CSE 4303: Computer Graphics
Spring 2025

As the instructor for this course, I reserve the right to adjust this schedule
in any way that serves the educational needs of the students enrolled in this course.
Tuan Dang

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Instructor Information

Instructor Name
Tuan Dang

Office Location
ERB 308

View Campus Map

Office Phone Number
817-272-5407

Email Address
tuan.dang@uta.edu

Faculty Profile
www.tuandang.info

Office Hours
Wednesday & Friday: 9:00 – 10:30

Communication Guidelines
My preferred communication method is email.

I will respond to emails and voice messages within 24 hours.

GTA Information

GTA Name

Saranya Muralidharan

Office Location

ERB 501

Email Address

sxm0966@mavs.uta.edu

Office Hours

Wednesday & Friday 10:00 – 12:00

Communication Guidelines

Course Information

Section Information

CSE 4303 - 001

Course Delivery Method

This course is designated ON-CAMPUS, which means a face-to-face meeting class.

For a full definition of the course modalities, please visit the [Course Modalities page](#).

Time and Place of Class Meetings

NH 202**,** On campus class (face-to-face); Friday 1:00 - 3:50 PM

Time Zone

This course operates on Central Time. All times listed for class meeting times, exams, and assignment deadlines are in Central Time.

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, raytracing, radiosity, color models, and computer animation.

 Prerequisites

Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3318, and either CSE 3380 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.

Textbooks and Other Course Materials

All the required reading materials will be provided online.

Required Textbooks and Materials

Software Engineering - 10Ed.; Ian Sommerville

Students: Additional materials for this course may range in cost depending on the project and or topic you choose to work on.

Recommended Course Materials

1. **Introduction to Computer Graphics** by Foley, VanDam, Feiner, Hughes, Phillips, Addison-Wesley

2. **Practical Linear Algebra** - **A Geometry Toolbox** by Gerald Farin and Dianne Hansford, A K Peters

3. **Fundamentals of Computer Graphics** (4th edition), by Steve Marschener, Peter Shirley

Descriptions of major assignments and examinations

This course includes face-to-face lectures, programming assignments, in-class quizzes and two exams.

- The lowest quiz score will be dropped.
- Quizzes and exams will include both theoretical and programming questions.
- Quizzes and exams will be comprehensive, covering material from pre-readings, textbook chapters, and class lectures.
- Quizzes may be administered at **any time during a class period** and will only be given to students who are present at the time of the quiz.
- Only **non-programmable calculators** are allowed during quizzes and exams, unless explicitly specified otherwise. The use of all other electronic devices, including laptops,cellphones, smartwatches, and tablets, is prohibited.

Assignments

- All assignments will be given well in advance of the due date and are due by 11:59 PM on the specified date.

- A 24-hour grace period is available after the due date with no penalty. The grace period is intended to accommodate unforeseen events such as network or server issues. No late assignments will be accepted after the grace period and the grade for the missed assignment will be zero.
- Assignments must be submitted electronically via Canvas.
- The programming language for this class is Python, and all lecture examples and demos will also use Python.
- Each assignment must be self-contained (unless explicitly stated otherwise), including all required components. The teaching assistant will only grade the files submitted—no additional or supplemental files will be used.
- Programs that do not run will receive no credit (no partial credit for non-running programs). Programs that partially meet requirements may receive partial credit but must still run without errors.
- It is each student's responsibility to thoroughly test their program before submission to ensure it runs without errors. After submitting an assignment, it's advisable to download and test the submitted file to confirm the correct version was submitted.
- All assignments are graded as submitted. Once the submission deadline has passed, no changes or modifications can be made to the submitted files.
- Assignments may be submitted multiple times before the deadline.

Expectations for Out-of-Class Study

Beyond the time required to attend each class meeting, students enrolled in this **3** credit-hour course should expect to spend at least an additional **3** hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

Technology Requirements

Canvas will be an important resource throughout the semester, so you will need to be proficient in the use of Canvas to perform well. Your assignments, grades, and other multimedia files will be posted through Canvas. Make sure you have access to Canvas. Canvas support is available 24/7 by calling 1-855-597-3401 or by clicking on the "?" icon on your Canvas Dashboard. Microsoft Teams will be used for online questions during the office hours. Note that the face-toface questions will be given precedence. Microsoft Teams is available to all employees and students at The University of Texas at Arlington. Download Teams to your device. Your computer must have a webcam, internet access, a word processor, and a microphone. Visit the UTA Libraries Technology page for a list of items that can be checked out or used at the library.

Recording of Classroom and Online Lectures

Faculty maintain the academic right to determine whether recording of classroom and online lectures is permitted by students. Recordings of classroom lectures, if permitted by the instructor or pursuant to an ADA accommodation, may only be used for academic purposes related to the specific course and may not be used for commercial purposes or shared with non-course participants except in connection with a legal proceeding.

