MA 402: Spring 2024   **Numerical Analysis**
Mathematics   *Albert Nerken School of Engineering at The Cooper Union*

Course Description:	Techniques for the solutions of ordinary and partial differential equations, the classical problems of linear algebra, integration and systems of nonlinear equations. Error analysis, convergence and stability theory. Course assignments will include use of computing facilities.
	3 credits. Prerequisite: Ma 223 and Ma 240
Instructor:	Mili Shah (mili.shah@cooper.edu)
	41 Cooper Room 311
Lectures:	Wednesdays 1:00PM-2:50PM, 41 Cooper Room 506
	Thursdays 10:00AM-10:50AM, 41 Cooper Room 504
Office Hours:	Wednesdays 12:00PM-1:00PM
	Thursdays 11:00AM-1:00PM
Participation:	Please contribute to the classroom environment by asking questions and participating in discussions. Your interaction will be considered when assigning borderline grades, as will improving performance throughout the course of the semester.
Exams:	Two exams (25% each) and one final exam (30%) will be given during the semester. Each exam will be one hour and the final will be two hours. You may not use outside resources: calculators, other students, other books, etc.
Homework:	There will be a homework set roughly every other week. You are encouraged to discuss these assignments, but the **final write-up must be entirely your own work**. If you collaborate, you **must** note that at the top of the assignment along with details of the collaboration. Note that collaboration does **not** mean turning in an identical solution. Sharing code or answers to exercises is **not** allowed. Any copying of an assignment, whether electronically or by hand is considered plagiarism. As soon as material is exchanged, the line between collaboration and plagiarism has been crossed. As a rule of thumb, you should spend half an hour working each problem independently before collaborating with a classmate. Homework will typically be due Wednesdays at 1pm.
Grading:	Homework: Due Wednesdays at 1pm (20% of final grade)
	Exam 1: Thursday, February 29 (25% of final grade)
	Exam 2: Thursday, April 11 (25% of final grade)
	Final Exam: Wednesday, May 8 (30% of final grade)
	Note: I reserve the right to adapt exam dates.
Late policy:	No work will be accepted late without prior arrangement or a written excuse. Neither exam or final may be made up without prior arrangement or a written excuse.
Required Text:	A. C. Faul, *A Concise Introduction to Numerical Analysis*, ISBN-9781498712187
	`https://ebookcentral.proquest.com/lib/cooper/detail.action?docID=4711485`
Suggested Texts:	Greenbaum and Chartier, *Numerical Methods*, ISBN-13: 978-0691151229
	Moler, *Numerical Computing with Matlab*, ISBN-13: 978-0-89871-660-3
	Trefethen and Bau, *Numerical Linear Algebra*, ISBN-13: 978-0898713619
Disabilities:	If you believe you are entitled to an accommodation on assessments through the Americans with Disabilities Act, you must self-identify to the Office of the Dean of Students and meet with me during the first week of the term to discuss arrangements for meeting your accommodation.

Timeline

Please note that this schedule is tentative and will likely be adjusted as the semester progresses.

Week	Schedule
1/17/2024	Linear Algebra Review
1/24/2024	Gaussian Elimination and LU Factorization
1/31/2024	QR Factorization and Gram-Schmidt Algorithm
2/7/2024	Singular Value Decomposition and Least Squares
2/14/2024	Eigenvalues
2/21/2024	Eigenvalues
2/28/2024	**Exam 1 on Thursday February 29**
3/6/2024	Nonlinear Systems
3/13/2024	Interpolation
3/20/2024	**Spring Break**
3/27/2024	Splines
4/3/2024	Quadrature
4/10/2024	**Exam 2 on Thursday April 11**
4/17/2024	Differential Equations
4/24/2024	Optimization
5/1/2024	**Study Period**
5/8/2024	**Final Exam on Wednesday May 8**