Course Syllabus

Code - Course Title	**OGP124 - Game Engine Technologies**
Course Type	II. SEMESTER
Laboratory + Practice	1+2
ECTS	**3.0**
Language of Instruction	Türkçe
Course Type	Area Elective Courses
Course Instructor(s)	ÖĞR. GÖR. GÜVENÇ USANMAZ

Mode of Delivery	This course is delivered through face-to-face instruction. Theoretical lectures and laboratory sessions are integrated throughout the semester. The default engine for practical work is Unity (C#); the instructor may prefer an equivalent game engine (e.g., Unreal Engine, Godot).
Prerequisites	There are no prerequisites or co-requisites for this course.
Courses Recomended	It is recommended to have completed OGP103 Programming I before taking this course. Taking it concurrently with OGP104 Programming II and OGP106 Computer Graphics is beneficial. Basic programming and object-oriented thinking will facilitate the learning process.
Recommended Resources	Gregory, J. (2018). Game Engine Architecture (3rd ed.). CRC Press.Nystrom, R. (2014). Game Programming Patterns. gameprogrammingpatterns.comUnity Technologies. Unity Manual: https://docs.unity3d.com/Unity Learn (free official courses): https://learn.unity.com/
Work Placement	This course has no internship or placement requirement.

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Game engine, framework and library distinction; commercial and open source engines; course scope and Unity environment introduction.	
Week - 2		Game loop, frame time, delta time, fixed timestep; Update/FixedUpdate/LateUpdate concepts.	
Week - 3		Engine architecture: subsystems (render, physics, audio, input, scripting); component-based design.	
Week - 4		Scene graph, transform hierarchy, prefabs and instances; asset lifecycle.	
Week - 5		Asset pipeline, import settings, resource management; memory and GC impact (Unity context).	
Week - 6		Introduction to rendering pipeline: camera, render pipeline (Built-in/URP overview), draw call concept.	
Week - 7		Materials, textures, lighting fundamentals; introduction to shading concepts.	
Week - 8		Physics subsystem: Rigidbody, Collider, physics materials, layers; PhysX integration.	
Week - 9		Raycasting, triggers, collision callbacks; linking to game mechanics.	
Week - 10		Animation systems: Animator, state machines, transitions; intro to sprite and 3D animation.	

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 11		Scripting architecture: MonoBehaviour lifecycle, event-driven programming, ScriptableObject; visual scripting overview.	
Week - 12		Performance profiling: Unity Profiler, CPU/GPU bottlenecks, batching, object pooling.	
Week - 13		Build and deployment: Build Settings, target platforms, Player Settings, cross-platform differences.	
Week - 14		Course wrap-up; mini project presentation: scene analysis, optimization report and improvement demo.	

Learning Outcomes

#	Learning Outcome
1	Distinguishes between game engine, game framework and library concepts.
2	Explains the game loop and the functions of engine subsystems (render, physics, audio, scripting).
3	Applies scene graph, prefab and asset pipeline concepts in Unity.
4	Configures rendering, physics and animation subsystems at a basic level.
5	Defines game object behavior using component-based scripting architecture.
6	Identifies performance bottlenecks with Unity Profiler and applies basic optimization.
7	Builds a Unity project for a target platform and explains deployment steps.
8	Evaluates and justifies the choice of a suitable engine and render pipeline for a game project based on requirements.

Sustainable Development Goals

No content has been provided.

Course Theme

No content has been provided.

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	0	0	0
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	0	0	0
Ödevler	0	0	0
Proje - Rapor - Sunum Hazırlama	0	0	0
Ara Sınav Hazırlığı (sınav süresi dahil)	0	0	0
Final Sınavı Hazırlığı (sınav süresi dahil)	0	0	0
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	0	0	0
Staj Uygulaması	0	0	0
		Calculated ECTS	**0**

Assessment Method and Passing Requirements

No content has been provided.