



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Linear Algebra

Academic Year 2024/2025

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Linear Algebra (L9002)

5. Scientific Area

6. Curricular Year

1st

7. Type of Curricular Unit / Semester

1st Semester



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8. Class type and workload (work time)

Theoretical classes:

Practical classes:

Theoretical-Practical Classes 30,00

Tutorial Guidance: 20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Dr. JOSÉ MANUEL SILVA GUERREIRO LOUÇÃO DE MATOS

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

To introduce the fundamental concepts of Linear Algebra and abstract reasoning.

15. Specific Objectives

To introduce the concept of vectorial space and subspace, linear transformations and eigenvalues.

16. Skills to be acquired

Characterisation of vectorial space and subspace; linear transformations, eigenvectors and eigenvalues; matricial representation of linear transformations.

17. Teaching Methodology

The course is organised in 2 weekly theoretical/practical sessions, supported by a weekly tutorial session. The fundamental concepts will be enlightened by examples.

18. Course Unit Program



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1. $\mathbb{R}^n$ spaces

- 1.1. Points and vectors
- 1.2. Addition and scalar multiplication
- 1.3. Linear combinations
- 1.4. Norm, distance and inner product
- 1.5. Straight lines and planes in $\mathbb{R}^2$ and in $\mathbb{R}^n$

2. Vectorial spaces

- 2.1. Vectorial spaces
- 2.2. Linear combinations
- 2.3. Linear independence
- 2.4. Generators
- 2.5. Basis and dimension
- 2.6. Subspaces
- 2.7. Intersection and sum of vectorial spaces
- 2.8. Dimension's Theorem
- 2.9. Direct sums

3. Linear transformations

- 3.1. Linear transformations
- 3.2. Kernel and image
- 3.3. Monomorphisms, epimorphisms and isomorphisms
- 3.4. Matricial representation of a linear transformation.
- 3.5. Change of bases
- 3.6. Eigenvalues and eigenvectors of an endomorphism
- 3.7. Diagonalization

19. Assessment Methods

Two mid term tests will be proposed during the semester.

20. Didactic Resources

Course notes and exercises are available in Moodle.

21. Sustainability Objectives

Fundamental knowledge in Linear Algebra is fundamental for engineers.



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22. Keywords

Linear Algebra
Vectorial Space
Subspace
Linear transformation
Eigenvector and eigenvalue

23. Main Bibliography

Author(s): António Monteiro
Title: Álgebra Linear e Geometria Analítica
Edition: 1ª Year: 2001
Local: Lisboa
Publisher: McGraw-Hill

Author(s): António Monteiro
Title: Álgebra Linear
Edition: 1ª Year: 2010
Local: Lisboa
Publisher: Dashöfer Verlag

Author(s): EH. Anton & C. Rorres
Title: Elementary Linear Algebra
Edition: 9ª Year: 2005
Local: USA
Publisher: John Wiley & Sons, Inc.

24. Complementary Bibliography

Author(s): António Monteiro
Title: Matrizes
Edition: 1ª Year: 2010
Local: Lisboa
Publisher: Dashöfer Verlag

Author(s):
Title:
Edition: Year:
Local:
Publisher:



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Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'ÁLGEBRA LINEAR': Academic Year 2024/2025
Autor / Author	Dr. JOSÉ MANUEL SILVA GUERREIRO LOUÇÃO DE MATOS
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Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
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