MATH 5176 Fall 2008

TR 2:00p.m.–3:15p.m., Friday 013

Instructor: Prof. You-lan Zhu
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Office Hours: TR 3:30p.m.–4:45p.m. and W 2:00p.m.–4:45p.m. (for both MATH 5176 and MATH 6202) and by appointment.

Homework will be assigned every lecture. During the first lecture of a week students should turn in all the homework problems assigned during the previous week for grading. Homework counts 30% of your grade.

There will be two tests and each one counts 35 % of your grade. You should expect that an average of 90% or better will be needed for an A, 89% - 80% for a B. Otherwise a C (79% - 60%) or U (below 60%) will be given.

As with most mathematics classes, the material covered in one class usually depends heavily on the material from previous classes. It is very important that you try to keep up with class assignments. If you have any questions, do not hesitate to ask me.

P.S.

	Estimated Dates	Percentages	Chapters
Test I	10/7 or so	35%	1 – 3, etc.
Test II	12/16 (3:00 p.m.– 6:00 p.m.)	35%	4–7, 11 etc.

Preliminary Syllabus for MATH 5176

Numerical Methods for Partial Differential Equations

Text/References:

1. Strikwerda, J.C., Finite difference schemes and partial differential equations, Second Edition, SIAM, Philadelphia, 2004.

2. Zhu, Y.-l, Guo, B.-y. (Eds), Numerical Methods for Partial Differential Equations, Proceedings, Shanghai, Springer-Verlag, 1987. (THE LAST PAPER)

3. Zhu, Y.-l. et.al., Difference methods for initial-boundary-value problems and flow around bodies, Springer-Verlag and Science Press, 1988. (APPENDIX 1 OF CHAPTER 1)

4. Zhu, Y.-l., Wu, X., Chern, I-L., Derivative securities and difference methods, Springer, New York, 2004. (SUBSECTION 2.9.5)

	Titles of topics	Text/Reference book, Chapter
1	Hyperbolic equations and difference schemes	1, Chapter 1
2	Formulation of initial-boundary-value problems	4, Subsection 2.9.5
3	Fourier analysis and Von Neumann analysis	1, Chapter 2
4	Algorithms for boundary points Stability conditions for variable coefficients	3, Appendix 1
5	Order of accuracy	1, Chapter 3
6	Stability for multistep schemes	1, Chapter 4
7	Dissipation and dispersion	1, Chapter 5
8	Parabolic equations and difference schemes	1, Chapter 6
9	Systems of PDEs and difference schemes	1, Chapter 7
10	Well-posed initial value problems and Kreiss matrix theorem	1, Chapter 9
11	Convergence and the Lax-Richtmyer equivalence theorem	1, Chapter 10
12	Well-posed and stable initial-boundary value problems	1, Chapter 11
13	Convergence of difference schemes for nonlinear initial-boundary value problems	2, Last paper