



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Geometry

Academic Year 2026/2027

1. Organic Unit

Faculty of Architecture and Arts

2. Course

DESIGN

3. Cycle

1st

4. Course Unit

Geometry (L5004)

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:

9. ECTS Credits

3,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutor PEDRO JOSÉ GENTIL- HOMEM CORREIA DA SILVA

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

The main goal of the curricular unit is to provide students with a foundational awareness and working knowledge of Geometry as a tool for project thinking in the design process.

15. Specific Objectives

To know the fundamental elements of geometry.

To operate rigorous and universal visual communication methods and processes.

To promote rigour on drawing representation for design.

To develop skills of normative and canonical representation systems: orthogonal and conical projection systems.

To recognise the importance of natural and artificial geometric structural analysis.

To Understand and master visual skills.

16. Skills to be acquired

To master fundamental geometric representation operations.

To be able to visualise two and three-dimensional mental recognition of objects in space. To recognise and operate the manipulation of models. Capacity for rigorous representation. To conceptualise natural/artificial geometries and their design application.

17. Teaching Methodology

Semester-long theoretical / practical curricular unit with hours per week. Participatory exposition, drawing and debate, practical exercises to apply the syllabus accompanied by the teacher.



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18. Course Unit Program

- 1 - Historical context: Why and what is the purpose of geometry?
- 2 - Euclidean geometry: Axioms, postulates and theorems.
 - 2.1 Wassily Kandinsky: Primitive elements: Point, line, plane.
 - 2.2 - Non-Euclidean geometry (conic and hyperbolic).
Fractal geometry.
- Formulas for calculating volumes (regular polyhedra: sphere, tetrahedron, hexahedron, octahedron, dodecahedron and icosahedron).
- 3 - Notable rectangles and natural proportions.
Notable triangles and natural proportions
 - 3.1.- Platonic and Archimedean solids. Hyper-Platonic solids.
- 4 - Human canons and proportions.
5. Bionics and biomimicry.
 - 5.1 - Bionic and biomimetic design.
- 6 - Anamorphoses.
- 7 - Gestalt principles.
- 8 - Conic projection systems.
- 9 - Self-shadows and cast shadows of solids.
- 10 - Intersections of planes with solids.

19. Assessment Methods

- Ongoing evaluation.
- Attendance, participation and debate in class.
- Exercises carried out in class
- Two written tests
- Other work considered relevant
- Final attendance test
- Exam

20. Didactic Resources

- Participatory lectures.
- Slide projections.
- Multimedia resources.
- Internet.

21. Sustainability Objectives



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The Geometry curricular unit aims to fulfil the following Sustainable Development Goals for 2030 listed by the United Nations:

Goal 4. Quality Education: providing programme content that ensures quality professional performance.

Goal 8: Decent Work and Economic Growth: contributing to the training of better professionals with a critical sense capable of recognising and implementing good work practices that lead to economic growth.

22. Keywords

Geometry

Visual Perception

Spatiality

Two-dimensionality and three-dimensionality

Bionics and bi



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23. Main Bibliography

Author(s): Elam, K.
Title: Geometria do Design: Estudos Sobre Proporção e Composição.
Edition: Year: 2010
Local: S. Paulo
Publisher: Cosac Naify
ISBN Code:

Author(s): Ricca, G.
Title: Geometria Descritiva - Método de Monge.
Edition: Year: 2011
Local: Lisboa
Publisher: Fundação Calouste Gulbenkian
ISBN Code:

Author(s): Massironi, M.
Title: Ver pelo Desenho.
Edition: Year: 1983
Local: Lisboa
Publisher: Edições 70
ISBN Code:

24. Complementary Bibliography

Author(s): Sausmarez, V.
Title: Desenho Básico.
Edition: Year: 1986
Local: Lisboa
Publisher: Edições 70
ISBN Code:

Author(s): Kandinsky, W.
Title: Ponto, Linha, Plano.
Edition: Year: 1987
Local: Lisboa
Publisher: Edições 70
ISBN Code:



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