As the instructor of this course, I elect to prohibit recording of classroom or online lectures.

Other Requirements

N/A

Grading Information

- Grades will be calculated based on the following percentages
  - Assignments   25%
  - Quizzes   25%
  - Mid-term Exam   25%
  - Final Exam   25%

- **Grading Policy**: Grades will not be curved and will be strictly determined based on the criteria outlined in the table above. Research shows that curve grading can demotivate students from studying effectively. Additionally, since curves are typically applied at the end of a semester, they create uncertainty, leading to increased stress and leaving students unsure of their standing in the course or what is required to achieve a specific grade.
- **Tracking Performance**: All grades and assignments will be posted on Canvas. Students are expected to monitor their progress throughout the semester and seek guidance from the instructor if their performance falls below satisfactory levels.
- **Important**: Grades will be determined solely by the grading criteria listed above. Students should not request or expect any additional factors to be considered when calculating the course grade. For example, factors such as needing a higher grade to improve GPA, remain in a program, qualify for a job offer, or graduate will not be considered.

Graded Assignments & Values

Students are expected to keep track of their performance throughout the semester which Canvas facilitates, and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see "Student Support Services," below.

Final Grade Calculation

Range (pts or %)	Letter Grade
87-100	A
75-86	B
65-74	C
55-65	D
0-54	F

Make-Up Exams & Late Work Policy

No make-up exams will be offered. Students are expected to be available to take the official exams at the previously communicated dates. The exam final time slots (finals) may depend on departmental procedures that are only known in the end of the term.

Extra Credit Policy

Extra Projects

Grades & Feedback Timeline

Grade Grievances

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current [University Catalog Grades and Grading Policies](#).

University & Course Policies

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the [Institutional Information](#) page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Attendance

Attending class sessions is a critical predictor and indicator of student success. The University of Texas at Arlington does not recognize a single attendance policy but encourages faculty to establish class-specific policies on attendance. As the instructor of this section, *attendance is mandatory in this class. If you cannot make it to any lecture, you must inform me via e-mail prior to the start of that lecture. E-mails after the lecture is over is not acceptable.*

The U.S. Department of Education requires that UT Arlington have a mechanism in place to verify Federal Student Aid recipients' attendance in courses. UT Arlington instructors are expected to report the last date of attendance when submitting students' final course grades; specifically, when a student earns a course grade of F, instructors must report the last date a student attended their class. For on-campus classes, last date of attendance can be based on attendance rosters or on academic engagements—a test, participation in a class project or presentation, or Canvas-based activity. Online or distance education courses require regular and substantive online interaction and participation. Students must participate in online course activities in Canvas to demonstrate attendance; logging into an online class is not sufficient by

itself to demonstrate attendance. The last date of attendance is reported to the U.S. Department of Education for federal financial aid recipients.

Generative AI Use in This Course

The use of Generative AI (GenAI) in course assignments and assessments must align with the guidelines established by the instructor. Unauthorized use of GenAI could result in breaches of academic integrity. Instructors bear the responsibility of clearly delineating the permissible uses of GenAI in their courses, underscoring the importance of responsible and ethical application of these tools.

The UTA Office of Community Standards articulate the university's stance on academic integrity and scholastic dishonesty. These standards extend to the use of GenAI. Unauthorized or unapproved use of GenAI in academic work falls within the scope of these policies and will be subject to the same disciplinary procedures.

As the instructor of this course, I have adopted the following policy on Student use of GenAI:
Prohibition of GenAI Use

Approach	Description
Prohibition of GenAI Use	In this course, the focus is on the development of independent critical thinking and the mastery of subject-specific content. To ensure that all submitted work accurately reflects personal understanding and original thought, the use of Generative AI (GenAI) tools in completing assignments or assessments is strictly prohibited. This policy supports our commitment to academic integrity and the direct measurement of each student's learning against the course's Student Learning Outcomes (SLOs). Any work found to be generated by AI will be subject to academic review.
Restricted Use of GenAI	While this course recognizes the potential benefits of Generative AI (GenAI) as a supplementary tool for certain learning activities, its use is restricted to specific assignments where GenAI's role is clearly defined and aligns with the course's Student Learning Outcomes (SLOs). These assignments will be clearly marked, and students must adhere to the guidelines provided for GenAI use. Unauthorized use of GenAI outside these parameters will be considered a breach of academic integrity.
Cited Use of GenAI	This course permits the use of Generative AI (GenAI) as a resource for completing assignments. However, transparency is crucial, students are required to explicitly cite any GenAI tools they utilize in the creation of their work. This citation requirement allows for the acknowledgment of the collaborative nature of GenAI in the learning process while enabling the assessment of student learning to remain focused on the achievement of the course's Student Learning Outcomes (SLOs).

