UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 2003
REVISED COURSE IMPLEMENTATION DATE: January 2018
COURSE TO BE REVIEWED: (six years after UEC approval) February 2018
Course outline form version: 10/29/2012

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

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

Course Code and Number: COMP 360	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Computer Graphics **Course Short Title (if title exceeds 30 characters):**	
Faculty: Faculty of Professional Studies	**Department (or program if no department):** CIS

Calendar Description:

This course focuses on the development of Computer Graphics technology. Topics include graphics hardware, lighting models, texture models and the geometric representation of shapes and surfaces.

Prerequisites (or NONE):	Admission to the Bachelor of Computer Information Systems degree and COMP 251. Note: Students admitted to a CIS or Computing Science minor may register with department permission.
Corequisites (if applicable, or NONE):	None
Pre/corequisites (if applicable, or NONE):	None

Equivalent Courses (cannot be taken for additional credit)

Former course code/number:

Cross-listed with:

Equivalent course(s):

Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

Transfer Credit

Transfer credit already exists: ☐ Yes ☒ No

Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☒ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☐ Yes ☒ No

To find out how this course transfers, see **bctransferguide.ca**.

Total Hours: 45

Typical structure of instructional hours:

Lecture hours	45
Seminars/tutorials/workshops	
Laboratory hours	
Field experience hours	
Experiential (practicum, internship, etc.)	
Online learning activities	
Other contact hours:	
Total	**45**

Special Topics

Will the course be offered with different topics?
☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 35

Expected frequency of course offerings (every semester, annually, every other year, etc.): Once per 12-18 months

Department / Program Head or Director: Daniel Harris	**Date approved:**	January 27, 2017
Faculty Council approval	**Date approved:**	April 2017
Campus-Wide Consultation (CWC)	**Date of posting:**	May 26, 2017
Dean/Associate VP: Tracy Ryder Glass	**Date approved:**	April 2017
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	September 29, 2017

Learning Outcomes

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

- Assess current hardware and software technologies for 3D computer graphics.
- Explain the 3D rendering process.
- Describe geometric models and their corresponding data structures.
- Demonstrate 3D transformations and composite transformations.
- Explain projections and the specification of a view.
- Demonstrate illumination models and texture mapping.
- Implement the behavior and interaction between objects.
- Give examples of advanced animation techniques.
- Illustrate advanced rendering techniques.
- Design and build 3D graphic applications: CAD systems, flight simulators, and interactive games.

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

This is a lab-based course based on case studies and extensive development practice. The course will be delivered in lecture-lab format with numerous demonstrations. The lab portion will give students and the instructor the ability to view and interact with current projects.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

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

Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	H. Zhang, Y. D. Liang	Computer Graphics Using Java 2D and 3D	☒	Prentice Hall	2007
2.			☐		
3.			☐		
4.			☐		
5.			☐		

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

Typical Evaluation Methods and Weighting

Final exam:	%	Assignments:	100%	Midterm exam:	%	Practicum:	%
Quizzes/tests:	%	Lab work:	%	Field experience:	%	Shop work:	%
Other:	%	Other:	%	Other:	%	Total:	100%

Details (if necessary):

Grading will be based on the students successfully completing a number of short assignments and a large programming project. Peer evaluation will be employed in grading the group-based term project.

Typical Course Content and Topics

- **Overview of Computer Graphics:** Introduction, Computer Graphics Systems and Related Fields, Java 2D and Java 3D
- **2D Graphics: Basics:** Introduction, 2D Rendering Process, 2D Geometry and Coordinate Systems, The Graphics 2D Class, Graphing Equations, Geometric Models, Constructive Area Geometry, General Path
- **2D Graphics: Rendering Details:** Colors and Paints, Strokes, Affine Transformation, Compositions of Transformations, Transparency and Compositing Rules, Clipping, Text and Font
- **2D Graphics: Advanced Topics:** Spline Curves, Custom Primitives, Image Processing, Creating Fractal Images, Animation, Printing
- **Basic 3D Graphics:** Introduction, 3D Rendering Process, Java 3D API Overview, Java 3D Scene Graphs, The Superstructure, The Nodes, The Node Components, The Structure of a Java 3D Program, Backgrounds and Bounds, Compiling Scene Graphs and Capacity Bits
- **Graphics Contents:** Introduction, Points and Vectors, Geometry, Geometry Info, Primitives, Fonts and Texts, Appearance and Attributes
- **Geometric Transformation:** 3D Affine Transformations, Transformations in Scene Graphs, Composite Transforms, Constructing Geometries with Transformations
- **Views:** Introduction Projections, Specification is a View, Java 3D View Model, Picking, Head Tracking
- **Lighting and Texturing:** Introduction, Lights, Illumination Models, Material, Atmospheric Attenuation and Depth Cueing, Texture Mapping, Texture Coordinates Generation
- **Behavior and Interaction:** Introduction, Behavior, Interaction, Behavior and Picking
- **Animation:** Introduction, Alpha Objects, Interpolators, Morphing, LOD, Billboard
- **Additional 3D Topics:** 3D Curves, Surfaces, Sound, Shadows, Geometry Change, Off Screen Rendering, 3D Textures