INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Computer Graphics			Field of study	Computing Science		
Bachelor in	Game Design			School	School of Public Management, Communication and Tourism		
Academic Year	2022/2023	Year of study	2	Level	1-2	ECTS credits	6.0
Type	Semestral	Semester	1	Code	8309-414-2102-00-22		

Workload (hours)	162	Contact hours	T	-	TP	15	PL	45	TC	-	S	-	E	-	OT	-	O	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s)	Telmo Miguel de Oliveira Adao

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Master the Fundamentals of 2D and 3D Computer Graphics
2. Develop Interactive Real-Time Rendering Applications
3. Set up a 3D Rendering Environment
4. Use the Unity3D tool to develop graphics applications
5. Recognize the importance of Computer Graphics in Digital Game Development

Prerequisites

Not applicable

Course contents

Concepts of Computer Graphics. Development of Real-Time Interactive Applications. Placement of Computer Graphics in the Development of Digital Games.

Course contents (extended version)

1. Introduction to Computer Graphics
2. Introduction to Unity3D
    - Basic 3D Programming Principles
    - Summary of the CG Pipeline
3. Geometric Primitives and Buffers
    - OpenGL/Unity3D Primitives
    - Solid Objects
4. Geometric Tranformations - The Unity3D pipeline
    - Using Projections
    - Cameras and Actors
5. Colors, Materials and Lighting
    - Colors and Materials
    - Lighting and Effects
    - Blending and Fog
6. Unity3D Imaging
7. Texture Mapping
8. Curves and Surfaces
9. Importing external Assets
10. Advanced Concepts

Recommended reading

1. Wright, R. , & Lipchak, B. (2005). Opengl Superbible. Indianapolis: SAMS, ISBN-10: 0321902947
2. Angel, E. , (1997). Interactive Computer Graphics. Boston: Addison-Wesley, ISBN-10: 0133574849
3. Watt, A. , (2000). 3d Computer Graphics. Boston: Addison-Wesley, ISBN-10: 0201398559
4. Foley, J. , Van, A. , K. , S. , & Hughes, J. (1997). Computer Graphics. Boston: Addison-Wesley, ISBN-10: 0201848406
5. Pereira, J., Brisson, J., Coelho, A., Ferreira, A., & Gomes, M. (2018). Introdução à Computação Gráfica.

Teaching and learning methods

The course will be taught using lectures on theoretical concepts, practical lessons in problem solving and self-learning guided by the teacher.

Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final, Supplementary, Special)
    - Practical Work - 15% (Progressive building of an Unity game (in line with the project between curricular units))
    - Presentations - 5% (Final presentation of the Unity game (in line with the project between curricular units))
    - Projects - 5% (Project developed in the interdisciplinary week context)
    - Projects - 30% (Project between curricular units)
    - Final Written Exam - 45% (Theoretical test)
2. Theoretical and Practical Exam - (Regular, Student Worker) (Final, Supplementary, Special)
    - Final Written Exam - 100% (Final Written Exam (Theoretical and Practical Exam))

Language of instruction

1. Portuguese
2. English

Electronic validation

Telmo Miguel de Oliveira Adao	Barbara Costa Vilas Boas Barroso	Elisabete da Anunciacao Paulo Morais	Luisa Margarida Barata Lopes
11-11-2022	12-11-2022	14-11-2022	14-11-2022