

# MATH 203 Calculus III

## 2024 Fall

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### Basic Information

**Instructor:** Prof. Jen Paulhus     [jpaulhus@mtholyoke.edu](mailto:jpaulhus@mtholyoke.edu)

I do not check email between 8 PM and 8 AM on weekdays, and only infrequently on the weekends. I will make every effort to respond to emails within 24 hours.

**Class Meetings:** 3:15 - 4:30 PM MWF 306 Clapp Laboratory

**Class Webpage:** [jenpaulhus.com/teaching/MHC/ma203f24.html](http://jenpaulhus.com/teaching/MHC/ma203f24.html)

**My Office Hours:** Mondays 4:30 - 5:30 PM, Wednesdays 10:30 - 11:30 AM,  
Thursdays 2:30 - 3:30 PM, Fridays 9:30 - 10:30 AM,  
*or by appointment*

**Text:** *Apex Calculus 3*, Hartman, Version 4. [Get it here!](#)

**Graphing Tool:** Desmos: [available here](#)

**Material Covered:** We will cover most of the textbook, although I will start with Chapter 10 and return to Chapter 9 content as it is needed. Our goal is to interpret and redefine ideas of derivatives and integrals to functions with many variables.

### Learning Goals

This course is designed to aid you in several explicit learning goals. By the end of the semester, a student who is successful in this course will:

- understand and be able to clearly articulate the motivation for and crucial concepts of functions of several variables,
- generalize and extend the computational procedures from single variable calculus to the multivariable setting,
- develop geometric visualization and reasoning skills,
- be prepared to apply the course topics in their own field of study,
- become confident articulating their ideas in small groups and to the class, and
- continue to develop skills to work well with a diverse group of colleagues.

Growth toward these goals will be measured by your ability to solve computational problems, interpret and solve word problems, explain conceptual ideas from the class, articulate the shared ideas of their group, and interact well with all students in the class.

### Grading Breakdown

- homework 15%
- quizzes 15%
- in-class exam with the lowest score 10%, other in-class exams (2) 15% each
- final exam (cumulative) 18%
- engagement 12%

## Grading Policies

### Homework Assignments

Homework assignments are **due on Gradescope by 3:00 PM almost every Tuesday and Friday**. Assignments will be listed on the class webpage and will consist of several required problems which are to be turned in to be graded, as well as additional problems which you may choose to solve at your discretion, but should not be turned in. No late homework will be accepted but the lowest two homework scores will be dropped. Homework will be graded for accuracy. Each assignment may be worth a different number of points, but they will all be weighted the same in the final grade. Show your work on the homework and answer questions that ask for an explanation in complete sentences. **Answers with no work will receive 0 points.**

### Quizzes

On weeks when there is not an exam, there will be a timed quiz. Each quiz will be posted on **Gradescope on Tuesdays at 10 AM and you will have until Wednesday at 10 PM** to complete it. Once you start it, you will have 30 minutes to finish it. (In other words you can take the 30 minute quiz any time in a 36 hour window.) Don't use anything to help you except a basic calculator (arithmetic and trig functions only) and a unit circle. The quizzes will be graded on whether you made an honest attempt, not on correctness (and I will post solutions for you to check your answers). The quizzes give you frequent, low-stakes opportunities to test your knowledge and understanding so far in the class. No late quizzes will be accepted but I will drop your lowest quiz score.

### Exams

There will be three in-class exams scheduled for: **September 27, October 23, and November 13**. The exams will be closed books, closed notes, etc. No make up exams will be given, unless agreed to beforehand so contact me immediately if any issue arises with the scheduled exams.

### Final

There will be a cumulative final exam. You will have added opportunities on the final exam to demonstrate mastery of topics you may have struggled with on earlier exams.

### Engagement

The final part of your grade is to gauge how well you have engaged with the class and the material. Your collaboration with group members during class, your contributions to questions or discussions in class, or your questions in my office hours can each positively impact this part of your grade. While I will not officially take attendance, if you miss a lot of classes or if you are perennially late for class, your engagement grade will suffer.

