MTH472-572 Syllabus
Numerical Methods for PDEs
Spectral and Pseudospectral Methods
Fall 2013

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Office Hours:	M: 2:00–3:00, T: 2:00 – 3:30, R: 2:00– 4:00, or by appointment.

Class Meetings: TR 12:30–1:45 PM. Larts 209.

Textbook: Spectral Methods in MATLAB by Nick Trefethen (mandatory). The textbook is available online through SIAM website when your computer is connected through UMass Dartmouth network.

Additional texts (optional):

1. A Practical Guide to Pseudospectral Methods by Bengt Fornberg.
2. Chebyshev and Fourier Spectral Methods by John P. Boyd.
3. Spectral Methods for Time-Dependent Problems by Jan Hesthaven, Sigal Gottlieb, and David Gottlieb. Prof Sigal Gottlieb's office is 5 steps from my office in case you are asking her to sign your book.
4. Approximation Theory and Approximation Practice by Nick Trefethen.
5. Learning MATLAB by Toby Driscoll. This book is available online through SIAM website when your computer is connected through UMass Dartmouth network.
6. Some SIAM papers. I will make them available in mycourses via links through UMass Dartmouth library.

You can also request (1)-(5) through inter-library loan.

Software: We will use MATLAB. UMass Dartmouth provides univesity wide license of MATLAB. As UMD students, you are free to register with mathworks, download, and install the software in your own computer.

Course Description and Objectives: This is the numerical methods for PDEs course offered by the Department of Mathematics at UMass Dartmouth. The topic this is year will be specialized on spectral and pseudospectral methods for the numerical solution of PDEs. With spectral methods, we will be covering topics such as function approximation, differentiation matrices,

solving time-independent and time-dependent problems in 1D and 2D cases, eigenvalue stability, and implementation of boundary conditions. After taking this course, students should be familiar with both practical implementations and analysis behind spectral methods.

Grades:
Your grades will based on 5 take home projects. Each project will contain questions about numerical experiments and mathematical analysis. Solutions and codes must be uploaded to mycourses before deadlines.

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%
Project 5:	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.

Academic Dishonesty:
Please consult UMass Dartmouth Student Academic Integrity Policy:
`http://www.umassd.edu/studentaffairs/studenthandbook/academicregulationsandprocedures/`