

<i>Course</i>	Mechanical and Industrial Informatics			<i>Academic year</i>	2021/2022	
<i>Subject</i>	Strength of Materials			ECTS	6	
<i>Type of course</i>	Compulsory					
<i>Year</i>	2nd	<i>Semester</i>	1st	<i>Student Workload:</i>		
<i>Professor(s)</i>	José Carlos Costa de Almeida			<i>Total</i>	162	<i>Contact</i> 60
<i>Area Coordinator</i>	José Reinas dos Santos André					

Planned SD

1. LEARNING OBJECTIVES

The course aims to instruct and develop students' ability to solve mechanical problems in material point systems and rigid bodies at rest, to determine tensions and deformations at any point of elements subjected to axial, bending, shear and torsion stresses, and their combinations, and study the stress and strain states at one point as well as the instability of compressed bars.

The students should be able to: Identify the different types of efforts that can act on a structure; Calculate the different stresses that are generated by the various requests/situations; Calculate the deformations associated with each type of request/situation; Identify complex requests/situations resulting from simple overlapping efforts; Calculate the stress state of a body on any plane; Identify the critical points of the sections.

2. PROGRAMME

1. Mass geometry;
2. Rigid body balance;
3. Internal efforts and effort diagrams;
4. Traction and compression;
5. Bending;
6. Shear;
7. Torsion;
8. Stress and strain states;
9. Instability.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The syllabus allows students to develop skills in understanding the behavior of components subjected to different kinds of strengths. The chapters allow the student to acquire the basis for the design and understanding of the functioning of structures.

4. MAIN BIBLIOGRAPHY

Beer, Ferdinand P; Resistência dos materiais. 2013. ISBN: 8534603448.

Gomes, J. F Silva; Mecânica dos sólidos e resistência dos materiais. 2004. ISBN: 9728826060.

Beer, Ferdinand P; Mecânica vectorial para engenheiros. 2011. ISBN: 9728298730.

Resistência dos Materiais, R. C. Hibbeler. 2010. ISBN 9788576053736.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The teaching methodology will allow the students to be at the center of their learning. Concepts and techniques will be taught through theory lectures, supported by case studies, to provide the knowledge needed for practical application.

Practical work will help students apply and develop the techniques that are taught and will be subject to discussion and questions clarified in practical classes.

The evaluation of this course will be ongoing throughout the semester based on the practical work carried out (25%) and a final written test (75%, where the grade is greater than or equal to 08/20) that covers the theory and practical aspects. 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 teaching methodology has a special focus on the concept of learning by doing so that the students apply the theory via eminently practical exercises. The practical work allows students to apply what is taught step by step.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

Professor: José Carlos Costa de Almeida (Ph.D); jcalmeida@ipg.pt; office n.º 75

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Date: 30/06/2021