Course:	DMED 540: Special Topics in Digital Media: Exploring Game Engine Technologies − 3 credits
Term:	Spring 2024
Delivery Method:	In person
Instructor:	Thoufeeq Ahamed
Email:	a.thoufeeq@outlook.com
Requirements:	Laptop with Unreal Engine v.5.3

Course Description

This course offers an overview of game engine technologies with a special focus on Unreal Engine 5. Students will explore different use cases for game engine technologies and go over fundamentals including basic scripting, animation, user interfaces, level-creation, lighting, and materials. The course will start with teaching basic concepts and techniques through in-class workshop sessions and take-home assignments. Students will then be assigned a final project that brings together all these fundamentals as we explore advanced topics including spatial applications for AR/VR, multiplayer, and learning how to collaborate effectively on Unreal Engine projects together.

Course Objectives

The goal of the course is to help students understand how to use Unreal Engine for interactive 3D and spatial prototyping towards various use-cases including gaming, training and simulation, enterprise applications, etc.

By the end of this course, students will be able to:

- Describe what game engines do, how they work, and the basics of real-time 3D pipelines.

- Implement basic interactive and scripting logic using Unreal Engine's (UE) Blueprints system.

- Implement animation, UI, textures, materials, and particle effects in their projects.

- Describe how multiplayer systems work.

- Import and manage content, set up version control systems, and collaborate effectively on a UE project.

- Make cost-complexity tradeoff decisions during the development process.

Format of the Course

- Classes are weekly, in-person on Mondays from 5:30-8:30pm.
- Classes are 3-hour workshop-oriented sessions.
- Experiential learning is the key, making attendance and participation a must.
- Course materials, required reading, assignments, and grading will be through Canvas.
- Final project: Industrial application/gamification project which will be individual with the option to work in pairs.

- In-class project check-ins will be structured like development team standups. Think along the lines of: "What was accomplished last week?", "What are you working on this week?", and "What challenges are you dealing with?"

Course Schedule

The following schedule outlines the proposed topics covered during the course. *Based on the interaction with students as well as the topics covered by other parallel courses, some topics may be added, modified, or swapped during the semester at the discretion of the instructor.*

Class	Topic
Week 1 (Monday, January 8)	Intro to Game Engines: How they work, how they're used in the industry, and how they're evolving.
Week 2 (Monday, January 15)	Starting a new project, understanding the engine's UI and tools, creating our first scene. Overview of how development teams work. **Assignment #1: Level design and layout (Video submission)**
Week 3 (Monday, January 22)	Intro to logic and scripting: Understanding basic logic systems, order of operations, and scripting in some interactivity.
Week 4 (Monday, January 29)	Blueprints and game logic: Working with UE's blueprint system, and making interactive elements work with each other. **Assignment #2: Scripting logic (Video submission)**
Week 5 (Monday, February 5)	Animation pipeline and materials: How to import animations, understanding how animations and scripting work together, and creating our first dynamic material. **Assignment #3: Animation assignment (Video submission)**
Week 6 (Monday, February 12)	UI systems: Creating UI systems for 2D and spatial applications, integrating UI with interactions. **Assignment #4: UI logic and Dynamic materials (Video submission)**
Week 7 (Family Day/Reading Break) Makeup Class - FEB 17 (Saturday AM class)	Putting it all together: Workshop session to create a basic interactive prototype. **Assigning final projects.**

Week 8 (Monday, Feb 26)	Content management: Where to get assets, importing content, best practices for content management, introduction to version control.
Week 9 (Monday, March 4)	VR/AR/Spatial industry applications + Project check-in.
Week 10 (Monday, March 11)	Multiplayer! How it works, and workshop session.
Week 11 (Monday, March 18)	How to optimize your game/experience + Project check-in.
Week 12 (Monday, March 25)	Discussing industry applications for 3D + Project check-in. **(No class next week due to stat holiday)**
Week 13 (Monday, April 8)	**Final project presentations, user testing, and feedback sessions.**

Evaluation

Grades are highly individualized, impacted by their interaction with others, and directly proportional to conscious attendance and participation, and timely delivery of quality assignments.
Mid-term grades are provided as a barometer of progress and to give each student the ability to improve their performance in the course.

Grades will be based on the following criteria (subject to instructor revision if deemed necessary):

Assignment	Weight	Details
Class participation	15%	Contribution to class discussion, participation and group activities
Assignment I	10%	Level design assignment
Assignment II	10%	Scripting logic assignment
Assignment III	10%	Animation assignment
Assignment IV	10%	UI and Materials assignment
Final project		
Documentation	10%	
Prototypes	15%	Quality of prototypes, level of exploration beyond fundamentals,
Presentation	20%	Final presentation and periodic check-ins

Assignment	Weight	Details
Total	100%	

Grading Profile

A+	95-100	Exemplary expectations
A	90-94	Exceeding expectations
A-	85-89	Meet expectations
B+	80-84	Approaching expectations
B	75-79	
B-	70-74	Below expectations
C	60-69	Far below expectations
F	0 – 59	Fail (Students must retake the course).

A student in a master's or doctoral program must maintain a CGPA of 3.0. Under no circumstances will a student whose CGPA is below 3.0, be awarded a graduate degree.
https://www.sfu.ca/students/advising-resources/calculators/gpa-calculator.html

Attendance and Participation
Regular attendance is expected of students in all their classes (including participation, group work, tutorials, seminars, online etc.). Students who are unavoidably absent due to illness or disability should notify their instructors of their situation.
- Students are expected to attend every class on the schedule (based on their assigned group) and be fully present. While sickness is sometimes inevitable, understand that due to the experiential nature of the material, classes cannot be made up.
- Lateness also informs grading. Classes start punctually every week according to the schedule. Instructions will not be repeated, nor will it be tolerated if a latecomer bothers another student for instructions. If arriving later than half an hour into a class, a student may be marked as absent.

Laptops and Cell Phones
The use of laptops and cell phones during class is at the discretion of the instructor. Students should respect their classmates and instructors and refrain from text messages, social media, games and videos during class and workshop times. Please note the students should always bring a pen and journal to class.

Written & Spoken English
English is the official language of the school and all communication (written and spoken) is expected to be conducted in English. SFU and the MDM Program provide a wide range of free language support for those who need and it is up to each student to seek that support.

Accommodations

The university accommodates students whose religious obligations conflict with attendance, submitting assignments, or completing scheduled tests and examinations. Students should let the instructor know in advance, preferably the first week of class, if they require any accommodations on these grounds.

The Centre for Accessible Learning (CAL) will make every effort to assist students with disabilities so that they achieve their educational goals.
https://www.sfu.ca/students/accessible-learning/establishing-accommodations/accommodation.html

Academic Integrity

SFU's Academic Integrity website http://www.sfu.ca/students/academicintegrity.html is filled with information on what is meant by academic dishonesty, where students can find resources to help with their studies and the consequences of cheating.

Each student is responsible for their conduct as it affects the university community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the university. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the university. http://www.sfu.ca/policies/gazette/student/s10-01.html

Inappropriate use of technology in coursework

If you are using any technology, including generative AI, to produce or edit content that will be part of your graded work in the course, you must be transparent about the tools that you use. Undeclared use of the tool/technology will be considered a violation of the academic integrity policy. Be aware that any tool used will require you to evaluate the output for accuracies and be responsible for making the appropriate corrections.

Graduate Studies Notes

Important dates and deadlines for graduate students are found here: http://www.sfu.ca/dean-gradstudies/current/important_dates/guidelines.html.