# ***CSCI 4312 (Advanced Game Development; Spring 2023); Syllabus***

## ***Course description***

This course builds upon the skills and development practices introduced by CSCI 3312 by extending to more advanced and recent game development processes. We will again focus on aspects of general software development (especially Agile/Scrum techniques) in the context of game-specific software design concerns, while also exploring game design and development beyond software implementations. The course will focus on creating 3D video games, and will explore specific topics possibly including game engines, 3D user interactions, 3D graphics, non-playable character artificial intelligence, procedural generation, positional audio, and virtual reality.

## ***Learning Objectives***

- **3D Game Development.** Students will utilize a modern game development engine to create 3D games and will demonstrate important skills related to 3D game development, such as camera control, character movement, physics interactions, lighting and rendering, object interactions, etc.
- **Ideation and Pitching.** Students will design and present their own game ideas in the form of a "pitch" to the class to receive feedback.
- **Critical Evaluation.** Students will examine multiple published games and the prototypes and contributions from other students to critically evaluate and analyze design choices, speculate about alternative solutions, and enhance their own development approaches.
- **Rapid Prototyping.** Students will create prototypes of multiple ideas in a short time frame to demonstrate the feasibility and key aspects of their design ideas.
- **Software Design & Decomposition.** Students will formally decompose larger game development goals into smaller, tractable tasks by applying important design patterns and by creating, maintaining, and updating design documents throughout the software development process.
- **Agile/Scrum Methodology.** Students will apply an Agile/Scrum software development model to collectively create a large-scale game. This will include iterative cycles of planning, sprints, and evaluations over the course of the semester.
- **Collaboration.** Students will utilize collaborative software development skills, such as pair programming, designing common interfaces, and contributing to a shared code base utilizing version control systems.

## ***Basic information***

Class meeting times and locations:

- TR 11:20am - 12:35pm, CSI 257

Additionally, exams will take the form of a series of "game jams" to be held on several Saturdays throughout the semester. You must attend 2 of these jams.

Prerequisites

CSCI 3312 (Into to Game Development); or permission of instructor

The course content assumes a general knowledge of basic data structures (e.g. linked lists, binary search trees, stacks, etc.), a general knowledge of object-oriented programming concepts, familiarity with a game development engine, and a general knowledge of math including basics in trigonometry, geometry, linear algebra, and calculus.

Instructor contact information

Dr. Matthew Hibbs
Office: CSI 270K

- Office hours will be held regularly on most afternoons (except for Thursdays):
  - Mon 2-4, Wed 2-4, Tues 1-2, Fri 1:30-2:30
  - If something disrupts my regular office hour schedule, I'll do my best to update my public calendar, which is linked from the course website
  - Generally, if my door is open and I'm in my office, I'm available to meet with you
  - If my regular times don't work for you, please contact me by email and we can schedule a specific time to meet
- Email: mhibbs@trinity.edu
  - Email is generally a good way to contact me or ask questions. I try to be prompt, but I'm not always available, and may take more time to respond.
- Phone: (210) 999-7482

## ***Course materials***

Reading Materials / Textbook

We will be using the Unity Game Engine to develop our game, and at least some of what you learn in this course will be specific to the current version of Unity. As this material is rapidly changing, we will be relying on the Internet and the wealth of documentation and online tutorials available for Unity.

Web page

Most course-related information (this syllabus, homework and reading assignments, etc.) will be made available via Google Classroom. Additional course material will be provided through GitHub repositories as the course progresses.

## ***Course Requirements***

Grading

The grade for this course will be composed of four components, discussed below. This table summarizes the contribution of each to your grade in the course.

| | |
|---|---|
| The Main Game | 50% |
| Game Jams | 20% (10% each) |
| Game Critiques & Discussions | 10% |
| Initial Game Pitch & Prototype | 20% |

The Main Game

A major goal of this course is for you to experience the creation, from beginning to end, of a fully functioning 3D video game so that you will have a firsthand approximation of the development process. As such, most of your grade will be based on The Game. The Game will be created using an Agile/Scrum development process. The class will be divided into Scrum teams of 3-4 students per team, and we will proceed on a schedule of multiple 2-week Agile/Scrum phases ("sprints"). At the end of each sprint, our goal is to have The Game in a fully-playable state. Clearly, at early phases The Game will not be feature complete, but we will be making constant and adaptive progress toward our eventual goals. Sprint planning sessions, backlog management, scrum meetings, and sprint evaluations will all take place during class. At the end of each sprint, all team members will evaluate themselves and the other members of their team through peer evaluation forms. Individual grades for The Game will be based on my evaluation of the work of your team, my evaluation of your individual contributions to your team, your teammate's evaluations of you, and the quality of your self-evaluation

and evaluations of your teammates. My evaluations of team and individual performance in development of The Game will be based on your team's productivity and product quality, your team's adherence to the agile/scrum principles of development, and your team's ability to deliver on sprint goals.

