UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Mathematics

Academic Year 2026/2027

1. Organic Unit

Faculty of Architecture and Arts

2. Course

Architecture

3. Cycle

1st

4. Course Unit

Mathematics (01308)

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	60,00
Tutorial Guidance:	

9. ECTS Credits

4,00

10. Scientific Area Coordinator

Drª ELSA INÊS SILVA DO ROSARIO NEGAS

11. Regent

12. Assistants

13. Teaching Language

Português

14. General Objectives

To enable students to acquire the fundamental mathematical knowledge required for understanding, representing, and analysing problems within the context of Architecture.
Students are expected to develop logical, abstract, and spatial reasoning skills, applying mathematical concepts to the interpretation of structures, proportions, geometries, architectural forms, and spatial organisation.
The course unit also aims to promote the ability to use Mathematics as a tool to support architectural des

15. Specific Objectives

By the end of the course unit, students are expected to understand Mathematics as a useful tool for analysing, representing, and interpreting situations related to Architecture. They will develop skills in reading, organising, and interpreting data through graphs, percentages, per mille values, and small-scale statistical studies applied to concrete situations.
Students will also be expected to recognise the presence of sequences, progressions, proportions, and patterns in Architecture, underst

16. Skills to be acquired

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Students are expected to develop essential mathematical skills to understand, analyse, and solve problems related to Architecture. The contents will be approached from a theoretical and practical perspective, always seeking to connect mathematical concepts with concrete situations.
Throughout the course, students will be encouraged to think mathematically about concrete problems that are relevant to their academic training and future practice in Architecture. To this end, they will learn to ide

17. Teaching Methodology

The teaching methodology is based on the articulation between theoretical and practical classes, valuing a theoretical-practical learning approach aimed at understanding mathematical concepts and applying them to situations related to Architecture.
In theoretical classes, the main syllabus contents are presented and systematised, with the aim of clarifying fundamental concepts, methods, and procedures. Whenever appropriate, these contents are related to examples and problems that highlight the

18. Course Unit Program

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1. Mathematics Applied to Architecture
Mathematics as a support tool for the analysis, representation, interpretation, and resolution of problems in Architecture. Application of mathematical concepts to concrete situations, with emphasis on measurement, scale, proportion, symmetry, and the organisation of elements, promoting the critical interpretation of results and their rigorous communication.
2. Mathematical Elements in Architectural Design
Study of elements such as pyramid, cube, ellipse, sphere, cone, parabola, paraboloid, hyperboloid, conoid, and catenary. Calculation of areas of plane figures, and areas and volumes of regular solids. Introduction to the notion of irregular and topological volumes. Use of support software, namely www.GI2.pt.
3. Descriptive Statistics
Collection, organisation, classification, and interpretation of data. Reading and construction of tables and graphs. Measures of location, dispersion, and concentration. Absolute, relative, simple, and cumulative frequencies. Application of percentages and per mille values to data analysis, occupied areas, and indicators.
4. Trigonometry, Periodic Functions, and Acoustics
Periodic functions, with emphasis on sine and cosine functions. Graphical representation and interpretation of sine and cosine functions. Application of trigonometric functions to the analysis of curves, surfaces, and periodic phenomena in concrete situations in Architecture.
5. Vectors in the Plane and in Space
Concept of vector: representation, notation, and components. Addition and subtraction of vectors. Magnitude, direction, and angle between vectors. Applications of vectors to the representation of forces, directions, and displacements in Architecture.
6. Proportions, Sequences, and Scales
Sequences defined by recurrence. Arithmetic and geometric progressions. Fibonacci sequence. Proportion, golden number, golden ratio, and golden spiral. Applications to the interpretation of rhythms, scales, metric relationships, and the organisation of elements in Architecture.
7. Calculus and Optimisation
Basic notions of derivative, primitive, and integral. Application of derivatives to optimisation problems. Calculation of bounded plane areas. Applications to the study of areas, inclinations, slopes, ramps, accesses, pathways, and optimisation solutions in concrete situations in Architecture.

19. Assessment Methods

Continuous assessment in the Mathematics course unit requires students? regular participation in learning activities, with a minimum attendance of 70% in theoretical classes and 70% in practical classes.
This assessment regime includes two individual written tests, each lasting 50 minutes, as well as the development of an applied project, related to the course contents and focused on the connection between Mathematics and Architecture.