### Accommodations

Please contact me right away if you have an accommodation as I would like to meet with you and discuss your approved accommodations and our class. Disability Services is the

office on campus that determines academic accommodations for students with disabilities. If you need official accommodations through Disability Services, you have a right to have these met and kept confidential. Please contact Disability Services, located in Mary Lyon Hall 3rd Floor, at 413-538-2634 or [disability-services@mtholyoke.edu](mailto:disability-services@mtholyoke.edu). If you are eligible for academic accommodations, you will be provided with an accommodation letter. For more information on who might be eligible for accommodations and the application process please see the [Disability Services website](#).

## **Class Policies**

### **Random Daily Seating**

For each class period, you will be randomly assigned a discussion partner. You and your discussion partner will work together at specific times during the class period to help each other understand the material. Importantly, the discussion partnerships will change with each class, allowing you to meet most of your classmates and to work with students from a variety of backgrounds.

The assignment of partners will occur as you enter class. When you enter the room, a seating chart of the day will be posted. Consult it and then take the seat assigned to you. Introduce yourself to your partner for the day and then start working on the warm-up exercise.

### **Warm-up Exercises**

Classes will begin with a warm-up exercise posted on the screen at the front of the room. The warm-up exercise helps us reset our frame of mind to be ready to engage with mathematics. This will also give you a chance to meet your partner for the day. The warmup period will conclude approximately 5-10 minutes into the class. You should be in your seat working on the warmup by 1:45 PM. If you are regularly late to class, your engagement grade will suffer.

### **Short Discussions**

Up to a few times each class period (including at the beginning of class for the warmup) we will break for a short discussion of the material. This will be accompanied by a prompt from me. Discussion partners will work together to answer a question, complete a computational exercise, identify misunderstandings, solidify concepts, and/or develop questions about the material.

- All partners should contribute to the discussion; in fact all partners are required to say something!
- Identify any thoughts, ideas, confusions, or new questions generated by the discussion.
- The partnership will formulate a response to the prompt that all partners understand.
- Each partner should be prepared to share the response with the class.

After we return from the breakout group, I will randomly select a student, and that student should explain the partnership's answer to the class. It is not a tag team answer. **Only the person I called should answer the question.** It is ok to say that you and your partners were not sure of an answer, but I will ask a followup question regarding what you and your partners discussed while you were trying to answer the question. So if your group cannot figure out the answer to the question I pose, come up with other questions you would like to ask me, or an explanation of where you got stuck. Participation in these conversations contributes to your engagement grade.

### **Partnerships**

As described above, we will spend part of the class time working in small breakout groups. When working in a partnership it is important to remember that varied backgrounds and experiences naturally induce varied explicit and implicit assumptions and attitudes towards each other. Each student should work diligently to be a cooperative, contributing member of the partnership who is helping the group achieve a common goal. The bottom line is that successful partnerships are founded on mutual respect. This can be achieved by:

- using your partners' names;
- recognizing that all partners matter and actively listening to all other partners;
- graciously inviting all of your partners to offer insights, suggestions, opinions, questions, etc.;
- being courageous enough to offer your own insights, suggestions, opinions, questions, etc.;
- being cognizant of the process by which partnership functions and how you operate within the partnership;
- thanking your partners at the end of each session.

### **Homework and Quiz Submissions and Returns**

All homeworks and quizzes will be submitted and returned on [gradescope.com](https://gradescope.com) (also linked on Moodle). They have a [Student Hub](#) with lots of great information about troubleshooting issues, and information about using [Gradescope through Moodle](#).

**Make sure you scan your homework and quizzes in black and white, in pdf format, and one document for the whole assignment.**

### **Workload**

The amount of time students spend on this course outside of class varies depending on many factors, but about 7-8 hours a week beyond the class sessions is quite typical.

