



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Computation and Graphic Representation

Academic Year 2024/2025

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Computation and Graphic Representation (L9019)

5. Scientific Area

6. Curricular Year

2nd

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 30,00

Tutorial Guidance: 20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutora MARIA INÊS VASCONCELLOS FURTADO

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

To provide students with fundamental knowledge of computer graphics, emphasizing the creation and integration of visual elements in web applications. Provide a solid foundation for understanding modeling, rendering and graphic interactivity.

15. Specific Objectives

- Learn HTML, CSS and JavaScript for developing web interfaces.
- Explore Tinkercad as an initial tool for creating simple 3D models.
- Understand the basic principles of computer graphics, including geometric transformations and homogeneous coordinates.
- Enable students to use graphics APIs such as WebGL to create interactive 3D graphics for the web.

16. Skills to be acquired

- Development of web pages using HTML, CSS and JavaScript.
- Creating and manipulating 3D models using Tinkercad.
- Application of computer graphics techniques for 2D modeling, rendering and animation.
- Implementing geometric transformations and using homogeneous coordinates.
- Using graphics APIs to create and integrate dynamic 3D graphics into web applications.



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17. Teaching Methodology

Theoretical exposition of concepts and objectives of the different stages of the subject. Practical monitoring of the individual development of students in the dialogue with the tools presented to them throughout the course. Students will develop practical projects throughout the course to apply the knowledge acquired.

18. Course Unit Program

1 Introducing the Fundamental Concepts of Programming for the Web

- Introduction to web programming.
- Basics of HTML, CSS and JavaScript.
- Development of simple web pages.

2. HTML

- Basic structure of an HTML document.
- Tags and fundamental elements.
- Creating web pages with HTML.

3. CSS

- Styling web pages with CSS.
- Formatting text, images and elements.
- Responsive layouts and adapting to different devices.

4. JavaScript

- Introduction to the JavaScript language.
- DOM (Document Object Model) manipulation.
- Events and interactivity on the web.
- Development of interactive scripts.

5. Introduction to Tinkercad

- Exploring and using Tinkercad as a 3D modeling tool.
- Creation of simple models and familiarization with the interface.

6. Basic Computer Graphics

- Introduction to basic computer graphics concepts.
- Notions of modeling, rendering and animation.
- Practical application examples in 2D graphics.

7. Interactive Graphic Systems

- Presentation of interactive graphic systems.
- Use of user interaction techniques.
- Development of simple graphic interfaces.

8. 2D Geometric Transformations and Homogeneous Coordinates

- Concepts of 2D geometric transformations.
- Use of homogeneous coordinates for graphical representation.
- Practical applications of geometric transformations.

9. Graphical APIs, WebGL

- Introduction to graphics APIs.
- Using WebGL for 3D graphics on the web.



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19. Assessment Methods

The evaluation will be based on attendance, the execution and presentation of works of application of the knowledge as well as two tests and a final work.

20. Didactic Resources

Didactic resources: computers with internet, IDE, slides, practical projects, tutorials, videos, recommended bibliography and live demonstrations.

21. Sustainability Objectives

22. Keywords

Computer Graphics
Website
HTML
JavaScript
WebGL



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23. Main Bibliography

Author(s): ANGEL, Edward, and SCHREINER, Dave
Title: Interactive computer graphics : a top-down approach with WebGL
Edition: 7 Year: 2015
Local:
Publisher: Pearson Education

Author(s): Donald Hearn, M. Pauline Baker
Title: Computer Graphics using OpenGL
Edition: Year: 2004
Local:
Publisher: Addison-Wesley

Author(s): CONCI, Aura; AZEVEDO, Eduardo.
Title: Computação gráfica: geração de imagens
Edition: 8 Year: 2003
Local:
Publisher: Ed. Campus

24. Complementary Bibliography

Author(s): Thomas Powell, Fritz Schneider
Title: JavaScript : the complete reference
Edition: Year: 2004
Local: New York
Publisher: McGraw-Hill

Author(s): Autodesk - Tinkercad
Title: Tinkercad
Edition: Year:
Local: On-line
Publisher: <https://www.tinkercad.com/>



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Autor / Author	Prof. Doutora MARIA INÊS VASCONCELLOS FURTADO
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Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
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