Textbooks:  

- *OpenGL Primer* by Edward Angel (ISBN 0-201-74186-5)  

Prerequisites:  

A "C" or better in CSCI 2170 and 3080 or consent of instructor. Programming maturity is advised.

Course Goals:

The primary goal of this course is to introduce students to the theory and practice of 2D and 3D interactive computer graphics. It is not to introduce the student to any specific graphics package used in industry.

Course Objectives:

- To learn the fundamentals of computer graphics hardware systems and organization of graphics software systems.  
- To learn to use mathematical transformations and vector techniques in the production of computer graphics.  
- To learn both fundamental and advanced algorithms for computer graphics.  
- To learn to write graphics programs using OpenGL and GLUT to represent 2D and 3D interactive data models.

Learning Outcomes:

Upon successful completion of this course, a student will:

1. Be able to explain the theory, fundamental concepts, and practical concerns involved in representing, modelling, and interacting with graphical scenes in 2D and 3D spaces.

2. Demonstrate the application of mathematical transformations and vector techniques in producing graphics requiring rotation, translation, scaling, and 3D projection.

3. Be able to apply algorithms used in computer graphics.
4. Have developed experience in graphics programming using a modern API (OpenGL and GLUT).

5. Demonstrate knowledge of computer graphics principles and concepts in the production of C/C++ programs that produce simple graphics

Topics: (all references are to the textbook)
1. Survey of computer graphics applications [Hill Ch. 1]
2. Introduction to graphics display devices[ Hill Ch. 1].
3. Introduction to OpenGL [Hill Ch. 2, Angel Ch 1, 2].
4. Graphics primitives, windows, viewports, clipping, 2D viewing in OpenGL [Hill Ch. 3, Angel Ch 1,2].
5. Interactive graphics, user input, animation [Hill Ch.2, Angel Ch. 3].
6. Vector tools for graphics, geometric transformations, homogeneous coordinates [Hill Ch. 4, 5].
7. 3D Viewing, Camera Analogy, perspective projections, orthographic projections [Hill Ch. 7, Angel Ch 4, 5].
8. Modeling Shapes with Polygonal Meshes, extruded shapes, surfaces of revolution [Hill Ch. 6]
9. Rendering faces for visual realism, shading models, texture mapping, adding shadows [Hill Ch. 8, Angel Ch 6, 8]
10. Curves and Surfaces, Bezier curves, interpolation [Hill Ch 10, Angel Ch 9]

Assessment Methods:
1. Students will demonstrate basic knowledge of computer graphics principles in written homework, programming exercises, and examinations.
2. Students will demonstrate knowledge of mathematical transformations and vector techniques in homework, programming exercises, and examinations.
3. Students will demonstrate ability to use OpenGL in programming exercises and a design project.

Attendance Policy:
School regulations state: “A student is expected to attend each class for which he or she is registered except in cases of unavoidable circumstances. The fact that a student may be absent from a class does not, in any way, relieve that student of the responsibility of work covered or assigned during the absences.”

Attendance will be taken each class period. You are responsible for making up any material missed by being absent. You are also expected to be on time to class. Being late is considered rude and is definitely disruptive to class.

Academic honesty:
All work for this class (including labs, exams, and homework) is to be done on an individual basis. The penalty for unauthorized collaboration will range from a grade of zero for an individual assignment to a failing grade for the course. See http://www.mtsu.edu/~csdept/Academics/academicIntegrity.htm for additional details and complete policy.

- Each student is expected to complete their own work. This includes all homework and exams.
- Students are encouraged to study for exams in groups.
- Students are NOT allowed to complete homework or labs in groups.
- Students are allowed to ask any questions concerning homework to the class instructor or any other instructor at MTSU.
- Students may ask questions of other students IF they deal with how to use the system at MTSU.
- Students may ask questions of other students IF they deal with clarification of a homework or lab assignment.

Exceptions to this policy may be made if any group lab assignments are given.
Instances of cheating may result in punishment ranging from 0 or F for an assignment to F for the course to suspension from MTSU.