### **Academic Honesty**

I expect all your work to abide by the MHC Honor Code, and if there is any work that does not, I will report it to the Academic Honor Board. For more detail on what constitutes an academic violation of the Honor Code, please see the College [Academic Rights and Responsibilities](#) webpage.

Some typical violations in this course fall under the following categories (taken from the webpage above).

- The unauthorized or unacknowledged use of material that is not a student's own.
- Cheating in any form in preparing assignments (including homework, essays or take-home exams), in completing in-class work (including quizzes or tests), or in taking a final examination.
- Unlawful or improper use of digital or online materials.

For this class, you are welcome to use any resource you find helpful for learning about the concepts and ideas in the class. However, the homework is designed to help you gain practice *yourself* in solving the problems. As such, it is important that while doing homework, **you do not seek out solutions to the specific problems** (this includes solution manuals, online systems that solve calculus problems, or asking someone down the hall who took the class last year). If you do so, you are cheating yourselves of the essential practice you need to master the material in this course. I do encourage you to work together to solve homework problems, but everyone must write their own solutions. Quizzes and exams will have more explicit instructions and you should not use anything besides writing tools, paper, a unit circle, and a basic scientific calculator.

In my past experiences, students are more likely to contemplate violating the honor code when they are very stressed or overwhelmed in a class. If you find yourself thinking about violating the honor code on the homework, quizzes, or exam, come talk to me. If you are worried about your grade, or if you're frustrated about the material, come talk to me. If you just need a pep talk, come talk to me!

### **Cellphones and Laptops**

Our class time together is limited and valuable. Cellphone and laptop usage should be restricted to only what is essential for this class. Don't be shopping during class!

### **Calculators and Computers**

Exams will not require calculators, but I will provide a few basic scientific calculators for the exam, or you may use your own basic calculator if it has no storage and no graphing.

Calculators will not be required in class, however you will likely find great value in using graphical aids to help you learn the material in this course. I will use [Desmos](#) for exploring graphs during class, but do keep in mind that you will not have access to graphing technologies during the exams (I will provide graphs on exams when needed).

### **Getting Help**

- There will be TA evening hours. More information coming soon!
- Come to my office hours with questions about material, assignments, or general questions about the course or your grade. These are times I specifically set aside to be available to answer questions. They are drop-in hours so I may be answering questions from several different students at once.

- I'm also happy to schedule an appointment to talk with you about your performance in the class so far, concerns about the class, or if you are frustrated or overwhelmed in the class. Email me to find a time to meet.
- Work together with others.
- The internet is full of other good resources that help explain math. Just make sure you understand the course academic honesty policies.

## Success in my Classes

Students come to this class with very different backgrounds, skills, and experiences. Usually the most successful students in my class have two things in common: they work hard, and they are able to self reflect honestly and then make adjustments accordingly.

My job is to help you *all* learn multivariable calculus. I do not think any less of you if you struggle with the material, or if you come ask me for help in office hours. In fact, I view struggling and discomfort with material as an essential part of learning! If you are frustrated or overwhelmed with the course, email me and we'll set up a time to talk.

## Unsolicited Advice

- Take ownership of your education.
- Embrace the discomfort and struggle. There will also be moments of joy and excitement in the class!
- There will be no extra credit and you cannot retake an exam nor redo homework. However on the final exam, there will be some opportunities to demonstrate mastery of prior exam content and the homeworks will be staggered to help you show mastery of the material.
- Exam problems will not necessarily be exactly like the homework problems. Understanding *why* we solve a problem in a certain way will result in a better grade than simply trying to mimic examples we have done previously.
- Think of math a bit like learning how to bowl. You can have someone explain to you how to throw the ball and how to put spin on it to make it hit the pins but chances are the first time you throw the bowling ball, you will throw a gutter ball. How do you improve at bowling? You practice. The same is true in math. The best way to learn math is to **practice, practice, practice.**
- **Read ahead in the material. A list of pages to read before each class will be regularly updated on the class webpage.**
- I can't say it enough, work together when you can.
- If you are struggling more than you think you should be, make an appointment to talk with me.