OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: MEDA 380	**Number of Credits:** 3 Course credit policy (105)

Course Full Title: Game Engines II
Course Short Title:

Faculty: Faculty of Humanities	**Department (or program if no department):** Media Arts

Calendar Description:

Students explore advanced practical uses of game engines, with an emphasis on project management, developing organized production pipelines, and utilizing efficient asset management techniques. Topics will include advanced environmental design, experiential production, game logic engineering, architectural previsualization, and data visualization.

Prerequisites (or NONE):	MEDA 280.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number:

Cross-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Course Details

Special Topics course: **No**
  (If yes, the course will be offered under different letter designations representing different topics.)

Directed Study course: **No**

Grading System: **Letter Grades**

Delivery Mode: **May be offered in multiple delivery modes**

Expected frequency: **Annually**

Maximum enrolment (for information only)**:** 32

Typical Structure of Instructional Hours

Lecture/seminar	15
Tutorials/workshops	15
Supervised laboratory hours (computer lab)	15
Total hours	**45**

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

Prior Learning Assessment and Recognition (PLAR)

PLAR is available for this course.

Transfer Credit *(See **bctransferguide.ca**.)*

Transfer credit already exists: **No**

Submit outline for (re)articulation: **No**
  (If yes, fill in transfer credit form.)

Department approval		**Date of meeting:**	November 26, 2021
Faculty Council approval		**Date of meeting:**	December 17. 2021
Undergraduate Education Committee (UEC) approval		**Date of meeting:**	February 25, 2022

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Use a game engine for real-time interactive design.
2. Apply user experience design concepts to human-computer interaction (HCI) systems.
3. Engineer games, software, or interactive experiences, using a visual scripting system.
4. Produce 2D and 3D computer-generated imagery and animation for use in interactive experiences.
5. Use proceduralism to generate assets.
6. Use a game engine for experiential production.
7. Use game engines for architectural, product, and data visualization.

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Assignments:	35%	Project:	50%	Quizzes/tests:	15%

Details: Assignment (35%): Virtual Production for VFX. Quiz (15%): Visual Scripting Challenge. Project (50%): Create a Game or Interactive Experience.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. Open Educational Resources (OER) should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.)*

	Type	Author or description	Title and publication/access details	Year
1.	Textbook	Cookson A, DowlingSoka R, Crumpler C, Johnson T	Unreal Engine 4 Game Development in 24 Hours, Sams Teach Yourself	2016
2.	Textbook	Shannon Tom	Unreal Engine 4 for Design Visualization: Developing Stunning Interactive Visualizations, Animations, and Renderings	2017
3.	Textbook	McCaffrey M	Unreal Engine VR Cookbook: Developing Virtual Reality with UE4	2017

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Adobe Photoshop CC, Unreal Engine.

Course Content and Topics

Unit 1: Advanced rendering, architectural visualization, and landscape design.
- Real-time rendering methods.
- Target framerates.
- Limitations of a renderer.
- Architectural previsualization.
- Lighting workflows.
- Physically Based Rendering (PBR).
- Advanced PBR materials.
- Optimizing geometry, normals, textures and UVs.
- Level of detail (LOD) systems (eg. nantite).
- Introduction to photogrammetry.
- Introduction to proceduralism.
- Landscape generation.
- Procedural geometry.
- Data-visualization and generating objects, or textures from data.
- Foliage, snow, erosion, and tree distribution.

Unit 2: Experiential production and mixed reality.
- Virtual production technology, and workflows.
- Experiential production.
- AR, VR, MR, simulation.
- Real-time motion-tracking.

Unit 3: 30 Day game design challenge.
- Project planning and designing a pipeline for a game concept
- Asset management.
- References.
- Playtesting.
- Questionnaires.
- AB testing.
- Interpreting data.