

# SYLLABUS

## Math 186 – Section 1 – Winter 2010

- Instructor: Karl Schwede
- Class web page: <http://www-personal.umich.edu/~kschwede/math186>
- Text: *Calculus* by Michael Spivak
- Suggested Text: *Calculus and Linear Algebra* by Wilfred Kaplan and Donald Lewis
- Contacting the instructor:
  - Email: [kschwede@umich.edu](mailto:kschwede@umich.edu)
  - Office: 3828 East Hall
  - Office Hours: TBD

**Course Content:** Our goal is to understand why and how calculus works and so there will be an emphasis on mathematically rigorous explanations (ie. *proofs*). From the book “Calculus”, we will cover most of part IV, the end of part III, and maybe also part V. We will also cover some “linear algebra” and there will be no official text for that.

**Honors course:** This is an honors class. This means that you will be expected to do harder problems and master more difficult concepts than is expected in Math 115/116. The type of math we’ll be covering in this class is likely very different from anything you have seen previously unless you have taken 185/295, and thus it might take some time to get used to the type of problems you will be expected to do.

**Homework, Quizzes, Exams, etc:** We will have weekly homework of various forms and two midterms, there may be occasional quizzes as well. The dates of the midterms are yet to be determined. Tentatively, they are Wednesday February 17th, and Monday March 20th. There will be no calculators allowed on exams, so please learn how to do problems without using a calculator. Homework problems will emphasize correct reasoning/explanation. I would also ask that you *read* the section of the book to be covered that day in class, *before* class. I strongly encourage you to work with each other on homework problems, but each person needs to turn in their own write-up.

### Your grade:

- 20% Homework (and other activities)
- 25% Midterm #1 (tentatively, Wednesday February 17th)
- 25% Midterm #2 (tentatively, Monday March 20th)
- 30% Final

The actual assigning of letter-grades to percentiles will be done later in the quarter.

**Weekly problem sessions and extra math:** We’ll try to find a time that works best for people today. More about this will be announced soon.

**LaTeX:** We may be introducing you to another way to write/type-up math, called LaTeX. There will be more about this during the second week.

**First homework (Due Friday, January 8th):** In general homework will be posted on the website. The first homework assignment is listed below.

- (1) Suppose that  $f, g : \mathbb{R} \rightarrow \mathbb{R}$  are surjective (ie *onto* functions with domain  $\mathbb{R}$  and allowable output values  $\mathbb{R}$ ). Prove that  $f \circ g$  is also surjective (ie, prove  $f \circ g$  is also *onto*).
- (2) Suppose that  $f, g : \mathbb{R} \rightarrow \mathbb{R}$  are functions. Suppose that  $f \circ g$  is injective (aka *one-to-one*). Prove that  $g$  is injective.