

MATH 241 — Multivariable Calculus

Spring 2008

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Office Hrs: Mon. 12:00 – 1:00 pm, Wed. 1:00 – 2:00 pm, Thu. 12:00 – 1:00 pm and by appt.
Prereq: A 4 or 5 on the BC AP Exam, Math 132, Math 133, Math 136, or the equivalent.

Required Text: *Multi-variable Calculus: Concepts and Contexts*, 3rd ed. by James Stewart. A copy of my lecture notes (red binder) is on reserve in the Science Library. They are for reference only; do not remove them from the library! However, you may photocopy them.

Goals: This course is designed to help you obtain a deeper understanding of the theoretical foundations and practical applications of the calculus of several variables. Your studies will help you to develop analytical thinking skills and the ability to solve applied problems. Ideally, you will learn how to think critically, write coherent solutions, and ideally become an articulate mathematician.

Content: We will cover selected sections of Chapters 9–13 of the text. Topics include vectors, coordinate systems, derivatives and integrals of vector functions, parametric surfaces, directional derivatives and the gradient vector, Lagrange multipliers, multiple integrals, and vector calculus.

Format: Most classes will be lecture style. However certain classes will involve collaborative learning exercises and/or computer labs (using the software package MAPLE) to explore particular aspects of calculus. Students will work in small groups of two or three. We will use the computer lab in Swords 219. Your Novell username and password will allow you to log on to the Sunray workstations. Enthusiastic class participation is always required of all students.

Homework: There will be weekly homework assignments consisting, on average, of 15–25 problems from the text. Homework is due at the beginning of class on Fridays and will be graded and returned within one week's time. Homework not handed in on the due day receives a grade of zero. I repeat, no late homework will be accepted; however everyone gets one "late-excuse," which allows the student to hand in the late assignment within one week from its original due date. If you will not be in class on a particular Friday, make sure the assignment is given to me sometime on Thursday, or placed under my office door Thursday night. The only exception to this rule is if you were sick and have obtained an adequately documented excuse from me or your Class Dean.

Students should make use of the department's Calculus Workshop, a drop-in peer tutoring center, open Sunday through Thursday, 7:00 - 9:00 pm in Swords 328. Tutors are there to provide assistance with homework questions, not to do your homework for you.

Exams: Exams will be graded and handed back within one week's time. You must be present for all exams, as makeups are given only if an adequately documented excuse is first obtained by the student from me or your Class Dean. The in-class exams are tentatively scheduled for Wednesday February 20th, Wednesday March 19th, and Wednesday April 16th.

Grading: The weekly homework assignment of problems from the text will count towards 20% of the course grade. The collaborative learning/computer lab exercises will count towards 10% of the course grade. The three in-class exams will each count towards 15% of the course grade. The comprehensive final exam will count towards 25% of your course grade. It is scheduled for Saturday, May 3rd from 8:30 - 11:30 am.

Academic Honesty: The Department of Mathematics & Computer Science adheres to the College's policy on Academic Honesty (<http://www.holycross.edu/catalog/>, page 12). In addition, the Department has formulated its own statement, intended to amplify the College's policy, as well as to precisely state our expectations of students and faculty with regard to cheating, plagiarism, etc. You are required to uphold this policy. Anyone who violates this policy will receive a grade of zero for that assignment or exam, and may incur further disciplinary action involving the College.

Tips for Success:

- *Attend the lectures, actively participate and ask questions*
I work hard to prepare coherent, structured lectures and will put forth every effort to assist you in learning the material. But this is no use to you if you do not attend class. During certain class periods, we will collectively work through problems together. This will mean minimum lecture on my part and maximum participation on your part.
- *Do your homework regularly*
You will find it impossible to begin your homework the night before it is due. You will need time to think carefully about the questions, what they are asking, and how to figure out the solutions. In office hours, I am notorious for not telling you how to solve a given problem. Instead, I will give hints and ask you questions to lead you in the right direction. You will be required to "sweat through" the material, but I promise that once you adjust to this learning style, you will find it to be an invaluable asset.
- *Work with your peers*
The best way to learn mathematics is to *do* mathematics. This means mastering the material so that you could explain it to your classmates. A common adage amongst mathematicians is, "You don't really learn a subject until you can teach it." Mimicking an algorithm is insufficient; a strong student is able to follow and propose arguments as to why a methodology is/is not working.
- *Come to office hours*
If you do not understand a particular topic, then come see me in office hours as soon as possible. Waiting only makes things worse. I will not come seek you out to give you help. You must take the initiative to ask for it. Office hours work best in groups, so that we can all learn together and from each other's mistakes. The format is simple; I sit while you (and everyone else) works through the problem in question at the blackboard. It's actually fun!
- *Show all of your work*
In this class, the details are vital and I will be a stickler in my grading. You'll be required to carefully justify each step, so show all of your work on homework and exams. Without showing all of the details, one will not receive full credit for a correct answer. I am less concerned with your obtaining the correct answer and more concerned with the process by which you obtained your solution.