20. Didactic Resources

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Students are required to acquire the book Estatística Descritiva ? Explicação Teórica e Casos, 2nd edition, published by Edições Sílabo in 2022, which will be used as a supporting resource for the study of Descriptive Statistics.

The remaining teaching resources required to support the course unit will be made available on the Moodle platform, including class support materials, exercise sheets, assignments, study guidelines, and other documents considered relevant to the learning process.

21. Sustainability Objectives

The development of critical thinking, the interpretation of indicators, and the ability to support decisions with evidence are also valued, contributing to a more conscious, inclusive, and sustainable academic path. In this sense, the course unit is particularly aligned with the Sustainable Development Goals related to quality education, innovation, sustainable cities, and responsible consumption.
Within the continuous assessment project, the choice of reusable, recycled, or low environmental i

22. Keywords

Mathematics applied to Architecture
Descriptive statistics
Proportion and scale
Trigonometric fun

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

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Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'MATEMÁTICA': Academic Year 2026/2027
Autor / Author	Drª ELSA INÊS SILVA DO ROSARIO NEGAS
Classificação / Classification	-
Descritores / Descriptors	-
Colaborador(es) / Colaborator(s	-
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Students are expected to develop logical, abstract, and spatial reasoning skills, applying mathematical concepts to the interpretation of structures, proportions, geometries, architectural forms, and spatial organisation. It also aims to promote the ability to use Mathematics as a tool to support the project.

15. Specific Objectives

Upon completion of the course unit, students should be able to understand Mathematics as a tool for analysis and representation in Architecture, applying statistical concepts to data interpretation. They should also be able to recognize and apply sequences, proportions, patterns, scales, and metric relationships, including the Fibonacci sequence and the golden ratio, in the analysis of structures and spaces.

16. Skills to be acquired

The aim is for students to develop mathematical skills applied to Architecture, combining theory and practice in the analysis and solution of problems. Emphasis is placed on the relationship between Mathematics, Geometry, and the built environment, promoting rigorous interpretation of information, appropriate selection of methods, and the use of Mathematics as a tool for analysis, decision-making, and communication.

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17. Teaching Methodology

The teaching methodology combines theoretical and practical classes, promoting the understanding and application of mathematical concepts to Architecture. Practical classes focus on problem-solving, while Moodle supports access to materials and independent study. An active, rigorous, and applied learning approach is encouraged.

18. Course Unit Program

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Basic notions of derivative, primitive, and integral. Application of derivatives to optimisation problems. Calculation of bounded plane areas. Applications to the study of areas, inclinations, slopes, ramps, accesses, pathways, and optimisation solutions in concrete situations in Architecture.

19. Assessment Methods

Continuous assessment requires a minimum attendance of 70% in theoretical classes and 70% in practical classes. It includes an individual written test, a team assignment, and assessment of oral participation in class.

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21. Sustainability Objectives

To promote the application of Mathematics to more efficient and sustainable architectural solutions, considering space, resources, and environmental impact.
In the continuous assessment assignment, 15% of the grade rewards the use of reusable, recycled, or low-environmental-impact materials, with appropriate justification.

22. Keywords

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Descriptive statistics
Proportion and scale
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23. Main Bibliography

Author(s): Elsa Negas
Title: Estatística Descritiva ? Explicação Teórica e Casos
Edition: 2ª Year: 2022
Local: Lisboa
Publisher: Editora Sílabo
ISBN Code: 9789895611508

Author(s): Sue Pemberton (autor) & Julian Gilbey (editor)
Title: Pure Mathematics 1
Edition: 1ª Year: 2018
Local: Londres
Publisher: Cambridge International AS & A Level
ISBN Code: 9781108407144

Author(s): Hermann Weyl
Title: Simetria
Edition: 1ª Year: 2017
Local:
Publisher: Editora Gradiva
ISBN Code: 9789896167646

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24. Complementary Bibliography

Author(s): Filipe Carvalho, Sílvia Carvalho
Title: Matemática zero
Edition: 1ª Year: 2021
Local: Lisboa
Publisher: Editora Sílabo
ISBN Code: 9789895612758

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Title:
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