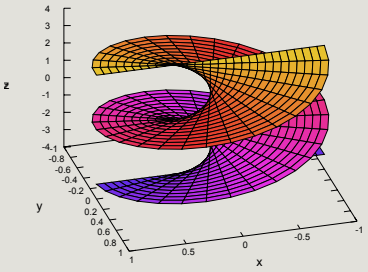

MATH 211: Multivariable Calculus

Classroom: Seeley Mudd 006

Instructor Info

Dr. Miriam Kuzbary

Pronouns: She/Her/Hers

Call me: Prof. Kuzbary, Dr. Kuzbary, or Dr. K.

Office Hours:
Drop-In: MF 9:30-10:30am, W 4-5pm
Appt: M 3:30-4pm, Thu 3-4pm

Office: SMUD 013

Course Website: On Moodle

mkuzbary@amherst.edu

Course Info

Prereq: A grade of C or better in MATH 121, placement into MATH 211, or instructor consent.

Mon, Wed, Fri

11:00am-11:50am

About

Welcome to Multivariable Calculus! Very few systems we will ever encounter in life only involve a single variable; the vast majority of settings involve multiple variables. In this class, we will develop the differential and integral calculus into multivariable tools!

What you'll learn along the way

Throughout this semester, you should plan to work towards the following goals:

- Demonstrate fluency with computational techniques in differential and integral calculus in several variables,
- Develop your geometric intuition for working in two and three dimensional space,
- Deepen your understanding of what concepts in calculus intuitively mean and how they apply to a variety of situations,
- Compare and contrast theorems in multivariable calculus relating derivatives and integrals to the fundamental theorem of calculus in the single-variable world, and

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Mutual Expectations

Learning new mathematics is a difficult thing to do, and takes a lot of work and time! That said, you are *completely capable of mastering this material if you are willing to put in the time, attention, and strategic effort into it.*

However, mathematics is not a spectator sport! For example, if you are trying to learn how to swim, watching someone swim and explain swimming technique to you is certainly not going to be enough to prepare you to jump in the water and win a race by itself. Math is a physical skill that takes focused practice over time to improve. You might even not notice your progress as it is happening. This is a hard course, but I'm here to help you succeed!

Some of the things you can expect from me:

- The most important thing to me is that you learn something in this class, and that will require work from both of us!
- I am committed to creating a learning environment in which all of my students feel safe and included. Our classroom is a living community that will change and grow based on our participation and interaction in it, and as its facilitator I will constantly work to help it be a place of trust, curiosity, and mutual respect where learners with many different communication styles, needs, and goals can participate meaningfully. I hope you will, too!
- I have been teaching and tutoring for quite some time (15 years). Students from a huge range of backgrounds and with many different kinds of preparation for college math have succeeded both in my classes and others I have helped them with. This means when I make choices in the classroom or suggest something for you to try, it's because I have seen it work for multiple people.
- I will always assume you are acting in good faith and with good intentions, and I hope you will assume that of me and your fellow classmates as well!
- I will respond to your emails within two business days (meaning Monday through Friday, excluding holidays), during normal business hours (9am-5pm) unless it is an emergency, in which case I will do my best to respond sooner. You can always email me questions at any time, including about specific problems or proofs!

- I will do my best to clearly communicate expectations and standards in this class, and will regularly solicit feedback from you on how it's going,
- I will also work to allow for as many different students to speak in each class session as possible, which will involve a few strategies. Some of these include: allowing for 1-2 minutes after each question so that all students have time to process the question and think about how they'd like to answer, asking you to discuss a question in pairs for 3-4 minutes and then calling on a pair to tell me what they talked about, or waiting to call on someone until at least 4-5 hands are raised to talk.

Some of the things I will expect from you:

