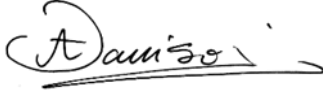


Approved by Chair:



Aug 21, 2023

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 handling, 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.

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/>.

## Detailed Evaluation System

| Assessment Tool: | Description:            | Outcome(s) assessed: | EES assessed: | Date / Week: | % of Final Grade: |
|------------------|-------------------------|----------------------|---------------|--------------|-------------------|
| Assignments (2)  | Practical assignments   | 2-7                  | 1-7, 10, 11   | 5, 13        | 20                |
| Labs (8/10)      | Practical lab exercises | 1-3                  | 1-7, 11       | 2-6, 10-14   | 20                |
| Midterm Exam     | Test on code and theory | 1-3, 7               | 2, 4-7, 11    | 7            | 30                |
| Final Exam       | Test on code and theory | 2-7                  | 2, 4-7, 11    | 15           | 30                |
| <b>TOTAL:</b>    |                         |                      |               |              | <b>100%</b>       |

## 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<br>- <b>Assignment 1 Due</b> | 1-4, 7   | Lab                  | Ch. 5     |
| 6  | - Engine Support Systems<br>- Review             | 1-6      | Lab                  | Ch. 6     |
| 7  | <b>Midterm Exam</b>                              | 1-6      |                      |           |
| 8  | <b>INTERSESSION WEEK</b>                         |          |                      |           |
| 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<br>- <b>Assignment 2 Due</b>         | 2-6, 7   | Lab                  | Ch. 12    |
| 14   | - Game Audio<br>- Review                         | 2-6      | Lab                  | Ch. 14    |
| 15   | <b>Final Exam</b>                                | 1-6      |                      |           |
| <b>Please note: this schedule may change as resources and circumstances require.</b><br>For information on withdrawing from this course without academic penalty, please refer to the College Academic Calendar: <a href="http://www.georgebrown.ca/Admin/Registr/PSCal.aspx">http://www.georgebrown.ca/Admin/Registr/PSCal.aspx</a> |  |          |                      |           |

