass the course in the second exam period are the same as in the first exam period: a final weighed average of at least 5/10 and a grade in the final exam of at least 4/10. Otherwise, the final grade may not exceed 4/10 – failure.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

8. SCHEDULE

The deadlines for the assessable activities in the course are shown in the following table:

Assessable activity	Deadline
Final exam	last weeks of the course (17-18)
Research project defense	week 12-15
Alternative assessment techniques	at the end of each topic

9. BIBLIOGRAPHY

The main reference work for this subject is:

- Young H.D., Freedman R.A., Sears F.W. and Zemansky M.W. "University Physics, Vols. 1 & 2" 14th edition (2019), Ed. Pearson.
- Tipler P.A. and Mosca G., "Physics for Scientists and Engineers", 6th edition (2010), Ed. W.H. Freeman.
- Sears F.W. et al., "University Physics, Vol. 1 & 2", (2004) Ed. Addison-Wesley Longman.

10. DIVERSITY MANAGEMENT UNIT

Students with specific learning support needs:

Curricular adaptations and adjustments for students with specific learning support needs, in order to guarantee equal opportunities, will be overseen by the Diversity Management Unit (UAD: Unidad de Atención a la Diversidad).

It is compulsory for this Unit to issue a curricular adaptation/adjustment report, and therefore students with specific learning support needs should contact the Unit at unidad.diversidad@universidadeuropea.es at the beginning of each semester.

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the "surveys" section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.