1. BASIC INFORMATION

Course	Mechanical Physics
Degree program	Barchelor in Mechanical Engineering
School	STEAM
Year	First
ECTS	6
Credit type	Basic
Language(s)	English
Delivery mode	Face to face
Semester	First semester
Academic year	25-26
Coordinating professor	Rafael Escalera Rivas

2. PRESENTATION

The basic matter "Physics" is made up of two subjects: "Mechanical Physics" and "Integrative Project: Electromagnetic Physics" which, together, provide a solid foundation in the fundamental aspects of classical General Physics. This guide corresponds to the first of these subjects, which focuses on Mechanics and Thermodynamics. The aim is for students to be able to identify, model, pose and solve practical situations involving forces, energy exchanges and thermodynamic processes. The course is focused so that students become familiar with and incorporate scientific methodology into their way of working, always according to the "Project Based School" model, the hallmark of our School.

3. COMPETENCIES AND LEARNING OUTCOMES

Knowledge:

CON1: Understanding and mastery of the basic concepts of the general laws of mechanics, thermodynamics, fields and waves, and electromagnetism, and their application to solving engineering problems.

Specific knowledge of the subject:

- Define the principles of kinematics and dynamics of bodies and their application to solving engineering problems in these fields.
- Describe the fundamentals of mechanical waves and their application to solving engineering problems in that field.
- Correctly apply the classical laws of mechanics.

Skills:
SK18: Ability to perform laboratory experiments in the field of physics, chemistry, and materials in the industrial area.

Subject-specific skills:

- Use systems of units appropriately.
- Conduct experiments in the mechanical physics laboratory.
- Write reports on laboratory experiments.

4. CONTENT

The contents of the course cover the following fields of classical physics:

1. Unit systems.
2. Measurement and errors
3. Kinematics
4. Dynamics
5. Wave Fundamentals

5. TEACHING-LEARNING METHODOLOGIES

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

- Master class.
- Problem-based learning.
- Workshop/laboratory-based learning.
- Simulation environment.

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	Total Hours	Classroom hours
Master class	10	10
Practical application seminars	20	20
Problem solving	34	10.2
Report and essay writing	6	0
Workshop and/or laboratory activities	10	10
Independent work	60	0
Debates and discussions	5	5

Face-to-face assessment tests	5	5
TOTAL	150	60.2

Further details on the AI usage policy will be published on the virtual campus platform once the course has started.

7. ASSESSMENT

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

Assessment system	Min%	Máx. %
Face-to-face assessment tests	50%	60%
Reports and written assignments	0	10%
Cases and problems	15%	40%
Performance assessment	5%	5%
Laboratory/workshop practice notebook	5	10

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

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Unit Problems 1 – 2	Week 2 – 5
Unit Problems 3	Week 6 – 7
Unit Problems 4	Week 8 – 10
Unit Problems 5	Week 11 – 13
Laboratory Practices	Week 14 – 15
Group Project (Report and Defence)	Week 16 – 17
Final Objective Test	Week 17 – 18

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The main reference work for this subject is:

- Young H.D., Freedman R.A., Sears F.W. y Zemansky M.W., “University Physics (9th edt), Vol. 1 y 2”, 12ª ed., Pearson Education (2013).

The recommended Bibliography is:

- Tipler P.A. and Mosca G., "Physics for Science and Engineers, Vol. 1 and 2", 6th ed.
- Serway R.A. and Jewett J.W., "Physics for Scientitis and Engineering, Vol. 1 and 2", 7th ed., Cengage Learning (2008).
- Burbano S., Burbano E. and Gracia C., "Physics Problems ", 27th ed., Tébar (2007).
- D. C. Giancoli, "Physics: Principles with Applications", Prentice Hall (1997).

For further information on some topics or as a complement for the development of the integrative project, we recommend consulting the following specialised bibliography:

- Beer F.P. Johnston E.R., Mazurek D.F. and Eisenberg E.R., "Vector Mechanics for Engineers: Statics", 9th edition, McGraw-Hill (2010).
- Beer F.P., Johnson E.R. and Cornwell P.J., "Vector Mechanics for Engineers: Dynamics", 9th ed.
- Feynman R., Sands M. and Leighton R., "The Feynman lectures on Physics, Vol. 1: Mainly Mechanics, Radiation and Heat", available on-line at the CalTech website http://www.feynmanlectures.caltech.edu/.
- Schiller C., "Motion Mountain: The adventure of Physics", available on-line at the author's website: http://www.motionmountain.net

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students’ inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by mean of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunity for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

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.