**Math 221 (821) Differential Equations**
**Section 003**

**Lecture:** TuTh 11:00-12:15 CBA 105

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**WWW pages for this class:** http://www.math.unl.edu/∼mbritten/classwk/221s03/

(There you will find copies of nearly every handout from class, lists of homework problems assigned, dates for exams, etc.)

**Office Hours:** (tentatively) Mo 11:00-12:00, Tu 2:00 - 3:00, We 10:00-11:00, and Th 1:00-2:00, and whenever you can find me in my office and I'm not horrendously busy. You are also quite welcome to make an appointment for any other time; this is easiest to arrange just before or after class.

**Text:** *Fundamentals of Differential Equations*, by Nagle, Saff, and Snider, Fifth edition, Addison-Wesley (2000).

This course, as the name is meant to imply, is intended to introduce you to some of the problems, techniques, and applications of differential equations (i.e., problems involving an (unknown) function and some of its derivatives). Developing and solving such equations is a fundamental part of many science and engineering problems. We will explore several different approaches to differential equations, which depend on different interpretations of the word 'solving'. The course will focus on analytical methods (finding a formula), qualitative methods (understanding the basic shape of the *graph* of a solution), and numerical methods (finding approximate solutions, largely with the help of a computer).

Our basic goal will be to work through some or all of each of the following chapters:

Ch. 1, Introduction
Ch. 2, First Order Differential Equations
Ch. 3, Mathematical Models and Numerical Methods
Ch. 4, Linear Second Order Equations
Ch. 5, Systems and Phase Plane Analysis
Ch. 6, Higher-order Linear Differential Equations
Ch. 7, Laplace Transforms

**Homework** will be assigned from each section, as we finish it. It is an essential ingredient to the course - as with almost all of mathematics, we learn best by doing (again and again and ...). Cooperation with other students on these assignments is acceptable, and even encouraged. However, you should make sure you are understanding the process of finding the solution, on your own - after all, you get to bring only one brain to exams (and it can't be someone else's). For the same reason, I also recommend that you try working each problem on your own, first. Homework will not be collected, and therefore, not graded (the solution to every odd-numbered problem may be found at the end of the book); but it

is probably the most important ingredient toward making sure that you are understanding the material..

In addition, we will have one significantly larger assignment. This **project** will be assigned near the end of February, and be due several weeks later. You may choose to work on the project in groups of up to three, with one write-up turned in for the group, or you may choose to work on it individually. It will count 10% towards your final grade.

**Quizzes** will be given each Thursday, during weeks that do not also contain an exam (in *our* class...) or the first day of classes. Each will typically consist of one question (modelled on a homework problem) from the material covered through the previous Tuesday. Your lowest two quiz grades will be dropped before computing your final quiz average, which will constitute 20 % of your grade. A missed quiz will count as zero (and will therefore be the first grade dropped); a make-up quiz can be arranged only under the most unusual of circumstances.

**Midterm exams** will be given two times during the semester, approximately every six weeks - the specific dates will be announced in class well in advance (likely candidates: mid February, end of March). Each exam will count 20% toward your grade. You can take a make-up exam only if there are compelling reasons (a doctor SAYS you were sick, jury duty, etc.) for you to miss an exam. Make-up exams tend to be harder than the originals (because make-up exams are harder to write!).

Finally, there will be a regularly scheduled **final exam** on Friday, May 9, from 10:00am to 12:00noon. It will cover the entire course, with a slight emphasis on material covered after the last midterm exam. It will count the remaining 30% toward your grade.

**Your course grade** will be calculated numerically using the above percentages, and will be converted to a letter grade based partly on the overall average of the class. However, a score of 90% or better will guarantee some kind of **A**, 80% or better at least some sort of **B**, 70% or better at least a flavor of **C**, and 60% or better at least a **D**.

And now the obligatory pep talk:

In mathematics, new concepts continually rely upon the mastery of old ones; it is therefore essential that you thoroughly understand each new topic before moving on. Our classes are an important opportunity for you to ask questions; to make sure that you are understanding concepts correctly. Speak up! It's your education at stake. Make every effort to resist the temptation to put off work, and to fall behind. Every topic has to be gotten through, not around. And it's alot easier to read 50 pages in a week than it is in a day. Try to do some mathematics every single day. (I do.) **Class attendance** and **doing the homework** are probably your best methods for insuring that you will keep up with the material, and to make sure that you understand all of the concepts.

**Departmental Grading Appeals Policy:** The Department of Mathematics and Statistics does not tolerate discrimination or harassment on the basis of race, gender, religion, or sexual orientation. If you believe you have been subject to such discrimination or harassment, in this or any other math course, please contact the department. If, for this or any other reason, you believe your grade was assigned incorrectly or capriciously, then appeals

may be made (in order) to the instructor, the department chair, the department grading appeals committee, the college grading appeals committee, and the university grading appeals committee.

**Some important academic dates**

**Jan. 13** First day of classes.
**Jan. 20** Martin Luther King Day - no classes.
**Jan. 24** Last day to withdraw from a course without receiving a **'W'**.
**Mar. 7** Last day to change to or from P/NP.
**Mar. 16-23** Spring break - no classes.
**Apr. 11** Last day to withdraw from a course.
**May 2** Last day of classes.