# COMPUTATIONAL GEOMETRY

St. Olaf College · Math 282

Dr. Matthew Wright · Spring 2019

**Meeting Times (in TOH 184)**: Monday, Wednesday, and Friday 9:05 – 10:00am

**Office Hours (in RMS 405)**: Mon. 10:30–11:30, Tues. 1:30–2:30, Wed. 8:00–9:00, Thurs. 10:15–11:00, Fri. 2:00–3:00, by appointment, or whenever the door is open

**Contact the Professor at**: wright5@stolaf.edu

**Web Site**

The course web site is:

http://math282.mlwright.org/

You will refer to this web site frequently for homework assignments and course files.

In addition, the course will use *Moodle* for grades and password-protected resources.

**Text**: Devadoss and O'Rourke, *Discrete and Computational Geometry*

**Course Objectives**

1. Understand key theorems and proofs in discrete and computational geometry.
2. Understand and implement algorithms for manipulating discrete geometric objects, and assess the computational complexity of such algorithms.
3. Develop/improve ability to work computationally in programming environments such as Mathematica.
4. Solve data-driven problems with geometric input and output, motivated by real-world applications.

**Software**

The primary computational tools for this course will be *Mathematica* (available for St. Olaf students) and *Python* (freely available online). No prior programming experience is assumed, though a desire to learn through experimentation will be essential.

**Grading**

Your final grade will be a weighted average of the following:

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|---|---|
| Homework: | 40% |
| Quizzes: | 30% |
| Final Project: | 30% |

## Homework

This course will involve weekly problem sets, which will be posted on the course web site. These problem sets will involve both mathematical problems and implementation of algorithms. Students wishing to count this course as a CS elective will be required to do more coding than students taking the course simply for a math elective.

Students are encouraged to work together on homework, though each student must hand in their own work. The lowest homework score for each student will be dropped.

## Quizzes

This course will involve three take-home quizzes. These will be similar to homework, but will focus more on understanding than on implementation. Students may use course resources (text, notes, etc.) for the quizzes, but may not consult with anyone except the professor.

## Final Project

The final project will be an opportunity to investigate a topic in computational geometry beyond what we study as a class. This could be a more in-depth study of a topic in the text, an application of some of the tools we discuss, or an advanced topic that we didn't get to in the semester. Final projects may be completed individually or as a small group. Each project will result in a written report and a brief presentation, to be delivered during the final exam period.

## Strategies for Success

- Attend class faithfully and participate in class activities.
- Work with other students, in class and on the homework. You will find that you will both learn from and teach your classmates.
- Keep up with the assignments. Start early — don't wait until the last minute!
- Don't give up when your code doesn't work. Writing good code often requires many revisions. Understand that mistakes are opportunities for learning.
- Ask questions! Experiment!
- When you encounter trouble, seek help!

## Getting Help

Prof. Wright is your primary resource for help in this course and is happy to talk with you. When you need help, or if you have any concerns about the course, you should stop by Prof. Wright's office or send him an email.

Additionally, your classmates are a valuable resource. You are encouraged to work together on homework, as long as you turn in your own work. Mathematics often involves collaboration!

## Inclusivity

Prof. Wright is committed to supporting all students. This course strives to be an inclusive learning community, respecting those of differing backgrounds and beliefs. As part of the St. Olaf community, we aim to be respectful to everyone in this class, regardless of race, ethnicity, religion, gender, or sexual orientation. If you have any questions or concerns, don't hesitate to talk with Prof. Wright.

## Accommodations

Prof. Wright is committed to supporting the learning of all students. Reasonable accommodation are available for students with documented disabilities. If you have or think you have a disability, please contact the Disability and Access (DAC) office at 507-786-3288 or wp.stolaf.edu/asc/dac. If you have already registered with the DAC office and have your letter of accommodations, please meet with the professor early in the course to discuss, plan, and implement your accommodations in the course.

## Academic Integrity

Claiming someone else's work as your own will earn you a failing grade on the work in question. Don't do it. For more information, see the *Academic Integrity* section of *The Book* (wp.stolaf.edu/thebook/academic/integrity).