IMVR A130: IMMERSIVE GAME DEVELOPMENT I

Item	Value
Curriculum Committee Approval Date	11/01/2023
Top Code	061410 - Multimedia
Units	3 Total Units
Hours	90 Total Hours (Lecture Hours 36; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

An introduction to Video Game Design and Development as it applies to Immersive Media Technologies, such as Virtual and Augmented Reality (VR/AR), as well as traditional computer games and animated films. Students will learn basic 3D modeling and Game Engine techniques using very powerful design software which is widely used by professionals in the industry. Because most of this software is FREE to non-professionals, students can download and practice with it at home as well, optimizing their ability to learn these time-intensive technologies in 16-weeks. Enrollment Limitation: FILM A223; students who complete IMVR A130 may not enroll in or receive credit for FILM A223. ADVISORY: FILM A220 and DMAD A281. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Discriminate between a variety of game engines and game creation techniques, the use cases of each, and how they relate specifically to current video game and VR/AR experiences on the market.
2. Demonstrate a basic level of proficiency in: a. Planning and workflow of 3D game creation using game engine software; b. Incorporating digital assets into a game engine; c. Designing simple game play and player interactivity; d. Optimizing game engine projects specifically for 360-degree VR/AR viewing and spatial audio monitoring.
3. Demonstrate a basic theoretical understanding of how to build video games and VR/AR experiences from beginning to end, using current game engine software.

Course Objectives

- 1. Understand the basic operation and techniques of game-engine software used in creating video games for a variety of platforms.
- 2. Understand the game-engine techniques and skills specific to 360-degree, Virtual and Augmented Reality projects.
- 3. Understand the unique planning and production workflow of building games and experiences in a game engine.
- 4. Demonstrate a retention and proper use of essential terminology used in video game and VR/AR development.
- 5. Demonstrate the ability to incorporate digital 3D assets from a range of sources into a game-engine project.
- 6. Demonstrate proficiency in creating, managing, and finishing a game-engine project from initial concept to a playable interactive product.
- 7. Demonstrate proficiency in dual-platform (Mac/PC) computer operations and data transfer between a range of devices, including VR/AR systems.
- 8. Recognize important supplemental technologies related to Game Design, Digital Film, Mobile Technologies, VR, AR, Haptics and Motion-Capture.
- 9. Understand how game engines are used in the various industries, including Animated Films, Games, Apps, and VR/AR.
- 10. Understand the main concepts and tools in a Game Engine, including the User Interface, Game Art Design, Game Audio, Project and Asset Management, Materials Effects, Navigation, Lighting, Animation, and simple Programming.
- 11. Demonstrate proficiency in effectively utilizing the main concepts and tools in a Game Engine, including the User Interface, Game Art Design, Game Audio, Project and Asset Management, Materials Effects, Navigation, Lighting, Animation, and simple Programming.

Lecture Content

I. Introduction to Game Engines A. Brief history of how animated films, video games, and VR/AR have evolved B. Overview of the features that Game Engines provide in creating content C. Comparison of the pros and cons of the major Game Engine platforms D. Essential terminology and principles used in Game Development E. Additional research, training, and tutorials available and necessary to supplement the learning process in order to accomplish the average student's creative goals in using Game Engines effectively II. Basic Game Engine Setup and User Interface A. Layouts Customizations B. Views C. Editor Interface III. Project Management Fundamentals A. Layers Masks B. Tags C. Components Properties IV. Asset Management A. Asset categories and formats B. Importing and creating Game Objects, Clips, Prefabs, Scenes, and Models V. Principles of Game Development A. Character, Environment, and Prop Artwork B. Game Design, Theory, Mechanics VI. Image Management A. Materials Textures B. Shaders C. Colors D. Effects E. Particles VII. Physics A. Rigidbodies B. Colliders C. Raycast VIII. Navigation, Pathfinding, and A.I. A. Using a NavMesh IX. Audio A. Standard mono and stereo audio B. 360-degree Spatial Audio X. Animation and Transitions XI. Lighting XII. Programming XIII. Prototyping a Game Idea as an Important Step Toward Finalization XIV. Careers in Immersive Media, Video Game Development, and Filmmaking using Game Engine Development skillsets

Lab Content

I. Basic Game Engine Setup II. User Interface A. Layouts Customizations B. Views C. Editor Interface III. Project Management A. Layers Masks B. Tags C. Components Properties IV. Asset Management A. Asset categories and formats B. Importing and creating Game Objects, Clips, Prefabs, Scenes, and Models V. Game Development A. Character, Environment, and Prop Artwork B. Game Design, Theory, Mechanics VI. Image Management A. Materials Textures B. Shaders C. Colors D. Effects E. Particles VII. Physics A. Rigidbodies B. Colliders C. Raycast VIII. Navigation, Pathfinding, and A.I. A. Using a NavMesh IX. Audio A. Standard mono and stereo audio B. 360-degree Spatial Audio X. Animation and Transitions XI. Lighting XII. Programming XIII. Prototyping a Game XIV. Tutorial screenings pertinent to each module

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)
- Lab (04)
- DE Online Lab (04X)

Instructional Techniques

1. Lecture 2. Demonstration 3. Video examples 4. One-on-one instruction 5. Individual assignments 6. Group assignments 7. Assignment critique 8. Examinations

Reading Assignments

Students will Read 1-2 hours per week from assigned handouts, equipment and software manuals, and online sources.

Writing Assignments

Students will spend 1-2 hours writing game and VR/AR treatments, scripts, and storyboards for their exercises and main projects. Proficiency will be demonstrated by satisfactorily completing assignments and by incorporating the elements of game creation they have learned. Students will demonstrate critical thinking and problem solving skills through the utilization of 3D game engine and VR/AR techniques, and by working through planning and execution challenges.

Out-of-class Assignments

Students will spend 2-3 hours creating basic 3D graphics and game-engine environments, to composite them all together into an immersive game experience. Students will also watch online tutorials.

Demonstration of Critical Thinking

A. Assigned individual projects B. Assigned group projects C. Examinations

Required Writing, Problem Solving, Skills Demonstration

Students will be required to write a script and storyboard for their main projects. Proficiency will be demonstrated by satisfactorily completing assignments and by incorporating the elements of 3D game engine development they have learned. Students will demonstrate critical thinking and problem solving skills through the utilization of unique game engine techniques, and by working through planning and execution challenges.

Eligible Disciplines

Broadcasting technology (film making/video, media production, radio/TV): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Commercial art (sign making, lettering, packaging, rendering): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Media production (also see broadcasting technology): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Multimedia: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Other Resources

1. Selected handouts provided by instructor