**University of the Incarnate Word** Professor: Jingtian Li (jili1@uiwtx.edu)

ANGD 3371 · Game Programming III Office: AD 408 • 832-5496 | Hours: 1:30 PM - 3:00 PM Mon

1:30 PM– 2:45 PM TR

11:00 AM – 1:00 PM Fri

Fall 2024 MW 3:00 PM - 5:45 PM, AD 407 Teams | Hours: 9:00 – 10:00 PM

**Course Overview:** This studio course builds on the topics covered in Game Programming I and II. Students will learn advanced game programming topics, such as procedural content generation, game design concepts, and interaction with online systems. It is the third part of a series of courses designed to train practical skills that will help prepare students for work in the video game industry.

**Outcomes:** Upon successfully completing this course the student will be able to: Use various procedural generation algorithms to create content and effects for their games. Implement and integrate pathfinding algorithms into their games, both hand-written implementations as well as engine-provided functionality. Design user interfaces for games that complement the gameplay and are intuitive to use, and ensure they scale well to different screen sizes. Create a game that interacts with an online service to host leaderboards or create other social features, and allow for simple asynchronous network gameplay. Design and build games for mobile devices, as well as port previously-created games, and understand how to design them to function well on both phones and tablets.

**Audience:** This is a Junior level course required of ANGD BFA majors in the Programming Concentration.

**Course Text:** *None.*

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| **Date** | **Lecture** | **Exercise** | **Projects** |
| **Project 01 Mobile Twin Stick Shooter** | | | **Personal Project 01** |
| 8/26 | Create the Project and Setup Camera, Basic Touch, and Move Input. | Create the Player Character, Basic Movement Control, and Set up the Testing Environment |
| 8/28 | Personal Project Plan Presentation (5 minutes each), Set up Animations with States, Blend Trees, and Parameters. | Make the Player Character Animate Based on Input and Movements. |
| 9/4 | Weapon and the Inventory System 01 – Basic Weapon and Inventory Class. | Make the Weapon class and the Inventory Component, Implement the Give, Attachment, and Equip Logic. |
| 9/9 | Weapon and the Inventory System 02 – Weapon Animations, Weapon Switch, Aim and Targeting Mechanics. | Add the Weapon Animation Layer and Controller Overrides. Implement the Aiming Component. |
| 9/11 | Health Component, Health Bar, Death Sequence, and Bullet VFX | Implement the Damage System, Character Death Sequence, and add the Bullet VFX. |
| 9/16 | **Personal Project 01 Code Review** | |
| 9/18 | AI Perception | Make AI able to Sense Player with Sight and Damage Perception. |
| 9/23 | AI Behavior 01 – the Behavior Tree Concepts and Classes. | Implement Behavior Tree Node, Compositor, Sequencer and Selector. |
| 9/25 | AI Behavior 02 – the Blackboard, and Behavior Tree Tasks | Implement the Patrolling Behavior, with a Move to Target Task. |
| 9/30 | AI Behavior 03 – the Attack Task, and the Blackboard Decorator. | Implement the Blackboard Decorator to Control the Flow of Behavior Tree. Using Behavior Tree Interface to Abstract the AI Avatar Game Object. |
| 10/2 | **Personal Project 01 Presentation. 15 Minutes Each.** | | |
| 10/7 | Personal Project Plan Presentation (5 Minutes Each). Ranged Enemy & Enemy Spawner. | Make a Ranged Enemy and Spawning Enemy. | **Person Project 02** |
| 10/9 | Player Abilities, Speed Up, and Fire. | Create the Ability System and Implement the Speeds Up and Fire Ability. |
| 10/14 | Shop System, and the Singleton Pattern. | Create a Shop System that Allows the Player to Buy Ability and Weapons. |
| 10/16 | Menu & Audio Setup. Object Pooling. | Create the Main Menu of the Game and Setup Audio Facilities. |
| 10/21 | Save Game, Review & Build the Game. | Implement the Same Game Mechanic & Build the Game for Android and iOS. |
| 10/23 | **Personal Project 02 Code Review** | |
| **Project 02 – The Hand of God VR** | | |
| 10/28 | Project Creation and Introduction to VR. | Install the VR Development Tools, Initialize the VR Device, Create the Player, And Test Run with Unity. |
| 10/30 | Set up VR Controllers and the Input Binding. | Implement the VR Rig and Bind the Input to Player Control. |
| 11/4 | Magic Wand, the Drag and Zoom System. | Code the Dragging Behavior of the Globe and Implement the Zooming Mechanic. |
| 11/6 | Implement Threats and Damage. | Create Meteor and Strom threats and Implement the Damaging Mechanic. |
| 11/11 | **Personal Project 02 Presentation. 15 Minutes Each.** | | |
| 11/13 | Final Team Project Presentation (5 minute each) Vote, and Team Selection. 3 Person Per Team. | | **FINAL TEAM PROJECT** |
| 11/18 | Inventory And UI | Implement Drag and Drop Inventory System and UI. |
| 11/20 | Wrap up and Package the Game. | Package the VR Game to the Platform. |
| 11/25 | Final Project Workday & Code Review | Q & A Helping Sessions |
| 11/2 | Final Project Workday & Code Review |  |
| 12/4 | **Final Project Presentation, 3 Projects, 30 Minutes Each** | |
| Final | Final Due Friday, Dec 8th Before Midnight |  |

# Grading Activities: Your final grade will be based on checkpoints and projects, your grade will be based upon the percentage of 100 pts you have earned. 100-90=A, 89-80=B, 79-70=C, 69 and below =F.

# Attendance: Attendance is mandatory.  After one absence, each additional absence will result in a letter drop in your final grade. *If you are late 3 times, that counts as an absence*. Illnesses or doctor's appointments are excused, but try to avoid appointments during class time. If you miss 30% of class (for this class XX meetings) for any reason - even if medically excused - you will need to withdraw; the class needs to be retaken.

**Late Work Policy**: No late assignments accepted. All assignments are due before the beginning of class on the day they were due. If you are sick or had to miss class, the assignment is still due. There are no redos. Make every project you turn in count.

**Assignments**: Every code review worth 20 points, there are 2 code reviews and worth 40 points in total. Every personal project worth 20 points, there are 2 personal projects, and worth 40 points in total. The final project worth 20 points, and you can get 100 points in total and will be mapped to UIW Grading Scale for Final Grade.

**Academic integrity Policy**: Self Plagarism: No work previously completed in another section or another course can be turned in. AI use or downloaded content is prohibited in all coursework, unless otherwise specified by your instructor.

**ANGD Phone/Device Policy**: When in class, no phones or devices. Keep them put away unless otherwise specified by your instructor. Phone usage in class will be considered a tardy. Three phone uses in class equals and absence and thus a letter drop in grade.

**UIW Course Policies, Guidelines and Accommodation:** This course complies with all UIW academic policies and federal guidelines, including but not limited to: academic integrity, disability accommodations, pregnancy accommodations, Title IX non-discrimination, and class absences for religious observances. Current policy statements will be provided to all students through the learning management system and in information provided on the first day of class. <https://www.uiw.edu/academics/academicpolicies.html>