Objective: This is an introductory course in computer graphics. The topics fall into two main categories: (i) fundamental principles of graphics theory and technology; (ii) graphics programming using OpenGL.

Recommended Texts

Note: Other texts (Hill, Angel, and others) are still useful. Ones that use OpenGL and GLUT are the most helpful.

Reserve reading: See library listing for titles.

Outline: Topics to be studied may include:
- OpenGL
- 2D raster algorithms
- GUI programming
- Computational geometry
- 2D and 3D transformations
- Animation
- Texture
- 3D perspective
- Visible surface determination
- Illuminated surfaces and lighting
- Ray tracing
- ???

Evaluation
- Assignments (3): 40%
- Project: 25%
- Final exam: 35%

Note: A grade of 40% must be obtained on the final to pass the course.

Important dates: (check the online University calendar for makeup days due to holidays)
- Date when 15% of final grade will be reported: Tuesday, October 28, 2014
- Date for withdrawal without academic penalty: Tuesday, November 4, 2014
Relationship between attendance and grades:

As is usually expected in upper-level courses, attendance in class correlates with a good grade in the course. If you must miss a lecture, you are expected to obtain the material and all other information from the lecture from another student (not the professor!).

Assignments

1. Assignments will use C, Glut and OpenGL, on either the Windows or Linux platform. C++ is an option. The department labs support Windows and Linux. If you do your programming elsewhere, be sure that your assignment will compile and run in our lab before handing it in. Assignments that cannot be run by the TA in our lab will be marked accordingly.
2. **No lates! Late assignments are not accepted.** Assignments are due on the specified date/time on the handout. You should hand in your assignment well in advance of the due time/date to avoid problems.
3. In order for an assignment or project to be marked: (a) a completed and signed cover page must be attached to the outside of the envelope containing the assignment, and handed into the course assignment box. (b) An online hand-in script must be used, which will submit your assignment to the marker so he or she can test it.
4. Assignments/projects submitted by email will not be marked.
5. Your assignment data should clearly indicate the operating system that it uses. Using a directory whose name incorporates the operating system used is recommended. That way, the marker can easily organize different assignments onto different platforms for marking.
6. Please be aware of the department’s policy on medical accommodations for assignments and projects (http://www.cosc.brocku.ca/forms/medical).

Course project

1. Projects can be an essay, graphics application, ray tracer, or computer animation. You can work in groups of up to 2 people for the application, ray tracer, and animation. Essays are done individually. See the project handout for information.
2. Essays will be due at the end of term in December (TBA).
3. Application, ray tracing and animation projects will be due in early January (TBA).
4. If you wish to finish your project earlier, you are encouraged to do so. The essay project can be done faster than an application or animation.
5. Projects must also be handed in with a cover page, and submitted into the hand-in box or to me personally. Animations must have a descriptive web page(s) and be viewable online.
6. Projects submitted by email will not be marked.

Plagiarism

Academic misconduct is a serious offence. The principle of academic integrity, particularly of doing one’s own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should consult Section VII, “Academic Misconduct”, in the “Academic Regulations and University Policies” entry in the Undergraduate Calendar, available at http://brocku.ca/webcal to view a fuller description of prohibited actions, and the procedures and penalties.

The department views plagiarism seriously. Since this is an upper-level course, cases of plagiarism will be harshly punished. A **minimum** penalty may be −100% on the offending assignment (i.e. the value of 2 assignments), or a grade of 0F in the course. Students are
directed to the discussion on plagiarism on the department’s web page (http://www.cosc.brocku.ca/about/policies/plagiarism).

Turnitin will be used on all essay project submissions. If you have a principled objection to its use, please see me within the first 2 weeks of the course, to make alternative arrangements.

The Moss plagiarism system will be used on assignments and projects.

Open source code and assignments/projects

In recent years, an increasing number of students have made use of free libraries and/or code obtained from open source web sites. My policy on libraries and open source code in course submissions is as follows.

• If the code reflects a non-essential aspect of the program (e.g. file I/O or some utility function that supports the application, but is not central to the project focus) then it may be acceptable. Students should first confirm with me that it is acceptable. A full citation to the source of the code must be included in inline comments in the program, as well as any supporting report. The start and end of the borrowed code must be clearly delimited with comments.
• If the code is an essential feature, extends the application in some way, or embellishes the functionality of the program, then it should not be used. The extent of use of such code in the final program will be assessed, and a mark will be given accordingly.
• If the sources of libraries or open source code are not fully acknowledged, then academic misconduct may arise.

The purpose of assignments and projects is to evaluate your own ideas and programming skills being applied to some problem in computer graphics. A recurring problem, however, is that assignments and projects are being submitted, in which a substantial portion of code (sometimes over 50%) is not written by the student! Although such code might be cited as to its source, and therefore is not plagiarism, it is often the case that students have no understanding of how the code works, and have used it as a means for avoiding thinking about the problem and implementing it themselves.

The above points apply both to directly copied open source code, as well as code that has been edited and modified to varying degrees, perhaps forming a basis for altered functionality.

Some examples of acceptable “borrowing” of code/libraries (all suitably cited/delimited with comments and accompanying reports):

• Using an image I/O library for reading/writing JPEG-compressed image files (presuming that JPEG compression is not the theme of the project!)
• Using a library for reading/writing a 3D file (eg. Collada).
• Using an audio library for supporting a 3D game.
• Using an XML I/O library for a ray tracer.

Some unacceptable examples:

• Core aspects of the game engine are implemented with open source code.
• A fractal rendering program has a number of mathematical expression and rendering options taken from open source fractal implementations.
- Open source code for a 2D hull algorithm is used to implement a 2D hull for an assignment or project. The algorithm may or may not be one discussed in class.
- Ray tracing intersection code for different mathematical shapes is taken from open source ray tracers.

If you have any doubts about using libraries or open source code, please ask me!

**Academic Accommodation Statement:**

As part of Brock University's commitment to a respectful work and learning environment, the University will make every reasonable effort to accommodate all members of the university community with disabilities. If you require academic accommodations related to a documented disability to participate in this course, you are encouraged to contact Services for Students with Disabilities in the Student Development Centre (4th floor Schmon Tower, ex. 3240). You are also encouraged to discuss any accommodations with the instructor well in advance of due dates and scheduled assessments.

**Academic Accommodation due to Religious Obligations:**

Brock University acknowledges the pluralistic nature of the undergraduate and graduate communities such that accommodations will be made for students who, by reason of religious obligation, must miss an examination, test, assignment deadline, laboratory or other compulsory academic event. Students requesting academic accommodation on the basis of religious obligation should make a formal, written request to their instructor(s) for alternative dates and/or means of satisfying requirements.

**General comments**

In past years, 3P98 students have said that there is more work in this course than in most half-credit courses. You will need to work hard to get a good grade in this course: the assignments are challenging, the project requires independent work, and there is a lot of material to digest for the final exam. It is wise to place a lot of effort in understanding the lecture material, since you must get 40% on the final exam in order to pass the course. Also, start your assignments as soon as possible. Do not leave your assignment until the weekend before the due date! An early start on the project is also recommended.