



DIG-552: 3D GAME DEVELOPMENT

Effective Term

Fall 2024

BOT Approval Date

11/09/2023

Discipline

DIG - Digital Media

Course Number

552

Course Title

3D Game Development

Short Title

3D Game Development

Credit Status (CB 04)

D - Credit - Degree applicable

Units

Activity Units

3.00

Total Units

3

Hours

Activity Contact Hours

96-108

Out of Class Hours Activity

48-54

Total Contact Hours

96 - 108

Total Out of Class Hours

48 - 54

Total Student Learning Hours

144 - 162

Distance Education

No

Catalog Description

This course introduces intermediate concepts of game development and fundamental creation techniques in the digital game development process. Students will learn the process of integrating production assets into 3D game development through various logic structures and designs that allow for interaction in digital games.



Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)

DIG-551 (with a grade of C or better).

Recommended Preparation

Recommended Preparation (note that students can enroll in the class even if they haven't take the recommended course)

DIG-554.

Codes

TOP Code (CB 03)

0614.20* - *Electronic Game Design

CIP Code

50.0411 - Game and Interactive Media Design.

Student Accountability Model (SAM) Priority Code (CB 09)

C - Clearly Occupational

Noncredit Category (CB 22)

Y - Credit Course

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications

Multimedia

And/Or

End

CSU Area(s)

IGETC Area(s)

Learning Objectives

Learning Objectives

Learning Objective

1. Examine and differentiate the business aspects of game studio startups.
2. Understand intermediate techniques of modern game engines and their role in the game development process.
3. Determine digital prototyping processes for game development testing.
4. Create digital assets for integration into digital game prototypes.
5. Analyze the representation of underrepresented and diverse groups in existing 3D games

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will transform creative ideas into tangible forms.
2. Students will generate new meaning using different media.
3. Students will adapt and apply a technical skill in a new and novel situation.

Program Learning Outcomes

Learning Outcome
Integrate theory with technical skills in digital media projects.
Devise innovative solutions to workflow-related problems.
Analyze the implications of technology changes on the digital media industry.
Apply appropriate design decisions and techniques in new, industry-relevant contexts.
Interpret and produce digital media content in a culturally responsive manner.

Institutional Learning Outcomes

Aesthetic Awareness: The student will identify and evaluate how aesthetic expression leads to an appreciation of social and cultural context as well as the values of art and nature.

Communication: The student will effectively express and exchange ideas through listening, speaking, reading, writing, visual works, and other modes of interpersonal expression.

Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.

Information and Technology Literacy: The student will access, interpret, evaluate, and apply relevant information sources and digital media effectively, and in an ethical and legal manner.

Social Awareness: The student will recognize and analyze the interconnectedness of global, national, and local concerns, analyzing cultural, political, social, and environmental issues from multiple perspectives and appreciate similarities and differences among cultures.

Civic

Personal

and Professional Responsibility

Content

Course Activity Content

1. The Business of Games
 - a. Game Studio
 - i. Funding
 - ii. Investors
 - iii. Development Costs
 - b. Project Management
 - i. Milestone Deadlines
 - ii. Task Tracking
 - iii. Bug Tracking / Player Feedback
2. Game Design
 - a. Iterative Design Process
 - b. Game Structure
 - i. Players
 - ii. Core Game Mechanics
 1. Accessibility Mechanics
 2. Alternative Control Schemes
 - iii. Objectives
 - iv. Resource Management

