Course Syllabus

Code - Course Title	**OGP224 - Virtual and Augmented Reality Applications in Games**
Course Type	IV. SEMESTER
Laboratory + Practice	2+1
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 environment for practical work is Unity XR/AR Foundation; the instructor may prefer an equivalent platform (e.g., Unreal Engine, native ARKit/ARCore).
Prerequisites	There are no prerequisites or co-requisites for this course.
Courses Recomended	It is recommended to have completed OGP104 Programming II, XXX7954 Game Engine Technologies and OGP108 2D Game Development Studio before taking this course. Having completed XXX7961 Audio and Music Technologies in Games may help reinforce spatial audio topics.
Recommended Resources	Unity. XR documentation: https://docs.unity3d.com/Manual/XR.htmlUnity. AR Foundation: https://docs.unity3d.com/Packages/com.unity.xr.arfoundation@latestOpen XR: https://www.khronos.org/openxr/
Work Placement	This course has no internship or placement requirement.

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Introduction to extended reality; VR/AR/MR differences, historical development, hardware types.	
Week - 2		Virtual reality mechanics: head tracking, image rendering, IPD and field of view.	
Week - 3		Motion sickness prevention; comfort settings, vignette, fixed reference point.	
Week - 4		Interaction design: hand/controller input, laser pointer, object grabbing and throwing.	
Week - 5		Locomotion systems: teleportation, smooth locomotion, focus narrowing (tunneling) techniques.	
Week - 6		Augmented reality basics: camera calibration, environment mapping, plane detection.	
Week - 7		AR content placement: anchor, scale and orientation; aligning game objects with the real world.	
Week - 8		Image processing: marker/image target tracking, face and hand tracking overview.	
Week - 9		Spatial audio: 3D auditory cues, sense of direction; audio positioning in VR/AR scenes.	
Week - 10		XR interface design: world-space UI, gaze/pinch interaction, accessibility.	

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 11		Performance: stereo rendering cost, frame rate targets, mobile XR limits.	
Week - 12		XR game design patterns: room-scale vs seated, social VR, mini game scenarios.	
Week - 13		Build and deployment: Quest/Android or mobile AR build process; testing and iteration.	
Week - 14		End-of-term VR/AR prototype presentation; comfort, interaction and performance evaluation.	

Learning Outcomes

#	Learning Outcome
1	Explains VR, AR and MR concepts and the hardware ecosystem in a game context.
2	Configures head tracking and stereo render pipeline in a VR scene.
3	Applies comfort and locomotion techniques that reduce motion sickness.
4	Designs controller/hand-based interaction and object manipulation.
5	Performs plane detection and anchor-based content placement with AR Foundation or equivalent.
6	Creates an AR experience with marker-based or image-based tracking.
7	Integrates spatial audio and directional cues in an XR scene.
8	Presents a VR or AR game prototype with optimized stereo render performance.

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.