



UNIVERSIDADE LUSÍADA
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Course Unit Program
Computation and Graphic Representation

Academic Year 2023/2024

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

Offer to students a complementary training in terms of computer graphics. Master the basic concepts of 2D and 3D Computer Graphics. Introduction of concepts used in websites, movies and video games.

15. Specific Objectives

- Introduce the fundamentals of programming for the web, including HTML, CSS and JavaScript.
- Explore the basics of computer graphics, interactive graphics systems and 2D geometric transformations using homogeneous coordinates.
- Use graphics APIs in practice, with a focus on WebGL and the Three.js library to create interactive and engaging 3D graphics on the web.

16. Skills to be acquired

The course unit provides the students with an overview of the research area and introduces the formation of images by optical devices. The students will have the knowledge of image transformations using an interactive interface. Learners will acquire the knowledge of defining and manipulating three-dimensional objects and visualizing them. The concepts of shading and reflection of light

17. Teaching Methodology



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Assessment of the specific needs of the students. 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



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1. introduce 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 adaptation 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. Basic Computer Graphics
 - Introduction to basic concepts of computer graphics
 - Notions of modeling, rendering and animation
 - Practical examples of application in 2D graphics
6. Interactive Graphic System
 - Presentation of interactive graphics systems
 - Use of techniques for interaction with the user
 - Development of simple graphical interfaces
7. 2D Geometric Transformations and Homogeneous Coordinates
 - Concepts of geometric transformations in 2D
 - Use of homogeneous coordinates for graphical representation
 - Practical applications of geometric transformations
8. Graphics APIs, WebGL and Three.js
 - Introduction to graphics APIs
 - Using WebGL for 3D graphics on the web
 - Exploring the Three.js library to simplify the creation of 3D graphics

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.



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20. Didactic Resources

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

21. Sustainability Objectives

22. Keywords

Website
HTML
JavaScript
WebGL
Three.js



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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):
Title:
Edition: Year:
Local:
Publisher:



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Ficha técnica MIP / MIP Datasheet	
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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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