








# Computer Science (COMP) 390

## Computer Graphics (Revision 4)

<b>Status:</b>	Replaced with new revision, see the <a href="#">course listing</a>  for the current revision 
<b>Delivery mode:</b>	Individualized study online  with eText 
<b>Credits:</b>	3
<b>Area of study:</b>	Science
<b>Prerequisites:</b>	COMP 206 or COMP 306 or Professor approval
<b>Precluded:</b>	COMP 390 cannot be taken for credit if credit has already been obtained for COMP 392.
<b>Challenge:</b>	COMP 390 is not available for challenge.
<b>Faculty:</b>	<a href="#">Faculty of Science and Technology</a> 
<b>Notes:</b>	Students who are concerned about not meeting the prerequisites for this course are encouraged to contact the <a href="#">course coordinator</a> before registering

## Overview

*Computer Graphics* is a 3-credit senior-level course that introduces the concepts and implementation of computer graphics. As one of the important subject areas of the study of computer science and information systems, this course will focus on the theoretical aspects and implementation of computer graphics using OpenGL.

## Outline

- Unit 1: Preparation
- Unit 2: Introduction to Computer Graphics and OpenGL
- Unit 3: Basic Programming Techniques using OpenGL
- Unit 4: 2D Graphics
- Unit 5: Colour Systems and Shading
- Unit 6: 3D Graphics I – Transformation and Viewing
- Unit 7: 3D Graphics II – Objects Modeling and Visible Surface Detection
- Unit 8: Lighting
- Unit 9: Surface Rendering
- Unit 10: Basic Ray Tracing Algorithms
- Unit 11: Applying Ray Tracing Techniques
- Unit 12: Additional Topics

## Learning outcomes

Upon successful completion of this course, you will be able to

- explain the core concepts of computer graphics, including viewing, projection, perspective, modelling and transformation in two and three dimensions.
- apply the concepts of colour models, lighting and shading models, textures, ray tracing, hidden surface elimination, anti-aliasing, and

rendering.

- interpret the mathematical foundation of the concepts of computer graphics.
- describe the fundamentals of animation, parametric curves and surfaces, and spotlighting.
- identify a typical graphics pipeline and apply graphics programming techniques to design and create computer graphics.
- create effective OpenGL programs to solve graphics programming issues, including 3D transformation, objects modelling, colour modelling, lighting, textures, and ray tracing.

## Evaluation

To **receive credit** [↗](#) for COMP 390, you must achieve a course composite grade of at least **D (50 percent)** [↗](#), an average grade of at least 50 percent on the assignments, at least 50 percent on the project, and a grade of at least 50 percent on the final examination. The weighting of the composite grade is as follows:


<b>Activity</b>	<b>Weight</b>
Assignment 1	10%
Assignment 2	10%
Assignment 3	10%
Assignment 4	10%
Programming Project	30%
Final Exam	30%
<b>Total</b>	<b>100%</b>

The **final examination** for this course must be requested in advance and

written under the supervision of an AU-approved exam invigilator. Invigilators include either ProctorU or an approved in-person invigilation centre that can accommodate online exams. Students are responsible for payment of any invigilation fees. Information on exam request deadlines, invigilators, and other exam-related questions, can be found at the [Exams and grades](#) section of the Calendar.

To learn more about assignments and examinations, please refer to Athabasca University's [online Calendar](#).

## Materials

Hearn, Donald, Baker, M. Pauline, & Carithers, Warren R. (2011). *Computer Graphics with OpenGL*® (4<sup>th</sup> ed.). Boston, MA: Prentice Hall.  (eText)

### eText

Registration in this course includes an electronic textbook. For more information on [electronic textbooks](#), please refer to our [eText Initiative site](#).

## Other Resources

All other learning resources will be available online.

## Special Course Features

*Computer Science 390* is offered in computer mediated communications (CMC) mode, and can be completed at the student's workplace or home.

## Important links

- > [Academic advising](#)
- > [Program planning](#)
- > [Request assistance](#)
- > [Support services](#)

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

*Opened in Revision 4, November 8, 2013*

*Updated July 16, 2024*

View **previous revision** [↗](#)

---