

# MTH472-572-599 Syllabus

## Numerical Methods for PDEs

### Spring 2015

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Office Hours: MW: 6:00–7:30 PM, F: 8:00 – 9:00 AM, or by appointment.

**Class Meetings:** MW 04:30–5:45 PM. Larts 218.

**Textbooks:** I will be using several textbooks as references for this course. All textbooks are available online in mycourses through SIAM website when your computer is connected through UMass Dartmouth network.

1. Finite Difference Methods for Ordinary and Partial Differential Equations: Steady-State and Time-Dependent Problems by Randall Leveque.
2. Finite Difference Schemes and Partial Differential Equations by John Strikwerda.
3. Finite Difference and Spectral Methods for Ordinary and Partial Differential Equations by Nick Trefethen.
4. Spectral Methods in MATLAB by Nick Trefethen.
5. Learning MATLAB by Toby Driscoll.
6. MATLAB Guide by Nick Higham & Desmond Higham.
7. Some papers (Fornberg, etc). I will make them available in mycourses via links through UMass Dartmouth library.

**Software:** We will use MATLAB. The software is available in most computer labs at UMass Dartmouth. You can also access it through UMass Dartmouth Virtual Computing Lab. The student version of MATLAB can be purchased through mathworks.

**Course Description and Objectives:** This is the numerical methods for PDEs course offered by the Department of Mathematics at UMass Dartmouth. This course is a continuation of MTH362. We will be covering topics such as finite difference approximation, differentiation matrices, solving time-independent and time-dependent problems in 1D and 2D cases, implementation of boundary conditions, and some advance topics related to numerical PDEs. After taking this course, students should be familiar with both practical implementations and analysis behind finite-difference methods for problems not covered in MTH362.

**Mycourses:** Syllabus, information about deadlines, course materials, projects, important links, and grades will be available through mycourses. Please log-in to mycourses at least twice a week.

**Grades:**

Your grades will be based on 4 take home projects and final presentation. Each project will contain questions about numerical experiments and mathematical analysis. Solutions and codes must be uploaded to mycourses before deadlines. You are encouraged to work together with your peers. However, all projects must be based on your own work and writing. You are not allowed to ask for help from your academic advisors to solve problems on the projects.

**Grade-O-meter:**

Project 1:	20%	A	96-100%	C	72-75%
Project 2:	20%	A-	92-95%	C-	68-71%
Project 3:	20%	B+	88-91%	D+	64-67%
Project 4:	20%	B	84-87%	D	60-63%
Presentation :	20%	B-	80-83%	D-	56-59%
Total:	100%	C+	76-79%	F	0-55%

**What's Valued:** The things most valued in this class are:

- Engagement. This is evidenced by participating in class, asking questions, by reading ahead, by bringing questions to class.
- Honesty. This is a basic scientific attribute. You are encouraged to work together as a group and to discuss homework problems with other students. However, all codes and homework solutions must be written and submitted individually.
- Take Pride in your Work. Project solutions must be carefully written and MATLAB codes must be neatly organized. Think about people who will read your codes. Putting extra comments in the codes will be helpful. Figures must be complete with labels, titles, etc.

**Attendance and Focus of Attention:**

Attendance is mandatory, as is being on-task and participating in class activities. Three (3) missed classes without explanation may result in a grade of F without further discussion.

**Grade Change Policy:** From memorandum on course procedures: "No final grade may be changed as a result of re-examination, the re-evaluation of work submitted, and/or assigning additional [extra credit] work before or after the end of the term, unless all students enrolled in the class are afforded the same opportunity".

**Academic Dishonesty:**

Please consult UMass Dartmouth Student Academic Integrity Policy:

<http://www.umassd.edu/studentaffairs/studenthandbook/academicregulationsandprocedures/>