Fall 2010

CSC 8470 – Computer Graphics Syllabus

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Phone: (610)519-7414

Office Hours  T  10:00 am – 11:30 am  
W  4:30 pm – 5:30 pm

Course Meets  W 6:15 pm - 9:00 pm in Mendel G87

Prerequisites  CSC 8301 – Design and Analysis of Algorithms

Course Description

Computer graphics deals with all forms of graphical images on computers. This course explores the 
mathematical and algorithmic principles of computer graphics. We will begin by experimenting with 
Blender, a powerful open-source interactive package that will help you improve your perception of 3D 
modeling, rendering and animation. In parallel we will delve into OpenGL, a portable graphics library and 
industry standard supported on all platforms. As we discover what these graphics packages can do for us, 
we will take a look at their underlying principles. Topics include 2D and 3D transformations, projections, 
shading, modeling, texture mapping and ray tracing. Understanding this material requires at least a 
working knowledge of geometry and linear algebra, so these mathematical essentials will be reviewed 
throughout the semester. As time permits, we will also experiment with software tools for particle 
systems and game programming.

After taking this course, students are expected to have attained the following knowledge and abilities:

- Understanding of the design issues for creating graphics
- Understanding of the mathematical foundations of graphics
- Understanding of color, illumination, and shading
- Understanding of rendering and rasterization techniques

Resources

There is no required textbook for this course. We will mainly use online materials. References to course-
related materials will be posted online at

http://www.cse.villanova.edu/~mdamian/graphics/

Please make sure you check the class page regularly.
Course Requirements

1. **Assignments**: Assignments will involve pencil and paper problem solving, modeling in Blender and programming in OpenGL.

2. **Exam**: One exam distributed towards the end of the semester.

3. **Class Attendance**: Regular attendance is expected of all students. Each student is responsible for all material, announcements, and assignments covered during any class missed.

4. **Late Policy**: All assignments are due at the beginning of the class on the due date. No credit will be given to late assignments. Exceptions to this policy will be granted only in extraordinary circumstances.

Tentative Grading Procedure

The following allocation of points is tentative and may change during the semester:

- Exam: 30%
- Assignments: 60%
- Participation: 10%

Academic Integrity

I encourage you to collaborate on assignments and learn from your fellow students. However, there is a fine line between collaboration and cheating. Collaboration means discussing problems and solution approaches with other students and independently writing your own answers; cheating means copying solutions from someone else or giving someone else your solutions. If you have questions about what is acceptable, please bring them to me *before* submitting your work.

Cheating, plagiarism and helping others commit these acts are all forms of academic dishonesty, and will not be tolerated. The penalty for any act of dishonesty is an ‘F’ grade for the course. Please consult the Code on Academic Integrity at

http://www.academics.villanova.edu/AcademicIntegrity.html

Special Arrangements

If anyone has a disability or other problems that warrant the need for special accommodation to complete the course work, please contact me at your earliest convenience.
**Tentative Course Schedule**

The course schedule below is approximate and subject to change as the semester progresses. It is the responsibility of the student to learn and adjust to changes.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Week 1: Aug 25</td>
<td>Introduction to Computer Graphics</td>
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<tr>
<td>Week 2: Sep 1</td>
<td>Introduction to OpenGL</td>
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<tr>
<td>Week 3: Sep 8</td>
<td>Modeling and Rendering 3D Objects</td>
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<td>Week 4: Sep 15</td>
<td>Geometric Transformations</td>
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<td>Week 5: Sep 22</td>
<td>Curves and Surfaces</td>
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<td>Week 6: Sep 29</td>
<td>Catching up. Home hands-on.</td>
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<td>Week 7: Oct 6</td>
<td>Texture Mapping</td>
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<td><strong>Week 8, Oct 11 – 17:</strong> Fall break</td>
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<tr>
<td>Week 9: Oct 20</td>
<td>Viewing and Projection</td>
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<td>Week 10: Oct 27</td>
<td>Hierarchical Models</td>
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<td>Week 11: Nov 3</td>
<td>Basic Animation</td>
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<td>Week 12: Nov 10</td>
<td>Lighting and Ray Tracing</td>
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<td>Week 13: Nov 17</td>
<td>Particle Systems and Interaction</td>
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<td><strong>Wk 14, Nov 23 – 28:</strong> Thanksgiving break</td>
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<tr>
<td>Week 15: Dec 1</td>
<td>Game Engine Basics</td>
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<td>Week 16: Dec 8</td>
<td>Advanced Topics</td>
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