Class Schedule

Classroom: HP4125
Class Time: Tuesday and Thursday 10:00-11:30
Course Website: Information is on CULearn

Teaching Assistants

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Office Hours</th>
<th>Location</th>
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<tbody>
<tr>
<td>TBA</td>
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Course Description

An overview of computer graphics covering: rendering, modeling, and animation. Topics include geometric primitives and modeling; image formation algorithms such as ray tracing and the Z-buffer; lighting, shading, and texture; and introduction to physics-based animation and character animation.

Topics Covered

The following topics will be covered in this course:

- Computer graphics hardware
- Graphics Pipeline
- Transformation
- Projections
- Graphics primitives
- Lighting models (Gouraud and Phong)
- Shaders
- Collision detection
- Colour
- Modelling (Object representation, hierarchical scenes/object)
- Textures
- Ray tracing
- OpenGL

Other topics such as curve modelling (Bezier curves), clipping, visibility, raster scan, line drawing and polygon fill may be included.

The environment is Visual C++ and OpenGL

Prerequisites

COMP 2401, COMP 2402, Math 1104, Math 1007.
Course Objectives

a. Explain basic concepts of computer graphics
b. Demonstrate computer graphics techniques used in generating graphics images
c. Include mathematical background used in computer graphics

Learning Outcomes:

Students should be able to

- Describe and explain the graphics pipeline
- Create computer graphics in C/C++ using OpenGL
- Create computer graphics models
- Use matrices and vector geometry to create computer graphics images
- Acquire knowledge of lighting models
- Understand the different coordinate system used in computer graphics (model, view, projection, and screen)
- Be able analyse a computer graphics image and determine components that were used in generating it

Textbook(s)


Other books

- Foley, van Dam, Feiner, Hughes, Computer Graphics Principles and Practice, Addison Wesley

Online and Other Resources

Numerous resources are available on line for OpenGL
Opengl.org – OpenGL main page (contains numerous links to OpenGL related websites).

**Library Reserves**

There are no library reserves

**Laboratory Software**

The undergraduate labs on 3rd and 4th floors of the Herzberg building are equipped with WindowsXXX PCs and Microsoft Visual C++ compiler. Visual C++ is the SDK (compiler) that will be used in the course. The computers should also have OpenGL, GLUT and SDL installed on them. This does not prevent you from using any C++ SDK that supports. However, when you hand in assignments or tutorials, make sure that the submitted work (when applicable), must compile and execute using Visual C++ SDK on the lab computers.

**Evaluation/Assessment**

Students will be evaluated in this course according to the following measures.

Tentative Evaluation Schema

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>15</td>
</tr>
<tr>
<td>Tutorials/labs</td>
<td>10</td>
</tr>
<tr>
<td>Project</td>
<td>25</td>
</tr>
<tr>
<td>Midterm</td>
<td>20</td>
</tr>
<tr>
<td>Final</td>
<td>25</td>
</tr>
<tr>
<td>Participation</td>
<td>5</td>
</tr>
</tbody>
</table>

**Evaluation Note**

There will be 3-4 assignments in this course. Assignments will be announced in class and will be available on CULearn and are due at the time indicated on the assignment. Assignments are to be submitted electronically using CULearn. It is your responsibility to ensure that your assignment is submitted properly and that all the files for the assignment are included.

There will be 10-11 tutorials/labs. It is expected that for each completed tutorial you will receive one point up to 10 points.

Please remember to keep a copy of your submitted assignment! No late assignments will be accepted.

Copying of assignments is NOT allowed. Discussion of assignment work with others is acceptable but students are expected to do the work themselves.
Outcome of cases where plagiarism has occurred (e.g., copying an assignment or code) may be:

a. the assignments of the collaborators will be graded 0, b. collaborators will be asked to withdraw from the course c. collaborators will be reported to the Dean of the faculty in which they are registered. Note, that in most cases the latter option will be the most likely outcome. For further information please review the university plagiarism policy.

Tentative Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Task</th>
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</thead>
<tbody>
<tr>
<td>Sept. 23</td>
<td>Project proposal</td>
</tr>
<tr>
<td>Nov. 1</td>
<td>Mid term</td>
</tr>
<tr>
<td>Oct. 24-28</td>
<td>Fall break</td>
</tr>
<tr>
<td>Nov. 2-6</td>
<td>Project – midterm demo/review</td>
</tr>
<tr>
<td>Nov. 11</td>
<td>PMC Accommodation Request</td>
</tr>
<tr>
<td>Dec. 5-9</td>
<td>Project presentations (may be cancelled)</td>
</tr>
<tr>
<td>Dec. 9</td>
<td>Last day of Fall term</td>
</tr>
<tr>
<td>Dec. 9</td>
<td>Project is due</td>
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Tutorials

Weekly tutorials will consist of programming and written work and problem solving. The purpose of the tutorial is to practice concepts studied in class.

In-class Tests

One midterm test.

Midterm Note

Students must retain all assignments and midterm results in case of questions regarding correctness of recorded marks. The marks will be posted on-line. The students should ensure that the posted marks are correct. Any complaints regarding assignment marks should be brought to the attention of the T.A. who marked it (only if the T.A. does not address the problem to your satisfaction should you bring the matter to the instructor). This should be done no later than one week after the assignment has been marked. After this time no remarking will be done.

Final Exam Note

The time and place as well as the format of the final exam will be announced later in the term. Do not make travel plans until the dates are known as no advance exams will be given. The final for this course may use the Scantron automatic grading system.
Assignments

In computer programming, an assignment statement sets or re-sets the value stored in the storage location(s) denoted by a variable name. In most imperative computer programming languages, assignment statements are one of the basic statements.

Presentations

Presentation is the practice of showing and explaining the content of a topic to an audience or learner. Presentations come in nearly as many forms as there are life situations.

Attendance

Class attendance is very important as students will be responsible for all items discussed in class.

Collaboration Policy

Collaborating on assignments is strictly disallowed. You must complete the work by yourself. If you need help, please see a TA or your instructor. Posting assignment solutions on discussion boards before the due date and time is also prohibited.

SCS Computer Accounts

Any student taking an SCS course qualifies to have an SCS account. SCS accounts can be created at the following URL: http://www.scs.carleton.ca/newacct. SCS students can access one of the designated labs for your course. The labs are operational 7 days a week 24 hours per day, please be advised that the building will be closed overnight, Mon. - Fri. 23:00 - 8:00 and on weekends from 17:00 - 8:00. Technical support is available in room HP5161 Monday to Friday from 9:00 until 17:00. All SCS account related information is accessible at the following URL: http://www.scs.carleton.ca/nethelp.

Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP, by telephone at 520-2600, ext. 4364 or by email at undergraduate_advisor@scs.carleton.ca. The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and the Writing Tutorial Services.

University Policies

Student Academic Integrity Policy

Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which
range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar.

**Plagiarism**

As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science.

**Unauthorized Co-operation or Collaboration**

Senate policy states "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

**Academic Accommodations for Students with Disabilities**

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable) at [http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines](http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines)

**Religious Obligation**

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Pregnancy Obligation**

Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Medical Certificate**
The following is a link to the official medical certificate accepted by Carleton University for the deferral of final examinations or assignments in undergraduate courses. To access the form, please go to http://www.carleton.ca/registrar/forms