Grading procedures:

**Tests (40%)**: Approximately three in-class tests will be given. Tests will cover lectures, assigned readings, homework assignments, etc. Makeups will not be given on tests. If you miss a regularly scheduled exam, the final exam will replace this exam. If you did not miss a test and the grade on the final exam is higher than the grade on your lowest test, then the final exam can take the place of the lowest test score.

**Final Exam (20%)**: A comprehensive final will be given at the end of the semester. If you do not miss any of the three in class exams and your course average is A going into the final, then you may opt out of the final exam. You will need to verify your course average with Dr. Hankins when the third exam is returned. The course average prior to taking the final exam will be calculated as if the three tests counted 60% of the grade.

**Homework (10%)**: Homework assignments that do not require the use of a computer or brief lab assignments will be assigned. Homework assignments are due at the beginning of class on the day due. NO HOMEWORK WILL BE ACCEPTED LATE.

**Programming assignments (Labs) (30%)**: Programming assignments usually require about two weeks to complete. All Programming assignments are given a due date. The late penalty is 10 points per class day. The e-mail submission date & time will be used as the date and time of submission. Assignments in graphics are time consuming and should be started immediately after the assignment is made. NO PROGRAMS WILL BE ACCEPTED over 3 class days late. The last program will be due the last day of class and must be turned in that day. It can not be late. In general, I will try to have graded programs back within a week from that time. Details concerning turning in programming assignments will be given when the first assignment is due.

Grading:

**Grading scale**

Letter grades will be determined using a standard percentage point evaluation as outlined below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90% - 100%</td>
</tr>
<tr>
<td>B+</td>
<td>87% - 89%</td>
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<tr>
<td>B</td>
<td>80% - 86%</td>
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<tr>
<td>C+</td>
<td>77% - 79%</td>
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<tr>
<td>C</td>
<td>70% - 76%</td>
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<tr>
<td>D+</td>
<td>67% - 69%</td>
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<tr>
<td>D</td>
<td>60% - 66%</td>
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<tr>
<td>F</td>
<td>0% - 59%</td>
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</tbody>
</table>

To calculate your final average

Determine your **test average** = (test 1 + test 2 + test 3)/3.0 where one of the tests may be replaced by the final test score if it is lower than the minimum test grade

Determine your **homework average** = (your total points on homework)/(total points possible on homework) * 100

Determine your **program assignment average** = (your total points on programs)/(total points possible on programs) * 100

Determine your **final average** = .40 * test average + .2 * Final test score + .10 * homework average +.3 * program assignment average

**Important Notes:**

**Reasonable Accommodation for Students with Disabilities**: If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with me as soon as possible. Students may also contact the Office of Disabled Students Services (898-2783) with questions about such services.
**Cell Phone/Beeper Policy:** Please turn all cell phones/beepers to silent or vibrate. If you believe you will need to be answering a cell phone, please sit near the door, and quietly leave the room if you receive a call.

**Inclement Weather Policy:** Unless the university is closed, I will meet class, so do not call the office. However, if the school system in your county of residence is closed for bad weather, you have an excused absence from this class.

**Collaboration on assignments is not allowed!** See [www.mtsu.edu/~csdept/Academics/academicIntegrity.htm](http://www.mtsu.edu/~csdept/Academics/academicIntegrity.htm) for a description of unacceptable collaboration. A link to this site is also on the CSCI 4250 web page. It should be noted that the first offense will result in a grade of zero for the homework/lab/test. A second offense will result in a zero for the class.

**Financial aid notice:**

**Do you have a lottery scholarship?** To retain [Tennessee Education Lottery Scholarship](http://scholarships.web.mtsu.edu/telsconteligibility.htm) eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, or I in this class may negatively impact TELS eligibility. Dropping a class after 14 days may also impact eligibility; if you withdraw from this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until a bachelor degree is earned. For additional lottery scholarship rules please refer to your Lottery Statement of Understanding form, review lottery scholarship requirements on the web at [http://scholarships.web.mtsu.edu/telsconteligibility.htm](http://scholarships.web.mtsu.edu/telsconteligibility.htm), or contact the MTSU Financial Aid office at 898-2830.

**For students receiving any form of financial aid, they should always consult with the Financial Aid Office before dropping a course.** For additional information, contact the Financial Aid Office or see [http://www.mtsu.edu/financialaid](http://www.mtsu.edu/financialaid).