Instructor: Shawn Williams
Email: shawn.williams@rice.edu
Class Webpage: Look for Math 212 on Canvas

Time: 10-10:50am , Monday-Friday
Office Hours: TBD

Due to the uncertainty inherent in this period of time, the some of the information below may change during the semester.

Course Design: This course will run as a partially flipped classroom. Each week there will be up to three sets of videos for you to watch before the class begins. During class I will review the material, and you will break off into groups to discuss and work on related problems. There will then be a class discussion, and possbily a small lecture before breaking off into groups again until the end of class. On some days we will deviate from this structure, but this is expected to be the primary structure of the course.

Note: Due to the recent spikes of COVID–19, the first few weeks of this course will be held entirely virtually. If we return to in-person instruction, there will be a means of attending virtually. If you know ahead of time if you are attending virtually, please let me and your group members know so we can plan accordingly.

Course content and objectives: The goals of this course include:

1. Gain familiarity with 3-dimensional space using various coordinate systems and multi-variable functions.
2. Learn to identify graphs of surfaces using various techniques.
3. Learn to identify and solve problems utilizing the dot product and cross product.
4. Explore applications of the gradient vector- its relationship to directional derivatives, Lagrange multipliers, the graph of a function, level curves and level surfaces.
5. Be able to explain the connection between Riemann sums and double integrals.
6. Identify, set-up and solve problems requiring double, line, surface, and triple integrals. Explore the meaning of these integrals in various situations.
7. Demonstrate your understanding of Green's theorem, Stokes theorem and the divergence theorem as they relate to the fundamental theorem of calculus, and recognize situations in which each theorem applies.

You should aim to not only provide solutions to problems given, but to learn the course content to the extent that you can explain why you performed each step of your solution. During class periods, we will practice doing exactly this.

Expectations: Multi-variable calculus is a difficult course. Although much of it involved generalizing single-variable concepts, it also introduces new concepts that are challenging. Taking place over the summer semester only makes it more difficult. You are expected to attend every class. If you are unable to attend a class period, please let me and your group members know ahead of time.

You are expected to treat all participants in the course, including your instructor, with courtesy and respect. Your comments to others should be factual, constructive, and free from harassing statements. You are expected to adhere to the mathematics department standards of collegiality, respect, and sensitivity (https://math.rice.edu/department-statement-collegiality-respect-and-sensitivity) in addition to the Rice Student Code of

Conduct. Serious offenses will be referred to the department chair and Rice Student Judicial Programs.

Text: https://openstax.org/details/books/calculus-volume-3

Attendance:

As mentioned earlier, you are expected to attend every class period. As a token of your attendance, there will be a worksheet you and your groupmates will work on during class. Although you are working together, each of you should submit individual worksheets. These will not be graded for accuracy, but for completion and effort.

Homework:

- There will be **online homework** assigned after each class period. These problems will not be very difficult, but are designed to reinforce the material taught in class that day. The lowest three online homeworks will be dropped.
- There will also be **written homework** assigned every week. These problems will vary from easy to challenging and are designed to get you thinking critically about the material. These will be good guides for studying for the exams. The lowest written homework will be dropped.

The homework is not pledged. You are allowed and encouraged to collaborate with your classmates on homework, but are expected to write up your solutions ***on your own***. If you do collaborate with others, please indicate with whom you've worked on the top of your homework.

Exams:

There will be two midterms and one final. The midterms will be 2 hours each, and will not be cumulative. The final exam is cumulative. It will last for 3 hours. Its time and location will be determined within the first week of class.

Grading:

Attendance: 5%. There will be leniency in the number of class periods you are allowed to miss unexcused, but this will be decided at a later date.

Homework: 25% (5% from online and 20% from written assignments). While each homework will differ in the number of points, their scores will be normalized so that they each contribute the same amount to the overall homework grade.

Exams: 70% (20% for each midterm, and 30

Disability Support: Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All such discussions will remain as confidential as possible. Students with disabilities will need to also contact Disability Support Services in the Allen Center.