

MATH 241 – Multivariable Calculus

Spring 2008

MTWF 1:00-1:50 PM Swords 328

Syllabus

Instructor: Prof. David Damiano, 341 Swords, 793-2476/3374

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Office Hours: M 11 AM-Noon, T 2-3 PM, W 10-11 AM, F 10 AM-Noon and by appointment.

Course Home Page: <http://math.holycross.edu/~dbd/math241/math241.html>

Course Materials (available in the College Bookstore): *Multivariable Calculus*, David B. Damiano and Margaret N. Freije.

Prerequisites: MATH 132, 134, 136, an equivalent college calculus course, or a score of 4 or 5 on the BC Advanced Placement Exam in Mathematics, or permission from the department chair.

Intended Audience: This course is designed for students who are interested in mathematics beyond one variable calculus, including students who are considering a major in mathematics, the sciences, engineering, or economics. It is a required course for mathematics and physics majors.

Quick Summary: Multivariable Calculus is a one semester course on the calculus of functions with more than one dependent variable or more than one independent variable. The course will use the language of vectors to study functions and express the concepts of differentiation and integration. A primary theme of the course will be to make substantive connections between the mathematics and its use in the sciences. We will also make use of the computer to investigate the mathematics and its applications. While we will draw on the ideas of differentiation and integration of functions of one variable, much, if not all, of this material will be new to you. We will cover material in Chapters 1-6 of the text.

Class Format: Monday, Wednesday, Friday and some Tuesdays will be lecture days. Quizzes and tests during the semester will be given on these days. There will be limited time to review homework in class, so you should make time to attend office hours should you want to ask questions on homework. There will be discussion sessions most Tuesdays (see schedule below). These will be devoted to collaborative learning sessions in the classroom or to laboratory sessions in 219 Swords. Material for these sessions will be distributed in class or electronically. You will be assigned to groups at the beginning of the semester. Groups may change once or twice during the semester.

Computing: You have graduated to the Mathematics and Computer Science Department's Linux network in Swords 219. Each of you will have an account on the network for this semester. Your username and password on this system are the same as your username and password on the College's Novell system. If you are a mathematics major, computer science major or minor, or plan to continue in further mathematics courses, the account will continue after the end of the semester. We will be using the multi-purpose computer algebra package called Maple. (Versions of Maple will also run on Mac's or PC's.) No prior familiarity with Maple is needed for this course.

Calculators: Graphing calculators have become the de facto norm for high school and college mathematics and science courses. On particular occasions, including assignments, quizzes, and tests, the use of calculators *may* be prohibited. This will be announced in class when the activity is announced so that you have the necessary time to prepare for working without a calculator. Keep in mind that while it is useful to be fluent in the use of calculators, calculator fluency alone is not a substitute for understanding.

Grading: There are several components to the course grade:

Homework	10%
Collaborative Assignments	10%
Quizzes (4)	15% (total)
Hour Exams (2 × 20% each)	20%
Final Exam	25%
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Total	100%

Homework from the text will be assigned weekly and will generally be due on Fridays. Collaborative work will generally be due one week after the discussion session. The final exam is a comprehensive exam covering the entire semester.

There are six scheduled quizzes. You may drop 2 quiz grades for a total of 4 quizzes that count for credit. Each graded assignment, quiz and exam will receive a numerical score which will contribute to the appropriate percentage. At the end of the semester, total course percentages will be used to determine final grades. I do not use an absolute scale to determine letter grades.

Academic Honesty: The Department of Mathematics and Computer Science adheres to the College's policy on Academic Honesty, which may be found in the 2007-2008 College Catalogue. In addition, the department has formulated the attached statement intended to amplify the policy as to how it might apply in mathematics and computer science.

Learning Tips. Here are several suggestions to help you learn mathematics.

