UMass Dartmouth MTH361, Numerical Analysis

Yanlai Chen, Fall 2019

Coordinates

- Time / Place: TuTh 9:30am - 10:45pm, LArts 218
- Instructor: Yanlai Chen

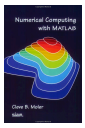
Email (best way to reach): yanlai _dot_ chen _at_ umassd _dot_ edu
Phone: 508-999-8438

Office hour: Tu 1:00pm - 2:30pm, Th 1:00pm - 2:30pm;
W 1:00pm - 2:00pm

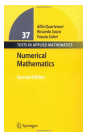
Office Location: LArts 394A

Class Website: http://yanlaichen.reawritingmath.com/fall19_361/

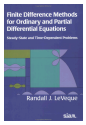
Recommended Textbooks



Numerical Computing with Matlab, by Moler [freely available online]



Numerical Mathematics, Second Edition, by Quarteroni, Sacco, and Saleri



Finite Difference Methods for Ordinary and Partial Differential Equations, by LeVeque

Course Description and Topics:

This course covers numerical algorithms to solve common problems arising in science and engineering. Primarily, students are expected to develop the basic understanding of the construction and implementation of numerical algorithms, and more importantly, the applicability and limits of their appropriate use. We will thoroughly study the numerical algorithms to understand the guaranteed accuracy, the efficiency, scalability, and stability issues. Topics include the standard algorithms for numerical computation:

1. Numerical Linear Algebra, Least Squares, Eigenvalues and Singular Values
2. Zero and roots
3. Interpolation
4. Numerical Differentiation and Integration
5. Numerical Methods for Ordinary Differential Equations
6. Fourier Analysis
7. Finite Difference Methods for Partial Differential Equations

Software

We will use Matlab at times in class. Students can use Matlab/Octave/FreeMat, python or any language of the student's choice. Students' competence with one programming languages for the purpose of scientific computing is a goal of this course.

Classroom Policy

Attendance, timely arrival, and classroom participation are expected. Three unexcused absences may result in an automatic failing grade. When missing a class, it is the students' responsibility to make up all the missed work. Please contact the instructor when you have any difficulty in doing so!

Personal electronic devices (cell phones, ipods, etc) have to be deactivated in classes. If it is absolutely necessary to use your cell phone, please step outside of the classroom.

Excused absences will typically require documents acceptable to the instructor. Extended absences for medical, personal or religious reasons will be handled on a case-by-case basis according to university policies.

Homework assignments are due in class typically two weeks after they are assigned. Late homework will be accepted only with prior approval. You are allowed to discuss homework problems in small groups, but limited to discussion of general ideas only. You must write your solutions completely independently, and in a clear manner (Latex preferred). Under no circumstances may you copy solutions from any source. Violation of these rules may result in a failing grade and possible disciplinary actions.

No make-up tests will be given in general. When it is absolutely necessary for you to miss one, please make all the effort to inform the instructor before the exam, and justify the reason of absence afterwards. A resolution will be determined at the discretion of the instructor.
Both tests will be in a "**closed book, closed notes**" format. No cheat sheet will be allowed.

Academic dishonesty will not be tolerated. This includes, but is not limited to, copying from others, and letting others copy from you. Any student caught cheating on an exam will receive a failing grade. Please refer to the following link for the university policy:
https://www.umassd.edu/provost/resourcesforfaculty/syllabus-language/

Students with Disabilities: Please note the available academic support services through the Center for Access and Success. A letter from this office documenting your eligibility for specific accommodations will help the instructor know how to best assist you.

Grading

A straight scale with plus grading will be used: A for 100-90, B for 90-80, C for 80-70 and D for 70-60. I reserve the right to modify the scale based on the actual difficulty of the work and average performance of the class. You final score will be based on:

- Midterm Exam 20%.
- Final Exam and/or project 35%.
- Homework 30%.
- Attendance, and participation etc 15%.

Homework/Test/Lecture Schedules

See class webpage or email, to be updated on a regular and timely basis by the instructor.
Also to be announced in class.

Important Dates

- September 4, 2019 — Class begins
- September 11, 2019 — Add/Drop ends; Last day to audit
- October 10, 2019 — Last day to Pass/Fail
- November 15, 2019 — Last day to withdraw from class