Course information, including all homework assignments, may be found on LATTE. The course URL is https://moodle2.brandeis.edu/course/view.php?id=14540.


The subject of this course is the study of functions of several variables, using the ideas of calculus. The phrase ‘several variables’ can refer to either independent or dependent variables, so we may be studying functions such as $F(x, y, z) = (e^x \sin(y + z), xyz)$ and so on. We will be dealing with derivatives and integrals of such functions; the calculations are mostly done by methods that you learned in ordinary calculus. The organization and interpretation of those calculations is the new part. Much of that organization is guided by geometrical ideas, and so we will spend a fair amount of time on visualization and geometric interpretations of the formulas we derive.

The plan is, roughly, to cover the following chapters of the textbook:

- Vectors and the Geometry of Space (approx 1.5 weeks; Sections 9.1–9.4, 9.7)
- Curves and Surfaces (approx 2.5 weeks; Sections 9.5, 9.6, Chapter 10)
- Partial Derivatives (approx 3 weeks; Chapter 11)
- Multiple Integrals (approx 3 weeks; Chapter 12)
- Vector Calculus (approx 3 weeks; Chapter 13)

The heart of learning mathematics at this level is in problem-solving and homework, and there will be regular assignments. Late homework will not be accepted. Students who miss a test (or exam) will not be granted a make-up test (or exam) unless there is a documented conflict, medical or other emergencies. If you have a conflict with an exam, you must notify me at least a week in advance.

Grading: Grades will be based on homework, quizzes, two midterm exams, and a final exam (scheduled by the registrar for this time block), weighted as follows:

- Homework and quizzes: 15%
- Midterm exams: 25% each
  - Midterm 1: Tuesday, Oct. 9, 7-9 pm
  - Midterm 2: Tuesday, Nov. 6, 7-9 pm
- Final Exam: 35%
**Homework policy:** You may discuss the homework problems with other students in the class; however, if you do, you should write on your homework submission the students with whom you discussed the assignment. (You do not need to mention any help you received from the TA’s or instructor.)

You may not copy the written work of another student or allow another student to copy your written work. What you submit should be your own work.

**Academic Integrity:** You are expected to be honest in all of your academic work. Please consult Brandeis University Rights and Responsibilities for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be found at LTS - Library guides.

**Accessibility Support:** It is the policy of Brandeis University that any student with a disability receive fair and equal treatment in this course. If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me immediately. **Learning Goals for Math 20a.**

The learning goals for Math 20a include the following. Students will:

- Learn what vectors are and how to perform dot and cross product.
- Understand the role vectors play in defining lines and planes.
- Extend the definition of the derivative and integral to vector functions.
- Define and compute partial derivatives.
- Learn how to write level curves and find tangent planes.
- Understand and compute directional derivatives.
- Define and determine differential and gradient of a multivariable function.
- Compute double and triple integrals.
- Learn about vector fields and how to compute line integrals.
- Define conservative vector fields and understand path independence.
- Learn how to apply Green’s theorem to solve integration problems.