Beginning Scientific Computing

Mathematics 3607
Spring 2019
Location: 209 W. 18th Avenue 295
Time: MWF 1:50 - 2:45PM
Carmen Homepage: https://osu.instructure.com/courses/53685

Instructor: Veronica Ciocanel, Ph.D.

Contact info:

- **Office:** Room 380, Jennings Hall
- **Email:** ciocanel.1@osu.edu
- **Office hours:** M 3:00PM-5:00PM, and by appointment.
- The best way to reach me is by email.

I **Course Description:**

Math 3607 is a course with three main goals: it introduces students to MATLAB (or improves their knowledge of MATLAB); it uses MATLAB to solve practical problems from various areas of mathematics, physics, biology, engineering, and finance; and it presents the numerical analysis needed to use MATLAB effectively. The principle underlying this course is that the way to learn MATLAB and numerical analysis is by doing it, not by reading about it. This course is taught in a computer lab and MATLAB will be used to some extent every class. See https://math.osu.edu/sites/math.osu.edu/files/courses/3607_0.pdf.

II **Course Goals and Learning Outcomes:**
By the end of the course, students will be able to:

- Identify MATLAB functions needed in solving practical mathematical problems.
- Become comfortable with using MATLAB to solve problems in applied areas such as physics, biology, and finance.
- Understand basic numerical analysis techniques and implement them in Matlab.

III **Course Prerequisites:**
You should know basic linear algebra (2568 or honors) and basic ODEs (2415 or 2255 or honors) for this course. We do not assume that you have any knowledge of MATLAB or any other programming or scripting language.

IV **Course Materials:**

Learning MATLAB and Numerical Analysis Through Examples, by Ed Overman.
A MATLAB Tutorial, by Ed Overman.
Both of these texts are available in the Content section of the course on the Carmen page.

As MATLAB is an integral part of this course, you will need access to it both during and outside of class. It should already be installed on lab computers, but you will need a flash drive or laptop computer to save your work (lab computers may be wiped at any time). For use with your own personal computer, you may download a copy of the software by following the instructions at http://ocio.osu.edu/software/ and following the link corresponding to your computer's operating system. You are responsible for having and using a method for regularly backing up your work (for example, bring along a USB drive and save your work on it).

V **Course Requirements:**

Homework: **Read and follow these instructions carefully to ensure receiving full credit** (45%)

- Homework in this class tends to be very time consuming. It is extremely important to begin the homework early.
- There will be 11 homework assignments. Each will be posted to Carmen.
- The lowest homework grade will be dropped and the total score scaled to 45% of your class grade.
- Assignments will be assigned every Wednesday and will be due the next Wednesday at the beginning of class.
  - If not turned in on time, homework may be submitted to me in person at my next regularly scheduled office hours for a 20% penalty.
  - In case of emergency, homework may be submitted to the front desk. You must inform me immediately if you submit your homework to the front desk and documentation may be requested for homework submitted in this manner.
  - Beyond this, late homework will not be accepted for any credit, for any reason. Early homework will be accepted without penalty.
- All due dates are as listed on the course calendar.
- Homework is expected to be neatly printed on paper, organized, labeled, and stapled with genuine metal staples.
  - Failure to do so, or to satisfy the requirements below, will result in significant point deductions.
  - All computer code must be included, as well as all output unless otherwise stated.
    * Both must be in a monospaced (typewriter) font, such as Courier.
    * Code and output must be grouped together for each problem.
    * Your code should follow the guidelines for writing code in MATLAB as covered in the course text and in class.
    * Never use the symbolic toolbox, and never use the inline function.
    * Longer codes must include enough test output to "prove" your code works! Generally, this means three test cases of valid input, aside from special cases.

- All work (especially plots) must be clearly labeled.
- If some type of explanation is required, you must give a complete answer that includes some analytical or numerical proof of your assertion, if applicable.
- If we can't understand your work, we will not grade it.
  * This particularly extends to missing or nonfunctional computer code.
- You may be asked to explain (in writing or orally) how a piece of code you wrote is supposed to work. Failure to competently do so may result in loss of credit.

Midterm exams (30%: 15% each)

- There will be two midterms during the semester, as scheduled on the course calendar. These exams will be taken with pencil and paper. Calculators, smart watches, notes, cell phones, books, etc. will not be permitted to be used or even to be accessible during the testing period.
- Make-up exams will only be given if there is a documented necessity. If you know that you will need to miss an exam, then you must let me know well in advance.

Final exam (25%)

- The final exam will be held in our classroom at the time dictated by the University Registrar (see course calendar). This exam will be taken with pencil and paper. Calculators, smart watches, notes, cell phones, books, etc. will not be permitted to be used or even to be accessible during the testing period.
- Make-up exams will only be given if there is a documented necessity. If you know that you will need to miss an exam, then you must let me know well in advance. I will consider exam schedule conflicts (but not travel) in giving a make-up exam.

VI **Grading Policy:**

Graded work	Weight
Homework	45%
Midterm exams	30%
Final exam	25%

VII **Tentative Course Schedule**

See Tentative calendar document.
Disclaimer: The schedule listed on the course calendar is tentative, and topics covered on a given day may change depending on the pace set for the course. There may be additional programming labs throughout the semester, which will consists of self-guided work on programming examples.

VIII **Email Policy**

The best way to reach me is by email. I will only respond to class-related emails from your "\osu.edu" address. In the subject line of your email, include the name or number of the course so that I know to respond in an appropriate timeframe. Please identify yourself in your email, and do not send attachments without first discussing it with me.

IX **Statement on Academic Misconduct**

Plagiarism will not be tolerated, especially when it comes to code. Do not copy your code from other students, online sources, or anyone else, and do not give your code to anyone else to copy. You may however discuss problems with other students and render help in debugging.
Exceptions: You are permitted to use code from the textbook or presented during class, but you must still be able to explain how it is supposed to work.

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

X Statement about disability services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

XI **Mental health statement**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766.