MATH 286: HONORS DIFFERENTIAL EQUATIONS

Instructor: Rohan Kadakia, kadakia@umich.edu. E-mail me from your @umich account.

Office Hours: For now, they are MWF 1:30–2:30 p.m., in East Hall 3827. If you can't make any of these, or if you prefer to meet with me separately, let me know.

Class Time and Location: MoWeFr 10:00–11:00 a.m. in East Hall 2866. Class will start at 10:10 a.m., on Michigan time.

Textbook: *Elementary Differential Equations and Boundary Value Problems*, by Boyce and DiPrima, 10$^{\text{th}}$ edition, published by Wiley. Strictly speaking, 9$^{\text{th}}$ edition also okay, I think.

Course Website: The course website is on Canvas. I will post homework assignments and other materials on the course website.

Course Description:

Background and Goals: The sequence Math 185-186-285-286 is an introduction to calculus at the honors level. It is taken by students intending to concentrate in mathematics, science, or engineering as well as students heading for many other fields who want a somewhat more theoretical approach. Although much attention is paid to concepts and solving problems, the underlying theory and proofs of important results are also included.

Content: Topics include first-order ordinary differential equations, higher-order linear differential equations with constant coefficients, an introduction to linear algebra, linear systems, the Laplace Transform, series solutions and other numerical methods. We will also introduce some qualitative theory of differential equations.

In particular, unlike Math 316, this course does not presuppose knowledge of linear algebra. I will incorporate the needed tools and language of linear algebra into the course.

Subsequent Courses: Math 471 (Intro. to Numerical Methods) and/or Math 572 are natural sequels in the area of differential equations, but Math 286 is also preparation for more theoretical courses such as Math 451 (Advanced Calculus I).

Prerequisites: Math 285, or equivalent. See me if you're unsure.

Pre-reading: You should read sections of the book ahead of the day they will be covered in class. I will tell you, or it should be clear, which section you should read for the next class meeting. In lecture, I will not simply regurgitate the material in the book. I may choose to

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Date: Winter 2016.

put emphasis on certain topics and possibly leave out others. This is further motivation for you to read the book.

Exams: The final exam will take place on **Wednesday, April 20, from 1:30 p.m. to 3:30 p.m.**, location TBD. It will start sharply at 1:30 p.m., *not* on Michigan time. The final will be cumulative, or at least you should expect it to be. In addition, in an effort to provide more frequent feedback, there will be *three* midterm exams. Their probable dates are:

<div align="center">

Midterm 1 ..... Wednesday, February 3, in class
Midterm 2 ..... Friday, February 26, in class
Midterm 3 ..... Wednesday, March 30

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The midterms will be non-cumulative. Note that class will not be held on January 18 due to the M.L.K. holiday, as well as February 29–March 4 due to Spring (Winter?) Break.

Evaluation: Grades will be determined according to the percent-wise breakdown below.

<div align="center">

Homework 20%
Midterms ..... 15% each
Final Exam 35%

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I promise: If you earn at least 90% of the points, after weighting, you will get no lower than an A-. If you earn at least 80% of the points, after weighting, you will get no lower than an B-. And so on.

Homework: There will be a weekly problem set, assigned each Friday (or Wednesday) and due the following Friday (or Wednesday). We will try to return graded homeworks in a timely manner. You may work on these problem sets together, but *you must submit your own solutions.* Show your work! When writing up your solutions, whenever possible, use complete sentences, especially when writing proofs; and please write up your solutions in order. No late homework will be accepted, and your lowest homework score will be dropped.

Technology: Demonstrations, which are mainly worked-out examples involving some sort of technology, have been created for Math 216, and you might find these to be useful. They are available at Demos.

Attendance: This is an honors course, so I will assume that you're excited about the material, and therefore won't be inclined to miss class. If you have a reason for not being able to attend class, send me an e-mail at least one hour prior to the start of class. Frequent absences, and particularly frequent unexcused absences, may adversely impact your grade.