Computer Graphics  
CSC 625  
Fall 2018  

Time: 06:30 PM-09:45 PM Monday  
Location: FEC 303, SCH 2007 (via IVN), Credit: 3 hours  

Contacting Your Instructor(s)  
Instructor: Dr. Bo Li  
Office: Science Building, Room 105D  
Office hours: Mondays: 2:30-5:30 PM  
Tuesdays: 2:30-4:30 PM  
Thursdays: 9:00-12:00 AM, 2:30-4:30 PM  
or by appointment  
Email: bo.li@usm.edu  
Phone: 228-214-3306  

Course coordinator: Mr. Tom Rishel  
Email: Tom.rishel@usm.edu  

Course Description  
3 hrs. Architecture of display systems, basic 2-D and 3-D mathematics, 3-D viewing and geometry, advanced surface mathematics, advanced architectures for raster and vector displays, hidden line and hidden surface problems, realistic imaging, software design for 3-D systems.  

Course Objectives  
• To give practical knowledge of the fundamentals of the graphics pipeline  
• To learn the state-of-the-art graphics techniques  
• To improve your programming skills  
• To refresh your math knowledge  
• To focus on  
  ▪ Modeling  
  ▪ Rendering  

Course Materials  
**Course Workload Statement**
Students are expected to invest considerable time outside of class in learning the material for this course. The expectation of the University of Southern Mississippi is that each week students should spend approximately 2-3 hours outside of class for every hour in class working on reading, assignments, studying, and other work for the course. We realize that most students work and have family or other obligations. Time management is thus critical for student success. All students should assess their personal circumstances and talk with their advisors about the appropriate number of credit hours to take each term. Resources for academic support can be found at [https://www.usm.edu/success](https://www.usm.edu/success).

**Grading Policies and Calculation**
A list of possible grades at the University can be found in the Bulletin ([http://catalog.usm.edu](http://catalog.usm.edu)). Note that students will receive an “interim grade” at the six-week point to give them an indication of their performance at that point in the semester.

Students may drop a course with no penalty in the first week of the semester. If students wish to leave a course with a grade of “W” (for “withdrawal”), they may request to do so before November 1, 2018 (specific dates can be found here: [https://www.usm.edu/registrar/fall-2018-academic-calendar](https://www.usm.edu/registrar/fall-2018-academic-calendar)).

Important note: Students who receive a grade of W do not receive any money back and that grade is permanently included on their transcripts.

Students should be aware that “Incompletes” can only be assigned in cases of “extraordinary circumstances” beyond the student’s control.

<table>
<thead>
<tr>
<th>Items</th>
<th>Score</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Attendance &amp; Performance</td>
<td>5 extra credits</td>
<td>Every class</td>
</tr>
<tr>
<td>Homework</td>
<td>20</td>
<td>Two to Four times</td>
</tr>
<tr>
<td>Programming Assignments</td>
<td>40</td>
<td>Two assignments</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40</td>
<td>November 26, 2018</td>
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<table>
<thead>
<tr>
<th>Grading System</th>
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<tbody>
<tr>
<td><strong>Letter Grade</strong></td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>A-</td>
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<tr>
<td>B+</td>
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<tr>
<td>B</td>
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<td>B-</td>
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<tr>
<td>C+</td>
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<tr>
<td>C</td>
</tr>
<tr>
<td>C-</td>
</tr>
<tr>
<td>D+</td>
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</table>
Academic Integrity Statement
All students at the University of Southern Mississippi are expected to demonstrate the highest levels of academic integrity in all that they do. Forms of academic dishonesty include (but are not limited to):

- Cheating (including copying from others’ work)
- Plagiarism (representing another person’s words or ideas as your own; failure to properly cite the source of your information, argument, or concepts)
- Falsification of documents
- Disclosure of test or other assignment content to another student
- Submission of the same paper or other assignment to more than one class without the explicit approval of all faculty members’ involved
- Unauthorized academic collaboration with others
- Conspiracy to engage in academic misconduct

Engaging in any of these behaviors or supporting others who do so will result in academic penalties and/or other sanctions. If a faculty member determines that a student has violated our Academic Integrity Policy, sanctions ranging from resubmission of work to course failure may occur, including the possibility of receiving a grade of “XF” for the course, which will be on the student’s transcript with the notation “Failure due to academic misconduct.” For more details, please see the University’s Academic Integrity Policy: [https://www.usm.edu/institutional-policies/policy-acaf-pro-012](https://www.usm.edu/institutional-policies/policy-acaf-pro-012)

Note that repeated acts of academic misconduct will lead to expulsion from the University.

