MTH335: Numerical Analysis

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Meeting Time and places: M: 12:20 - 2:15, 1S-217
Office Hours: MW 2:30-3:45
Required Text: Numerical Analysis, Kincaid and Cheney, Third Edition, AMS

About: MTH335 covers the basics of numerical analysis. The attached syllabus is tentative. It is likely a few sections will be trimmed during the semester.

The book: The book is available at the book store or online. It is a bit advanced in parts, but was significantly cheaper than some alternatives. It should be available for under $80, where alternatives were well over $200.

Grading policy: Your grade will be determined by your performance on the two in-class exams, the final exam, and ahomework grade. The three exams are each worth 30% of the grade, the homework grade 10%. Homework will be collected and spot-checked, but not fully graded. There may be quizzes during the semester. Points earned here will count towards your test grades.

Exam Policy: I expect full attendance at all the exams. There will be no make-up exams as a general rule.

Exam Dates: Our tentative dates for the mid-term exams are The mid-term exams will be 10/7 and 11/16. These fall on the 10th and 20th classes of the semester.

Academic Honesty: The CUNY academic integrity policies are available from the website http://www.math.csi.cuny.edu/verzani/classes/CUNYapr.pdf. Cheating on exams will not be tolerated. Although I encourage you to work together – if desired – on any assignment for the in-class portion of your grade, this does not mean you can copy another person's work.

(Tentative) Syllabus for MTH 335

	Topic	pgs	Homework
	Ch. 1: Mathematical Preliminaries		
1	Taylor's Theorem, Convergence	2-28	1.2: 1,2,4,7,10,30; cp: 1, 2
	Ch. 2: Computer Arithmetic		
2	Floating point	37-54	2.1: 3, 10, 16,24,26;
	Julia in a nutshell		2.2: 2,3,5,7,25, cp: 3,4,8
3	Errors, Conditioning	55-72	2.3: 3,4,5 cp: 6
	Ch. 3: Solution of Nonlinear Equations		
4	Root finding, Bisection	74-80	3.1: 2,8,9,22; cp: 1, 4
5	Newton's method, Secant method	81-99	3.2: 2,5,8,15; cp 1,2,5,9; 3.3: 1,2,3,7
6	Fixed points and Functional Iteration	100-108	3.4: 2,3,5,7,10,12, 39
	Ch. 4: Solving Systems of Linear Equations		
7	Matrix algebra	139-149	4.1: 3, 6,11
8	LU and Cholesky factorization	149-162	4.2: 1 bc, 5,7,12,30,31,33,46
9	Pivoting and Algorithms	163-185	4.3: 1,3,18,50
10	Norms and analysis of errors	186-197	4.4: 1, 5, 13, 40, 48
11	Solution of equations by iterative methods	207-231	4.6: 1, 8, 18, 29; cp: 1
	Ch. 5: Topics in Numeric Linear Algebra		
12	Matrix Eigenvalue Problem: Power method	254-263	5.1: 1, 6, 7, 13; cp: 1, 3
13	Orthogonal Factorizations and Least-Squares Problems	273-287	5.3: 5, 8, 29, 37
	Ch. 6: Approximating Functions		
14	Polynomial interpolation	308-327	TBA
15	Splines	349-377	TBA
16	Best Approximation: Least-Squares Theory	392-404	TBA
	Ch. 7: Numerical Differentiation and Integration		
17	Numerical Differentiation	465-477	TBA
18	Numerical Integration, Interpolation	478-491	TBA
19	Numerical Integration, Gaussian Quadrature	492-501	TBA
	Ch. 8: Numerical Solutions of ODEs		
20	Existence and Uniqueness	524-529	TBA
21	Taylor-Series method	530-538	TBA
22	Runge-Kutta Methods	539-548	TBA
23	Local and Global Errors, Stability	557-565	TBA
24	Systems and Higher-Order ODEs	565-571	TBA