

Math 221 Differential Equations

May 18, 2009

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Course website:

<http://www.math.stevens.edu/~ifloresc/Teaching/2008-2009/index221.html>

Objectives

This course is designed to introduce the students to the world of solving differential equations. Differential equations are encountered in all areas of scientific application (perhaps not in literature). The textbook contains software but that is irrelevant for us. We are interested in learning fundamental methodology for solving differential equations. For methods and programming used to solve complex partial differential equations one needs to follow up this course with Numerical methods or numerical analysis courses.

The students are assumed a good working knowledge of Calculus and Analysis (MA 116 or equivalent). Some of the topics covered are *Ordinary differential equations of first and second order; homogeneous and non-homogeneous equations; Laplace transforms; Taylor and Power series methods; boundary-value problems; Fourier series; and separation of variables for heat and wave PDE's.*

Textbook(s):

The textbook for this class is:

- *Fundamentals of Differential Equations with Boundary Value Problems with IDE CD*, by Kent Nagle, Edward B. Saff, Arthur D. Snider 5th edition, Addison-Wesley, Sep 29 2008, ISBN: 032161321X, ISBN-13: 9780321613219

Homework, Exams and Grading:

Proper assignment write-up

To understand the course material and get a good grade it is necessary (though not sufficient) to invest a substantial amount of time working on the assignments. Homework consisting of about 2-3 problems will be assigned in class every day or on the web. They will be next class at the beginning of the lecture. ***No late homework will be accepted under any circumstances.***

You are encouraged to discuss homework; however, **all written homework must be written by you. Copying solutions from other students in the class, former students, tutors, or any other source is strictly forbidden.** Copying the solution of one or more problems from another source than your own brain is consider academic dishonesty/misconduct and will be dealt with according to the Stevens honor board policy. Please review the [document posted on the website](#) which details what is considered fair collaboration and what is considered academic misconduct.

Exam policy

We will have two midterms and a final exam. All exams are in-class. The exams will be closed books and notes. No calculators are allowed. The most weight for the final grade will be coming from the final examination.

There will be no individual make up exams. If you miss one of the exams, you may be allowed to take a *comprehensive* make up exam (location and time to be determined) at the end of the semester. To be allowed to take this make up exam you have to bring valid written documentation that explains

the reason for the missed exam. The make up exam will replace at most one missing exam grade.

Learning Outcomes

A student graduating this course will be expected to obtain the following specific knowledge.

1. Simple methods to solve specific ordinary differential equations analytically.
2. Approximating the solution of ODE's and PDE's with Taylor or power series.
3. Use the *Laplace transform* to solve differential equations.
4. Use the *Fourier transform* to solve differential equations.
5. An introduction to specific PDE's: the heat equation and the wave equation.