ECSE/CSDS 290 – Spring 2025
Introduction to Computer Game Design and Implementation

Catalog Description: This class begins with an examination of the history of video games and of game design. Games will be examined in a systems context to understand gaming and game design fundamentals.

Various topics relating directly to the implementation of computer games will be introduced including graphics, animation, artificial intelligence, user interfaces, the simulation of motion, sound and music synthesis, and networking.

Extensive study of past and current computer games will be used to illustrate course concepts. Individual and group assignments will be used throughout the semester to motivate, illustrate, and demonstrate the course concepts and ideas. A final group game development and implementation project will culminate in classroom presentation and evaluation.

Prerequisites by course: ECSE/CSDS 132 Introduction to Programming

Course Topics
1. History of Videogames
2. Fundamentals of Game Design
3. Introduction to the Unity editor
4. Unity programming
5. Game Objects
6. Models, Materials, and Textures
7. Prefabs
8. Terrain
9. Environments
10. Lights and Cameras
11. Scripting I, II, III, …
12. Collisions
13. Simulating Motion
14. Artificial Intelligence
15. Graphical User Interfaces
16. Character Controllers
17. Particle Systems
18. Animations
19. Animators
20. Audio
21. 2D games
22. Multiplayer
23. Mobile Development
24. Deployment and Development Considerations

Required texts:
> Hocking, Joseph, Unity in Action (3rd edition), Manning Publications Co., ISBN: 9781617299339, Shelter Island, NY, 2022.

Required Software:

Unity Engine LTS 2022: https://unity.com/releases/2022-lts

Generative Artificial Intelligence (AI) /Machine Learning (ML) Policy:
Use only no-cost generative tools (same as for human-made assets) or ai.case.edu. Treat generative tools like search engines or any other asset/code source by citing it as inspiration/reference or explain its use, including name and version of the generative tool, date of use, input prompt and any relevant settings or random seed, original output, and how it was modified or used). Assets that resemble copyrighted assets must be replaced and will be subject to late submission penalties. Consistent with CWRU Academic integrity policy, avoid using generative tools to fabricate human play test feedback and avoid unattributed use or misrepresentation of generative tool output as original.

Graded Material:

Homework Assignments	50%
Final project	50%

Grading and Ethics Policy:

Homework is due as noted on the posted assignments unless documented and approved exceptions exist. The homework will consist of both individual and group assignments. For all group assignments, in addition to receiving an overall team grade based on the level of completion and the quality and degree of problem solution, individuals may be assigned grades either higher or lower than the team grade depending on how their contributions are evaluated.

Except for group/team assignments, all work that you submit must be your own. For individual assignments you are allowed to work together on problem sets at the *strategic level*, i.e., "How do I approach this problem"? However, all work and answers should be derived independently. "Copyright rules" apply to all assignments: you may have the same general story as another student or team in the class, but the details must be your own (or your team's).

Academic Integrity Policy: All students in this course are expected to adhere to University standards of academic integrity. Cheating, plagiarism, misrepresentation, and other forms of academic dishonesty will not be tolerated. This includes, but is not limited to, consulting with another person during an exam, turning in written work that was prepared by someone other than you, making minor modifications to the work of someone else and turning it in as your own, or engaging in misrepresentation in seeking a postponement or extension. Ignorance will not be accepted as an excuse. If you are not sure whether something you plan to submit would be considered either cheating or plagiarism, it is your responsibility to ask for clarification. For complete information, please go to http://bulletin.case.edu/undergraduatestudies/academicintegrity/

Disability Resources: ESS Disability Resources is committed to assisting all CWRU students with disabilities by creating opportunities to take full advantage of the University's educational, academic, and residential programs. For further information, please go to https://students.case.edu/academic/disability/

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