642:527

METHODS OF APPLIED MATHEMATICS

FALL 2009

Instructor: Professor Eugene Speer
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Office hours: Monday 9:00–10:00 AM, Hill 520
                     Tuesday 3:20–4:40 PM, Hill 520
                     Thursday 9:00–10:00 AM, Hill 520
                     Or by appointment or chance in Hill 520

Text: Greenberg, Michael, D., *Advanced Engineering Mathematics* (2$^{\text{nd}}$ 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. The first assignment will be due Thursday, 9/10; after that assignments will normally be due on Tuesdays.

Exams: There will be two in-class exams, tentatively scheduled for **Thursday, October 8** and **Tuesday, November 17**. The final exam will be held **Wednesday, December 16, 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:

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