Academic Support Resources
Please see our Student Success Website: [http://www.usm.edu/success](http://www.usm.edu/success) for information on where you can find tutoring and other academic assistance, as well as the location of key resources on campus.

If a student believes that they have a disability which is covered by the Americans with Disabilities Act (ADA) and makes them eligible to receive classroom or housing accommodations, they should contact the Office for Disability Accommodations (ODA) for information regarding the registration process. Disabilities covered by the ADA may include but are not limited to ADHD, learning disabilities, psychiatric disabilities, physical disabilities, chronic health disorders, temporary illnesses or injuries and pregnancies. Students should contact ODA if they are not certain whether their documented medical condition qualifies for ODA services. Students are only required to disclose their disability to the Office for Disability Accommodations. All information submitted to ODA by the student is held with strict confidentiality.

Contact information:
Important Class Policies

Class Attendance
Attendance will be taken every class period. Students who are excessively absent (30% of all the lectures, not including exams) and/or tardy will be assigned a grade of NA (Not Attending) according to the University’s Class Attendance Policy. Coming to class unduly late and leaving class unduly early is treated the same as being absent.

Plagiarism
Plagiarism or cheating of any type will not be tolerated. This includes, but is not limited to, copying programs, projects, assignments, abstracts, documentation, wandering eyes/copying on tests, turning in previously submitted term papers or projects (in whole or part), using other person's USM computer accounts to do projects, programs, etc., getting other people to do your assignments, etc. Copying from the internet of any type is not allowed.

Missing Exams
If you should miss an exam, you must let me know why you will be missing the exam before the exam is administered to the class (at least a couple of days before). You may send me an e-mail, or come by my office to explain why you will be missing the exam. If the excuse is reasonable, (I am the sole judge of reasonability) I will allow you to retake the exam. Please be aware that I am not responsible for lost e-mail. It is your responsibility to make sure that I know you are missing the exam.

Once I agree upon your excuse, please furnish me with a confirmation of your reason(s) for missing the exam. This confirmation must be in my hands by a maximum of 5 days after the exam is administered.

Tardiness for Tests
It is your responsibility to make it to class on time for all scheduled examinations. If you are late for an examination, you will be allowed only the remainder of the scheduled period to complete the examination.

Cell Phones/Beepers/Pagers/etc.
Please make sure you switch off all cell phones/beepers/pagers while you are in class. I may ask you to leave the class under such circumstances.
Turning In Work
Assignments not turned in on time will not receive full credit. All homework, programming assignments as well as course project will be submitted via Blackboard, due on 11:59 PM of the submission day.

Test Regrading Policy
I will be glad to review any test for possible grading errors. Any requests for regrading of tests must be made within one calendar week upon the return of the test to the class, regardless of when you received your test back. If you submit your test for regrading, I reserve the right to regrade your entire test.

More Than Two Finals on the Same Day
If you have two or more final examinations scheduled for the same day and you wish to reschedule my examination, please inform me.

E-mail Addresses
I may contact you during the whole semester and will use the email address provided on SOAR.

Mental Well-Being Statement
USM recognizes that students sometimes experience challenges that make learning difficult. If you find that life stressors such as anxiety, depression, relationship problems, difficulty concentrating, alcohol/drug problems, or other stressful experiences are interfering with your academic or personal success, consider contacting Student Counseling Services on campus at 601-266-4829. More information is also available at https://www.usm.edu/student-counseling-services. All students are eligible for free, confidential individual or group counseling services. In the event of emergency, please call 911 or contact the counselor on call at 601-606-HELP (4357).

