

Course Syllabus

CS 6319: **Computational Geometry**, Spring 2023

Website: <http://utdallas.edu/~bar150630/courses/cs6319sp23.html>

Professor Contact Information

Benjamin Raichel, Associate Professor

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Office hours time: TBD

Office hours will be held online through MS Teams.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

CS 5343

Course Description

This course will cover basic computational geometry topics, such as computing convex hulls, computing Voronoi diagrams and Delaunay triangulations, motion planning, and the main methods for developing geometric algorithms. We will also discuss various geometric data structures for point location and range searching and additional topics at the discretion of the instructor, such as geometric approximation and high dimensional data analysis.

Course Learning Objectives

1. Knowledge of basic geometric data structures such as Voronoi diagrams, quad trees, and range trees.
 2. Knowledge of basic geometric algorithms, including line sweep, point location, and convex hull.
 3. Knowledge of useful techniques and geometric structures, including duality, arrangements, and Delaunay triangulation.
 4. Ability to design and implement a geometric algorithm.
 5. Ability to apply computational geometry techniques to real world problems.
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Course Content

All course content (assignments, exams, handouts, quizzes, projects, videos, etc.) is only for registered students of this course. Do not share or publicly post any of these materials.

Course Mode

The course mode is face-to-face. Lectures and presentations will be in our assigned classroom on campus. Homeworks, quizzes, and office hours are online.

Textbooks

- David Mount's lecture notes:
<http://www.cs.umd.edu/class/fall2021/cmsc754/Lects/cmsc754-fall-2021-lects.pdf>
 - Computational Geometry: Algorithms and Applications, third edition. Mark de Berg, Otfried Cheong, Marc Van Kreveld, Mark Overmars
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Grading Policy

- Homework 48%: There will be around 4 homeworks. Homeworks may be done individually or in groups of size two. (Groups of 3 or more are not allowed.)
- Quizzes 12%: There will be a short online quiz posted for most lectures.
- Course Project 40%: Each student will be expected to do either a research, implementation, or survey project. The topic is left to the student, though it must relate to computational geometry. Mid way through the semester students will submit a one page project proposal for approval. At the end of the semester students will submit a project report and give a short presentation about their project. Projects may be done individually or in groups of two.

When determining your final letter grade the numerical value of your score is less important than your score relative to the class average. That said, there is no fixed curve, i.e. if everyone performs well in the class then everyone can get top grades. I encourage students to talk with me about their grade before considering dropping the course.

Course & Instructor Policies

--Students are expected to turn in all of the homeworks on time. No late homeworks will be accepted, unless there is a valid documented reason, i.e. medical or family emergencies.

--Any request for a regrade needs to be made within one week of the assignment being graded. Note that a regrade request means "regrade", i.e. your score could go down.

--Students may submit homeworks/projects individually, or in groups of size two. It is your choice, but your group size cannot exceed two. If you discuss homework problems with students outside your group, please limit your discussion to no more than 4 students outside your group, and please write the names of those students on your assignment. Each group should work individually when writing the homework solutions, and solutions must be in their own words.

--Students are expected to solve problems without the help of outside sources (i.e. "googling the solution"). If for any reason the student does use outside sources, they must cite them clearly, and their solution must still be put in their own words. Failure to cite sources is considered cheating and plagiarism.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

Academic Support Resources

The information contained in the following link lists the University’s academic support resources for all students.

Please see <http://go.utdallas.edu/academic-support-resources>.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus. Please review the catalog sections regarding the [credit/no credit](#) or [pass/fail](#) grading option and withdrawal from class.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.