Bow Valley College

Course Outline

DESN3306

Computer Graphics
Winter 2021 - Current

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DESN3306 Computer Graphics

COURSE DESCRIPTION

This introductory computer graphics course focuses on the development of efficient computer graphic elements including their rendering, control and enhancement. The course introduces two-dimensional (2D) and three dimensional (3D) computer graphics with emphasis on shape representation, visualization, and manipulation as well as problem solving. Using C++ and OpenGL, learner project work addresses graphical pipelines and their implementation including fine tuning graphic elements as they move toward finished animations.

REQUISITES	None
EQUIVALENTS	None
CREDITS	3
HOURS	45
ELIGIBLE FOR PLAR	No
ZERO TEXTBOOK COST	Yes

COURSE LEARNING OUTCOMES

Bow Valley College is committed to ensuring our graduates can demonstrate their abilities in key areas that will make them effective citizens and encourage their development as lifelong learners. In addition to the discipline-specific skills that learners acquire in their programs, the College has identified ten learning outcomes.

College-Wide Outcomes:

1. Communication
2. Thinking Skills
3. Numeracy and Financial Literacy
4. Working with Others
5. Digital Literacy
6. Positive Attitudes and Behaviours
7. Continuous Learning
8. Health and Wellness Awareness
9. Citizenship and Intercultural Competence
10. Environmental Sustainability

#	COURSE LEARNING OUTCOME(S)	COLLEGE WIDE OUTCOMES SUPPORTED
1	Draw geometric primitive types such as lines, triangles, and polygons using Modern OpenGL and C++.	1, 2, 3, 4, 5, 6, 9
2	Develop and interpret computer graphics algorithms.	1, 2, 3, 4, 5, 6, 9
3	Determine the appropriate choice between two-dimensional (2D) and three-dimensional (3D) viewing, projections, modelling, and transformation to address various circumstances or scenarios.	1, 2, 3, 4, 5, 6, 9
4	Write interactive 3D computer graphic programs.	1, 2, 3, 4, 5, 6, 9
5	Fine tune a computer graphic pipeline addressing elements such as rendering, object material modelling, and spotlighting.	1, 2, 3, 4, 5, 6, 7, 9
6	Plan the next steps in the creation of a finished animation using OpenGL addressing fundamental processes such as animation, texture, and surface modelling.	1, 2, 3, 4, 5, 6, 7, 9

COURSE MODULES AND SCHEDULE

**Course schedule subject to change, depending on delivery mode and term of study. For exact dates, please consult the Course Offering Information in Brightspace.*

WEEK/HOURS	MODULES
Week 1	Course Overview Introduction to Computer Graphics
Week 2	The Environmental Setups and drawing geometric primitives
Week 3	Uniform Variables and GLSL Shader Programming
Week 4	OpenGL Transformations
Week 5	OpenGL Projections
Week 6	OpenGL 3D Indexed Drawing and Controlling User Inputs
Week 7	Controlling OpenGL Virtual Camera (View Model)
Week 8	Texture to Surface Coordinate Mapping
Week 9	Reading Week
Week 10	Implementing Texture Mapping
Week 11	Ambient and Diffuse Light Components
Week 12	Specular Light Component and Point Lights
Week 13	Spot Light and the uses of Multiple Lights in a Scene
Week 14	External 3D Model Importing using The Open Asset Importer Library (Assimp)
Week 15	Final Quiz/Assignments/Journal

ASSESSMENT

COURSE LEARNING OUTCOME(S)	ASSESSMENT	WEIGHT
1, 2, 3, 4, 5	Learning activities	30%
1, 2, 3, 4, 5	Assignments	30%
1, 2, 3, 4, 5, 6	Quizzes	20%
1, 2, 3, 4, 5, 6	Project	20%

Important: For details on each assignment and exam, please see the Course Offering Information.

PERFORMANCE STANDARDS

A minimum grade of D is required to pass this course. However, a program may require a higher grade in this course to progress in the program or to meet specific program completion requirements.

Please consult with the program area or contact the program chair for further details. A minimum Grade Point Average of 2.0 is required for graduation.

