SYLLABUS FOR MATH 285 F1: INTRO TO DIFFERENTIAL EQUATIONS

Time and Location: MWF 2 - 2:50 PM in 314 Altgeld Hall

Instructor: Alex Barron

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- **Note:** Please begin all email titles with '**Math 285:**' This will help me organize my emails and respond promptly. There are a lot of people registered for this class!

Course Overview: This class is a broad introduction to differential equations. The goal of the course is to understand how to interpret and solve a range of ordinary and partial differential equations. We will focus on the important underlying ideas and solution techniques, rather than on rigorous mathematical proofs.

Textbook: *Elementary Differential Equations and Boundary Value Problems*, **tenth edition**, by Boyce and DiPrima. An e-copy of the textbook is available on WebAssign (see the next section). If you purchase a physical copy note that we are using the tenth edition.

Moodle and WebAssign Updated information about our class can be found on the course Moodle page. **We are required to use WebAssign** for homework due to the large class size. You will have to pay to access WebAssign, though this will come with access to an e-copy of our textbook for the semester.

I will send out information about accessing our WebAssign shortly before the semester begins.

Piazza Forum We will have a Piazza forum for the class, which you can use to ask questions about the course and discuss course material. I will try to set aside time on most days to respond to questions, and you are also free to respond to other students' questions (it is a good idea to discuss class material with other students, since this typically helps everyone involved). However, **please do not post solutions to homework problems on Piazza**.

Organization of topics: We will cover the following topics. (For more detail, view the standard syllabus here.)

- Introduction to differential equations via slope fields (Ch. 1)
- Solving first order differential equations (Ch. 2)
- Solving second order linear differential equations (Ch. 3)
- Solving higher order linear differential equations (Ch. 4)
- Partial differential equations and Fourier series (Ch. 10)
- Boundary value problems (Ch. 11)

Prerequisites: Multivariable calculus at the level of Math 241 is required.

Exams: There will be three midterms and a final exam. The midterms will have an **in-class** component and an **online** component via WebAssign.

Homework Help and Tutoring: The TAs for our class will be available each week to answer any questions you may have about the course, and to help with your homework. I will also hold weekly office hours.

For now the plan is to hold TA help hours on Zoom because of the large class size. My office hours will be held in-person in my office in CAB 70 (more details to follow in class). If the Covid situation worsens I may have to move to Zoom office hours, since there are a lot of people registered for the class and my office is relatively small.

There are also tutoring hours for Math 285 each week available through CARE. For more information see their website.

Evaluation: The final grade will be determined as follows:

- WebAssign Homework: 20 %
- Midterm 1: 15 %
- Midterm 2: 15 %
- Midterm 3: 15 %
- Final Exam: 35 %

The **guaranteed** letter grade cut-offs are as follows:

- A range: 90 - 100 %
- B range: 80 - 89 %
- C range: 68 - 79 %
- D range: 55 - 67 %

The ± range is determined by dividing the above ranges into thirds. At the end of the semester I may lower the cut-offs by a small amount, depending on the overall class performance. (In this sense your grade can be 'curved.' I will only curve to benefit you).

Homework: Problem sets will be assigned weekly on WebAssign. On a typical week your homework will be due on **Wednesdays by 11:59 PM**. I will also routinely post suggested problems from the textbook. These will be recommended extra problems to help you learn the material and study for exams. In addition to suggested problems, it is **strongly recommended** that you read the sections we cover in the textbook, since these can provide more context and examples than we have time for during the lectures.

It is generally better to spend time *each day* working on homework problems, since this gives you enough time to think through and absorb the course material. Note that it is usually recommended that one spends 2-3 hours studying per hour of lecture, and it is usually better to spread this time out over the week (instead of working on an entire assignment the night before it is due). WebAssign approximates the average time needed to solve each problem; I will design homework assignments each week to correspond to about 2 hours of work per lecture. This may vary a little depending on the week, since different topics in the course can be more (or less) difficult than others.

Late homework will not be accepted. In order to accommodate unforeseen circumstances I will drop your two lowest homework grades when calculating your averages.

How to Succeed: This class will move quickly through a lot of material, so it is important that you keep up with the lectures on a weekly basis. In particular, it is recommended that you work on problems (either homework exercises or suggested exercises) every day in order to help you keep up with the class. Indeed, the best way absorb new mathematical content is to work on a lot of problems. It is a myth that some people are naturally 'good' at math, and that those who are 'not good' cannot get better; if you put in the time and practice you can succeed in the course.

Weekly office hours and TA help hours are designed to help you with this. During my office hours or the TAs' office hours you're welcome to ask any questions about material from the course, including concepts you may have trouble understanding or exercises you're stuck on. Feel free to contact me if you feel you have trouble keeping up with the pace of the course.

Collaboration Policy and Academic Code: Students are encouraged to work together on problem sets and to talk with one another about course material, but the final assignments should answered individually. Copying another student's completed assignment is a violation of the academic code (even if you worked together on the problem!). All students should also be aware of the university's academic integrity guidelines.

It is occasionally tempting to look up solutions to math problems online. This is cheating and moreover a waste of time; you will not learn the material if you simply copy solutions, and you will have trouble passing exams if you don't spend time thinking about the assigned homework problems.

Accommodation for Exams: Students who are permitted extra time on exams should contact me directly (I'll send out some reminder emails in the weeks before exams). We can offer extra time through DRES in their Testing Accommodations Center. See their website for more information.

If you have any potential conflict with the final exam (once it is scheduled), please inform me. All of our midterms will be given in class so you should have no scheduling conflicts with these exams. However, if you happen to have three or more exams within a 24 hour period of one of our midterms you qualify for a conflict and can reschedule the exam. If this is the case please contact me as soon as possible before the exam day.