Introduction to Differential Equations (Math 256)
Fall 2014

Meeting times: Mon., Tues., Wed., and Fri. 12–12:50pm in 306 Deady Hall

Instructor: Ben Elias
Office: Fenton 210, x6-5629
Office hours: Monday 3-4, Tuesday 2-3, and Friday 10-11
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Course website: `http://pages.uoregon.edu/~belias/256-winter-2015/`
Midterms: Monday Jan. 26 and Monday Feb 16. In class, 50 minutes
Final: Thursday March 19, 10:15AM, 2 hours, in 306 Deady Hall

Textbook: *Elementary Differential Equations, 10th edition*, by William E. Boyce and Richard C. DiPrima. We will most likely cover Chapters 2, 3, 4, and 7.

Topics we will cover: first order differential equations, higher order differential equations with constant coefficients, linear systems of differential equations. See below under "Course Learning Goals" for a more detailed outline.

Calculators: Calculators will not be allowed on any of the exams. If a calculator is needed for any part of the homework, it will only be for basic arithmetic.

Grading and Exams: There will be two midterms and a final exam. The dates of the two midterms will be decided on in the first week of class. There will also be a practice quiz (not for credit) before each midterm. The final exam is worth 40% of your grade, the midterms 35% total, and homework 25%. No calculators or other electronic devices will be permitted on any of the exams. Please bring your UO ID to all exams.

Prerequisite: Math 253 or the instructor's permission.

Homework: There will be homework due each Wednesday by the start of class, and assigned the previous Wednesday (first homework due W 1/14). Check the course website each week, where the problems will be posted. Late homework will not be accepted without *prior* permission. We will *not* be using Blackboard this term; all materials will be on the course website.

Learning Outcomes: The goal of this course is to introduce differential equations, understand basic modeling, and learn how to solve the easiest types of problems. **This may be updated once I have access to the textbook - apologies!** Specific goals:

(1) Identify differential equations and their properties (e.g. linear, constant coefficients, separable, etcetera).
(2) Understand initial value problems, and the fundamental theorem of differential equations.
(3) Be able to model problems using differential equations.

(4) Solve first order differential equations using the appropriate technique.
(5) Analyze first order differential equations qualitatively. Slope fields.
(6) Approximate first order differential equations with Euler's method.
(7) Solve higher order differential equations with constant coefficients.
(8) Solve linear systems of differential equations with constant coefficients.
(9) Analyze first order systems of differential equations qualitatively. Phase plane diagrams.
(10) Understand the various options for tackling difficult differential equations. (Although this course emphasizes differential equations which can be solved, one should know one's options.)

Learning Environment: The University of Oregon strives for inclusive learning environments. Please notify me if the instruction or design of this course results in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall at 541-346-1155 or `uoaec@uoregon.edu`. If you are entitled to extra time on exams, make sure to contact the AEC more than one week prior to the exam!

Academic Conduct: The code of student conduct and community standards is at:

`http://conduct.uoregon.edu`

It is not appropriate to help each other on exams, to look at other students exams, or to bring unauthorized material to exams. Any type of academic dishonesty will not be tolerated

In this course, you are encouraged to work on the homework problems with your colleagues. Math is a collaborative activity, and one which is easier to learn as a team. However, when it comes time to write up your homework answers, this should be done individually, without reference to any common solution or the work of others. By writing it up individually, you can really isolate those things you thought you understood in the group, but which did not make sense later. For example:

Ok: a study group works a problem on the blackboard, gets the answer. Erases the answer, each member tries to write up the solution individually, asks questions of the group when something goes wrong.

Not Ok: a study group works a problem on the blackboard, gets the answer. Members copy the answer from the board to their homework sheet, or write up the solution while referencing the solution on the board. This is cheating, even if credit is given to your collaborators (otherwise it is also plagiarism).

Attendance and Participation: If you miss a class, it is your responsibility to find out what happened in this class from your colleagues. Not all class material is in the book (nor is all material in the lecture either - homeworks are essential). If your grade is borderline between one grade and another, then attendance and participation will be taken into account.

OFFICE HOURS ARE A VASTLY UNDERUSED RESOURCE. I am stuck in my office, waiting to answer your questions, so please use the opportunity!

Please, do not hesitate to ask questions, either in class or in office hours. Chances are that if you are confused, so are many of your colleagues, and they will thank you

for speaking up. Office hours should be very helpful. I will create a google group for class announcements, which can also be used for communication between classmates. I do not plan to answer any mathematical questions by email - email will be used for administrative business. Mathematical questions are best asked to your classmates: it helps everyone learn! If you can't make office hours, email me to set up an appointment.