SYLLABUS MATH 3377/6577 Numerical Analysis Fall 2024

Professor:	Dr. Mark Demers Office: GR-21 Bannow Science Center	Phone: (203) 254-4000 Ext. 2252 Email: mdemers@fairfield.edu	
Lectures:	Bannow 139, Mondays & Wednesdays $5:00 - 6:15$ p.m. If needed, we will meet by Zoom and I will post recorded lectures online.		
Office Hours:	Mondays 2:00 – 3:00 p.m. & Wednesdays 11:00	0 a.m. – 12:00 p.m. and 3:00 – 4:00 p.m.	
Required Text:	Numerical Analysis, 10th edition, by Burden, Faires, Burden. Published by Cengage. ISBN 978-1-305-25366-7 Resource Webpage: http://sites.google.com/site/numericalanalysis1burden/		
Class Website:	http://faculty.fairfield.edu/mdemers/numeric This is a valuable resource that contains the assi lectures, and important information and announ	al Bookmark this page! igned problem sets, links to the class cements regarding the class.	

Prerequisites

Knowledge of elementary and multivariable calculus including the theory and techniques of single variable continuous functions, basic differentiation and integration theory and techniques. A working knowledge of matrix operations and their relation to linear systems.

Outline of Topics by Week

Sections 8 1	Material Covered
1.1, 1.3	Review of Calculus; algorithms
2.1-2.3	Bisection, fixed-point iteration, Newton's method
2.4, 2.6	Error estimates; Muller's method
3.1, 3.2	Lagrange polynomials; data approximation
3.3-3.5	Divided differences; Hermite and cubic interpolations
4.1, 4.2	Numerical differentiation
4.3	Fall Break; Numerical integration
4.4, 4.5	Numerical integration and Romberg integration
4.6, 4.7	Quadrature methods
4.8, 4.9	Improper integrals and multiple integrals
6.1-6.3 Solv	ving linear systems of equations; pivots
6.4, 6.5	Matrix factorization
6.6	Special matrices; Thanksgiving Break
7.1-7.3	Eigenvalues and eigenvectors; iterative techniques
	Graduate student presentations
	Sections 1.1, 1.3 2.1-2.3 2.4, 2.6 3.1, 3.2 3.3-3.5 4.1, 4.2 4.3 4.4, 4.5 4.6, 4.7 4.8, 4.9 6.1-6.3 Solv 6.4, 6.5 6.6 7.1-7.3

This outline is only a broad indication of topics to be covered and may fluctuate depending on our pace during the term. The numbered sections refer to the required text for the class. There may be additional handouts during the course of the term that contain required material.

Attendance

In my experience, attendance is an important part of doing well in a course. Although no one is required to participate during class, you are encouraged to do so and I hope you will feel comfortable participating throughout the course of the term. Attendance for all quizzes is mandatory and make-ups will be given only for absences due to documented illness or other valid reasons. You must notify me **in advance** if you plan to miss a

quiz for an official university event. It is your responsibility to remain informed about what is going on in class and to obtain notes from classes you miss during the semester.

Problem Sets

Six problem sets will be assigned throughout the semester and due dates will be announced when the assignment is given (usually 2-3 weeks). Because they constitute a major component of the course, the problem sets will be substantial, comprising both exercises to be worked out on paper as well as algorithms to be implemented.

Problem sets will contain some problems assigned to all students in the class, **plus some extra problems assigned for the graduate students only.**

You should read the text and use it as a reference to complete the problem sets. I also expect you to read the upcoming sections of the text before each class so that you have some idea what material we will cover each week. This will enable you to keep pace with a fast-moving class as well as be better prepared to ask questions during class. Reviewing your notes and the text during the week will also help to keep the ideas fresh in your mind for the next class.

You are invited to attend office hours to discuss the material presented in class or in the text. If you cannot meet during office hours, email me for an appointment – I am available most days. You may also send me questions by email. You are also encouraged to form study groups and work with other students in the class if you find that helpful. But all work you hand in must be written by you and be your own intellectual property. If you work with a tutor, you cannot have your tutor give you solutions to the assigned problems. Tutors should help with concepts and practice, but the assignments you hand in must be your own work. Evidence of plagiarism on an assignment will result in a zero for the entire assignment. Please refer to the Fairfield Honor Code or ask me if you need further clarification on this issue.

Quizzes

Every two or three weeks, we will have a short, in-class quiz. Quizzes will comprise 2 or 3 questions and will focus on key concepts. You may be asked for definitions or to solve problems similar to what you have seen in class or on the problem sets. All quizzes will be announced in advance. You are required to attend class on a quiz day.

Grading

Your final grade will be determined by a weighted average of your quiz and problem set grades.

Undergraduate Students:

Problem Sets:	80%	(all problem sets weighted equally)
Quizzes:	20%	(all quizzes weighted equally, with lowest grade dropped)

Graduate Students:

Problem Sets:70%(all problem sets weighted equally)Quizzes:20%(all quizzes weighted equally, with lowest grade dropped)Presentation:10%(material presented during Finals Week)

Student Accommodations

If you require special accommodations, please contact the Office of Accessibility within the Academic Commons located in the Library, (203) 254-4000 Ext. 2615, or email ooa@fairfield.edu. Please notify me within two weeks of the start of the semester of any arrangements you make regarding accommodations.