Course Syllabus

Code - Course Title	**OGP219 - Artificial Intelligence in Games**
Course Type	III. SEMESTER
Laboratory + Practice	2+2
ECTS	**5.0**
Language of Instruction	Türkçe
Course Type	Required 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 OGP104 Programming II, OGP108 2D Game Development Studio and XXX7965 Data Structures and Algorithms in Games before taking this course. Basic programming, data structures and graph knowledge will facilitate the learning process.
Recommended Resources	Millington, I. & Funge, J. (2009). Artificial Intelligence for Games (2nd ed.). CRC Press — selected chapters.Buckland, M. (2005). Programming Game AI by Example. Wordware — selected chapters.Unity Manual — NavMesh and AI: https://docs.unity3d.com/Unity ML-Agents Toolkit documentation: https://unity-technologies.github.io/ml-agents/
Work Placement	This course has no internship or placement requirement.

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Introduction to game AI; agent concept, NPC, difficulty tuning; how game AI differs from academic AI.	
Week - 2		Finite state machines (FSM); states, transitions and hierarchical FSM.	
Week - 3		Pathfinding fundamentals; graph and grid representation, the A* algorithm.	
Week - 4		Unity NavMesh; agent, obstacle and off-mesh links.	
Week - 5		Steering behaviors; seek, flee, arrive, wander.	
Week - 6		Perception systems; vision cone, hearing and memory/attention models.	
Week - 7		Behavior trees; selector, sequence and decorator nodes.	
Week - 8		Utility-based AI; scoring functions and decision making.	
Week - 9		Goal-oriented action planning (GOAP) awareness; preconditions and effects.	

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 10		Group AI; flocking, swarm behavior and simple formations.	
Week - 11		Tactical AI; cover, flanking and position selection.	
Week - 12		Introduction to learning-based game AI; reinforcement learning awareness and Unity ML-Agents.	
Week - 13		AI debugging, visualization and performance; LOD AI and update frequency.	
Week - 14		Project presentation; evaluation of the game prototype with an AI module.	

Learning Outcomes

#	Learning Outcome
1	Explains game AI concepts and NPC behavior models.
2	Designs and implements decision systems using FSM and behavior trees.
3	Implements pathfinding and movement with A*, NavMesh and steering behaviors.
4	Builds a perception system including vision, hearing and memory.
5	Compares utility-based and goal-oriented (GOAP) decision approaches.
6	Explains the potential and limitations of learning-based game AI approaches (RL, ML-Agents).
7	Evaluates AI performance using profiling and optimization techniques.
8	Develops and presents a game prototype containing an AI module.

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.