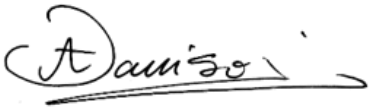
Approved by Associate Dean:



06 January 2026

Signature

GAME3111 – Advanced Graphics Programming

Course Description

Students explore a wide range of advanced 3D graphics programming topics. Modern games require a delicate balance between visual quality and rendering speed, imposed by the limitations of the available hardware. Students learn to dynamically manage the complexity of 3D scene representations through model, animation, and texture level-of-detail techniques. In addition, advanced geometry handling techniques, mesh optimization, and advanced scene management techniques are studied.

Course Outcomes

1. Use math techniques appropriate to the creation of various applications.
2. Initialize Direct3D to create various applications.
3. Develop lighting and texturing techniques for use in applications.
4. Implement different types of shaders within an application.
5. Dynamically manage scene representations for an application.
6. Utilize advanced geometry handling techniques for a variety of applications.
7. Develop applications that use custom meshes and character animations.
8. Format all deliverables to comply with Canadian laws and policies.

List of Textbooks and Other Teaching Aids:

Required:

Introduction to 3D Game Programming with DirectX 12
By: Frank Luna
ISBN-13: 978-1-942270-06-5
Publisher: Mercury Learning and Information

Recommended Resources:

None

Course Delivery Mode

- This course has a combined 2-hour lecture, and separate 2-hour lab sections per week.
- T163: Labs are on-campus, and lectures are online except for Week 7 and 15 for exams.

- T193: All classes are online, including exams.

  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 (If applicable): Week 7 of the semester
- Final Exams (If applicable): 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
Labs (8/10)	Weekly DirectX coding exercises	1-8	4,5,7	2-6, 10-14	20%	NO

Assignment 1	Practical DirectX assignment	1-4, 8	4,5,7	6	15%	YES
Assignment 2	Practical DirectX assignment	1-8	4,5,7	11	15%	YES
Midterm Exam	Written test on code and theory with t/f and mc questions	1-4	4,5,7	7	20%	NO
Final Project	Practical DirectX code project	3-7	4,5,7	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, Math Review	1		Class notes
2	- Direct3D Initialization	2	Lab	Class notes
3	- Rendering Pipeline	2	Lab	Class notes
4	- Drawing in Direct3D	1-4	Lab	Class notes
5	- Lighting	1-4	Lab	Class notes
6	- Texturing **- Assignment 1 Due**	1-4, 8	Lab	Class notes
7	**MIDTERM EXAM**	1-4		
8	*INTERSESSION WEEK*			
9	- Blending	1-4		Class notes
10	- Stenciling	5	Lab	Class notes
11	- Geometry Shader **- Assignment 2 Due**	5, 6, 8	Lab	Class notes
12	- Compute Shader	5,6	Lab	Class notes
13	- The Tessellation Stages	5, 6	Lab	Class notes
14	- FPS Camera, Instancing, Frustum Culling	6, 7	Lab	Class notes
15	- Picking **- Final Project Due**	3-8		Class notes

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**