

# MODERN COMPUTATIONAL MATHEMATICS

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St. Olaf College • Math 242

Dr. Matthew Wright • Spring 2020

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## Meeting Times in RNS 160R:

Math 242A: Monday, Wednesday, and Friday, 11:50am – 12:45pm

Math 242B: Monday, Wednesday, and Friday, 2:00pm – 2:55pm

## Office Hours:

In RNS 160R: Mon., Wed., and Fri. 12:45 – 1:50pm

In RMS 405: Wed. 10:00 – 11:00am, Thurs. 10:30–11:30am, by appointment, or whenever the door is open

Contact the Professor at: [wright5@stolaf.edu](mailto:wright5@stolaf.edu)

## Web Site

The course web site is:

[math242.mlwright.org](http://math242.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

There is no textbook for this course. However, the course will involve a variety of assigned readings, which will be available online.

## Course Objectives

1. Develop skill of using computation to investigate mathematical topics and ideas.
2. Use computational experiments to provide evidence for claims, stimulate questions, and formulate precise conjectures.
3. Develop/improve ability to work computationally in various programming environments, especially Mathematica and Python.
4. Develop mathematical problem solving skills applicable in a variety of theoretical and applied settings.

## 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:

Assignments:	20%
Projects:	65%
Final Project:	15%

## Assignments

This course will involve various (small) assignments, such as:

- The Syllabus Quiz, available on *Moodle* at the beginning of the course.
- Exercises in programming or mathematics, assigned in class. These will typically be due at the next class period.
- Questions to accompany course readings. These will be announced in class and posted on the course web site.
- Attend at least one MSCS Colloquium or Research Seminar, and complete the questions on *Moodle* about how computation relates to the subject of the talk.

## Projects

The main component of this course will be computational projects, which will build on computational work done in class. For each project, you will turn in a *Mathematica* or *Python* notebook containing your computation and explanations. Project details including expectations, due dates, and grading information will be announced in class and posted in the course web site.

## Final Project

The final project will be an opportunity to investigate a topic in computational mathematics that goes beyond what we study as a class. Final projects will involve reading mathematical papers and doing computational experiments, and may be completed individually or with a partner. 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. Mathematics is a collaborative activity! You will find that you will both learn from and teach your classmates.
- Keep up with the assignments and projects. Start early — don't wait until the last minute to get started!
- 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.

The course teaching assistant will hold help sessions on Tuesday and Thursday evenings from 7:00 to 8:00pm in RNS 316. These are excellent opportunities to ask questions about writing code for assignments and projects, and to get some help with debugging your code.

Additionally, your classmates are a valuable resource. You are encouraged to work together on assignments and projects, as long as you turn in your own work. Mathematics is a collaborative activity!

## **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. If you have already registered with Disability and Access (DAC) 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. If you have or think you have a disability, please contact the Disability and Access office at 507-786-3288 or [wp.stolaf.edu/asc/dac](http://wp.stolaf.edu/asc/dac).

## **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](http://wp.stolaf.edu/thebook/academic/integrity)).