

642:527

**METHODS OF APPLIED MATHEMATICS**

FALL 2008

**Instructor:** Professor Eugene Speer  
Hill Center 520, 732-445-1313 (Rutgers extension 5-1313)  
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**Office hours:** Monday 1:40-3:00 PM, Hill 520  
Tuesday 3:20-4:40 PM, Hill 520  
Wednesday 10:20-11:40 AM, 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 **Thursday, October 9** and **Thursday, November 13**. The final exam will be held **Friday, December 19, from 8:00 AM to 11:00 AM**. 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:

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