- Approach this course with curiosity and commitment: some struggle is expected and is necessary for learning mathematics! I will *never ask you to do something I don't believe you are capable of doing*, and sometimes we learn and grow the most by trying things that feel difficult.
- Trust yourself that you are capable of meeting the expectations I have for you in this course. Mistakes are good: they help you clarify how you are understanding the material and where you have more room to grow!
- Use our class time effectively and treat your fellow class members with respect and care. This can include asking questions, even if they feel silly, because if you have a question there are usually multiple other students with the same question who aren't speaking up! Participating in class in a respectful way also includes listening to your classmates, stepping up to take space when appropriate, and allowing other class members to take up space when appropriate.
- Assume good intentions from other students and myself, but please acknowledge in a timely fashion if you are feeling hurt by information in the class and/or the way it is shared.
- Try not to make assumptions and ask questions to learn more about other perspectives and strategies from your peers and me, especially those that are different from your own.
- If something is going on with you that affects your participation in this class, please tell me as early as possible!
- Read the entire syllabus carefully, familiarize yourself with the entire course Moodle page, and check your email every day, even if you take a business day or two to respond to non-urgent emails.
- If what you've done so far in the course isn't giving you the results you want, be open to changing how you are studying, doing homework, participating in class, or participating in office hours(among other things) and please come to office hours or schedule a meeting with me to chat about it!
- If you have a concern about a grade you've earned on an assignment, reach out to me AS SOON AS POSSIBLE. I won't be able to address regrade requests or concerns about a grade if I get them more than one week after you have received the grade.
- Keep track of deadlines and assignments, turn things in on time, and take in-class assessments on time.
- Follow assignment instructions carefully.

Illness Policy

If you are showing symptoms of a contagious illness and/or testing positive for COVID-19 on a regular class day, please follow the Amherst College *protocols* and do not come to class. If it is an exam day, please email me immediately to schedule a makeup exam. I (and some of your classmates) are high risk, so if you are sick please rest and protect yourself and our community!

Visualization and Spatial Reasoning

One of the best things about taking a class is having support to get better at things that are difficult! Visualizing objects in 3D, graphing, and spatial reasoning in general are things that can be improved with practice, and I promise by the end of the semester you will find these things easier than at the start.

When I took this class as an undergrad, I had trouble with graphing functions in 2D, much less 3D! Now, my research area is in geometric topology (and I draw *a lot* of diagrams).

The components of this course and their purpose

In-class work, discussion, and lecture

During our lecture time we will have many conversations about what we are learning, so come to class expecting that you will be both contributing to the discussion and taking away something interesting to think about. We are creating this class together. The in-class portion of this course is time to engage with material together, ask questions, and do practice problems and proofs with immediate feedback from me. Our class time is also your opportunity to think out loud, make mistakes, and ask questions!

I encourage you to stop me during the lectures and ask questions. If you are feeling lost, it is extremely likely there is someone else sharing the same feeling. Asking your question ensures the whole class gets to benefit from the answer!

I like to stop from time to time and ask around questions about the material, please do not feel intimidated! It is a way to encourage thinking through things in a different way, and for me to check in with how you all are connecting with the material in real time.

Class participation is part of the Effort portion of your grade. If you are quiet by nature, don't worry; as long as you attend class, pay close attention, and do the homework, you will get full Effort credit. That said, even though this is a lecture course, class should be interactive, and participating in classroom discussion helps you learn the material. In addition, when I ask a question to the class, I'm usually expecting an answer. If you have even a vague idea of how to answer the question, please share it!

Studying and learning outside of class

We only spend 3 hours in class each week together, and according to the Federal Credit Hour standard that means you should expect to spend at least 2 hours outside of class per week for each credit hour of class. Therefore the time you spend outside of class on this material is the single biggest component of the course! To help support you with this work outside of class, I will occasionally post videos of extra problems and proofs and I will post selected homework solutions.

The time outside of class you spend learning and studying is how you develop your own perspective on the course material, deepen your understanding, and strengthen your skills. It is also important that you check in with yourself regularly on how the class is going, and part of your Effort grade will involve occasional reflection assignments.

Reading Assignments

College courses have significantly fewer contact hours than high school courses; this is because you are expected to both attend class and read material outside of class in order to get the understanding you need to master the material.

It would be amazing if we could all learn something once and have it stick forever, unfortunately human brains do not work this way! We learn best and most deeply from encountering and engaging in material multiple times, in multiple different ways. This is part of why it is so crucially important that you both come to class and *do the assigned reading each week.* These components of the course support each other in helping you reach fluency with the topics in this course!

Homework

There will be one homework assignment per week, due on *Tuesdays by 11:59pm* through Gradescope. I will not accept homework in person, you must scan it and turn it in online. Homework turned in after the due date will not be accepted (see the special arrangement section of the syllabus for extension policies). In order to make sure your work is organized well, please make sure you write legibly and label the problems in the same order as listed in the assignment. I will drop your lowest homework grade.

