

## Course Information

Course Number: CSCE 441  
Course Title: Computer Graphics  
Section: 200, 500  
Time: Tue/Thu 12:45 pm -2:00 pm  
Location: ZACH 350  
Credit Hours: 3

## Instructor Details

**Instructor:** Shinjiro Sueda  
E-Mail: [sueda@tamu.edu](mailto:sueda@tamu.edu)  
Zoom: [LINK](#)  
Office Hours (tentative):  
• M 2p-3p, W 1p-2p

**TA:** Libing Zeng  
E-Mail: [libingzeng@tamu.edu](mailto:libingzeng@tamu.edu)  
Zoom: [LINK](#)  
Office Hours (tentative):  
• T 3p-5p, R/F 10a-12p

**Grader:** Samraat Gupta

## Course Description

Principles of interactive computer graphics; 2-D and 3-D rendering pipelines, including geometric object and view transformations, projections, hidden surface removal, and rasterization; lighting models for local and global illumination; hierarchical models of 3-D objects; systems and libraries supporting display and user interaction.

## Course Prerequisites

CSCE 221; junior or senior classification or approval of instructor.

## Course Learning Outcomes

- Understand the graphics pipeline and make use of a basic implementation of the pipeline in modern hardware (and graphics libraries)
- Apply coordinate transforms and affine transformations and understand the application of such transforms using a vertex shader
- Apply basic geometric computations involving points, lines, planes, and triangles related to spatial queries
- Develop basic data structures to represent a mesh, including applying transforms and necessary data for shading
- Implement basic rasterization methods (algorithm, stage in the graphics pipeline, and relationship to fragment shaders)
- Make use of hierarchical animation
- Create local shading models (Phong, etc.)
- Apply basic texture mapping
- Implement basic ray tracing
- Be introduced to the application of more advanced computer graphics topics (including, rendering, animation, real time and visualization)
- Practice translating mathematics into C/C++ programs

## Textbook and/or Resource Materials

There is required no textbook for this class, since there are many online resources available. The following *optional* text may be useful:

- [OPTIONAL] Fundamentals of Computer Graphics 4th ed., CRC Press
- [OPTIONAL] OpenGL Programming Guide 9th ed., Addison-Wesley

We will be using [Campuswire](#) [CODE 3617] for:

- Announcements
- Discussions/help

We will be using [Canvas](#) for:

- Assignment submission

## Grading Policy

- 70%: 6 substantial programming assignments (11.667% each)
- 10% Midterm exam
- 20%: Final exam
- You must obtain at least 50% on the final exam to pass the course.
- You may optionally skip the midterm and make the final be worth 30% of the course grade.
- Final course grades will be based on the following scale:  
 A = [100, 90], B = (90, 80], C = (80, 70], D = (70, 60], F = (60, 0]

## Late Work Policy

All assignments must be submitted on time. However, you get 6 free days for the entire semester which can be applied to any of the programming assignments. You do not need to explain why you are using the days—these late days will be automatically applied to any late assignments. All assignments are due at 23:59. The free days will be given out in increments of full days.

## Course Schedule

The following schedule for the lectures and assignments may (and will) change—it is meant to serve as a basic outline of topics and schedule.

Week 1	1/18	Introduction; Meshes	
	1/20		
Week 2	1/25	Graphics Pipeline; Rasterization; Z-buffering	
	1/27		
Week 3	2/1	Linear Algebra Review; Transformation Matrices	
	2/2		Assignment 1 due
Week 4	2/8	Matrix Stacks; Hierarchical Transforms	
	2/10		
Week 5	2/15	GLSL; Colors	
	2/17		Assignment 2 due
Week 6	2/22	Transforming Normals; Lighting and Materials	
	2/24		
Week 7	3/1	Camera; Projection; Clipping; Culling; Viewport	
	3/3		Assignment 3 due

Week 8	3/8	Review	
	3/10		Midterm
	3/15	Spring Break	
	3/17		
Week 9	3/22	Free-look Camera	
	3/24		
Week 10	3/29	Texture Mapping	
	3/31		Assignment 4 due
Week 11	4/5	Ray Tracing	
	4/7		
Week 12	4/12	Reflection/Refraction; Spatial Data Structures	
	4/14		Assignment 5 due
Week 13	4/19	Heightfields; Render-to-texture	
	4/21		
Week 14	4/26	Deferred Rendering; Cubemaps; Shadows	
	4/28		Assignment 6 due
Exam Week	5/10 (Tuesday)	8:00 a.m. – 10:00 a.m.	Final exam

## University Policies

### Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

### Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

### Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

“Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one’s work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case” ([Section 20.1.2.3, Student Rule 20](#)).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at [aggiehonor.tamu.edu](http://aggiehonor.tamu.edu).

### Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit [disability.tamu.edu](http://disability.tamu.edu). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

### Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University’s goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services](#) (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University’s [Title IX webpage](#).

### Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](https://suicidepreventionlifeline.org).