

642:527

**METHODS OF APPLIED MATHEMATICS**

FALL 2007

**Instructor:** Professor Eugene Speer  
Hill Center 520, 732-445-1313 (Rutgers extension 5-1313)  
Web: <http://www.math.rutgers.edu/courses/527/527-f07/>

**Office hours:** Tuesday 9:00-9:40 AM, Murray 115  
Friday F 9:00-9:40 AM, Murray 111  
Tuesday 3:20-4:40 PM, Hill 520  
Or by appointment or chance in Hill 520

**Text:** Greenberg, Michael, D., *Advanced Engineering Mathematics* (2<sup>nd</sup> edition). Upper Saddle River: Prentice Hall, 1998.

**General:** This is a first semester graduate course appropriate for students in mechanical and aerospace engineering, biomedical engineering, other engineering, and physics. The topics to be covered are: solution of ordinary differential equations by power series methods (in particular, the method of Frobenius), Laplace transform methods, and phase plane methods; vector spaces of functions, Hilbert spaces, and orthonormal bases; Fourier series, Fourier transforms, and Sturm-Liouville theory; solution of the linear differential equations of physics—the heat, wave, and Laplace equations—by separation of variables.

**Prerequisites:** We assume familiarity with

- Single and multivariable calculus;
- Ordinary differential equations (as in Greenberg, Chapters 1, 2, and 3 and Sections 4.1-2, although the material in chapter 4 will be reviewed);
- Linear algebra (roughly Greenberg Chapter 8 and Sections 9.1-5, 10.1-5, and 11.1-2, although not all of this material will be used in detail).

**Homework:** Homework problems will be assigned weekly through postings on the web page, and will normally be due on Tuesdays.

**Exams:** There will be two in-class exams, tentatively scheduled for **Tuesday, October 9** and **Tuesday, November 13**. We will schedule the final exam near the end of the term; it will be sometime during the final exam period (December 14 through December 20), so you should not plan to be out of town during this period until we have scheduled the exam. Make-up exams will be given only in the case of well-documented illness or major emergency or (only with permission in advance) of a major outside commitment.

**Grading:** Grading will be based on a weighted average of homework and exams:

Homework . . . . .	20%
Class exams . . . . . 20% each . . . . .	40%
Final exam . . . . .	40%