Homework gives you an opportunity to get feedback on your demonstrated understanding of course material outside of an exam. That said, you would probably prefer to make mistakes on the homework and learn how to fix them before a quiz or exam than make a mistake for the first time on a quiz or exam! This means homework will be most beneficial to you if you study the material and look at examples *before you start the related homework*, and push yourself to do the homework in a closer to exam-style environment! Try not to flip back to example problems unless you have given a problem a serious try without any help, but please don't be afraid to ask for help once you've given it a try and don't feel comfortable with it yet!

Your homework consists both of reading the relevant sections of the book and of doing the assigned problems. (Only the written work counts directly in your grade, but I expect you to do both.)

Homework grading will be more general feedback than quizzes and exams; this is intentional to help you feel more comfortable trying out the material for the first time. On quizzes and exams, you have had more time and practice with the material. After each homework assignment, I will post solutions to selected problems. *One the solutions have been posted, I will not accept that homework assignment late, even if you haven't used up your two allowed extensions.*

Working in groups and talking through your ideas is a great thing to do, and a skill that will be invaluable throughout your mathematical journey. However, the homework you turn in must be written *by you*. Copying or paraphrasing the work of others is plagiarism and is *a violation of the honor code*. This includes using ChatGPT, Chegg, CourseHero, Wolfram Alpha, and similar websites and programs. If you happened to work on an assignment with other people and you all came up with the same solution, please write the name(s) of the other students involved.

It has become very common for students to use GenAI (artificial intelligence or machine learning tools such as ChatGPT or Dall-E 2) on homework assignments in ways other than simply asking for answers to homework problems. This practice may not be particularly helpful for preparing you for the quizzes or the exams; however, if you still decide to use it for homework, you must properly document and credit how you used it. This includes using it to brainstorm or generate code, outlines, or

other text for you. Note that GenAI tools often “hallucinate" incorrect statements or computations, so be careful to double check its output if you rely on it to study!

Sample Citation: Chat-GPT-3. (YYYY, Month DD of query). “Text of your query.” Generated using OpenAI. https://chat.openai.com/
Note: Material generated using other tools should follow a similar citation convention.

A bit of advice for the homework in this class:

- Start each problem thinking first about what it is you are trying to do (write it down!) and then thinking about what information you have to start with.
- Start the homework the day it is assigned, even if we haven’t covered all of the material for the assignment. You can still work on the problems related to material we have covered!
- Study for your homework: look over your notes from class and the reading before looking at homework problems. It is more important to focus on learning the material well using the homework as practice than to just focus on finishing every problem!
- Space out studying and working on your homework throughout the week; cramming can increase stress and decrease our long term retention of new material. Try out *the study cycle*!
- Since Multivariable Calculus is very geometric, you will likely understand the homework problem better (and be able to solve it quicker) if you draw a rough sketch of what you think is going on in the problem.
- Start on scratch paper first to organize your thoughts and try things out. Then, once you think you have a solution, write it up carefully to turn in!
- Justify all your logical steps in a problem, and use the grading example on Moodle as a guide for the level of explanation the graders and I are looking for.
- You will get more out of office hours if you start thinking about the material and where you might be confused before you come. Office hours and math fellow hours are finite, so preparing for them can help them be more useful for you!

Weekly quizzes

Starting the second week of class, there will be weekly short quizzes on Friday during weeks we don’t have an exam.

These quizzes are to provide a regular check in for both of us on how the material in the class is going for you. Since a semester has many twists and turns for everyone, I will drop your lowest quiz grade. The quizzes will be easier than the hardest questions on the exams; this is both because I don’t expect you to have learned the material as thoroughly as I would for a midterm, and because we will have less time!

Additionally you will be allowed one 8.5’ x 11" page of notes (you can use the front and back of the paper) which you must turn in with your quiz since you are still getting used to the material. The midterm exams are closed note. I strongly suggest making your own page of notes rather than sharing with another student, as making your own note sheet will help you organize your thoughts in the best way for you and usually helps you study.

Exams

There will be 3 midterm exams in class and one comprehensive final exam during final exam week.

Midterm Exam 1	Friday, February 28
Midterm Exam 2	Friday, March 28
Midterm Exam 3	Friday, April 25
Final Exam	TBA

An important part of learning the material in this course is gaining fluency in the concepts, computations, and proofs we are learning together. Being able to succeed on an exam in a timely fashion is part of being able to demonstrate that fluency. For example, if you wanted to become fluent in a new language, one of your goals would probably be to be able to have a conversation without having to refer to a dictionary for most of the words and grammatical structures during the conversation (this is one of the skills distinguishing different levels of fluency in a language by the ACTFL and CTFR scales). For this reason, the exams for this class will be closed book and closed note. Calculators, cell phones, laptops, ipads, etc. are not permitted in exams.

