

MATHEMATICS 23b

Vector Calculus II

Spring 2022

Instructor: Jesse Kass

Office Hours: Monday, Wednesday 1:05 – 2:00 pm in McHenry 4174.

Classroom: Kresge College Room 321

Class times: Monday, Wednesday, Friday 12:00 – 1:05 pm.

Course Website: <https://kassclasses.weebly.com/math-23b-vector-calculus.html>

Teaching Assistants: Jady V. Breland (jbreland@ucsc.edu) and Yufei Shan (yshan7@ucsc.edu)

Office Hours: Breland is available at McHenry 1261 on Tuesday from 1:00 to 2:00 pm; Shan is available at McHenry 4117 on Thursday and Friday from 2:00pm to 3:00pm or by appointment.

Small Group Tutors: Morea Lee (momalee@ucsc.edu) and Azucena Molina (azrmolin@ucsc.edu).

SGT Sessions: Lee holds a Zoom session on Sunday from 10 am to 11 am; an in-person session on Monday from 2:40 pm to 3:40 pm in Academic Research Center 221. Molina holds a Zoom session on Sundays from 5 pm to 6 pm; an in-person session on Tuesday from 5:30 pm to 6:30 pm in the Academic Resource Center, second floor.

Drop-in Tutoring: Lee offers tutoring on Monday from 3:00 pm to 5:00 pm at Academic Research Center 115. Molina offers tutoring on Sunday from 3:00 pm to 5:00 pm via Zoom.

BULLETIN INFORMATION

MATH 23b – Vector Calculus II (5 credit hours)

COURSE DESCRIPTION

From MyUCSC: Double integral, changing the order of integration. Triple integrals, maps of the plane, change of variables theorem, improper double integrals. Path integrals, line integrals, parametrized surfaces, area of a surface, surface integrals. Green's theorem, Stokes' theorem, conservative fields, Gauss' theorem. Applications to physics and differential equations, differential forms.

PREREQUISITES

MATH 23A

WELCOME MESSAGE

Welcome to Calculus! I am looking forward to exploring with you some deep and fascinating topics that have interested mathematicians for hundreds of years.

With all its classes, the mathematics department strives to create an open and supportive community where everyone can research, teach, and learn about math. To help foster this environment, everyone in class is asked to treat each other with courtesy and respect. Please make comments and questions in class, but try to keep your comments constructive and free from harassing statements. Math is hard enough without people being rude to each other in class.

COURSE OUTLINE

How do you derive Maxwell's equations, the physics equations governing classical electromagnetism? How to describe how Mars orbits around the Sun. How to find the volume of a trapezohedron? Surprisingly, these seemingly unrelated problems can all be answered using the same tool: Calculus. In this class, we will learn ideas from Calculus that will allow us to compute area and volume integrals and related quantities. We will cover roughly chapters

5 through 8 of the textbook.

LEARNING OBJECTIVES

Master integral Calculus of Several Variables at a high level!

Topics to be mastered are

1. The Double and Triple Integrals
2. Line, Path and Surface Integrals
3. Fundamental Theorems of Calculus in Several Variables and their Applications to Physics

REQUIRED TEXTS

1. Vector Calculus, 6th ed, by Marsden/Tromba.

ASSIGNMENTS AND EXAMS

1. Homework: Homework will be assigned and collected regularly. The lowest homework grade will be dropped.
2. In-class mid-term exam: this exam is tentatively scheduled for *Wednesday April 27, 2022*.
3. Final Exam: the registrar has scheduled this exam for *Thursday June 9, 2022*.

GRADING

Grades will be computed with the following weights:

Mid-term exam:	30%
Final exam:	40%
Homework:	20%
Discussion section:	10%
Total:	100%

I won't curve individual tests or homeworks, but there may be a curve for the class in the sense that grade ranges that lead to certain grades are adjusted based on overall results.

Homework: Homework will be collected on a weekly basis. Homework is due at the beginning of class. Homework submitted during class but after the start of class will be marked LATE and the grader may invoke a penalty. Once class has ended, no homework will be accepted. If you can't make it to class on a day that a homework is due, the correct procedure is to submit the homework before class in my mailbox on the 4th floor of McHenry (by the main office).

The lowest homework grade you receive this quarter will be dropped when computing your final grade. This policy is designed to address situations where you can't submit a homework because of unforeseen events (you are ill, for example).