- In class: Take careful notes. If you don't understand an idea or point being made or calculation, ask about it. We have plenty of time to answer questions but you must ask them. When opportunities arise to talk in groups or work together in the computer lab, take advantage of them. Talking about mathematics is an important way to formulate your understanding of the concepts.
- Out of class: Reread your class notes as soon after class as possible. Summarize your notes for the next class and reread your summaries to prepare for the next class. Read the text before attempting assignments. Mark up the text not just by highlighting but by commenting about concepts and calculations in the margins. Rewrite ideas in your own words and fill in the gaps in the text's calculations. Also, note things that you don't understand so that you can ask about them in class.
- Reading mathematics: Mathematics is expressed in a dense but rich symbolic language that has been refined literally over centuries. It is both precise and concise. Learning mathematics, including multivariable calculus, necessarily involves mastering this symbolic language. Accordingly, mathematics must be read differently than ordinary prose. One must be attentive to every line and every word of the text and to every symbol that appears on the page.
- Homework: The goal of assignments is to help you develop your understanding of the material. This is accomplished both by basic calculations which help to become fluent in the symbolic language of mathematics, and by more open-ended thought problems which allow you to explore ideas. You should attempt homework problems after reading the text and your notes. The least effective way to learn the material is to parrot examples in the text that appear to be close to a particular homework problem. You may also find it helpful to discuss homework problems with other students in the class. It is, however, essential that you write up your own solutions and do not copy those of anyone else.
- Office Hours: If you find that you have additional questions that you would like to ask outside of class, which is quite common in multivariable calculus, please see me in office hours. While I'm pleased to speak with students about multivariable calculus any time, it's important for your benefit that you seek assistance before assignments are due.
- Quiz and Test Preparation: There will be 6 quizzes during the semester. These will consist of 2 or 3 questions and will cover material since the last quiz or test. These will be given at the beginning of class, so it is important that you have your questions answered prior to that class. There will be 2 in-class hour exams that will cover the material covered since the preceding test. There will be evening review sessions prior to each test. You should begin studying for tests at least one week in advance; you should organize your studying so that you progress through all the material that is covered on the test; you should study from the text, workbook, class notes and graded assignments; and you should make use of office hours and review sessions. It is important to break up your studying into manageable chunks of time that are spread over each day of the week before the test. The same comments hold for the final exam, which is a comprehensive exam covering all the course material.

MATH 241-01, Spring 2008 Course Schedule:

- Week 1: 1/16 Lecture.
1/18 Lecture.
- Week 2: 1/22 Lab/Discussion 1.
1/23 Lecture.
1/25 **Quiz 1.**
- Week 3: 1/28 Lecture.
1/29 Lab/Discussion 2.
1/30 Lecture.
2/1 Lecture.
- Week 4: 2/4 Lecture.
2/5 Lab/Discussion 3.
2/6 Lecture.
2/8 **Quiz 2.**
- Week 5: 2/11 Lecture.
2/12 Lecture.
2/13 Lecture.
2/15 **Hour Exam 1.**
- Week 6: 2/18 Lecture.
2/19 Lab/Discussion 4.
2/20 Lecture.
2/22 Lecture.
- Week 7: 2/25 Lecture.
2/26 Lecture.
2/27 Lecture.
2/29 **Quiz 3.**
- Spring break, no classes, 3/3-3/7.
- Week 8: 3/10 Lecture.
3/11 Lab/Discussion 5.
3/12 Lecture.
3/14 Lecture.
- Week 9: 3/17 Lecture.
3/18 Lecture.
3/19 **Quiz 4.**
- Easter. No classes 3/20-3/25.
- Week 10: 3/25 Lab/Discussion 6.
3/26 Lecture.
3/28 Lecture.
- Week 11: 3/31 Lecture.
4/1 Lecture.
4/2 Lecture.
4/4 **Hour Exam 2.**
- Week 12: 4/7 Lecture.
4/8 Lab/Discussion 7.
4/9 Lecture.
4/11 Lecture.
- Week 13: 4/14 Lecture.
4/15 Lab/Discussion 8.
4/16 Lecture.
4/18 **Quiz 4.**
- Week 14: 4/21 Lecture.
4/22 Lecture.
4/23 Lecture.
4/25 Lecture.
- Week 15: 4/28 Lecture.
4/29 **Quiz 6.**
- 4/30 Study Period begins.
- **Final Exam: Monday, May 5, 2:30-5:30 PM.**