Additionally, the kind of deep studying required for an exam allows you to engage in the material in a different way and learn the material more thoroughly. Think about it this way: would you study harder for a class with no exams or a class with exams?

Finally, exams provide valuable feedback for both of us on specific things you are understanding and not understanding in this course, and can help both of us make an informed decision about how the class is going.

Office hours and Math Fellow Hours

Office hours with myself, the Math Fellows, and the Q Center are your time to have smaller group interaction and feedback with us to clarify concepts, ask questions, and get help if you are stuck on a problem. I have a mix of drop-in and by appointment office hours so that you can choose what kind of environment you'd like!

Please come to office hours as often as you'd like, and please know that *all of us* need help sometimes! I will never judge you or think less of you for coming to office hours and I truly hope to see all of you in office hours!

You can think about going to office hours like meeting with a coach or a trainer: I can demonstrate lifting a weight for you, I can help you make a plan to improve your lifting, but ultimately, if you don't also actually lift the weight yourself you won't get the benefits from lifting weights! Office hours are for helping you navigate problem solving and learning the material in the course, which is not the same thing as simply telling you the solutions to homework problems. Office hours supplement the rest of the components of this course, but they *cannot replace any other component of the course*.

Some of the things you can expect from the Math Fellows and QCenter Fellows

- Treating you with dignity and respect,
- Holding regular office hours,
- Supporting your problem solving and learning in this course with a student-centered approach,
- Asking you questions to pinpoint exactly where you need more support in this class, and providing that support based on their significant experience and expertise (this might not include giving you the final answer!)
- Their support will likely be a mix of helping with specific problems and more broad, structural advice about studying and engaging with the course; both will help support your success!
- They will be patient with you and respect the learning process.

Some of the things the Fellows will expect from you

- Treating them with dignity and respect,
- Trusting their experience and expertise and that you will try out the things they suggest you try,
- Assume they are acting with good intentions and in good faith and have been chosen as Fellows because they know what they are doing!
- You will be patient with them and respect the learning process.

My Office Hours

Drop In (in SMUD 013):

MF 9:30-10:30 am W 4-5pm

Appointment Office Hours (in SMUD 013 or Zoom depending on your preference):

Book through Calendly using this link.

M 3:30-4pm Thu 3-4pm

You can book 15 minute slots at a time and are allowed to book multiple slots in a row. You can book appointments up to 24 hours in advance using Calendly, and are welcome to email me for a last minute appointment if my schedule hasn't filled up already. Please indicate if you would like to meet in person in my office or on zoom.

Appointment office hours are for when you would prefer to talk to me in a smaller setting or if the drop-in office hours don't work for your schedule. You are welcome to bring friends with you if you would like but please do not interrupt someone else's appointment office hour time without their consent!

Tuesdays are my research days and I am not available for meetings on those days. If you're curious about my research, check out this link.

Hours with Math Associate Allison Tanguay at the QCenter

TBA

Fellow Office Hours

TBA

Strategic Learning Center

The strategic learning center is an incredible tool for supporting your learning; they can help you work on your time management, work on techniques to reduce stress from your classes, develop a study schedule for an exam, try out different note-taking strategies, interpret a quiz grade, and a lot more.

Click here to view the same day availability or schedule a future appointment with the SLC.

Required and Recommended Texts

All required textbooks at Amherst are now provided by the college! You will receive an email from customerservice@efollett.com notifying you that course materials are ready for pickup.

Please bring your Student ID to the textbook distribution center at the Alumni House to collect your course materials. If you drop the course on or before the last day of the add/drop period, you must return the print materials to the same Alumni House location.

Distribution Dates: Starting January 20
Location: Alumni House
Hours Monday - Friday, from 10 a.m. to 4 p.m., January 25-26, February 1-2 9 a.m.-3 p.m.

Required texts

Multivariable Calculus, 9th edition by James Stewart. Copies of the textbook and its solution manual are on reserve in the Science Library.
Stewart's Single Variable Calculus and its student solution manual are also on reserve for your reference.

