UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
META-529	Metaverse Game Development	10
Prerequisites	**Department**	**Semester**
None	Digital Innovation	Fall/Spring
Type of Course	**Field**	**Language of Instruction**
Elective	Metaverse	English
Level of Course	**Lecturer**	**Year of Study**
2nd Cycle	Dr. Nikolaos Ladas	1st
Mode of Delivery	**Work Placement**	**Corequisites**
Face to face	N/A	N/A

Course Objectives:

The main objectives of the course are to:

1. Discuss and analyze the concept of Metaverse and virtual worlds and identify different types of Metaverse games and popular platforms and tools.
2. Analyze topics associated to the design of Metaverse games.
3. Equip students with skills for Metaverse game development.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Understand Metaverse game development principles.
2. Explain the role of multiplayer design and NFT use in Metaverse game development.
3. Design, develop and present a Metaverse game prototype.
4. Understand the importance of optimizing Metaverse game performance.

Course Content:

Session 1: Introduction to Metaverse Game Development

- Overview of the course and objectives
- Metaverse and Virtual Worlds
- Different types of Metaverse games
- Popular Metaverse platforms and tools
- Hands-on/Demo: Installing and configuring the necessary software

Session 2: Game Design Fundamentals

- Game design principles and mechanics
- Character and level design
- Creating a game storyboard
- Playtesting and iteration
- The role of NFTs in Metaverse game
- NFTs, GameFi and Metaverse Game Economy
- Hands-on/Demo: Creating a game concept and basic design document.

Session 3: Unity

- Introduction to Unity game engine
- Unity Interface and Tools
- Creating scenes and game objects
- Basic scripting and coding with C#
- Hands-on/Demo: Creating a simple game in Unity

Session 4: Multiplayer Game Development in Unity

- Unity networking
- Syncing player movement and actions
- Implementing multiplayer game mechanics
- Creating a lobby and matchmaking system
- Hands-on/Demo: Creating a multiplayer game prototype in Unity

Session 5: Building Metaverse Game Environments

- Metaverse development platforms
- Building environments in VR and AR
- 3D modeling and texturing
- Lighting and special effects
- Hands-on/Demo: Creating a basic Metaverse environment

Session 6: Integrating Audio and Video in Metaverse Games

- Audio and video in game development
- Recording and editing game sounds
- Implementing background music and sound effects
- Adding video and cutscenes
- Hands-on/Demo: Adding audio and video to Metaverse games

Session 7: Advanced Multiplayer Game Development in Unity

- Advanced networking concepts and techniques
- Creating more complex multiplayer mechanics
- Handling user input and latency issues
- Hands-on/Demo: Implementing advanced multiplayer features in Unity

Session 8: Metaverse Interactions and User Interface

- Metaverse interactions and interfaces
- Creating interactive objects and buttons
- Handling user input and feedback
- Hands-on/Demo: Creating a user interface for a Metaverse game

Session 9: Artificial Intelligence and Non-Player Characters

- AI and NPC programming
- Creating behaviors for non-player characters
- Creating enemy AI and combat systems
- Hands-on/Demo: Implementing AI and NPC behaviors in a Metaverse game

Session 10: Augmented Reality and Virtual Reality in Metaverse Games

- Overview of AR and VR technologies
- Creating AR and VR game experiences
- Hands-on/Demo: Creating a basic AR or VR Metaverse game

Session 11: Game Optimization and Performance

- Optimizing game performance and graphics
- Reducing lag and improving frame rate
- Hands-on/Demo: Optimizing a Metaverse game for better performance

Session 12: Final Project and Presentation

- Working in teams to develop a Metaverse game
- Designing and implementing features such as quests, rewards, and achievements
- Playtesting and iteration
- Final project presentation and demo

Learning Activities and Teaching Methods:

- Faculty Lectures
- Guest-Lectures Seminars
- Directed and Background Reading
- Case Study Analysis
- Academic Paper Discussion
- Simulations
- Student-led Presentations
- In-Class Exercises

Assessment Methods:

- Interactive Activities
- Project
- Final exams

Assessment Methods in alignment with Intended Learning Outcomes:

		Intended Learning Outcomes to be assessed			
Assessment Method	**Weighting**	LO1	LO2	LO3	LO4
Interactive activities	12%	✓	✓	✓	✓
Project	28%	✓	✓	✓	✓
Exams	60%	✓	✓		✓

Student Study Effort Expected:

Student Study Effort Expected	Hours
Lectures	12h
Assignments	80h
Interactive activities and forum participation	20h
Reading and research	135h
Exam	3h
Total	250h

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Unity in Action	Joseph Hocking	Manning publications	2022	978-1617299339
Unity Game Development Cookbook: Essentials for Every Game	Paris Buttfield-Addison, Jon Manning, Tim Nugent	O'Reilly	2019	978-1491999158

Recommended Textbooks / Readings:

- Antier. (2022). Metaverse Game Development- What's Enclosed In The Future? Retrieved from https://www.antiersolutions.com/metaverse-game-development-whats-enclosed-in-the-future/
- Ball, M. (2022). The Metaverse and How It Will Revolutionize Everything. Liveright. ISBN: 978-1324092032.
- Christodoulou, K., Katelaris, L., Themistocleous, M., Christoudoulou, P., & Iosif, E. (2022). NFTs and the Metaverse Revolution: Research Perspectives and Open Challenges. In M. Lacity & H. Treiblmaier (Eds.), Blockchains and the Token Economy: Theory and Practice (pp. 139-178). Palgrave Macmillan.
- McAllister, G., & White, G. R. (2015). Video Game Development and User Experience. In Game User Experience Evaluation (pp. 11-35). Springer.
- Nidagundi, P. (2022). Metaverse Development: Handbook for Software Developer, Analyst, Consultant, Startups and Business Owners. ISBN: 979-8418729293.

- Ramadan, R., & Widyani, Y. (2013, September). Game Development Life Cycle Guidelines. In 2013 International Conference on Advanced Computer Science and Information Systems (ICACSIS) (pp. 95-100). IEEE.
- Safadi, F., Fonteneau, R., & Ernst, D. (2015). Artificial Intelligence in Video Games: Towards a Unified Framework. International Journal of Computer Games Technology, 2015.
- Urbain, J. (2010). Introduction to Game Development. Cell, 414, 745-5102.
- Winters, T. (2021). The Metaverse. ISBN: 979-8450959283.