

Math 223 - Multivariable Calculus

Spring Term 2024

Course Description

February 12, 2024

Instructor: John Schmitt

Contact: Warner Science Hall 205, Ext. 5952 and jschmitt@middlebury.edu

Office Hours: Tuesday 1pm–2:15pm, Wednesday 9am–10:30am, Friday 9:30am–11am and by arrangement

Course webpage: <http://community.middlebury.edu/~jschmitt/Multi.html> and a Canvas page.

Meeting Times: Section B MWF, 11:15am–12:05pm in Warner Science Hall 104

Textbook: Susan Colley *Vector Calculus, 4th edition*, Pearson-Prentice Hall, 2012.

Homework: Homework will be assigned on a daily basis. The content of this course is best learned by *practicing problems*. I **encourage you to work together**. However, the write-up of homework solutions *should be done on your own*. Generally, homework will be collected three times a week, on Monday, Wednesday and Friday. Please see my accompanying “thoughts” on homework.

Quizzes: I reserve the right to give quizzes. If given, they will be short in length and cover recent homework problems. They will generally be announced beforehand.

Additional Resources:

Texts available in the Davis Family Library:

- Susan Colley *Vector Calculus, 4th edition*, Pearson-Prentice Hall, 2012.
- James Stewart, *Multivariable calculus: concepts and contexts*, Brooks-Cole, 2001.
- H.M. Schey, *Div, grad, curl and all that: an informal text on vector calculus*, W.W.Norton, New York, 1997.
- J. Marsden, A. Tromba, *Vector Calculus, 3rd edition* W.H. Freeman, New York, 1988.

- The software package Maple is available on many computers throughout campus. It should facilitate computations and drawing when appropriate. Other software packages may also be useful, including Mathematica and MATLAB.

Special Needs: If you require special arrangements for class or during tests/exams, please talk to me as soon as possible to make such arrangements. If you are color-blind, please let me know as I like to use colored ink/chalk.

Students who have Letters of Accommodation in this class are encouraged to contact me as early in the semester as possible to ensure that such accommodations are implemented in a timely fashion. For those without Letters of Accommodation, assistance is available to eligible students through the Disability Resource Center. Please contact Jodi Litchfield (litchfie@middlebury.edu or 802-443-5936) or Peter Ploegman (pploegman@middlebury.edu or 802-443-2382), the ADA Coordinators. All discussions will remain confidential.

Grading Percentages:

Homework/Quizzes	10
Midterms	60
Final	30

The lowest homework score will be dropped from consideration.

Assignment of Grades:

The assignment of grades will follow the scheme below *at a minimum*. Distinction of plus or minus will be determined at the completion of the course.

90 and above	A
80 - 89	B
70 - 79	C
60 - 69	D
below 60	F

Midterm Exams: Exams will be proctored – this is done with permission of the Dean of Faculty. Midterm on Chapters 1 and 2: Thursday evening, March 14 7:30–9:30pm
 Midterm on Chapters 3 and 4: (*tentatively scheduled for*) Thursday evening, April 18, 7:30–9:30pm

Final Exam: The final exam will be given during the scheduled time-slot only - this is Thursday, May 16 9am–12pm.

Etiquette: Beyond basic etiquette, I ask that students not use electronic media devices once in the classroom – this includes cell-phones, laptops, and more. I wish for our time together to be our time together. If you need to use a device for note-taking or the like, please seek my permission.

Absences: Please see me as far in advance as possible for absences that will occur on the day of an exam. Any such absences, or unforeseen ones, must be documented in writing by the appropriate person.

Honor Code: The Honor Code will be observed throughout this class and for all examinations. If you have a question about how the Honor Code applies to this class, please ask. Consulting or copying from a solutions manual, solutions found via the web or any other source is a violation of the Honor Code.

Course Webpage: Problem sets and syllabi and other relevant material will be posted on a course website, available by linking from my homepage:
<http://community.middlebury.edu/~jschmitt/>. It is also available on the course's Canvas site.

Multivariable Calculus - Course Content

1. Vectors: the dot product and cross product
2. Differentiation in Several Variables
 - Functions of several variables
 - Limits
 - The derivative
 - Higher-order Partial Derivatives
 - The Chain Rule
 - Directional Derivatives and the Gradient
3. Vector-valued functions
 - Parametrized Curves
 - Arc-length and differential geometry
 - Vector fields
 - Gradient, Divergence, Curl and the Del operator
4. Maxima and minima in several variables
 - Differentials and Taylor's formula
 - Extrema
 - Lagrange multipliers
 - Applications
5. Multiple Integration
 - Areas and volumes
 - Double integrals
 - Triple integrals and change of variables
6. Line Integrals
 - Scalar and vector line integrals
 - Green's theorem
7. Surface Integrals and Vector Analysis (time permitting)
 - Parametrized Surfaces
 - Surface Integrals
 - Stoke's and Gauss' Theorem