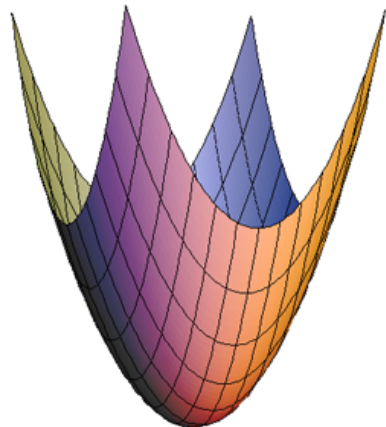# Multivariable Calculus

1. Course Content

In single variable calculus, you learn how to use derivatives and antiderivatives to answer classical questions about functions which take in one real number and spit out another real number. In the jargon of mathematics, these functions are said to have the real numbers (denoted $\mathbb{R}$) as both their domain (i.e., set of inputs) and their codomain (i.e., set of potential outputs).

Math 205 (Multivariable Calculus) is a first attempt to understand what derivatives and integrals mean for a function which takes in more than one input, or whose output is more than a single number. That is to say, this class will focus on the calculus of functions $f : \mathbb{R}^n \to \mathbb{R}^m$, particularly when $n, m \leq 3$. Fortunately much of the differential and integral calculus that you remember has natural extensions in this setting. Our goal will be to complete chapters 11 and 13-17 from the text.

2. Course Details

2.1. **Professor.** The professor for this class is Andy Schultz. His office is on the third floor of the Science Center, room S352. Office hours will be held on Mondays from 1-3, Wednesdays from 10-11, and Thursdays from 3-4. You are highly encouraged to attend office hours, and you never need an appointment to do so. If these office hours don't fit with your schedule, contact the instructor so that he can either adjust when "official" office hours are held or set up an appointment to help you outside of office hours.

You can contact the instructor at `andrew.c.schultz@gmail.com`. Though he is always happy to receive emails from you with questions or concerns about the course, he can't guarantee that he'll be able to promptly reply to emails late at night or over the weekend. If you do contact the professor by email, please be sure to follow standard email etiquette. In particular, please make sure you include a greeting and signature and avoid abbreviations. If you're contacting him to ask about a problem, please be sure to specify what the problem asks (as opposed to asking something like "I can't get problem 2 and need your help").

2.2. **Text.** The course uses the 6th edition of Stewart's *Multivariable Calculus*. You can purchase a copy of this text either in the bookstore or online. The ISBN for the text is 978-0-495-01163-7. If you have already purchased an earlier edition of this text in the hopes of saving some cash, please be aware that the problems assigned in this class are as listed in the 6th edition; occasionally publishers like to mix these problems around, so you should be sure to check that you have the correct assignment before pouring into your work.

2.3. **Online resources.** You'll be able to access homework assignments, lecture summaries and copies of quizzes online through the course webpage at `http://palmer.wellesley.edu/~aschultz/f14/math205`.

3. Expectations

3.1. **Prerequisites.** Students are expected to have a solid understanding of standard, high school-level algebra and trigonometry. Students are also expected to be proficient in the topics covered in single-variable differential and integral calculus courses. If you find that you are struggling with any of the prerequisite topics, contact the instructor immediately so he can help you get caught up to speed.

3.2. **Attendance.** Mathematics requires that a student understand one concept before moving on to the next, and since our course moves at a fast pace it is critical that you attend each and every class. If you are going to miss any classes this term, please let the instructor know as soon as possible. More than 1 absence could negatively impact your final grade.

3.3. **Effort.** Many students have the impression that "understanding the material" means instantly knowing how to do problems assigned in the class. On the contrary, most students find they don't truly understand the course material until they have struggled through several attempts at solving problems or understanding concepts. You are expected to exert a good amount of effort in working through the course material, and you shouldn't be discouraged if a certain topic remains elusive when you first encounter it: try some suggested problems, go to office hours, and ask your instructor or friends for help when you need it.

3.4. **Academic Integrity.** Students are expected to read and understand the college's Honor Code. Incidents where academic integrity have been compromised will be dealt with severely. Although most students have a good feel for what constitutes a violation of the Honor Code, for this class you will also need to be familiar with the instructor's policy on homework collaboration. Please be sure to thoroughly read and understand the section on homework below to avoid an inadvertent violation of the Honor Code.

4. Grading

4.1. **Homework.** Homework problems will include both written and on-line components. The online portion of the homework will be completed through the MAA's WebWork online homework system; our WebWork site is `https://webwork.wellesley.edu/webwork2/MATH-205-03-FA-14/`. Your homework grade is calculated by averaging your homeworks after dropping your lowest two scores.

An important note about collaboration and the Honor Code. Students are more than welcome to work with the instructor or their friends when solving homework problems. In the event that you have taken notes while working with someone else, you must put these notes away and recreate the solutions on your own when you submit your solutions for the homework assignment. Using notes from a collaboration while writing your homework assignment will be considered a violation of the Honor Code. If you have any confusion about this policy, please talk to the instructor.

4.2. **Quizzes.** There will be in-class, 10–20 minute quizzes given in this course, occurring (approximately) every Wednesday beginning with the second week of class. We will never have a quiz in the same week that we have a exam. Calculators may not be used on quizzes. Your quiz average will be computed after dropping your lowest quiz score. Barring extreme circumstances, make-up quizzes will not be given. In general, the material covered on quizzes will include recitation of definitions or theorems learned in class and calculations which should be familiar to students who are up-to-date on the homework.

4.3. **Tests.** There will be 3 midterm examinations and 1 final. All midterms are given during the regularly scheduled lecture period in the regularly scheduled classroom, so there should be no conflicts which prevent you from taking midterms as scheduled. The midterm exams will be held on: Monday, September 29; Monday, October 27; and Monday, November 24. You will have 70 minutes to complete each of these tests. Your final will be self-scheduled.

4.4. **Computing your grade.** Your grade is computed by weighting homework at 10%, quizzes at 10%, the first midterm at 15%, the second and third midterms at 20% each, and your final exam at 25%. Students who score at or above a 90 are guaranteed to receive some sort of 'A' in the course. A score of 80 or better guarantees some sort of 'B,' 70 or better some sort of 'C,' and 60 or better some sort of 'D.'