

642:527

METHODS OF APPLIED MATHEMATICS

FALL 2012

Instructor: Professor Eugene Speer
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Office hours: Monday, 1:40–3:00 PM, Hill Center 520
Wednesday, 3:20–4:40 PM, Hill Center 520
Thursday 9:00–10:00 AM, Hill Center 520
Or by appointment or chance in Hill 520

Text: Greenberg, Michael, D., *Advanced Engineering Mathematics* (2nd edition). Upper Saddle River: Prentice Hall, 1998. A copy of the text is on reserve in the Mathematical Sciences Library in Hill Center.

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 some of 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 Wednesday, 9/12; the next few assignments after that will also be due on Wednesdays.

Academic integrity: You are strongly encouraged to discuss homework problems with me or with other students. On the other hand, after you have finished discussing a problem, you *must* write your solution independently, not in concert with others. If you consult any source other than Greenberg (such as a web page, solutions from a previous semester, etc.), and material from that source contributes significantly to the preparation of homework, you *must* acknowledge this by citing that source; moreover, the work you turn in *must* be written up in your own words, not copied from a source. Failure to observe these restrictions will be treated as a violation of the Rutgers Academic Integrity Policy.

Exams: There will be two in-class exams, tentatively scheduled for **Wednesday, October 10** and **Monday, November 19**. The final exam will be held **Thursday, December 20, from 4:00 PM to 7:00 PM**. 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%