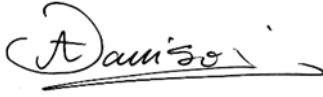


Approved by Chair:



Dec 24, 2023

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:

Recommended:

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/>.

Detailed Evaluation System

Assessment Tool:	Description:	Outcome(s) assessed:	EES assessed:	Date / Week:	% of Final Grade:
Labs (8/10)	Weekly DirectX coding exercises	1-8	4,5,7	2-6, 10-14	20%
Assignment 1	Practical DirectX assignment	1-4, 8	4,5,7	6	15%
Assignment 2	Practical DirectX assignment	1-8	4,5,7	11	15%
Midterm Exam	Written test on code and theory with t/f and mc questions	1-4	4,5,7	7	20%
Final Project	Practical DirectX code project	3-7	4,5,7	15	30%
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		Ch. 1-3
2	- Direct3D Initialization	2	Lab	Ch. 4
3	- Rendering Pipeline	2	Lab	Ch. 5
4	- Drawing in Direct3D	1-4	Lab	Ch. 6, 7
5	- Lighting, Texturing	1-4	Lab	Ch. 8, 9
6	- Blending, Stenciling - Review - Assignment 1 Due	1-4, 8	Lab	Ch. 10, 11
7	MIDTERM EXAM	1-4		
8	INTERSESSION WEEK			
9	- Geometry Shader, Compute Shader	1-4		Ch. 12, 13
10	- The Tessellation Stages	5	Lab	Ch. 14
11	- FPS Camera, Instancing, Frustum Culling - Assignment 2 Due	5, 6, 8	Lab	Ch. 15, 16
12	- Picking	5,6	Lab	Ch. 17
13	- Mapping	5, 6	Lab	Ch. 18-20

14	- Ambient Occlusion	6, 7	Lab	Ch. 21
15	- Quaternions, Character Animation - Final Project Due	3-8		Ch. 22, 23
<p>Please note: this schedule may change as resources and circumstances require.</p> <p>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</p>				