

# MA 0350 Honors Multivariable Calculus

## fall 2016-2017

Class meeting: Mondays, Wednesdays and Fridays at 10:00-10:50 a.m. in WH 302

**Professor:** Dan Abramovich

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Preliminary Office hours: Wednesday 2:00-3:00; Monday and Friday 11:00-11:50

Canvas: [direct link](#)

**Text:** *Vector Calculus* Jerrold E. Marsden and Anthony Tromba

W. H. Freeman; Sixth Edition (December 16, 2011)

ISBN-10: 1429215089 | ISBN-13: 978-1429215084

**Goals:** Mastery, with conceptual depth, of differential and integral calculus in several variables and of the key theorems of vector analysis in dimensions 2 and 3.

**Prerequisites and non-prerequisites.** Students entering math 350 are required to master one-variable calculus at least at the level of AP calculus BC or math 100/170/190 at Brown. Linear algebra is not a prerequisite, and more importantly, **Multivariable calculus is not a prerequisite for math 520 or 540.**

**Homework:** reading and problems assigned on Canvas. Assignment will come in two kinds:

- **Routine exercises assigned and graded through WebWork.** These exercises are automatically randomized. Collaboration is encouraged. Generally you may try an exercise till you get it right with no limit on number of attempts.  
WebWork is supposed to automatic report grades. (In case that fails you will report your own WebWork grade on Canvas - stay tuned).
- **Other exercises assigned from the book or directly on Canvas. These will be handed in class.** You may discuss material and ideas required for homework with other students or get help as discussed below, but this homework is done primarily on your own and the **solutions must be written by you alone.** If you work with someone else you must indicate that person's name. These assignments are graded by a grader, returned to you, and grades reported on Canvas at the appropriate time.  
Allowed help resources are: (a) my office hours (b) our teaching assistant, and (3) the math resource center in Kassar House. You may not consult students outside the class, TA or MRC. You may not consult the internet for help or homework solutions.

**It is the student's responsibility to know which rules govern each assignment and to adhere to the university's academic conduct code.**

**Teaching Assistant** Eva Loeser will be in the math lounge (Kassar 105, 151 Thayer Street) on Thursdays between 7pm and 9pm, beginning Thursday September 15.

The main entrance is locked after hours, but you can enter through the Math Resource Center (the side door on George Street).

Since the course has two sections, the current arrangement is that in the first hour, 7-8pm, Eva will address questions of students in my section, and in the second hour she will serve the other section.

This is a new and somewhat informal program, we hope you will enjoy it and find it beneficial. It will probably evolve over the semester. Eva has taken this course and a good number of more advanced ones.

I will **not** be available October 3, October 12 and December 5-9, but class will meet on those dates and through reading period.

### **Comparison and relationship of courses**

*Comparison with math 180:* Math 350 being the honors multivariable course, the emphasis here is less on computations and more on depth and concepts than math 180. (I will assign exercises for you to gain computational mastery on your own.)

Also, examples from "the real world" are treated as motivation rather than a central theme. The mathematical world is not limited to three dimensions!

*Comparison with math 200:* Math 200 aims to tie every math concept with applications in physics and engineering. There is no attempt to follow all the connection here - in math 350, it is hoped that students will appreciate mathematics on its own terms.

*Relationship with math 1010:* That's our first truly proof-based mathematical analysis course, redoing one-variable calculus "the right way". In math 350 I will provide proofs, which I expect you will enjoy immensely, but the methodology of the course will not be centered around generating proofs.

*Relationship with math 540:* That's our honors linear algebra course, which is the first truly proof-based course (or at least one of them). You can take the courses in any order. You would likely enjoy taking both at the same time (however your advisor might insist you diversify your courses).

### **Exams:**

- **Exam 1:** September 30 (To Be Confirmed)
- **Exam 2:** November 7 (To Be Confirmed)
- **FINAL EXAM:** Tuesday, December 17 at 2pm-5pm (rescheduled by registrar, set in stone, not subject to changes!)

### **Credit hours and estimate of work load.**

We have 38 regular classes, 2 hour exams in class, and one final exam of 3 hours, totalling 43 hours in person.

Different students require different amount of time for reading, assignments and preparation, but I expect there will be about 10 hours per week over 11 weeks of reading and assignments, totalling 110 hours, and 40 hours of exam preparation spread over three exams, totalling 150 hours outside class.

This very rough estimate totals in 193 hours of time commitment.

While this may seem on the heavy side, it is consistent with students' assessment that mathematics courses, especially those requiring both computational and conceptual mastery, are demanding. Students also agree that consistent work through the term is essential for enjoying the class.

**Grading.** I expect to use the following: Homework 15%, midterms 22.5% each, final 40% of grade.

While **attendance** is not computed in the grade, attendance is expected. If you expect this to be an issue, you must discuss it with me as soon as the issue arises.

