Approved by Chair:

Signature

GAME3121 – Game Engine Development I

Course Description

Students gain the fundamental knowledge necessary for building a game engine from scratch. This course assumes a solid understanding of mathematics and strong programming skills. Topics include the architectural and implementation aspects of engine design. This enables the students to create a graphics rendering engine using low level programming interfaces such as DirectX or OpenGL and integrate it with other gameplay aspects, such as input handing, sound, timing, movement, animation, and physics.

Course Outcomes

1. Explain the structure of a game engine.
2. Incorporate various components inside a game engine to functional examples.
3. Apply the collective components of a game engine to the creation of a game project.
4. Apply advanced programming techniques to create a clean, user-friendly interface.
5. Integrate a management system to maintain an efficient engine structure.
6. Construct behavior for elements of a game engine using a scripting language.
7. Format all deliverables to comply with Canadian laws and policies.

List of Textbooks and Other Teaching Aids:

Recommended:

- Game Engine Architecture, Third Edition
  By: Jason Gregory
  ISBN-13: 978-1-1380-3545-4
  Publisher: CRC Press Taylor & Francis Group

Recommended Resources:

- None

Course Delivery Mode

- This course has a separate 3-hour session for each section per week.
- **T163:** All classes are on-campus.
- **T193:** All classes are online.

Any variation to the above will be posted in the online course shell in advance.

Assignment Policy

All assignments must be submitted on the due date of each respective assignment by means specified by their professor for that assignment. For every day past the due date there will be 10% penalty unless the student has notified the professor (via e-mail, phone or in person) ahead of due date that he/she has a valid reason for late submission. Submissions will no longer be accepted after five days past an assignment due date.

Test Policy

Students are required to complete lab tests, quizzes, exams as well as take-home assignments. If a student misses a test for valid reasons, including medical, and can provide a doctor's note, he/she will be given a chance to rewrite the test at a later date.

Students are required to adhere to all George Brown College policies and procedures regarding withdrawals, exemptions, attendance, class assignments and academic dishonesty. Please refer to the following: https://www.georgebrown.ca/about/policies/.

In-Person Exam Policy

Mid-term and Final exams for the T163 programs will be conducted in person. Please note the following exam schedule:

- Mid-Term Exams: Week 7 of the semester
- Final Exams: Week 15 of the semester

Students are expected to be available in person during these exam periods.

Important Note on the Use of Generative AI:

Students must review the "Generative AI Usage Guidelines" document, available on D2L, for detailed instructions on how generative AI tools may be used in this course. The course evaluation table now includes a column labelled "AI Usage Allowed," indicating whether AI use is permitted for each assessment.

Yes: AI can be used with proper referencing.
No: AI cannot be used, and any usage will be considered plagiarism and subject to academic penalties.

Misuse of AI in assessments where it is not permitted or failure to adequately disclose its use will be treated as a violation of academic integrity. According to college policy, consequences may include failing the assignment or the course or more severe disciplinary actions. **Students must also download the AI Usage Declaration form from D2L, complete it, and submit it with their assignments where AI use is permitted.** Adherence to these guidelines is mandatory to maintain academic integrity.

Detailed Evaluation System

Assessment Tool:	Description:	Outcome(s) assessed:	EES assessed:	Date / Week:	% of Final Grade:	AI Usage Allowed

Assignments (2)	Practical assignments	2-7	1-7, 10, 11	5, 13	20	YES
Labs (8/10)	Practical lab exercises	1-3	1-7, 11	2-6, 10-14	20	NO
Midterm Exam	Test on code and theory	1-3, 7	2, 4-7, 11	7	30	NO
Final Exam	Test on code and theory	2-7	2, 4-7, 11	15	30	NO
TOTAL:					**100%**	

Topical Outline

Learning Schedule / Topical Outline (subject to change with notification)

Week	Topic / Task	Outcomes	Content / Activities	Resources
1	- Introduction	1		Ch. 1
2	- Tools of the Trade	1, 2	Lab	Ch. 2
3	- Software Engineering for Games	1, 2	Lab	Ch. 3
4	- Parallelism	1-3	Lab	Ch. 4
5	- 3D Math for Games **- Assignment 1 Due**	1-4, 7	Lab	Ch. 5
6	- Engine Support Systems - Review	1-6	Lab	Ch. 6
7	**Midterm Exam**	1-6		
8	*INTERSESSION WEEK*			
9	- Resources and File System	2, 3		Ch. 7
10	- The Game Loop	2-4	Lab	Ch. 8
11	- Human Interface Devices	2-5	Lab	Ch. 9
12	- Tools for Debugging and Development	2-6	Lab	Ch. 10
13	- Animation **- Assignment 2 Due**	2-6, 7	Lab	Ch. 12
14	- Game Audio - Review	2-6	Lab	Ch. 14
15	**Final Exam**	1-6		
Please note: this schedule may change as resources and circumstances require. For information on withdrawing from this course without academic penalty, please refer to the College Academic Calendar: **http://www.georgebrown.ca/Admin/Registr/PSCal.aspx**				