UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Structural Systems

Academic Year 2026/2027

1. Organic Unit

Faculty of Architecture and Arts

2. Course

Architecture

3. Cycle

1st

4. Course Unit

Structural Systems (01325)

5. Scientific Area

6. Curricular Year

3rd

7. Type of Curricular Unit / Semester

2nd Semester

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8. Class type and workload (work time)

Theoretical classes:	
Practical classes:	
Theoretical-Practical Classes	60,00
Tutorial Guidance:	

9. ECTS Credits

3,50

10. Scientific Area Coordinator

Prof. Doutor ANTÓNIO JOSÉ DÂMASO SANTOS MATOS VILHENA

11. Regent

12. Assistants

Prof. Doutora ANA ISABEL MERA MARQUES

13. Teaching Language

Portuguese

14. General Objectives

Provide students with the ability to understand the integrated relationship between structural design and architectural design in a continuous and total interconnection.
Provide the student with an understanding of the effect of the use of materials in buildings.

15. Specific Objectives

Encourage students to develop their skills in structural analysis so as to enable them to realise the architectural project.
Understanding the functioning of constructive elements when integrated into a structure and in service.
Analysing the structural element and its internal workings.
Motivate the student to apply the different structural materials available.

16. Skills to be acquired

Ability to quantify the actions acting on buildings and structures.
Ability to calculate stresses and strains in isostatic structural elements.
structures.
Understanding of the pre-dimensioning of simple metal structures.

17. Teaching Methodology

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The classes given throughout the year are divided into theoretical classes and theoretical-practical classes, which make up the theoretical and practical path.
The goal is also for the student to be fully involved in the course, with a proactive attitude, which will be achieved through the need for research and investigation during the semester.

18. Course Unit Program

1. Stress: concepts and application
1.1 Concept of stress
1.2 Design implications

2. Force and deformation
2.1 Force
2.2 Deformation
2.3 Stress/strain diagram
2.4 Hooke's law
2.5 Deformation and elasticity

3. Deformation
3.1 Deformation of homogeneous materials under axial loading
3.2 Deformation of homogeneous materials in indeterminate systems
3.3 Deformation of homogeneous materials due to temperature variation
3.4 Deformation of heterogeneous materials due to temperature variation

4. Centroid, centre of gravity and moment of inertia
4.1 Centre of gravity and centroid
4.2 Composite figures
4.3 Moment of inertia
4.4 Radius of gyration
4.5 Moments of inertia of composite surfaces

5. Pure bending
5.1 Simple plane bending
5.2 Navier equation

6. Actions on structures
6.1 Current national and European regulations
6.2 Actions and their combinations
6.3 Acting forces and resisting forces
6.4 Safety verification

19. Assessment Methods

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The aim is to motivate student attendance and intervention in class, as well as critical thinking, factors that will be taken into account in each student's final assessment.

Students' attendance at classes will be monitored in order to enforce the assessment regulations in force at Universidade Lusíada, with a minimum attendance of 60 per cent to be considered for continuous assessment.

There will be two tests that will contribute to the continuous assessment, within the provisions of the

20. Didactic Resources

Various audiovisual media are used, such as multimedia presentations and film screenings.

Whenever possible, real cases will be presented for analysis and discussion.

21. Sustainability Objectives

1 - Ensure equal access to quality technical, vocational, and cultural education.
2 - Substantially increase the number of young people and adults with relevant qualifications, including technical and professional skills, for employment, decent work, and entrepreneurship.
3 - Ensure equal opportunities in university education, including for people in vulnerable situations.
4 - Promote the dematerialization of the teaching/learning process in a gradual way.

22. Keywords

Forces
Stresses
Tension
Deformation
Force
Structures

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23. Main Bibliography

Author(s):	Beer, F.; Johnston, E. R.; DeWolf, J. T. , Mazurek, D. F.		
Title:	Mecânica dos materiais		
Edition:	5.ª	Year:	2011
Local:	Lisboa		
Publisher:	Mc-Graw Hill, AMGH Editora Ltda.		
ISBN Code:			

Author(s):	Beer, F.; Johnston, E. R.; DeWolf, J. T., Mazurek, D. F.		
Title:	Mechanics of materials		
Edition:	6th	Year:	2012
Local:	New York		
Publisher:	Mc-Graw Hill, AMGH Editora Ltda		
ISBN Code:			

Author(s):	-		
Title:	NP EN 1991-1-1:2009 - Eurocódigo 1 - Ações em estruturas. Parte 1-1: Acções gerais. Pesos volúmicos,		
Edition:	Dezembro de 20(	Year:	2009
Local:	Lisboa		
Publisher:	Instituto Português da Qualidade		
ISBN Code:			

24. Complementary Bibliography

Author(s):	-		
Title:	NP EN 1990:2009 - Eurocódigo 0 - Bases para projeto de estruturas		
Edition:	Dezembro de 20(	Year:	2009
Local:	Lisboa		
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Título / Title	Course Unit Program 'SISTEMAS ESTRUTURAIS': Academic Year 2026/2027
Autor / Author	Prof. Doutor ANTÓNIO JOSÉ DÂMASO SANTOS MATOS VILHENA
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Colaborador(es) / Colaborator(s	-
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