What will you learn?

We're going to explore the generalization of (single-variable) calculus to situations where multiple variables arise. These come up very naturally in physics, engineering, and other areas where one is interested in 2- and 3-dimensional problems. A more recent application of multivariable calculus is machine learning, in which one may be interested in several hundreds or thousands of variables.

Our topics include differentiation and integration in one, two, and three variables. As a consequence, we will learn to integrate functions over more "interesting" domains like curves and surfaces, as well as integrating entirely new kinds of things, like vector fields. Time permitting, the last unit of the class will cover the many unexpected relationships between all these new kinds of integrals.

What do you need to know?

My information

Patricia Cahn
Burton 313
pcahn@smith.edu

Our class location and time

Seelye 308
Section 01 Meets MWF 9:25-10:40
Section 02 Meets MWF 10:50-12:05

What kind of work will you be doing?

WeBWorK

We will have WeBWorK assignments for each section of the book that we cover. WeBWorK is an online tool that you can use to practice solving problems. We'll grade WeBWorK based on how many problems you end up getting right, but since you have an unlimited number of tries, this should hopefully feel more like a completion grade. There is no penalty for needing multiple tries, and no pressure to get it right the first time; the important part is that you learn how to solve the problem eventually. With that said, if you find yourself stuck on a problem, please don't hesitate to ask me or someone else for help!

WeBWorK will generally be due one week after we cover each topic in class.

Written Homework

We will have regular homework assignments, usually every week. You will always have at least a week to work on these. Homework will generally be due on Gradescope at 11:59pm on Fridays the week after it is assigned.

Exams

We will have two exams: one midterm and one final. These will be administered via Smith's self-scheduled exam system.

Our midterm will be available to take between March 28th and March 30th. The final will be available during finals week.

More information about permissible resources will be provided in advance of the exams.

Late Work

WebWork: Late assignments are not accepted.

Written Homework: Written homework is due on Fridays at 11:59pm. You can request an extension until the "late deadline", Monday at 11:59pm, *provided you write to me in advance of the Friday deadline*. This extension will be approved as long as I receive the request on time. No written homework will be accepted after the late deadline. The purpose of this policy is to provide you with some flexibility, as we all have difficult weeks, while still making sure you stay current with the assignments. It is far better to submit an incomplete assignment than to get behind in the class overall.

Starting your homework early will guarantee that you have at least something to submit, even if something unexpected comes up! This is also best for your learning, as reading/processing/working on a problem takes time.

Exams: Late exams will not be accepted.

Grades

The course grade will be based upon the scores on the homework and exams as follows:

WeBWorK	20%
Homework	30%
Midterm	20%
Final	30%

We will use the usual scale for converting numerical grades to letter grades.

Academic honesty

For more information about Smith College's Academic Honor Code, see here[1]. As a general rule, if you are ever unsure of whether or not something is allowed, please ask me first.

Academic honesty as it applies to homework:

I strongly encourage working together with your classmates on homework problems; however, the work you turn in should reflect your own understanding of how to do a problem. I recommend writing up your solutions independently, after you are finished talking with your group. You are required to cite any extra resources that you use, like an online article or

[1] https://www.smith.edu/about-smith/offices/student-affairs/student-handbook/academic-honor-code-0

software calculator. You may not use ChatGPT or other AI to help solve your homework problems.

Academic honesty as it applies to the exams:

Specific instructions about permissible resources will be provided in advance of the exam and on the exam instructions. No other resources are permitted. The use of ChatGPT or AI is on exams is not permitted.

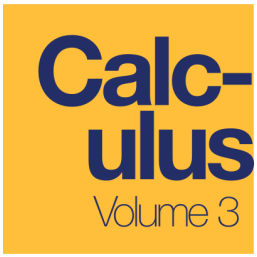
Acceptable use of ChatGPT and AI

You may use ChatGPT or AI in the process of studying concepts for the course, as long as you are not using it to solve a specific problem for a required assignment. Be careful, though, as the information provided is not always correct.

What resources are available to you?

Textbook

Calculus Volume 3 by Herman and Strang (ISBN: 978-1-947172-16-6). This textbook is available for free online at https://openstax.org/details/books/calculus-volume-3.



Office hours

Office hours are specific times that I set aside for you to be able to show up to my office, Burton 313; no appointment is necessary. Office hours will be held at the following times:

Monday 4:00pm – 5:00pm
Wednesday 4:00pm – 5:00pm
Thursday 4:00pm – 5:00pm

These times may change once weekly meetings, special studies, etc. are scheduled.

Tutors

The Spinelli Center offers many options for getting help. For more information, see here[2]. Specifically they offer

- Tutors during the day in Seelye 207, or email qlctutor@smith.edu.
- Math TA hours 7-9pm every evening in the Math Forum, Burton Hall 3rd floor.
- Office hours with Max Greenberg, the Calculus Counselor, in Seelye 207e.

[2] https://www.smith.edu/qlc/tutoring.html

Academic Accommodations

We want everyone to succeed in this course. The Accessibility Resource Center (ARC) will work with you to figure out what accommodations you need to accomplish this goal. If you think you may need academic accommodations, please contact ARC early so that any necessary arrangements can be made (see here[3]). After you have registered with ARC, please email or meet with me so we can discuss how to best implement your accommodations.

Advice from past MTH 212 students

- Go to office hours as often as possible and start written assignments early.
- Make sure you understand all of the in–class worksheets; ask questions during lectures; do web–works early on, when that section is still fresh.
- Always ask questions when you first have them! This entire class just continues to build on concepts which you learn at the beginning of the semester, so make sure that you have a very solid base to build the rest of your learning upon. Also, go to office hours and work with your classmates when allowed! Often, when you are stuck, you are missing something very simple and it is always great to have another brain to help see that!
- Read the textbook if you are confused!! It offers some good insight if you're having trouble grasping a concept in class alone.
- This course gets more challenging as it goes, but it is manageable! My advice: take notes in class and keep them, because they are necessary for the homework. Start webworks with enough time to email questions or go to office hours! Don't spend too much time struggling without asking for help. If you do all the homework, you will understand the concepts that build on each other toward the end of the course.
- Stay on top of your work, don't procrastinate, don't miss classes.
- I would recommend going to office hours whenever you are stuck. Even if you do not ask any questions I was able to be around peers and bounce ideas/concepts off of them. Also, even though the written homework's are long, stick with them and try your best because they will significantly help you learn the content better.
- You have to go to class and keep up on the work but this class was one of my favorite classes ever.
- Make sure you pay close attention at the beginning of class, because everything builds on everything else and this will make your life so much easier. I would recommend future students find a study–buddy and work through long problems in groups. Nothing is worse than having to restart a three page long problem because you copied something down wrong, and friends will usually catch that. Also, problem solving in this class is really fun in groups!

[3] https://www.smith.edu/your-campus/offices-services/accessibility-resource-center