

# Math 034 Several-Variable Calculus

## Fall 2019

*“Masterpieces are not single and solitary births; they are the outcome of many years of thinking in common, of thinking by the body of the people, so that the experience of the mass is behind the single voice.” - Virginia Woolf, A Room of One’s Own*

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### Meeting times and Locations

Math 34-01 meets 10:30-11:20am MWF and Math 34-02 meets 11:30-12:20pm MWF. Location: SCI 181

### Required Text

*Vector Calculus* (4th edition) by Susan Jane Colley

### Office Hours

2-3pm Mondays, 10-11am Tuesdays, and 9-10am Thursdays or feel free to email me to schedule an appointment!

### Prerequisites

A grade of C or better in Math 27 or Math 28, or permission of the instructor.

### Course Description

This course considers differentiation and integration of functions of several variables. Topics include partial differentiation, extreme value problems, Lagrange multipliers, multiple integrals, line and surface integrals, Green’s, Gauss’, and Stokes Theorems.

### Course Objectives

An important goal is, of course, for you to learn the material well enough so that you can use it comfortably when the need arises in future math, science, and economics courses. More broadly, it is hoped that you appreciate some of the exquisite beauty of the subject and the power of abstraction. In particular, in this course you will:

- Gain computational facility in differentiation/integration methods of several variable calculus
- Understand the wide variety of applications of several variable calculus for future courses
- Enhance problem solving skills for many types of problems

### Homework and Exams

#### 1.) *Written Homework*

After each lecture, I will post homework problems on our course moodle page. The entire written homework set is due each Wednesday at the beginning of lecture, unless otherwise indicated. It is expected you also read the book as well, to supplement the lectures. Quite often, my examples will be different from the book so going through the book’s examples will be highly valuable as well.

## 2.) *Online homework: WeBWork*

We will use the online homework tool called WeBWork. After a lecture, I will assign a few WeBWork problems. The entire week's WeBWork problems will be available for you to complete until 10:30am Wednesdays. After this time, solutions to the WeBWork problems become available and you can no longer submit that week's WeBWork's problems. As with written homework you are highly encouraged to discuss the problems with others. However, note that WeBWork problems are individualized for each student so you must submit your own assignment. Once you have done a WeBWork problem correctly, the database immediately records your score. (You don't turn in any WeBWork problems to me at all.) You can retake the problems *as many times as needed until the correct answer is obtained or until the homework set availability has expired*. The very first assignment, which does not count towards your grade, is called an "Orientation Assignment" which simply acquaints you with how to use the WeBWork system. To access WeBWork, go to our moodle course webpage and click on the link to WeBWork. This action automatically sets up the account. You will always access WeBWork through our Moodle page. You may be denied access if you try accessing WeBWork through a path other than the Moodle link.

## 3.) *Grading of written homework*

Only a subset of the assigned written homework problems will actually be graded. Homework will be graded using a  $\sqrt{+}$ ,  $\sqrt{\phantom{x}}$  or  $\sqrt{-}$ . A  $\sqrt{+}$  means absolutely everything was clear and correct. There were no computational errors and there were no conceptual errors. It was a masterpiece! A  $\sqrt{\phantom{x}}$  means there were a few small errors, and at most one conceptual error. A  $\sqrt{-}$  means there were numerous errors and/or more than one conceptual error and/or the work was just too sloppy to read. Hence, you should usually be earning a  $\sqrt{+}$  and  $\sqrt{\phantom{x}}$ . If you seem to be getting a lot of  $\sqrt{-}$  you should see me right away. At the end of the semester, I will convert these marks to a numerical grade.

## 4.) *Technology use on homework and exams*

You are permitted to use your favorite piece of technology to check answers that are computational, but I will expect you to be able to do the calculations by hand and you *must show your work*. **No technology of any kind is permitted on the exams.**

## 5.) *Late Homework and Make-up Exams*

Only under truly extraordinary circumstances will I give a make-up exam. Late homework is not accepted but I will **drop the two lowest written homework scores and the two lowest WeBWork scores**.

## 6.) *Exam Dates*

**Exam 1** will be in class on **Wednesday, October 2**. **Exam 2** will be in class on **Wednesday, November 20**. The cumulative final exam will be scheduled by the registrar. There will be no make-up exams unless the circumstances are absolutely extraordinary. Since the final exam will be scheduled by the registrar **do not make any arrangements to leave campus until after the final exam schedule is posted**.

## Grading Policy

The course grade shall be computed as follows:

Course Grade	
Written Homework	12%
Webwork	8%
Exam 1	25%
Exam 2	25%
Final Exam	30%

## Resources

### 1.) *Math Clinic*

Besides my office hours (which I hope you attend if you need any help), the Math department offers the Math Clinic which runs Sunday through Thursday from 7 to 10pm, located in SCI 145. This is a wonderful place to discuss homework problems and get help. Math Clinics are drop-in study sessions run by friendly and knowledgeable upperclassmen starting the first day of classes. Clinics are a wonderful opportunity to study, do homework, meet/work with classmates, and ask questions about mathematics. Because clinics are drop-in, you are welcome to come and go as you please, but be sure to sign-in when you are there. To make the most of your time at clinic be sure to first try problems on your own, or bring questions you have from your text or lecture. Bringing your textbook and lecture notes is essential because these are helpful resources for both you and the Clinician working with you. There will likely be other students at Clinic with questions for the Clinician, so do not expect to get individual attention the entire time you are at clinic. Be open to working on other problems, thinking about and trying to work through the question you have for the Clinician, working with classmates, or doing other coursework while you wait to speak with the Clinician. For questions about Math Clinics please visit <https://www.swarthmore.edu/math-stat-academic-support/math-and-stat-clinics> or contact Danielle Ledford, the Academic Support Coordinator for the Math/Stat Department. help from the Math/Stat Clinicians.

### 2.) *Multivariable Calculus Clinic*

This is the same structure as a math clinic but the clinician only focuses on multivariable calculus problems. It runs Tuesdays, 7-10pm in SCI 158.

## Accommodations

If you believe you need accommodations for a disability or a chronic medical condition, please contact Student Disability Services (Parrish 113W, 123W) via e-mail at [studentdisabilityservices@swarthmore.edu](mailto:studentdisabilityservices@swarthmore.edu) to arrange an appointment to discuss your needs. As appropriate, the office will issue students with documented disabilities or medical conditions a formal Accommodations Letter. Since accommodations require early planning and are not retroactive, please contact Student Disability Services as soon as possible. For details about the accommodations process, visit the Student Disability Services website. You are also welcome to contact me [the faculty member] privately to discuss your academic needs. However, all disability-related accommodations must be arranged, in advance, through Student Disability Services.