Math 12, Spring 2011: Intermediate Calculus

Meetings:	**Section 01** MWF 10–10:50 AM and Tues 1:00–1:50 PM, ESNH 107, Paino Lecture Hall
Professor:	**Danielle Benedetto**
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Office Hours:	Mon 1–4:30; Tues 10–12:00 and 2–3:00 PM; Thurs 1–4:00 or by appointment.
Webpage:	`http://www.cs.amherst.edu/~danielle/math12`
	Find all class information, handouts and assignments here.
Text:	James Stewart, *Single Variable Calculus*, 6th edition, Brooks/Cole 2007,
Exams:	There will be three midterm exams and a final exam. The midterms will be in class, on the dates listed below. (The final exam will be scheduled later, by the Registrar.) There are NO EXCUSES, other than incapacitating illness, religious conflict, or the like, for missing an exam. If you do have such a conflict, see me immediately.

Exam Dates:	**Midterm 1:**	**Wednesday, February 23**, in class.
	Midterm 2:	**Wednesday, March 30**, in class.
	Midterm 3:	**Wednesday, April 27**, in class.
	Final Exam:	TBA. (It will be three hours.)

Homework:	Reading from Stewart according to the schedule
	Problem sets will be due (usually) twice a week, **at the START of class**.
Grading:	Computed roughly as follows:

Effort:	5%.
Homework:	10%.
Midterm Exams:	Best one: 20%. Second best: 20%. Worst:15%. (Total 55%.)
Final Exam:	30%.

"Effort/Homework" is a combination of class attendance, class participation, and handing in problem sets. Despite the fact that homework is not given a large value, you are *expected* to complete all of the homework. Quite often, borderline cases for final grades are decided by knowing that certain students made a largely active effort (or lack thereof!!) on homework.

What to Expect

Calculus II definitely requires a larger commitment than most of you made to Calculus I. The work load increases some, but mainly the intensity increases. Overall a better focus and stronger work ethic is necessary to succeed. Many of the problems in this course require the combination of several techniques from many different sections. In general, the homework problems are much longer. You must keep on top of all the various strategies we learn. The first time that you find yourself hesistating on how to solve a problem, please get help.

Amherst College's version of Calculus II is more intensive than most high school versions of the same course. Although most of the exercises and exam problems will still be computational, our focus will be more on what integrals, sequences, series, and other objects actually **are**.

Course Content

Intermediate Calculus covers three main topics: Intergration Techniques, Sequences and Series, and Parametric Equations. Here's a more detailed summary:

- In Chapter 7, we'll discuss **inverse** functions and their derivatives. We'll review exponentials and logarithmic functions, define the hyberbolic functions ($\sinh x$ and $\cosh x$), and study the inverses of trigonometric and hyperbolic functions. We will also learn about **L'Hôpital's rule**, used for computing certain difficult limits.

- In Chapter 8, we'll have a brief review of **integration**, including a refresher for integration by substitution and learn several new **methods of integration.** Finally, we will talk about **improper integrals**, which are integrals where either the domain or range runs off to infinity.

- In Chapter 12, we'll introduce **sequences** (infinite lists of numbers) and **series** (infinite sums). The key questions we'll consider are whether a given series converges, and in what cases we can find the actual sum. We will learn several tests/techniques to help us answer these questions. Finally, we'll talk about **power series**, which are a special way of writing certain functions as infinite sums.

- In Chapter 6, we'll return to **integration** and discuss several methods for finding volumes of certain solid (three-dimensional) solids.

- In Chapter 11 we'll discuss **parametric equations**, which are a handy way to describe curves in the plane. Closely related are **polar coordinates**. We'll apply Calculus to find area or lengths of curves for parametric equations and for polar coordinates.

Necessary Background

You need to know Calculus I. We'll assume precalculus stuff likes functions and graphing, as well as trigonometry. Within Calculus itself, we'll rely on former knowledge of limits, derivatives, and early integration. Besides being able to compute such things, you should have an intuitive knowledge of what each means. We'll review most of the final topics from Math 11, but at high speed. Please come see me if you have any questions.

Homework

Homework comes in two forms: textbook reading and problems sets. Both are important. Start working on each problem set as soon as possible, because some of the problems may turn out to be more challenging than you thought. Your work should be double-checked and written neatly. Unexcused late assignments will not be accepted or graded. Travelling sports players should hand in homework before you travel for an away game. Do not rely on using a calculator for homework, since they will not be allowed in exams. HW is due at the START of class.

About the Statement of Intellectual Responsibilty

For exams: your work must be entirely your own, so no looking at other people's papers, no talking to each other or passing signals, and no outside help. Unless I specifically allow it, aids like calculators, iPods, cell phones, books, notes, or cheat sheets are not permitted in exams.

For problem sets: you may interact with other students discussing problems. Still, the work must be your own, even if you received substantial input from others. Each student must write up each problem **in his or her own words**. Obviously, copying someone else's solution (even when the source doesn't mind) is plagiarism and a violation of intellectual responsibility.

Getting Help

If you get stuck on a problem, or you're feeling lost in the material, or anything like that, there is a lot of help available out there:

Office Hours: Stop by (unannounced) to see me during scheduled office hours. Make an appointment to see me another time.

The QCenter: The Moss Quantitative Center is located in 202 Merrill Science. They provide drop-in help afternoons and evenings and some one-on-one tutoring.

Peer Tutoring: If you feel you need several hours of help a week, you might want to get a peer tutor. Please talk to me about it first.

Expectations and Advice

- **Attend class religiously;** in general, a Calculus class moves very quickly, and the material repeatedly builds on itself daily. I will not reteach material for unexcused abscences. Simply put, I strongly discourage you from skipping class!!

- **Be on time;** if you miss the first five minutes, you'll be behind and confused for the next forty-five. Besides that, honestly, it's disrespectful to the professor.

- **Come to Office Hours regularly;** please never be embarrassed to come ask for help!! One of my favorite parts of teaching is helping students in office hours. I "expect" to see all of you there at some point.

- **Be patient;** if you feel like you are struggling, come see me. I'm so happy to help!! However, if you feel like you are bored because the class is moving too slowly, talk to me. You might belong in another class. Otherwise, count yourself fortunate to be comfortable with the material. Based on the pace of the course, that could change at any time

- **Read the book;** search the sections looking for relevant definitions, theorems, examples.

- **Do all of the problem sets;** my experience teaching convinces me it's absolutely vital for success with learning the material. If you believe that you don't need to do the homework, then you probably belong in another class. Ultimately, we are all here to truly learn, so please make this a commitment. Assignments are designed carefully and are important.

- **Don't procrastinate;** start homework early. Do not wait until the night before it is due. Otherwise, you can't take advantage of my office hours before the due date.

- **Class participation is encouraged and expected;** ask and answer lots of questions. Always get concerns clarified during lecture. Usually other students share the same question. Meanwhile, please show respect for other people's questions.

- **Make an impression!** If are skipping class regularly and not handing in problem sets, you are essentially telling me you aren't taking things seriously. **Being attentive in class, visiting office hours, and completing problems sets make strong impressions.**

- **Take advantage of my help;** I become really invested in helping my students. I create a lot of extra worksheets and review packets.

- **Take RESPONSIBILITY!!!** Please do **not** take this class if you plan to disregard the class or work. I imagine that you will do poorly.