Syllabus for CSE4303, CSE5365 Section 001
Computer Graphics

Term:	Spring 2016	**Office:**	ERB 321
Time:	MW 4:00 PM – 5:20 PM	**Phone:**	(817) 272-3785
Room:	Nedderman Hall 112	**E-mail:**	clanton@uta.edu
Credit Hours:	3	**Profile:**	uta.edu/profiles/carson%20-clanton
Instructor:	Carson Clanton		

Office Hours: MW 5:30 PM – 6:00 PM, Tues 4:00 PM – 6:00 PM, or by appointment.

Required Textbook(s):

[1] James D Foley, Andries Van Dam, Steven K Feiner, John F Hughes, and Richard L Phillips, *Introduction to computer graphics*, vol. 55, Addison-Wesley Reading, 1994.

Description of Course Content: Theory and practice for the visual representation of data by computers including display devices, output primitives, planes and curved surfaces, two- and three-dimensional transformations, parallel and perspective viewing, removal of hidden lines and surfaces, illumination models, ray tracing, radiosity, color models, and computer animation.

Prerequisite(s): A working knowledge of a high level programming language. CSE 2320, and MATH 3319 or MATH 3330.

Student Learning Outcomes: This course focuses both on the theoretical and practical implementation of the most common algorithms and techniques in computer graphics. After completing this course, students will be able to:

- Represent and construct mathematical models of 3D scenes containing planar and curved objects and surfaces.
- Understand the mathematics and representation of various transformations.
- Understand and use matrices to transform and position 3D objects in space.
- Use OpenGL to create high quality computer graphics.
- Understand shading models.
- Understand and implement ray tracing algorithms.

Description of major assignments and examinations:
There will be 8 programming assignments assigned in one to two week intervals, schedule of which depends on the pace of lecture completion (see tentative lecture outline at the end of this syllabus).

- All assignments will be assigned well in advance of the due date. All assignments are due at 11:59 PM on the specified date. No late assignments shall be accepted.
- Assignments must be submitted electronically using the Blackboard at https://elearn.uta.edu.
- The programming language to be used for this class will be Python 3.4.
- Each assignment must compile properly on a University Linux system as submitted without requiring any additional files (you must include all the supporting files in your submitted folder.
- Programs that do not compile or compile with compiler warning or error receive no credit (No partial credits).
- Programs that implement some, but not all, of the requirements may receive partial credit. However, these programs must still compile and run without errors.
- It is each student's responsibility to completely test their program PRIOR to submission and make sure that it compiles and executes without error(s).

There will be one in-class midterm exam and one special session final exam.

- Midterm and final exams will include theoretical and programming questions.
- Exams will be comprehensive and shall include information from the textbook as well as information from class lectures.

Make-Up Policy: There will be no make-up exams. If and only if you have a University excuse for being absent from a test, the next scheduled exam shall count twice.

Final Exam: The final exam is **comprehensive**. The final exam will be held on Wednesday, May 11^{th} from 2:00 PM – 4:30 PM in the regularly scheduled lecture room. The University's final exam regulations will be strictly followed.

Grading: Grades will be calculated based on the following percentages:

Assignments	50%
Midterm	25%
Final	25%

This course syllabus provides a general plan for the course; deviations may be necessary.

Letter grades are assigned as follows:

90% to 100%	A
80% to 89.7%	B
70% to 79.7%	C
60% to 69.7%	D
$< 60\%$	F

Important Dates:

Drop Deadline ..... April 1^{st}
Midterm ..... March 9^{th}
Spring Break ..... March 14^{th} – 18^{th}
Final ..... May 11^{th}, 2:00 – 4:30 p.m.

Attendance Policy: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating student's academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I do not require attendance except for exams. However, you are strongly encouraged to attend all classes and students are expected to attend arrive in a timely fashion.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide reasonable accommodations to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671.

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit www.uta.edu/titleIX.

Academic Integrity: All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlingtons tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT SystemRegents Rule 50101, 2.2, suspected violations of universitys standards

for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the students suspension or expulsion from the University. All students are expected to pursue their academic careers with honesty and integrity. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts (Regents Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22.). Students found guilty of dishonesty in their academic pursuits are subject to penalties that may include suspension from the university. Any student found guilty of academic dishonesty will receive a -100% for that work (assignments, project, etc.) as well as having the course grade lowered one full letter grade - in addition to any other penalties assessed (suspension, expulsion, probation). These and other applying UTA rules, will be strictly enforced. Any case of academic dishonesty will be treated in accordance with the UTA Handbook of Operating Procedures or the Judicial Affairs website at http://www2.uta.edu/discipline. If you do not understand this policy, it is your responsibility to obtain clarification or any additional information you may require. Students are not allowed to:

- Collaborate with others on the code they write
- Copy any part of someone else's program, even if they have permission and/or have modified the code
- Share or give their code, or even a subset of the code to, another student
- Review another students solution (including from past semesters)
- All work turned in for grading must be the student's own work.

Electronic Communication Policy: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at `http://www.uta.edu/oit/cs/email/mavmail.php`.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each students feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlingtons effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus.* During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Tentative Lecture Outline: As the instructor for this course, I reserve the right to adjust this tentative lecture schedule in any way that serves the educational needs of the students enrolled in this course.

- Introduction.
- Mathematics for 3D computer graphics.
- Two-dimensional concepts.
  - Translation, rotation, and scaling.
  - Homogeneous coordinate systems.
  - Matrix representations.
  - Window to viewport mapping
- Three-dimensional transformations.
  - Translation.
  - Rotation.
  - Scaling.
  - Shear.
  - Composite transformations.
- Viewing in 3-dimensions.
  - Orthographic parallel projections.
  - Oblique parallel projections.
  - Perspective projections.
  - Mathematics of 3-dimensional projections.
- Three-dimensional representation of curved surfaces.
  - Polygon meshes.
  - plane equations.
  - Parametric equations.
  - Bezier curves and surfaces.
  - Hermite curves.
  - Spline curves and surfaces.
- Hierarchical modeling.
  - Structure concepts.
  - Editing structures.
  - Hierarchical models.
  - Local coordinates.
  - Modeling transformations.
- Output primitives.
  - Line drawing algorithms.
  - Frame buffer.
  - Circle drawing algorithms.
  - Filled-area primitives.
  - Polygon fill algorithm.
- Hidden Lines and Surfaces.
  - Visible line determination.
  - z-Buffer algorithm.
  - Scan-Line algorithm.
  - Area-Subdivision algorithm.
  - List-Priority algorithm.
- Illumination and Shading.
  - Illumination models.
  - Shading models for polygons.
  - Shadows.
  - Reflections.
  - Ray tracing.
  - Radiosity