Teach Yourself How to Learn: Strategies you can use to ace any course at any level by Saundra Yancy McGuire.
This is an excellent book to use as a reference for study strategies in addition to talking to me and the Strategic Learning Center, and especially if you find yourself spending more than 10 hours a week on this class outside of class or stressing out regularly about this class!

Add/Drop and Attendance Policy

It is very difficult to catch up in a math class if you miss classes, even the first couple of days of the semester. We will start out the semester with some tricky, geometric ideas and trying to catch up if you miss the topics the first time in class is unnecessarily difficult. If you're interested in adding this class, you should attend every class the first week.

Our time together in class is very important and there is quite a lot of data that attending class regularly strongly correlates with success in the course (see Credé, Roch, and Kieszczynka 2010).

As a result, I will take attendance in this class. If you have at least four unexcused absences (which is over 10% of our class meetings for the semester) you must schedule an individual meeting with me to discuss your absences. This may or may not be paired with a grade penalty.

If you come to class more than 15 minutes late without an excused reason, that will count as an unexcused absence.

The Amherst College Honor Code and Course GenAI Policy

The Amherst College Honor Code applies to this course. It is your responsibility and mine to be familiar with and uphold *all aspects* of this code, including the Statement of Intellectual Responsibility, the Statement of Respect for Persons, the Statement of Freedom of Expression and Dissent, and the Statement of Student Rights.

Generative AI will not be allowed on any in-class assignment and if used will be considered a violation of the honor code.

How to earn a specific grade in this class

Your final grade in the class will be computed by:

Effort	3%
Weekly Quizzes	14%
Two Highest Midterm Exams	38% (19% each)
Lowest Midterm Exam	14%
Final Exam	25%
Homework	6%

"Effort" is a combination of class attendance, class participation, and handing in problem sets. Final grades will be determined based on a holistic evaluation of your performance throughout the course. This will include, but is not limited to, mastery of the content of the course, participation, improvement over time, and engagement with course materials. At the end of the semester, I as the instructor reserve the right to make adjustments to the final grade to reflect overall learning and effort in the course. Final course grades will be curved.

Any student who skips an exam for an unexcused reason or fails to hand in at least 50 homework problems *on time* over the course of the semester *automatically* gets an F in the class.

Special arrangements

Illness Policy

If you are showing symptoms of a contagious illness and/or testing positive for COVID-19 on a regular class day, please follow the Amherst College *protocols* and do not come to class. If it is an exam day, please email me immediately to schedule a makeup exam.

Extensions and Make-Ups

If for some reason you cannot hand in your homework in time or take a quiz on time, you can request up to TWO extensions during the term with no questions asked. You must contact me no later than the day before the due date to let me know. If you have a religious holiday on the same date as an exam in this course, let me know within the *first two weeks of the semester*.

Accommodations

I strive to support all students so please come meet with me if you have any questions or concerns about your engagement and success in this course. Students seeking general disability services and/or accommodations should contact Accessibility Services. You can reach them via email at accessibility@amherst.edu, or via phone at 413-542-2337. Once you have your accommodations in place, I will be glad to meet with you privately during my office hours or at another agreed upon time to discuss the best implementation of your accommodations. For more information, please visit the Accessibility Services website.

Electronics Policy

Please silence your phone and put it away during class. As many students find laptops distracting, if you plan to use a laptop during class please sit in the back row.

What you'll be doing and when

The following times and topics are tentative and may shift slightly to foster a more effective learning environment. Nothing will be made due earlier than indicated but some things may be pushed back or eliminated altogether, depending on time. All changes will be announced in class and posted on the course website.

MODULE 1: 3-Dimensional Geometry

Week	Topics we'll explore	Suggestions for how to prepare

Week 1	• The 3-dimensional Cartesian coordinate system and vectors	• Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week. • Draw some sketches of vectors in 3D by hand
Week 2 Quiz 1 Friday, 2/7	• Ways to combine vectors • Constructing subsets of 3D space	• Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
Week 3 Quiz 2 Friday, 2/14	• Lines and planes • Understanding 3-dimensional pictures with 2-dimensional slices	• Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week. • Come up with your own equations describing subsets of 3D space and sketch the corresponding sets by hand • Put equations describing subsets of 3D space into Geogebra or Wolfram Alpha and rotate the view to better understand those subsets
Week 4 Quiz 3 Friday, 2/21	• Vector-valued functions and space curves • Taking limits, derivatives, and integrals of curves • The precise definition of a limit • Why a limit should not depend on the path you take • What it means to be continuous	• Review from single-variable calculus: definitions of limits and continuity, derivative and integral formulas • Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.