GRADING SCHEME

Grade	**Percentage**	**Grade Point**	**Description**
A+	95-100	4.0	Exceptional: superior knowledge of subject matter
A	90-94	4.0	Excellent: outstanding knowledge of subject matter
A-	85-89	3.67	
B+	80-84	3.33	
B	75-79	3.0	Very Good: knowledge of subject matter generally mastered
B-	70-74	2.67	
C+	67-69	2.33	

C	64-66	2.0	Satisfactory/Acceptable: knowledge of subject matter adequately mastered
C-	60-63	1.67	
D+	57-59	1.33	
D	50-56	1.0	Minimal Pass
F	Less than 50	0.0	Fail: an unsatisfactory performance

REQUIRED LEARNING RESOURCES

Additional learning resources may be found in the Course Offering Information or in Brightspace.

ADDITIONAL INFORMATION

Additional information may be found in the Course Offering Information or in Brightspace.

ACADEMIC ACCOMMODATIONS

Learners with a disability (learning, physical, and/or mental health) may qualify for academic and exam accommodations. For more information, or to apply for accommodations, learners should make an appointment with Accessibility Services in the Learner Success Services (LSS) Department. Accessibility Services can also assist learners who may be struggling with learning but do not have a formal diagnosis. To make an appointment visit LSS on the first floor of the south campus or call 403-410-1440. It is the learner's responsibility to contact Accessibility Services and request academic accommodations. For more information, please visit our website at http://www.bowvalleycollege.ca/accessibility.

INSTITUTIONAL POLICIES

Bow Valley College is committed to the highest standards of academic integrity and honesty. Learners are urged to become familiar with and uphold the following policies: Academic Integrity (500-1-7), Learner Code of Conduct, Procedures and Guidelines (500-1-1), Learner Appeals (500-1-12), Attendance (500-1-10), Grading (500-1-6), Academic Continuance and Graduation (500-1-5), and Electronic Communications (300-2-13). Audio or video recording of lectures, labs, seminars, or any other teaching and learning environment

by learners is allowed only with consent of the instructor as part of an approved accommodation plan. Recorded material is to be used solely for personal study and is not being used or distributed without prior written consent from the instructor.

Turnitin:

Students may be required to submit their course work to Turnitin, a third-party service provider engaged by BVC. Turnitin identifies plagiarism by checking databases of electronic books and articles, archived webpages, and previously submitted student papers. Students acknowledge that any course work or essays submitted to Turnitin will be included as source documents in the Turnitin.com reference database, where it will be used solely to detect plagiarism. The terms that apply to a student's use of Turnitin are described on Turnitin.com.

Online Exam Proctoring:

Examinations for this course may require proctoring through an online proctoring service. Online proctoring enables online exam taking within a controlled and monitored environment, thereby enhancing academic integrity. Online proctoring may occur through a variety of methods, including but not limited to:

a. live online proctoring where a remote invigilator authenticates identity and observes completion of an exam using specialized software and recordings;
b. automated proctoring where the exam session is recorded and AI (artificial intelligence) analyzed;
c. browser lockdown that limits access to other applications, websites, copying, printing, screen capture and other functions; or
d. a combination of both live/automated proctoring and browser lockdown.

Course instructors will review recordings, analyses, and data obtained through online proctoring for academic integrity infractions. It is the student's responsibility to meet the technical, software, location, and identity verification requirements necessary to enable online proctoring.

Further details of these policies are available in the Academic Calendar and on the Bow Valley College website, bowvalleycollege.ca.

Learners are encouraged to keep a copy of this course outline for future reference.

Collection of Personal Information:

This course, including your image and voice, may be recorded and made available to you and other students taking the course section. By attending the class(es) online or in person, you consent to the collection of your personal information. If you do not wish to be recorded, please contact your instructor before starting the course/class to discuss alternative arrangements.

You may use the recordings only for educational purposes and you must not copy, share, or use the recordings for any other purpose without the instructor's express permission.

Your personal information is collected in accordance with section 33(c) of the Freedom of Information and Protection of Privacy Act (Alberta) to deliver academic programming, support learner flexibility, promote

universal design for learning principles, and for purposes consistent with the course activities and outcomes. If you have any questions about the collection, disclosure, use, or protection of this information, please contact the College's Access and Privacy Officer at foip@bowvalleycollege.ca.