Numerical Analysis
MAT 3338
Spring 2025

Instructor:	Dr. Matt Dallas
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Class Meeting Times:	TR 12:30 - 1:50 PM in HSC 022
Office Hours:	MW 10:00 - 11:00 AM & 1:00 - 2:00 PM TR 2:00 - 3:00 PM

Prerequisites MAT 1404 and MAT 3310 or consent of instructor.

Course Description and Objectives The goal of this course is to introduce the fundamental ideas, concepts, and techniques of scientific computing. These include floating-point arithmetic, solving nonlinear equations, approximating functions and data, numerical differentiation and quadrature, and solving linear systems. The rest of the course will survey methods for computing eigenvalue and eigenvectors, numerical optimization (maybe), and solving ordinary differential equations.

Required Materials Quarteroni A., Saleri F., and Gervasio P., *Scientific Computing with MATLAB and Octave*, Springer, 4th ed, 2014.

Grades Homework: 30% Exams: 50% Final Project: 20%

Your final grade will be rounded to the nearest hundredth and a letter grade will be given using the following grading scale:

90.00-100 A	87.00-89.99 A−	84.00-86.99 B+	80.00-83.99 B
77.00-79.99 B−	74.00-76.99 C+	68.00-73.99 C	64.00-67.99 C−*
62.00-63.99 D+	57.00-61.99 D	54.00-56.99 D−	0-53.99 E

Homework Homework, abbreviated HW, will be assigned regularly. Any type of question that appears on the homework could appear on an exam. You are encouraged to discuss homework problems with your classmates, but **the work you submit must be your own.** Late work will **not** be accepted. For more details see the *homework rubric* on Brightspace.

Exams There will be approximately 3 exams held during class, with dates announced well in advance. There will be no cumulative final. Instead, you will complete a final project (see Final Project).

Final Project Numerical analysis is a vast field, and it is impossible to touch on every interesting topic in one semester. The final project is an opportunity to delve deeper into something we covered in class, or investigate a topic we didn't cover that you find interesting. You will give a 10 minute presentation of your project in class, and submit a 3-4 page report. A rubric will be posted on Brightspace for both the presentation and the report.

Attendance

You are expected to attend class. After three unexcused absences you will receive a warning letter from the Registrar. Additional unexcused absences can result in forced withdrawal from the course. Visit Class Attendance Policy for information regarding absences due to athletic and University-sponsored events. If you are attending a University-sponsored event that will cause you to miss an exam, you must let me know **at least two weeks in advance.**

Academic Dishonesty

The University's policy on academic honesty may be found here. Collaboration on problems is encouraged, but the expectation is that the work you submit is your own. If you run into difficulties with a problem, the best thing to do is ask a friend or your instructor.

I understand that **generative AI** such as ChatGPT can be helpful for various tasks, so my policy is not total prohibition. I only ask that if you choose to use a generative AI, due so with caution. They are not experts in mathematics, or any other field, and can produce inaccurate, misleading, or outright incorrect results. Further, if you rely on sources besides yourself to solve homework problems, it is very likely that your exam and final project scores will suffer.

Accommodations

Students with a qualifying disability may request accommodations here. You must provide me with a letter of accommodation no later than the fourth day of class. You must also schedule a meeting with me within a week of submitting your letter to discuss those accommodations that are mutually acceptable. **Accommodations will not be granted without an accommodation letter.**

Important Sp25 Dates

Classes Begin Wednesday; January 22, Spring Break March 15 - March 23; Easter Break April 17 - April 21; Classes end Thursday, May 8

Week	Content	Book Chapter
Week 1 (Jan 22)	Introduction, finite precision computations, and Octave	1
Week 2 (Jan 27)	Finite precision computations and nonlinear equations	1 & 2
Week 3 (Feb 3)	Nonlinear equations	2
Week 4 (Feb 10)	Nonlinear equations	2
Week 5 (Feb 17)	Nonlinear equations and Approximation of functions & data	2 & 3
Week 6 (Feb 24)	Approximation of functions & data	3
Week 7 (March 3)	Numerical Differentiation & Integration	4
Week 8 (March 10)	Numerical Differentiation & Integration	4
Week 9 (March 17)	Spring Break	
Week 10 (March 24)	Refresher and Linear Algebra review	
Week 11 (March 31)	Linear Systems	5
Week 12 (April 7)	Linear Systems	5
Week 13 (April 14)*	Linear Systems and Eigenvalues & Eigenvectors	5 & 6
Week 14 (April 21)	Eigenvalue & Eigenvectors & Numerical Optimization†	6 & 7
Week 15 (April 28)	Ordinary Differential Equations	8
Week 16 (May 5)	Ordinary Differential Equations & Presentations	8
Final (May 13)	Presentations (11:00 AM - 1:00 PM)	

* No class on Thursday for Easter break. † May be skipped. In which case we'll begin Chapter 8.

Note: Information in this syllabus is subject to change. Any changes will be clearly announced in class and through e-mail.