MODULE 2: Functions of several variables, taking their derivatives, and what those derivatives mean

Week 5 Exam 1 Friday, 2/28	• Multivariable functions • Partial Derivatives	• Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week. • Study for Exam 1

Week 6

- Different types of derivatives and what they mean
- The chain rule in 3D

- Review from single-variable calculus: Tangent lines, linearization, and the chain rule
- Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Sketch some graphs of functions in 3D from different viewpoints and draw the gradient vector at a few different points on the graph. How does the length and direction of this vector compare to the graph of the function?
- Think about the difference between the graph of a function and a subset of 3D space described by an equation (or some number of equations). Can you come up with concrete examples?

Week 7
Quiz 4
Friday, 3/14

- Tangent planes and approximating multivariable functions
- Finding maxima and minima with partial derivatives

- Review from single-variable calculus: Optimizing functions
- Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Sketch some graphs of functions in 3D from different viewpoints and draw a couple of tangent planes at a few different points on the graph. How well do the different tangent planes approximate the function?

SPRING BREAK

MODULE 3: Taking integrals of different types of functions involving multiple variables

Week 8
Exam 2
Friday, 3/28

- Finding absolute maxima and minima with partial derivatives
- Using gradients to look for absolute maxima and minima with the method of Lagrange multipliers

- Try optimizing (i.e. looking for maxima and minima) the same function using both methods. In which situations are partial derivatives more appropriate and in which situations are Lagrange multipliers easier or more efficient?
- Study for Exam 2

Week 9

- Using gradients to look for absolute maxima and minima with the method of Lagrange multipliers
- Taking double integrals in Cartesian coordinates
- Taking double integrals in polar coordinates
- What double integrals are good for
- Taking triple integrals in Cartesian coordinates

- Review from single-variable calculus: U-substitution and trigonometric substitution
- Review from single-variable calculus: Integral formulas, u-substitution, integration by parts
- Use the "how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Sketch *each region* you are taking an integral over, the bounds for these integrals are usually more subtle than they first appear!
- Sketch *each region* you are taking an integral over, the bounds for these integrals are usually more subtle than they first appear! This is particularly important when you are changing coordinate systems or changing the order of integration

Week 10
Quiz 5
Friday, 4/11

- Taking triple integrals in cylindrical coordinates
- Taking triple integrals in Spherical coordinates
- Changing coordinate systems/variables in several dimensions
- Line integrals of scalar-valued functions
- Line integrals of vector fields

- Review from single-variable calculus: Parametric curves
- Use the "how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Sketch *each region* you are taking an integral over, the bounds for these integrals are usually more subtle than they first appear! This is particularly important when you are changing coordinate systems or changing the order of integration
- Come up with some of your own vector fields and draw them on a subset of 2d or 3D Cartesian coordinates.

MODULE 4: Relating derivatives and integrals involving several variables

Week 11
Quiz 6
Friday, 4/18

- The fundamental theorem of line integrals
- Green's theorem

- Review from single-variable calculus: The fundamental theorem of calculus
- Use the "how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Sketch each region you are applying Green's theorem to

Week 12
Exam 3
Friday, 4/25

- Operations on vector-valued functions: gradient, curl, and divergence
- Oriented surfaces
- Surface integrals

- Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Practice writing down parametric equations for different surfaces, and make sure to sketch the surfaces! Feel free to use computer tools to make visualization easier, but make sure you practice at least a little bit by hand.
- Study for Exam 3

Week 13
Quiz 7
Friday, 5/2

- Surface integrals
- Stokes’ Theorem
- The divergence theorem

- Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Sketch out examples illustrating what the theorems this week actually mean

Week 14

- Summarizing the course
- Reviewing course material
- Making up missed class day(s)

- Use the “how to read a math textbook" handout on Moodle to effectively use the reading assignment for learning the material this week.
- Study for Final Exam (comprehensive)

FINAL EXAM WEEK

Important Dates

January 27	First Day of Classes
February 5	Last Day of Add/Drop
March 17-21	Spring Break
April 21-22	April Break
May 6	Last Day of Classes
May 9-15	Final Exams

This syllabus provides a general plan for the course; deviations may be necessary. You are responsible for all of the information in this syllabus, so please read it carefully and refer back to it regularly.