

Methods of Applied Mathematics II – Math 557 X1

Spring 2008

Syllabus

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Course Web Page: <http://www.math.uiuc.edu/~rdeville/teaching/557/>

Optional Text: Keener, J. P. *Principles of Applied Mathematics*, 2000.

Lecture Time and Location: MWF, 12–12:50, Altgeld 443.

Office Hours: Illini Hall 344B, time TBD

Subject material: We will use Keener's book as a topical guide and use various supplemental materials throughout the course. A rough approximation to the topics we plan to cover in the class is the second half of Keener, Chapters 6–12.

Grading:

Homeworks (somewhere between five and seven) throughout the semester, and a final exam. Each component worth half.

Course goals and expectations:

The overarching theme of this course is to give the students some skills in dealing with various linear and nonlinear partial differential equations (PDE). As we all know, nonlinear PDE have exact solutions in only the most special of cases, thus we need qualitative and asymptotic techniques to get meaningful information out of most PDE we will encounter.

My expectation is that the students will have broad mathematical, engineering, or scientific interests and the course will be geared toward developing tools which are mathematically sound, yet also effective in dealing with problems outside of mathematics. We will cover topics including transform methods, scattering and inverse scattering methods, and asymptotic techniques, but always with a view towards potential applications.

We will need a very broad collection of mathematical results in this class to get where we want to go, and since our scope will be so broad it will of necessity be shallow. Specifically, we will not prove rigorously everything we use; in some cases we will simply point out where the rigorous results lie and give an overview of the technicalities. In other places we will do everything with full rigor.

All that being said, I expect this to be an enriching and useful course for all who take it. My hope is that this course will give a good idea of what constitutes modern applied mathematics and that it will lay down a foundation on which the students can build towards eventually doing research mathematics on these topics.