	<b>SUBJECT DESCRIPTION</b>	<b>MODELO PED.013.02</b>
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<i>Course</i>	<b>Mechanics and Industrial Informatics</b>			<i>Academic year</i>	2021/2022		
<i>Subject</i>	<b>Applied Physics</b>			ECTS	6		
<i>Type of course</i>	<b>Compulsory</b>						
<i>Year</i>	<b>1 st</b>	<i>Semester</i>	<b>1 st</b>	<i>Student Workload:</i>			
<i>Professor(s)</i>	<b>Paula Alexandra Cebola Amaro Rodrigues</b>			<i>Total</i>	162	<i>Contact</i>	75
<i>Area Coordinator</i>	<b>Fernando Pires Valente</b>						

### Planned SD

## 1. LEARNING OBJECTIVES

Promote a critical spirit based on the Physics methodology.

Acquire fundamental knowledge of Physics, related to material point mechanics and electromagnetic fields.

Apply the knowledge towards the analysis and resolution of problems in those themes.

## 2. PROGRAMME

1 - Physical quantities and measurements in Physics, International System of Units; Notions of vector calculus and integral calculus.

2 - Material point mechanics: Kinematics; Newton's Laws; Balance of a body; Conservation principles.

3 - Introduction to Electromagnetism: Electric field: electric fields; Gauss's law; Electric current and resistance; Induced magnetic fields; Electromagnetic interaction.

## 3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

Promote a critical thinking based on physics methodology to all the contents taught, with particular emphasis on obtaining measurements in physics directly (use of instrumentation) and indirectly (algebraic calculations).

Acquire the fundamental knowledge of physics based on the study of the fundamental laws and principles of mechanics and electromagnetism.

The application of knowledge will be done in solving exercises and problems framed in those themes.

## 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 (3ªedição). 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.

Walker, J. (2016); Fundamentos de Física (9ª edição) - Volume 3 (Eletromagnetismo); Edição: LTC, junho de 2016, ISBN: 9788521630371.

Alonso, M. and Finn, E. (2012); Física, Um Curso Universitário. Edição; Escolar Editora, janeiro de 2012. ISBN: 9789725922965.

Amaro, P. (2020); Coletânea de Problemas para a UC; Instituto Politécnico da Guarda.

## **5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)**

The teaching methodology will be implemented through lectures (theoretical and predominantly theoretical-practical) and interactive/demonstrative classes with laboratory activities. This methodology should be reflected in the continuous evaluation with theoretical-practical (tests) – 75%, practical (problem-solving) and laboratory components – 25%.

Final grade equal to or higher than 10 values to obtain approval, with 20 being the highest grade possible.

## **6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES**

The recommended teaching methodologies are based on three performances matrixes: theory, analysis and practice. In the first case we will try to bring to light the key concepts, the relation between them and the conditions of validity. In the second case, the application of knowledge and critical analysis in case studies will be stimulated. Finally, through practical demonstrations and laboratory activities, conditions will be provided for the transfer of knowledge in real situations.


## **7. ATTENDANCE**

Students must attend at least 2/3 of the class hours to qualify for ongoing assessment in this subject. Students with student worker status do not have to meet this requirement.

## **8. CONTACTS AND OFFICE HOURS**

Professor: Paula Amaro (Ph.D); [paula.amaro@ipg.pt](mailto:paula.amaro@ipg.pt); office n.º 1

Area Coordinator: Fernando Pires valente; [fpvalente@ipg.pt](mailto:fpvalente@ipg.pt); office n.º 46

 <p><b>IPG</b> Polytechnic of Guarda School of Technology and Management</p>	<p><b>SUBJECT DESCRIPTION</b></p>	<p>MODELO PED.013.02</p>
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Date: 30/06/2021