

	PROCESO PARA EL DESARROLLO DE LAS ENSEÑANZAS DE LA FACULTAD DE CIENCIAS DE LA UEx		 FACULTAD DE CIENCIAS [UEx]
	Curso académico: 2025-26	Código: P/CL009_FC_D002	

COURSE PROGRAM

Identification and characteristics of the course			
Code	503067	ECTS Credits	6
Course name (English)	General Physics I		
Course name (Spanish)	Física General I		
Degree programs	Physics		
Faculty/School	Faculty of Science		
Semester	1	Type of course	Basic education
Module	Basic education		
Matter	Physics		
Lecturer/s			
Name	Office	E-mail	Web page
Manuel Antón Martínez	A010	mananton@unex.es	
Subject Area	Physics of the Earth		
Department	Physics		
Coordinating Lecturer (If more than one)			

Competencies
Basic competencies: CB1 - Students should be able to show that they possess and comprehend facts and contents in an area of study which, based on a previous general secondary school level, have been extended to those included in advanced textbooks and in some aspects proceed from the most advanced studies in the area. CB2 - Students should be able to show that they have learned how to apply their knowledge professionally to their future jobs or tasks and that they possess the competences needed to develop and defend arguments and solve problems in the area of study. CB3 - Students should be able to show that they are capable of collecting and interpreting the relevant data (normally within their area of study) needed for formulating judgments which require critical thought on social, scientific and ethical topics of relevance. CB4 - Students should be able to show that they are able to transmit information, ideas, problems and solutions both to specialized and non-specialized publics. CB5 - Students should be able to show that they have developed the learning skills required to perform further studies with a high degree of self-dependence.
General competencies:

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CG1: Students should obtain a highly positive and encouraging experience from the physics learning process, serving as a way to sustain academic motivation.

CG2: Knowledge, understanding and critical analysis of physics principles and fundamentals. Mastery of the appropriate mathematical and numerical tools.

CG3: Ability to observe and identify the key elements of physical processes in real systems. Ability to construct simplified but accurate enough models.

CG4: Experimental and technology skills in their field of study.

CG5: Students should develop the ability to check and appropriately correct (if discrepancies were observed) their own models.

CG6: Ability to apply learning to their professional career.

CG7: Foster the student's imagination and creativity inherent to the evolution of Science.

CG8: Ability to identify the ethical issues in scientific research. Ability to identify ethical needs in their professional work.

Cross curricula competencies:

CT4: Critically evaluate their own learning process and professional activity, as well as to put into practice improvement strategies.

CT9: Develop Foreign language foundations (English preferred).

CT11: Develop Information and Communication Technology (ICT) skills

Particular competencies:

CE1: On the bases of Secondary Education, students should be able to increase the knowledge about different physical phenomena.

CE2 - Have updated or cutting-edge knowledge in some fields of Physics.

Contents
Course outline
Introduction, Mechanics. Oscillations and Waves. Thermodynamics
Course syllabus
Name of the lesson 1: Mechanics Contents of the lesson 1: 1.1 Kinematics 1.2 Newton's laws 1.3 Friction. Circular motion. Coriolis force 1.4 Work and Energy 1.5 Systems of particles 1.6 Gravitational field Description of the practical activities of lesson 1: Problem resolution
Name of lesson 2: Fluids Contents of lesson 2:

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2.1 Properties of fluids 2.2 Fluids at rest 2.3 Fluids in motion Description of the practical activities of lesson 2: Problem resolution
Name of lesson 3: Angular Momentum and Rotation Contents of lesson 3: 3.1 Introduction. 3.2 Velocity and angular acceleration. 3.3 Moment of inertia. 3.4 Equation of motion for rotation. 3.5 Rotational kinetic energy. 3.6 Angular momentum of a system of particles. 3.7 Conservation of angular momentum. Description of the practical activities of lesson 3: Problem resolution
Name of lesson 4: Oscillations Contents of lesson 4: 4.1 Introduction. 4.2 Simple harmonic oscillatory movement. The simple pendulum. 4.3 Energy in simple harmonic motion. 4.4. Damped and forced harmonic motion. Description of the practical activities of lesson 4: Problem resolution
Name of lesson 5: Waves Contents of lesson 5: 5.1 Introduction. 5.2 Characteristics of waves. 5.3 Harmonic waves. The harmonic wave equation. 5.4 Energy and intensity of a wave. 5.5. Wave overlay. 5.6. Standing waves. Doppler effect. Description of the practical activities of lesson 5: Problem resolution
Name of lesson 6: Thermodynamics Contents of lesson 6: 6.1 First law of thermodynamics 6.2 Second law of thermodynamics Description of the practical activities of lesson 6: Problem resolution

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Educational activities								
Student workload in hours by lesson		hours	Practical activities in hours				Monitoring activity in hours	Homework in hours
Lesson	Total	L	HI	LAB	COM	SEM	SGT	PS
1		20						30
2		6						10
3		8						12
4		6						12
5		8						14
6		8						12
Assessment **		4						
TOTAL	150	60						90
L: Lectures (85 students) HI: Hospital internships (7 students) LAB: Laboratory or field practices (15 students) COM: Computer room or language laboratory practices (20 students) SEM: Problem classes or seminars or case studies (40 students) SGT: Scheduled group tutorials (educational monitoring, ECTS type tutorials) PS: Personal study, individual or group work and reading of bibliography								
Teaching Methodologies								
1. Explanation and discussion of the contents. 2. Resolution, analysis and discussion of problems. 3. Autonomous student work.								
Learning outcomes								
1. To describe the basic principles and fundamentals of Mechanics, Oscillations and Waves, and Thermodynamics. 2. To interpret these principles and foundations for the analysis of specific issues. 3. To apply these principles and fundamentals to problem solving.								
Assessment systems								
Continuous assessment: This evaluation modality will be carried out through two activities:								

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- Preparation and individual presentation in the classroom of a work related to any field of Physics. The weight of the mark for this presentation in the final mark of the subject will be 5%.
- A written exam with questions and problems on the fundamental concepts and applications of the subject. The weight of the mark for this exam in the final mark of the subject will be 95%.

Overall assessment:

This evaluation modality will be carried out through:

- A written exam with questions and problems on the fundamental concepts and applications of the subject. The weight of the mark for this exam in the final mark of the subject will be 100%.

EVALUATION CRITERIA

1. To apply the basic and fundamental concepts of physics in simple specific cases. This would be the part that is traditionally called "theory" in the exams. The student will not be required to memorize developments so much as to understand the definitions and concepts and their immediate applications as clearly as possible. The weighting of this part in the final grade of the exam will be 40%.
2. The part traditionally called "problems" will weight 60% in the final mark of the exam, the criteria for evaluating being the following:
 - 2.1 The correct formulation of the problem, with adequate justification of the laws, procedures or equations used.
 - 2.2 To carry out the appropriate intermediate steps to reach the solution. Understands the necessary mathematical skills such as: solving unknowns, solving systems of equations, use of trigonometric functions, etc. In this part, the correct use of the units and dimensions of the physical variables will also be assessed.
 - 2.3 To achieve and to analyze the final result. A correct solution without an approach or development that justifies it will not score anything in the problem. If the student does not reach the correct final result due to a mistake, or an error in an intermediate step, the penalty will be proportionally small. The suggestion of alternative solutions or the discussion of the solution obtained, particular cases, etc., will be valued very positively. On the other hand, if the solution is incorrect but the student is able to argue its incorrectness, it will be taken into consideration in the problem's score.

Bibliography (basic and complementary)

Paul A. TIPLER, Gene Mosca. Física para la ciencia y la tecnología, Volumen 1: Mecánica, Oscilaciones y Ondas, Termodinámica, 6ª edición, 2010. Ed. Reverté.

Other resources and complementary educational materials