The homework will be largely graded for completeness. This is partially to discourage from students to rely too much on online resources like WolframAlpha and Chegg.

Mid-term and final exams: The mid-term exam will cover all the material covered in class up to the date of the exam. The final exam will cover all material from class, but the focus will be on material covered after the mid-term. No calculators or notes are allowed on the exam.

Discussion section: I will determine how the discussion section grade is assessed after our TA has been assigned.

CONTACTING THE INSTRUCTOR

You can contact me either through Course Feedback message box on the course webpage or by email (kassj@math.sc.edu). Email is great for communicating about logistics related to a

specific student (“I am going to miss the midterm because...”). For concerns or comments (positive or negative) the Course Feedback message box is a good way to communicate with me as it can be used anonymously. In-person meetings are better for things like help with math.

In written correspondence, I prefer to be addressed as Jesse with an email opening with “Dear Jesse” or “Hi Jesse”. If you would like to be addressed in a certain way, please let me know.

ACADEMIC INTEGRITY

Cheating will not be tolerated. Honor code violations will be addressed according to university guidelines.

On homework assignments, the academic integrity policy is loose. You can use any resources you want, but I ask that you list everything you used. The homework is largely graded on completeness, so you don't really gain anything by copying down answers and not solving the problems on your own.

Academic integrity for exams is more serious. Examples of misconduct are looking at another student's work, communicating with another student during the exam, using unauthorized material like a cellphone or written notes.

RECORDING POLICY

I may use the Lecture Capture recording technology to record lectures and post them to Canvas. I will discuss whether or not we'll do this in class. If you would like to make an electronic video and/or audio recording of the class using your own device, please let me know ahead of time.

OTHER POLICIES

Missed exams, quizzes, and homework will not be made up. Exceptions may be made for exams missed due to documented illness, family emergency, or university-sponsored activity.

Electronic devices such as cell phones are to be turned off or put in silent mode during class meetings. I reserve the right to answer your phone if it goes off during class. If you are using a laptop or tablet for any purpose other than note-taking, I reserve the right to use it during class.

If you plan to leave class early, the correct procedure is to inform me before lecture begins. Unless this procedure is followed, early departures disrupt lecture.

Do not be late to lecture. From a ratemyprofessors.com review: “Don't ever show up late; if you do he will ask you hard questions and call you out in order to make you feel bad for showing up late.” If you know you will arrive late, the correct procedure is to inform me ahead of time; students arriving late should discreetly find an open seat.

Description of Small Group Tutors (by Morea Lee)

SGT is weekly peer and community-based learning with me, the tutor, as the facilitator. Each student that wants to attend is required to sign-up via TutorTrac and you commit to attending each week for the rest of the quarter. Some benefits of SGT are: guaranteed group study time, an opportunity to engage with class material more deeply, and make friends/build community!

Each tutor offers one session via Zoom and one session in-person each week. If signing up for the virtual session, students will receive the zoom link from TutorTrac after signing up. SGT sessions max out at 6 students to make it easier to get to work closely with one another!

In addition to SGT sessions, the tutors will also provide individual tutoring support where students can sign up for a 20 minute time slot within a 2 hour window to meet with me in person. Sign ups for any of these sessions begin on August 4th and sessions will start on Wednesday during week 2.

Previous Years' Grade Distributions

Students often ask about the grade distributions. The historical grade distribution is given below. I have not taught this class before, but I expect my grade distributions to be similar.

A:	24.92%
B:	26.89%
C:	27.23%
D:	09.33%
F:	06.36%
P:	01.57%
NP:	00.86%
U:	00.03%
W:	02.80%

Tentative Weekly Schedule

Weeks 1 and 2: Double and triple integrals (Chapter 5)

Weeks 3 and 4: Change of variables and some applications of integration (Chapter 6)

Weeks 5 and 6: Line integrals, vector fields, and an introduction to surfaces (Chapter 7)

Week 7: Surface integrals of vector fields (Chapter 7)

Week 8: Green's Theorem and Stokes' Theorem (Chapter 8)

Week 9: Conservative vector fields (Chapter 8)

Week 10: Gauss' Theorem and review (Chapter 8)

KEY DATES

April 15: Add/drop/swap ends

April 16–May 6: Withdraw from a class

April 27: In-class mid-term exam

May 30: Holiday

June 3: Instruction ends

June 9: Final exam