Differential Equations

MATH 301

Fall 2005

MWTF 11:00–11:50 Thompson 320

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Course Overview and Text

This course centers on solving and analyzing *ordinary differential equations* (as opposed to *partial differential equations*, the subject of Math 302). After successfully completing this course, a student should be able to

- solve various types of differential equations including first order differential equations, linear second-order differential equations, and systems of linear differential equations;
- do qualitative analysis of nonlinear differential equations;
- understand and apply relevant existence and uniqueness theorems;
- use differential equations in modeling real-world phenomena.

Calculus and linear algebra are prequisites for this course.

The course text is *Elementary Differential Equations*, Werner Kohler and Lee Johnson, Pearson, 2004.

Course Web Pages

Web pages for this course are located at

`www.math.ups.edu/~martinj/courses/fall2005/m301/m301.html`

You can get to this page by following links at `www.math.ups.edu/~martinj`. The web site will have a list of assignments and due dates. I will also post announcements and comments about questions or issues that come up in class. You should check the web site for new announcements several times each week. Class handouts will be available to download as PDF files if you lose your copy or miss class.

Grading, Coursework, and Policies

In class, we will discuss new material, respond to questions from reading the text, and work through assigned problems on which there are difficulties. When we discuss new material, the focus will be on "the big picture." That is, we will look at new ideas in their simplest form and how these ideas fit together. Often, we will not consider details and variations in depth during a first pass through new material. Your mastery of the details will begin outside of class with a careful reading of the text and work on the assigned problems. We will address the details by responding to questions on the reading and problems that you bring to class. You are expected to participate in class by being present (and alert), by responding to questions I pose, and by asking the questions that you have.

Outside of class, you should read the relevant sections of the text carefully. This will generally include working through the reasoning of arguments and filling in steps that are omitted in calculations. You should keep a list of specific questions from the reading and find answers to those questions either in class, with me outside of class, or with study partners.

Evaluated coursework will include homework problems, modeling reports, exams, and a comprehensive final exam.

The text is also a source of problems that are essential in building understanding and skill. I will assign homework problems from the textbook on which I expect you to spend considerable time and effort. You should not get in the habit of focusing only on the problems designated to be turned in. You will need to demonstrate mastery of computational techniques on exams.

The study of differential equations includes a significant computational component. Since you should have a lot of experience with mastering new computational techniques, I will focus on evaluating homework problems that have some focus on modeling. For the problems you submit, you should explain assumptions and interpretations in the modeling situation. You do not need to include every computational detail. You should use the standards of proper technical writing (including using paragraph form with complete sentences).

I will assign three to five modeling projects for which you will submit a detailed report. More details will come with the first project.

We will have four exams during the semester. These will be a combination of in-class and take-home. I will give you at least one week notice before any in-class exam. The fourth exam will be in the last week of classes.

The final exam is scheduled for Monday, December 12 from 12:00-2:00 pm. The final exam may include a take-home component.

To determine course grades, I calculate a total course score with homework problems weighted at 15%, modeling reports at 15%, exams weighted at 50%, and the final exam weighted at 20%. I assign a preliminary course grade based on an objective standard (93.3-100% for an A, 90.0-93.2% for an A−, 86.7-89.9% for a B+, 83.3-86.6% for a B, etc.). I then look at each student's performance subjectively. Occasionally I will assign a course grade that is higher than the objective standard. For example, if a student has a grade of B according to the objective standard but has shown steady improvement, I might assign a course grade of B+.

Office Hours

I am generally available in my office for help several hours each day. I am often in my office during the day in hours at which I do not have a scheduled class, meeting, or other activity. You can see my weekly schedule at

<div align="center">www.math.ups.edu/~martinj/schedule.html</div>

Feel free to come look for me. To be (almost) guaranteed that I will be in, come during one of the hours labeled as an "office hour." You can also call, send e-mail, or stop me after class to schedule an appointment for a specific time.

Important Dates for Fall 2005

Tuesday, September 6	Last day to add a course
Monday, September 12	Last day to drop a course without record
Monday, September 26	Last day to drop a course with an automatic W

Note that University policy mandates a grade of WF if you drop a course after Monday, September 26 unless "there have been unusual circumstances beyond the student's control and the student's work has been of passing quality." For full details, see the Academic Policies section of *The Logger*.