Approach	Description
Unrestricted Use of GenAI	In this course, the integration of technology, including the use of Generative AI (GenAI), is encouraged to fulfill the course's Student Learning Outcomes (SLOs). Students may use GenAI tools freely to assist in the creation of content and to achieve learning objectives. It is expected that students will engage with these tools ethically and responsibly, ensuring that their use of GenAI contributes to a deeper understanding of the subject matter and the development of relevant competencies.

Academic & Wellness Resources

Academic Success Center

The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: Academic Success Center (https://www.uta.edu/student-success/course-assistance). To request disability accommodations for tutoring, please complete this tutoring request form (https://www.uta.edu/student-success/course-assistance/tutoring/request).

The English Writing Center (411LIBR)

The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the Writing Center (https://uta.mywconline.com). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see Writing Center: OWL (http://www.uta.edu/owl) for detailed information on all our programs and services.

Academic Plaza

The Library's 2nd floor Academic Plaza (http://library.uta.edu/academic-plaza) offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours (https://library.uta.edu/hours) of operation.

UTA CARE Team

UT Arlington is committed to the safety, success, and well-being of our students. To support our community, UTA has created a CARE Team, which is a dedicated group of campus professionals responsible for helping students who could benefit from academic, emotional, or psychological support, as well as those presenting risk to the health or safety of the community. If you know of someone experiencing challenges, appearing distressed, needing resources, or causing a significant disruption to the UTA community, please submit a CARE Referral by visiting the Behavior Intervention Team (https://www.uta.edu/student-affairs/dos/behavior-it) page. You may also submit a referral for yourself if you would like additional support.

NOTE: If a person's behavior poses an immediate threat to you or someone else, contact UTA Police at 817-272-3303 or dial 911. If you or someone you know needs to speak with a crisis counselor, please reach out to the MAVS TALK 24-hour Crisis Line

(https://www.uta.edu/student-affairs/caps/crisis)at 817-272-8255 or the National Suicide and Crisis Lifeline (https://988lifeline.org/) at 988.

Student Services

Everything you need to make the most of your time as a student (and beyond) is all on campus. Below are a few resources to get you started.

- Student Services Home
- Student Access and Resource (SAR) Center
- Military and Veteran Services
- Health Services
- Counseling and Psychological Services (CAPS)
- Activities and Organizations
- Recreation

Librarian to Contact

Each academic unit has access to Librarians by Academic Subject (https://libraries.uta.edu/research/librarians) that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Safety Information & Resources

Lab Safety Training

Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., Fall through Summer II) and must be completed anew in subsequent years. There are **no** exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

Face Covering Policy

Face coverings are not mandatory; all students and instructional staff are welcome to wear face coverings while they are on campus or in the classroom.

Emergency Exit Procedures

Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit, which is located on the left and right corridor in front of entrance of **ERB 131**. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

MavAlert System

The MavAlert system sends information in case of an emergency to cell phones or email accounts of subscribed users. Anyone can subscribe to MavAlerts at [Emergency Communication System](https://www.uta.edu/uta/emergency.php) (https://www.uta.edu/uta/emergency.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

Course Schedule

Class Date(s)	Topic(s)
Week 1	- Introduction 2D concepts - Translation, Rotation, and Scaling - Homogeneouse coordinate systems - Parameteric equations - Matrix Representations - Window to viewport mapping
Week 2-3	- Mathematics for 3D computer graphics - Parametric equations - Plane equations 3D tranformations - Translation, Rotation, Scaling, and Shear - Composite transformations
Week 4-5	- Viewing in 3D - Orthographic parallel projections - Oblique parallel projections - Persective projections - Mathematics of 3D projections
Week 6-8	- Representations of curves and surfaces - Polygon meshes - Beizer curves and surfaces - Hermite curves - Spline curves and surfaces
Week 9	- Color - Color Spectrum - CIE Choromaticity - Color space (RGB, HSV, YIQ, YCbCr,..) - Color convention

Class Date(s)	Topic(s)

Week 10-12	• OpenGL
	  ○ Facts and concepts
	  ○ Naming convention
	  ○ Installation
	  ○ Primitives
	  ○ Lighting and Shading
	  ○ Texture
	  ○ Display Lists
	  ○ Packages
	  ○ Vertex Shader
	  ○ Fragment Shader

Week 13-15	• Illumination and Shading
	  ○ Illumination models
	  ○ Shading models for polygons
	  ○ Shadows
	  ○ Reflection
	  ○ Ray tracing