Game Jams

Many (if not most) game development houses participate in a process called "game jamming", where in a defined and limited amount of time, the team creates an entire, functional game. These are typically small scale, often exploratory projects, but have turned into major hits, and have become a strong creative avenue for game development. Rather than hold traditional exams for this course, we will have a series of game jams on weekends throughout the semester. Multiple jams will be held, and each student must participate in at least 2 of the jams to receive full credit. The dates of the jams will be determined based on a survey of student availability taken near the beginning of term. Grading will be similar to The Game, and will be based on my evaluation of your team and yourself, evaluation of you by your team members, and the quality of your self-evaluation and evaluation of your teammates.

Game Critiques

A few times through the semester, I will assign written critiques analyzing and evaluating the design of different games. Written critiques should address the questions assigned for each game, as well as contain your own thoughts and evaluation of its design and discussion of how the game could be developed. This portion of your grade will be based on your short writing assignments, as well as your participation in class game critiques and discussion.

Initial Game Pitches & Prototypes

Before we determine all aspects of The Game; all students will be expected to create an industry-style "pitch" of a game concept. Game pitches will be delivered in 2 stages during class. The first will entail a basic idea of the proposed game concept, while the second should include some form of working prototype or tech demo of the major mechanics proposed. For both of these milestones, you may work individually or in pairs. Based on these initial game pitches, the class will decide upon the final concept and plan for The Game.

***Course Policies***

Late and Missed Work

As per Agile/Scrum methods, sprint deadlines are fixed and cannot be changed. As such, work cannot be accepted late, rather it is pushed back into the pool of available tasks and re-distributed in the next sprint. Thus, late or missed work will result in poorer evaluations by teammates and the instructor during development of The Game.

Academic integrity at Trinity

All students are covered by the Trinity University Honor Code, which prohibits dishonesty in academic work. The Code asserts that the academic community is based on honesty and trust. It defines specific violations as well as the procedure to determine if a violation has occurred. It also covers the process of hearings for alleged violations and the various sanctions applied for specific violations, and it provides for an appeal process.

Collaboration and academic integrity in this course

This course is largely about teamwork, reflecting a (quasi-)realistic game development environment. Please help each other. Please be in the labs together working with your teams. Please use the Internet and don't reinvent more wheels than necessary. This is the key point for academic integrity in this course: **We must follow copyright, intellectual property, and common sense laws in the use**

**of any materials from the Internet.** This means that **if you want to use someone else's code, image, sound, movie, effect, etc., you must have permission**, and you must document that permission. This is especially important, because in order to release our game, we must have the rights to do so.

***Title IX/Sexual Misconduct Reporting***

As a Responsible Employee who is committed to creating an environment where every member of our community can thrive, I want to let you know that I am a Mandatory Reporter under Texas state law. What that means is that I am am required to report any instances of sexual misconduct, including sexual harassment, non-consensual sexual intercourse, non-consensual sexual contact, sexual exploitation, intimate partner violence, stalking, and related retaliation that I am aware of to the Title IX Coordinator. So, if you share information with me about any incidents that implicate the Sexual Misconduct or Anti-Harassment Policies, I am required to report all information to the Title IX Coordinator to make sure you have information about support resources and complaint resolution options. My report does not initiate the complaint process, and you are in control over how you choose to engage with our Title IX Coordinator. If you or someone you know has experienced sexual misconduct, including sexual harassment, I encourage you to share this information directly with the Title IX Coordinator or one of the individuals who has been designated as a confidential resource on campus. Information about reporting is available here: Reporting.

***Academic Support Resources***

Trinity faculty hold students to the highest academic standards and also know that the very best students seek out help when necessary. The following resources are in place to support your academic success:

- Academic Success: time management, student skills, test anxiety, note taking, supplemental 1:1 tutoring
- Career Services: major exploration, career guidance
- Counseling Services: mental health concerns, mental health referrals
- Quantitative Reasoning and Skills Center: tutoring for quantitatively demanding coursework
- Student Accessibility Services: accommodations for a diagnosed disability
- Wellness Center: nutrition, sleep, stress management
- Writing Center: starting a paper, finding a thesis, drafting and editing