

POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.013.03
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Course	Informatic Engineering					
Subject	Introduction to Physics					
Academic year	2023/2024	Curricular year	1st	Study period	2nd semester	
Type of subject	Compulsory	Student workload (H)	Total: 168	Contact: 75	ECTS	6
Professor(s)	Jorge Fonseca e Trindade					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)	Fernando Pires Valente				

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

Acquire and apply fundamental knowledge of classical physics, related to the mechanics of the material, electrostatic and continuous electric current. Apply the knowledge in the analysis and problem solving framed on those themes.

2. PROGRAMME

- Material points kinematics: characterization of uniform and uniformly varied rectilinear and circular movements; Intrinsic acceleration components.*
- Material points dynamics: dynamics laws applied to translation and rotation movements. Moment of a strength and moment of inertia. Work and Energy: Mechanical Energy Balance to a System.*
- Electrostatic: electric charges and fields; Gauss Law; electric potential.*
- Continuous electric current: OHM Law; Joule effect; circuit analysis laws; electric power.*

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The promotion of the critical spirit based on the methodology of physics is transverse to all content to be taught, with particular emphasis on obtaining measures in direct physics (use of instrumentation) and indirect (algebraic calculations). The acquisition of fundamental knowledge of physics is based on the study of the fundamental laws and principles of mechanics and electricity. The application of knowledge will be made in the resolution of exercises and problems framed on those themes. Thus, the first and second chapters confine the foundations and fundamental principles of the material point mechanics, from a comprehensive perspective, particularly related to movements and their causes. The third chapter applies these concepts in the interpretation of essential electrostatic phenomena, which will serve to understand the contents addressed in the Fourth Chapter. Thus, there is a broad approach to the fundamental principles of classical physics essential to the computer engineering course, as

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recommended on the objectives, which is intended to serve as structuring support to other curriculum units.

4. MAIN BIBLIOGRAPHY

Breithaupt, J. (2018). *Física*. Editora LTC.

Villate, J. (2019). *Dinâmica e Sistemas Dinâmicos*. Disponível em: <https://def.fe.up.pt/dinamica/>

OpenStax, (s.d.). *University Physics, Volume 1*. Disponível em:

<https://openstax.org/details/books/university-physics-volume-1>.

OpenStax, (s.d.). *University Physics, Volume 2*. Disponível em:

<https://openstax.org/details/books/university-physics-volume-2>.

Schiller, C. (s.d.). *Motion Mountain – Volume 1: Fall, Flow and Heat*. Disponível em:

<https://www.motionmountain.net/contents.html>.

Silvestre A., Teixeira, P. (s.d.) *Física – Uma Introdução*. Disponível em:

https://repositorio.ipl.pt/bitstream/10400.21/14649/1/Fisica_uma_introducao.pdf

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The teaching methodology will be realized by conducting expository (predominantly theoretical and theoretical-practical) and interactive/demonstrative classes with laboratory activities and practices.

Continuous evaluation consists of:

- *Two theoretical-practical tests (75%)*
- *Practical activities (25%).*

Evaluation by examination:

- *Unique proof with issues of theoretical-practical nature, (100%).*

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The recommended teaching methodologies are based on three matrices, which define the space of operant modus: theory, analysis, and practice. In the first case we will seek to bring to light the key concepts, their relationship between them and the conditions of validity. In the second case, the application of knowledge and critical analysis in case studies will be encouraged. Finally, through practical demonstrations and laboratory activities, conditions will be provided for the transfer of knowledge in real situations.

7. ATTENDANCE

There is no obligation to assist classes, although its frequency is recommended.

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8. CONTACTS AND OFFICE HOURS

Contacts:

Jorge Fonseca e Trindade: jtrindade@ipg.pt

Fernando Pires Valente: fpvalente@ipg.pt

Office hours: Thursday (09:00AM-11:30AM)

DATE

19 de fevereiro de 2024

SIGNATURES

Professor(s), Area/Group Coordinator or Head of Department signatures

Professor

(signature)

Area/Group Coordinator

(signature)

Assinatura na qualidade de (clicar)

(signature)

Assinatura na qualidade de (clicar)

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