Multivariable Calculus

MATH 241-01, MWRF 2:00 - 2:50, O'Neil 123, Fall 2001

Dr. Gareth Roberts

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Office hours: Mon. 10:00 - 12:00, Wed. 4:00 - 5:00, Thurs. 3:00 - 4:00 or by appointment.

Required Text: *Multivariable Calculus*, 1st Edition, by William G. McCallum, Deborah Hughes-Hallett, Andrew M. Gleason, et al.

Web page: `http://mathcs.holycross.edu/~groberts/Courses/MA241/homepage.html` Homework assignments, schedule changes, exam materials, computer projects, useful links and other important information will be posted at this site. Please bookmark it! Also, there will be a site for you to make use of group communication tools like discussion board, chat room, calendar, etc. using the Blackboard system at `http://cms.holycross.edu`

Prerequisites: MATH 132 (Calc 2) or a 4 or 5 on the Calculus BC Advanced Placement exam.

Course objectives:

- Develop an understanding for the techniques and theory of multivariable calculus.
- Become proficient at making clear and coherent mathematical arguments.
- Learn to use the computer to enhance and supplement your learning.
- Work and communicate with your peers.

Syllabus: This course focuses on the calculus of multivariable functions. It is traditionally thought of as the third semester of calculus. Topics include functions of several variables, vectors and vector operations, differentiation, maxima and minima and constrained extrema, integration in two and three variables, parametric curves, vector fields, line integrals, flux integrals, Stokes' theorem and applications to the sciences. We will cover most sections of the text.

Computer projects: There will be approximately 3 computer projects assigned during the semester. The goal of the projects is to use computers to gain a better understanding of the subject material and/or to explore some of the applications of multivariable calculus. We will make use of the software package MAPLE. You are **required** to work on your projects in small groups of two or three members. One report is turned in for the group and everyone in the group receives the same grade.

Homework: There will be homework due every Thursday at the START of class. Assignments will be posted on the course web page. There will be a list of problems for you to hand in, a subset of which will be graded. **Late homework will not be accepted.** While you are allowed and encouraged to work on homework problems with your classmates, the solutions you turn in to be graded should be your own. Plagiarism will not be tolerated.

Exams: There will be 2 in class exams and a comprehensive final at the end of the semester. The exam schedule is given below. Please mark these dates down and plan accordingly. Any conflicts must be legitimate and brought to my attention well before the exam is scheduled. If you have any specific learning disabilities or special needs and require accommodations, please let me know early in the semester so that your learning needs may be appropriately met. You will need to

contact Dr. Matthew Toth of Disability Services in Hogan 207 (x 3693) to obtain documentation of your disability.

One interesting feature of the exams is that each student will be asked to provide a sample problem (with solution) before each exam. These will be graded and count towards your homework grade. My favorite problems will be chosen for the exam.

Exam Schedule:	**Exam 1**	**Wed., Oct. 3**	**In Class**
	Exam 2	**Wed., Nov. 7**	**In Class**
	Final	**Fri., Dec. 7**	**8:30 am**

Grade : Your course grade will be based on your scores on the homework 25% , computer projects 20% , two in-class exams 30% and final exam 25% .

How to do well in this course :

- ATTEND THE LECTURES, PARTICIPATE and ASK QUESTIONS

    I take pride in my lectures and will work hard to get you to master the course material. However, this will not be of much use to you if you don't attend class. Furthermore, certain class periods will involve your participation in activities designed to get you to think. These days should be fun, with me lecturing little and you participating greatly. Do not take for granted the privilege you have of attending college. Value your time here and I will make it worth your while.

- DO YOUR HOMEWORK REGULARLY.

    The best way to learn mathematics is to *do* mathematics. This means mastering the material to the point where you could explain it to your classmates and your friends. "You don't really learn the subject until you teach it," is a common adage amongst mathematicians. It is not enough to know how to mimic an algorithm. An "A" student should be able to follow and propose arguments as to why an algorithm is working or not working.

- WORK WITH YOUR CLASSMATES.

    Some of the best assets available to you are the knowledge and abilities of your peers. Learn to explain mathematics to your classmates. Mathematics can be fun and rewarding when there are people around you who enjoy figuring out problems as much as you do. Take advantage of this opportunity and organize study groups.