Instructor: Clover May
Office: MS 6903
Email: clovermay@math.ucla.edu

Office Hours: M 5:00-6:00pm,
Th 2:00-3:00pm in
CLC in Boelter 8251

Class Meetings: MWF 12:00pm-12:50pm, Kaplan Hall A51

Course Website: https://ccle.ucla.edu/course/view/19W-MATH32A-3

Prerequisites: C- or better in Math 31A or equivalent.

Textbook: The textbook is *Multivariable Calculus* (3rd Edition) by Rogawski and Adams. We will cover roughly Chapters 13, 14, and 15.

Grading: Your grade will be determined as the better of the following two options:

- 10% homework + 35% best midterm grade + 55% final exam
- 10% homework + 25% Midterm 1 + 25% Midterm 2 + 40% final exam

Homework: Each lecture will have problems assigned from the book. These are chosen to help you best understand the material. Each week in discussion you will have a written homework assignment due at the beginning of discussion. Credit will only be given for complete solutions showing all work, written neatly and using correct notation. You are encouraged to work together on these problems, however you must turn in your own work. **No late homework will be accepted**, but your lowest two homework scores will be dropped.

Exams: There will be two in-class midterm exams and a cumulative final exam. The schedule for the midterm exams is below. The final exam is scheduled by the registrar.

Midterm Exam 1:	**Friday, February 1**	(Week 4)
Midterm Exam 2:	**Friday, March 1**	(Week 8)
Final Exam:	**Thursday, March 21, 3:00-6:00pm**	(Week 11)

You must bring your student ID to exams. **There will be no make-up exams**. If you miss a midterm, your grade will be computed by the first rubric. **You must take the final exam as scheduled by the registrar in order to pass the class**.

Calculator Policy: You are welcome to use calculators or wolframalpha.com (a free online calculator) on homework, but *no* calculators or cell phones will be allowed on any of the exams in this course. Students are expected to be able to perform basic arithmetic operations with fractions and decimals by hand and know common values of trigonometric and log functions.

Learning Outcomes: A successful student in this course should be able to understand the geometry of space, vectors, and the differential calculus of vector functions and multivariable functions. Much of the material in this course is necessary for that objective. Students successfully completing this course will be able to:

- compute and interpret vector operations including the dot product and cross product, as well as apply these to determine equations of lines and planes in space, the projection of a one vector onto another vector, and volume.
- recognize the basic quadric surfaces; cylinders, paraboloids, hyperboloids of one sheet, hyperboloids of two sheets, cones, and ellipsoids.
- sketch and interpret vector-valued functions.
- compute and interpret derivatives and integrals of vector-valued functions.
- compute and interpret partial derivatives of multivariable functions.
- use partial derivatives to find the tangent plane to a surface and to find the best linear approximation of a function.
- define the gradient vector, interpret it geometrically, and use it in optimization of multivariable functions.
- use the second derivative test to classify critical points as local minima, local maxima, or saddle points.
- use the method of Lagrange multipliers to find local minima and local maxima of functions subject to constraints.

General Expectations/Study Tips:

- *Attendance is mandatory.* You are responsible for any announcements, material, and assignments discussed in class.
- You must show all work and justify your reasoning on homework and exams. If I do not understand what you have written for a problem, you will not get credit for it.
- An atmosphere of mutual respect. In particular, cell phones, tablets, and laptops are to be powered off or silent and put away during class to limit distractions. Please keep talking to a minimum and raise your hand if you have a question.
- Go over your notes after each class. Explain to yourself or someone else what the lecture was about, what the key ideas were, and how the examples work.
- Read ahead in the book. It helps a lot to have already seen the material covered in class, even if you do not understand everything the first time through.
- Form a study group with others in the class. The best way to learn something is to try to explain it to someone else.
- Keep your old homework assignments and exams. Make sure you know how to do each problem correctly and use these for studying for future tests.
- If you are having trouble with the course material, I expect you to ask for help. You are encouraged to come to my office hours and to your TA's office hours. There is also free tutoring in the Student Math Center in MS 3974, M-Th 9am-3pm.
- If you need to conact me via email you should write **Math 32A** in the subject line or I may not receive it.

Student Conduct: Violations of the student conduct code can result in a failing grade on any course work related to the violation, a failing grade in the course, and/or suspension. Cheating includes, but is not limited to

(a) looking at another student's exam during a quiz or test,
(b) copying the work of another person and submitting it as your own, and
(c) using any materials except those explicitly approved during a test-taking situation.

For more information, see the Student Conduct Code at
https://www.deanofstudents.ucla.edu/studentconductcode.

Accessibility: Students needing academic accommodations based on a disability should contact the Center for Accessible Education (CAE) at (310)825-1501 or in person at Murphy Hall A255. In order to ensure accommodations, students need to contact the CAE within the first two weeks of the term.

Tentative Schedule:

Week	Date	Sections
1	Mon 1/7	13.1: Vectors in the plane
	Wed 1/9	13.2: Vectors in three dimensions
	Fri 1/11	13.3: Dot product
2	Mon 1/14	13.4: Cross product
	Wed 1/16	13.5: Planes in three-space
	Fri 1/18	13.6: Quadric surfaces
3	**Mon 1/21**	**MLK Jr Day** - No class
	Wed 1/23	14.1: Vector-valued functions
	Fri 1/25	14.2: Calculus of vector-valued functions
4	Mon 1/28	14.3, 14.4: Arc length and speed; Curvature
	Wed 1/30	14.4, 14.5: Motion in three-space
	Fri 2/1	**Midterm Exam 1**
5	Mon 2/4	15.1: Functions of multiple variables
	Wed 2/6	15.2: Limits
	Fri 2/8	15.2: Limits and continuity
6	Mon 2/11	15.3: Partial derivatives
	Wed 2/13	15.3: Partial derivatives
	Fri 2/15	15.4: Differentiability and tangent planes
7	Mon 2/18	**Presidents' Day** - No class
	Wed 2/20	15.4: Differentiability and tangent planes
	Fri 2/22	15.5: Gradient and directional derivatives
8	Mon 2/25	15.5: Gradient and directional derivatives
	Wed 2/27	15.6: Chain rule
	Fri 3/1	**Midterm Exam 2**
9	Mon 3/4	15.6: Chain rule
	Wed 3/6	15.7: Optimization
	Fri 3/8	15.7: Optimization
10	Mon 3/11	15.8: Lagrange multipliers
	Wed 3/13	15.8: Lagrange multipliers
	Fri 3/15	Catch up and Review
11	**Thurs 3/21**	**Final Exam**