INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Game Engines			Field of study	Computer Science								
Bachelor in	Game Design			School	School of Public Management, Communication and Tourism								
Academic Year	2023/2024	Year of study	2	Level	1-2	ECTS credits	6.0						
Type	Semestral	Semester	2	Code	8309-801-2205-00-23								
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): João Paulo Pereira de Sousa

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Recognize the main components of a game engine;
2. Outline strategies and identify requirements for the development of digital games;
3. Integrate preexisting assets using resources provided by the game engine;
4. Create games and interactive applications using the existing game engines, namely with Unity.

Prerequisites

Before the course unit the learner is expected to be able to:
Basic concepts of programming.

Course contents

Introduction to digital games development. Game engines overview. Games development and interactive applications using game engines, namely Unity3D.

Course contents (extended version)

1. Introduction do Computer Game Development
2. Game Level Design
   - 2D and 3D Space Navigation
   - GameObjects and Prefabs
   - Materials and Textures
   - Light and Lightmapping
   - TileMaps e Terrain
   - Particle Systems
   - Camera Configuration
   - Adding Audio
   - Woking with sprites.
3. Physics System
   - Rigidbody
   - Colliders
   - Controllers
   - Joints
   - Cloth
4. Animação
   - Creating and controlling 2D Animations.
   - Character Animation (Rigged)
   - Creating Animation Clips (Animation VIew/Mecanim)
5. Scripting
   - C# Introduction
   - Variables, Components and GameObjects
   - 3D Vector Geometry
   - Movement Generation
6. User interfaces (UI)
7. Game/Application Deployment

Recommended reading

1. Ferrone, H. (2019). Learning C# by Developing Games with Unity 2019: Code in C# and build 3D games with Unity, 4th Edition. Packt Publishing. [ISBN: 1789532051]]
2. Halpern, J (2018). Developing 2D Games with Unity: Independent Game Programming with C#. Apress; Edição: 1st ed. [ISBN: 1484237714]]
3. Hocking, J. (2015). Unity in Action: Multiplatform Game Development in C# with Unity 5 1st Edition. Manning Publications. [ISBN: 161729232X]
4. Unity Team, (2016). Unity official documentation, retrieved from, http: //unity3d. com/learn/documentation

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. Final assessment - (Regular, Student Worker) (Final, Supplementary, Special)
   - Practical Work - 35% (Implementation of a 2D game. Minimum grade 7 values.)
   - Practical Work - 35% (3D game or interactive application. It is part of the integrated project. Minimum grade 7 values.)
   - Projects - 5% (Project developed during Interdisciplinary Week.)
   - Practical Work - 25% (Individual practical work. Minimum grade 7 values.)
2. Erasmus Students - (Regular) (Final, Supplementary)
   - Practical Work - 35% (Implementation of a 2D game. Minimum grade 7 values.)
   - Practical Work - 35% (3D game or interactive application. It is part of the integrated project. Minimum grade 7 values.)
   - Projects - 5% (Project developed during Interdisciplinary Week.)
   - Practical Work - 25% (Individual practical work. Minimum grade 7 values.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

João Paulo Pereira de Sousa	Barbara Costa Vilas Boas Barroso	Anabela Neves Alves de Pinho	Luisa Margarida Barata Lopes
20-03-2024	10-04-2024	10-04-2024	17-04-2024