

POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.013.03
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Course	Energy and Environment					
Subject	Fundamentals of Physics					
Academic year	2022/2023	Curricular year	1st	Study period	2nd semester	
Type of subject	Compulsory	Student workload (H)	Total: 154	Contact: 67,5	ECTS	5,5
Professor(s)	Paula Amaro Rodrigues					
<input checked="" type="checkbox"/> Area Coordinator <input type="checkbox"/> Head of Department	(select)	Fernando Pires Valente				

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

Acquire structural knowledge of Newtonian mechanics and thermodynamic systems, which allow to obtain essential skills for the study and analysis of the dynamics of bodies and the interaction of electromagnetic radiation with matter.

2. PROGRAMME

Kinematics of the particle - Fundamental variables and relationship between them. Intrinsic components of acceleration.

Characterization of rectilinear and circular movements. Composition of movements.

Dynamics of the particle - Newton's Laws. Forces and linear momentum, angular momentum, and torque. Energy considerations: work and mechanical energy, power, efficiency. Principles of conservation of mechanical energy, of linear momentum and angular momentum.

Electromagnetic radiation - Oscillatory and undulatory movements; Propagation of electromagnetic radiation; Interaction of radiation with matter: black body, photoelectric effect, and radiation absorption.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The first two items (kinematics and dynamics of the particle) include the foundations and principles of classical mechanics, in a comprehensive perspective, particularly related with movements and their causes.

The last item takes a more specific approach to aspects related to energy and its balance in thermodynamic systems, particularly related to heating and cooling systems.

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4. MAIN BIBLIOGRAPHY

- Serway, R. and Jewett, J. Jr., (2013). *Physics for Scientists and Engineers*; Edição: Cengage Learning, INC, janeiro de 2013. ISBN: 9781133954071
- Noronha, A., Deus, J., Peña, T., Pimenta M. and Brogueira, P. (2014). *Introdução à Física (3ª edição)*. Edição; Escolar Editora, novembro de 2014. ISBN: 9789725924402
- Walker, J., 2016; *Fundamentos de Física (9ª edição) - Volume 1 (Mecânica)*; Edição: LTC, junho de 2016, ISBN: 9788521630357
- Alonso, M. and Finn, E. (2012). *Física, Um Curso Universitário*. Edição; Escolar Editora, janeiro de 2012. ISBN: 9789725922965
- Amaro, P.; 2023; *Coletânea de Problemas para a UC; Instituto Politécnico da Guarda*.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The methods and teaching techniques to apply during the sessions are lecture, solving problem, simulation and laboratory group work.

Continuous evaluation:

Written tests (75%) and practical project (25%)

Final evaluation:

Written test (100%) or written test (75%) and practical project (25%), both of which will need to be conducted on the proposed dates during the semester.

Students who have obtained final score higher than 16 values may make an oral test to "defend" the obtained score. If they do not intend to make this oral exam the final score is 16 values.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Lectures, moments involving exposure with audiovisual support, theoretical-practical classes with problem-solving and laboratory classes provide the students with the knowledge needed to achieve the proposed objectives.

7. ATTENDANCE

There are no minimum requirements, however attendance is strongly recommended

8. CONTACTS AND OFFICE HOURS

e-mail: paula.amaro@ipg.pt

office # 1

office hours: Thursday: 11:00 – 12:30

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Friday:14:30 – 16:30

DATE

22 de fevereiro de 2023

SIGNATURES

Professor

(signature)

Area Coordinator

(signature)