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- v. Conflict
 - vi. Goals
 - c. Project Development Overview
 - i. Rapid Prototypes
 - ii. Playtesting
 - iii. Game Balancing
 - d. Advanced Game Structures
 - i. Rules & Gameplay
 - ii. Objectives
 - 1. Challenges
 - 2. Actions
 - 3. Goals
 - iii. Game Balancing
 - 1. Symmetrical Game Design
 - 2. Asymmetrical Game Design
 - iv. Level Design
 - e. Character Development & Narrative Diversity
 - i. External Perspectives & Underrepresented Groups
 - ii. The Effects of the race or identity of the Main Character on Story
 - iii. Narrative Themes About Race, Ethnicity, Gender, and/or Ability
 - f. Game Documentation
 - i. High Concept Document
 - ii. Pitch Document
 - iii. Game Design Document
 - g. Diverse & Accessible Game Businesses
 - i. AbleGamers
 - ii. International Game Developers Association (IGDA)
 - iii. Games for Change
 - 3. Game Engine Technology
 - a. 3D Engine Techniques
 - i. Game Pipeline
 - ii. Plugins
 - b. Advanced Prototyping Techniques
 - i. Advanced Game Loops
 - ii. Data Structures
 - c. Game Engine Physics
 - d. Game Engine Lighting / Rendering
 - 4. 3d Game Prototype
 - a. First Person Shooter
 - i. Movement / Camera Controls
 - ii. Inputs
 - iii. Inventory
 - iv. Enemies / Pathfinding
 - v. Health / Loss Condition
 - vi. Levels / Scene Management
 - vii. Power-Ups
 - 5. Level Construction

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- a. Level Building Tools
 - i. Colliders
 - ii. Materials / Textures
 - iii. Lighting / Bake Maps
 - iv. Animation
 - v. Particle Systems
 - vi. Game Build / Testing

Methods of Instruction

Method

Role Playing/Simulation

Integration

Simulated production meeting at the start of every assignment strengthens teamwork and increases student interactive discussion.

Method

Critique

Integration

Instructor-led critiques provide a way to interpret the effectiveness of more exotic types of modeling and animating methods

Method

Film/video Viewing and Discussion

Integration

Film and Video viewing of examples provide an introduction to the early years of 3D animation and its technical development around the world.

Methods of Evaluation

Method

Exams/Tests

Integration

Exam essay evaluates student understanding of the historical animation innovations from cultures outside of the US and their impact on animation development on a global scale. The innovations may include various film effects, 3D animation techniques, and motion capture.

Method

Portfolios

Integration

Portfolio generation exhibiting artifacts communicating animation skills, cultural awareness/sensitivity, and industry knowledge. The portfolio will be evaluated for the number of artifacts, artifact quality, contribution to character/in-game diversity, and visual communication.

Method

Projects

Integration

Projects demonstrating proficient modeling tool skills, shading network design, and timing control of animations. The project will be evaluated based on visual effect, communication, and planning.

Assignments**Assignment Type**

Other

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Assignment: 3D Racing Game

Create a 3d racing game with computer-controlled opponents

CRITERIA (3d First Person Adventure will include the following elements)

Creation of 3d level environment using prototyping tools and 3d modeling software

Creation of 3d props, enemies, and hazards

Creation of 3d particle effects systems for visual effects

Creation of 3d materials and textures

Creation of 3d lighting system

Create functioning User Interface to provide feedback to player

GOALS (Students will be able to)

Comfortably use 3d application to make assets for their game

Use 2d applications to make menu interface

Create complex prefab game objects to work in the game world

Create complex game controllers and inventory system for the player character

Manipulate game scripts to adjust the difficulty of game and enemy behavior

Create a complete game loop in which players can win/lose and restart

Assignment Type

Reading

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Assignment: Article Review

For this assignment, you will be tasked with reading the provided article from the Scientific American that discusses whether violent video games lead to violence. You will need to read this article in class and be prepared with at least 3 observations for discussion at the end of class time. It's okay to disagree with points made in the article!

Read article: Moyer, Melinda W. (2018). Do Violent Video Games Trigger Aggression? Scientific American.



Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Assignment: 3D Game Design Document

Overview:

In this assignment, you will write a design document for a 3D game of your choosing. The design document will serve as a blueprint for your game and should include a detailed description of the game's story, characters, setting, and gameplay mechanics. The purpose of this assignment is to encourage you to think critically and creatively about game design, while also helping you develop stories and characters that aid in the diversification of main characters and their story arcs in the game industry.

Instructions:

Choose a game idea that you are passionate about and that can be developed using 3D game design software.

Write a design document that includes the following elements:

Game overview: Describe the game's story, characters, setting, and intended player experience with a focus on diverse cultures and populations.