Nondiscrimination Statement
The University of Southern Mississippi offers to all persons equal access to educational, programmatic and employment opportunities without regard to age, sex, sexual orientation, disability, pregnancy, gender identity, genetic information, religion, race, color, national origin, and/or veteran status pursuant to applicable state and federal law.

Confidentiality and Mandatory Reporting
[The Title IX office urges all instructors to consider adding this statement to your syllabi, or to read the statement during the first class meeting. Questions about this request can be directed to Rebecca.Malley@usm.edu or by calling 601.266.6804.]

As an instructor, one of my responsibilities is to help create and maintain a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. I am required to share information regarding sexual misconduct or information about a crime that may have occurred on USM’s campus with certain University officials responsible for the investigation and remediation of sexual
misconduct. The information will remain private and will only be shared with those officials necessary to resolve the matter. If you would like to speak in confidence, resources available to students include Confidential Advisors with the Shafer Center for Crisis Intervention, the Counseling Center, Student Health Services, and Clergy. More information on these resources and University Policies is available at https://www.usm.edu/sexual-misconduct.

Class Schedule

Tentative syllabus

Introduction (1 week)
- Course overview & Introduction to CG
- Math review (H&B Appendix)

Modeling (5 weeks)
- OpenGL programming basics (Redbook Ch1, H&B Ch. 3-5)
- Geometric transformation (H&B Ch. 7-9)
- 3D viewing (H&B Ch. 10)
- 3D object representation (H&B Ch. 13-15)
- Visibility algorithms (H&B Ch. 16)
- Digital geometry processing *

Rendering (4 weeks)
- Basic rendering & texturing (H&B Ch. 17-18)
- Global illumination (H&B Ch. 21)
- GPU rendering & ray tracing *
- CUDA Programming
- Scene graphs *

Final exam (1 week)

Note: * denotes the advanced topic (based on research papers)

Tentative time schedule

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<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>September 3</td>
<td><strong>Labor Day</strong></td>
<td>No Class</td>
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<tr>
<td>2</td>
<td>September 10</td>
<td>Course overview &amp; Introduction to CG</td>
<td><strong>Reading:</strong> H&amp;B Ch. 1</td>
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<td></td>
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<td>Math review</td>
<td><strong>Reading:</strong> H&amp;B Appendix</td>
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<td>3</td>
<td>September 17</td>
<td>OpenGL programming basics</td>
<td><strong>Reading:</strong> Redbook Ch. 1</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Reading</td>
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<tr>
<td>4</td>
<td>September 24</td>
<td>Geometric transformation</td>
<td><strong>Reading:</strong> H&amp;B Ch. 7-9</td>
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<td>5</td>
<td>October 1</td>
<td>3D viewing</td>
<td><strong>Reading:</strong> H&amp;B Ch. 10</td>
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<td>6</td>
<td>October 8</td>
<td>3D object representation</td>
<td><strong>Reading:</strong> H&amp;B Ch. 13-15</td>
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<td>Visibility algorithms</td>
<td><strong>Reading:</strong> H&amp;B Ch. 16</td>
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<td><strong>PA1:</strong> Due 11:59 PM, October 14</td>
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<tr>
<td>7</td>
<td>October 15</td>
<td>Digital geometry processing *</td>
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<td>8</td>
<td>October 22</td>
<td>Basic shading &amp; texturing</td>
<td><strong>Reading:</strong> H&amp;B Ch. 17-18</td>
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<td>9</td>
<td>October 29</td>
<td>Global illumination</td>
<td><strong>Reading:</strong> H&amp;B Ch. 21</td>
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<td>10</td>
<td>November 5</td>
<td>CUDA Programming</td>
<td><strong>Reading:</strong> CUDA Ch. 1-3</td>
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<td>November 12</td>
<td>CUDA Programming</td>
<td><strong>Reading:</strong> CUDA Ch. 1-3</td>
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<td>12</td>
<td>November 19</td>
<td>Scene graphs*</td>
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<td>Final Review</td>
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<tr>
<td>13</td>
<td>November 26</td>
<td><strong>Final Exam</strong></td>
<td><strong>Exam Time:</strong> 06:30 PM-09:30 PM</td>
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<td><strong>PA2:</strong> Due 11:59 PM, November 30</td>
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