Math 211 – Multivariate Calculus – Syllabus

Fall 2022

- **Instructor**: Chris Elliott (pronouns: he/him)

  You can reach me by e-mail at `celliott@amherst.edu`. Please feel free to call me Chris.

  > **Office Hours**: Monday 2:30–4:30, Wednesday 9:30–10:30, Friday 10:30–11:30 in Science Center E206.

- **Math Fellows**:

  - Jessica Huang
  - Bea Kiggen
  - John Koomson
  - Yerkezhan (Erko) Sakhiyeva
  - Maksym Sherman

  Office hour times to be announced during the first week of classes.

- **Math Associate (Quantitative Center)**: Timothy St Onge (drop in office hour details to be confirmed during the first week of classes)

What We'll Cover

In this course we'll be learning how to deal with functions of several variables. You've learned a lot about the theory of functions of a single variable (functions on the real line $\mathbb{R}$) in previous calculus classes, and we'll learn how to extend this theory to functions of several variables (particularly functions on the plane $\mathbb{R}^2$, or on 3d space $\mathbb{R}^3$). A lot of what you already know can be extended, but there are new and interesting phenomena to learn about because shapes in the plane or 3d space can have interesting geometry!

Topics we will cover include:

- The algebra and geometry of vectors in $\mathbb{R}^2$ and $\mathbb{R}^3$.
- Finding tangent lines to curves in space, and tangent planes to surfaces in space.
- Differentiation in several variables: partial derivatives; grad, div and curl.
- Integration in several variables: double and triple integrals, line integrals, surface integrals.
- The fundamental theorem of calculus in several variables: Green's and Stokes' theorems.

Schedule

We will meet three times a week for classes:

> Monday, Wednesday and Friday at 1pm in **Seeley Mudd, room 205**.

There will be two midterm exams and a final. The exams will be held on the following days.

- **Midterm 1:** Friday October 7th during class

- **Midterm 2:** Wednesday November 2nd during class

- **Final:** TBD (During the period December 14th to 16th)

The exams will be in person, and will be closed book. Calculators will not be allowed.

Makeup Exams

If you cannot make one of the exam times, please let me know as long as possible in advance and **at least two weeks beforehand**. I can arrange make-up exams for legitimate conflicts (e.g. for academic commitments, religious observances) but two weeks advance notice is necessary.

Textbook

We will use the textbook *Multivariate Calculus* by Stewart (if you own a copy of the big "Calculus" book, that will also work well, his "Multivariate Calculus" is a subset of the big book). Nominally we will use the 8th edition (ISBN 978-1305266643, ebook $40, rent from $20, available used from $20) but older editions should also be fine – ask me if you have any questions. We will cover most of the material in chapters 12 to 16.

Homework

Homework will be assigned each week and due on **Fridays at 5pm**. There will not be homework due during weeks with a midterm exam. The first homework will be due on Friday September 9th.

Homeworks will consist of 5-10 problems on the material we learned in the past week. Some problems that are particularly challenging will be marked with a ($*$). These problems are **optional**; you can earn 100% on the homework without attempting these, but good solutions will be worth extra credit!

You are encouraged to work on the homework in groups; this is often one of the best ways of learning. However, your final solution **must** be your own work; you should write up your answers on your own, without anyone else's work present (in other words, do not copy!). On the first page of your homework submission, please list the people that you worked with.

You will submit your homework online through **Gradescope** (`https://www.gradescope.com`). You should sign up for a free account using your Amherst College email address. Once you've created an account you should join the section using the following course code:

Gradescope course code: **4VJ6W3**.

Homework Extensions

I know that sometimes things come up that make it difficult to complete homework on time. As such, I will grant up to two homework extensions per person during the semester (you don't need to give a reason, just ask). If you want an extension on one of the homeworks, please e-mail me no later than the **day before** the homework is due.

Assessment Structure

Your grade will be calculated as follows.

- Homeworks: 35% (lowest two scores dropped)

- Midterm exams:

  - Higher midterm score: 20 %

  – Lower midterm score: 15 %

- Final exam: 30%

Accessibility

As the instructor of this course, I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, let's connect to discuss ways to best support your access. If you have disability-related circumstances and are seeking academic accommodations (e.g. extra-time testing, reduced distraction test area, short breaks as needed, note taking assistance, etc.), Accessibility Services is eager to assist with identifying reasonable accommodations for the course. They can be contacted at `accessibility@amherst.edu`.

Honor Code

The Amherst College honor code applies to this course. All the work you submit, both for the exams and the homework, must be entirely your own. In particular, although discussing the homework in groups is encouraged, when you write down your solutions you should not be looking at anyone else's work. Copying somebody else's work is a violation of the honor code.

If you feel stuck or lost in the course, please get in touch with me or one of the Math Fellows assigned to Math 211 either by e-mail or in office hours as early as possible. We will be happy to help you!