Gameplay mechanics: Outline the core mechanics that will drive the game, including how the player will interact with the game world and the challenges they will face.

Art and visuals: Include sketches, storyboards, and concept art that illustrate the game's look and feel.

Audio and music: Describe how sound effects and music will be used in the game.

Development timeline: Outline the development process for your game, including milestones and deadlines.

Design choices: Provide a written explanation of your design choices and how they will contribute to the game's success.

Submit your design document to the CMS for grading and feedback.

Course Materials**Textbooks**

Gibson, Jeremy (2022). Introduction to Game Design, Prototyping and Development: From Concept to Playable Game with Unity and C# (3rd Edition). Addison-Wesley Professional. ISBN-13: 978-0136619949

Class Size Information**Class Size**

32

Class Size Category

G - Large lab 32

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

As a technical/skill-based course, students will consistently apply technical knowledge in projects/animations in ways that reflect/communicate their views, beliefs, and concerns about society, race, gender, and self while also exploring views other than their own.

Diverse characters and narratives (2.e.i-iii in the COR): The course will encourage students to create characters and narratives that represent a range of diverse experiences and perspectives, including those of underrepresented groups. This could involve exploring themes of race, ethnicity, gender identity, sexuality, ability, and more in game narratives and character design.

Inclusive game mechanics (2.b.ii in the COR): The course will encourage students to consider inclusive game mechanics that take into account the different abilities and preferences of players. For example, games that provide alternative control schemes or difficulty levels can help make games accessible to a wider range of players.

Representation in game development (2.g.i-iii): The course will expose students to diverse game developers and industry professionals, and discuss the importance of representation in game development. This could involve inviting guest speakers from diverse backgrounds to speak to the class or assigning readings or videos that highlight the experiences of underrepresented game developers.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

Modern games are a form of communication and communication is an opportunity for expression of self and an exploration of others. For example, students can produce a game that puts the player in the position of a displaced refugee to raise awareness to an issue they choose. Through their production efforts, they will be able to produce game that requires the player to be put into the position of someone they would otherwise have no perspective on. The instruction and evaluation will largely be based on this effect, having students think beyond their own perspectives and place themselves in the perspective of others through the games they both play and create.

In addition, the course is given very clear structure in its course design. Understanding that a lack of structure can leave students behind, this course is structured so that students who engage with the assignments, exercises and pedagogy have clarity in direction and accessibility in content; this way, students who come to the class with different cultural backgrounds, personalities, social supports, and learning differences can approach the course with confidence.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students in this course will actively engage with one another by collaborating on game design projects, playtesting each other's games, and providing constructive feedback. By sharing their ideas and strategies, students can learn from one another and improve their own game designs. Through these collaborative efforts, students can develop a deep understanding of game mechanics and gain valuable experience in game design and team collaboration.

Explain how the course will incorporate instructor-to-student interaction.

Using the course CMS discussion forums and/or in-class, the instructor will participate in class discussions asking students to apply technical/creative concepts, challenge/clarify creative bias, pose questions/critiques to student work, and/or have students think beyond base processes and incorporate passions, views, and concerns into the work they produce. In addition, the instructor will preside over game projects and engage with students through the production process.

Explain how the course will incorporate student-to-content interaction.

Students in this course will engage with the course content through working collaboratively on 3D game development projects and exploring different game engines and design tools to create immersive and engaging game experiences. Through hands-on learning and experimentation, students can develop a deep understanding of game design principles, including level design, game mechanics, and player interaction. They can also explore different aspects of game development, including character design, animation, and sound effects. By immersing themselves in the course content and actively engaging with their peers, students can develop valuable skills and experience in 3D game development, setting themselves up for success in the gaming industry.

Explain how the course will incorporate student-to-self interaction (metacognitive).

Throughout this course, students will reflect on their learning process and analyze their own thinking strategies. They will set goals and track their progress, evaluating their strengths and weaknesses in different areas of the game development process. Through self-reflection and self-assessment, students can develop a deeper understanding of their own learning style and identify areas for improvement, developing their ability to reflect, analyze, and learn from their experiences.