Multivariable Calculus

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OFFICE HOURS I am almost always in my office (Fowler 313) until at least 5pm. My official office hours for Spring 2006 are **MWF 3:30-5:00pm** and **T 10:30am-11:30am** and **R 3-4pm**.

I am readily accessible by e-mail at **ron@oxy.edu** and by phone at **323-259-2536** and AIM at **ProfBuckmire** or **MadProfessah** (add me to your buddylist!) If you need to see me at a time not specified here, then contact me and make an appointment and I'll be happy to meet with you then. If you don't interact with me on a 1-to-1 basis then you really aren't getting your (tuition) money's worth!

TEXTBOOK *Multivariable Mathematics*, (4th edition) by Richard Williamson & Hale Trotter. Published by Pearson/Prentice Hall, 2004.

WEBSITE `http://faculty.oxy.edu/ron/math/212/06/`

NATURE OF THE CLASS The material in the class will begin with a brief introduction to vectors, equations of lines and planes and a review of linear systems of equations and matrices. We shall then proceed through the textbook by going through Chapter 4 (Derivatives), Chapter 5 (Differentiability), Chapter 6 (Vector Differential Calculus), Chapter 7 (Multiple Integration), Chapter 8 (Integrals and Derivatives on Curves) and Chapter 9 (Vector Field Theory).

FORMAT OF THE CLASS I believe strongly in collaborative learning. This will be an integral part of the class. I predict that you will learn the most from the weekly quizzes and daily homework. I expect that every single student will have met with me in my office *at least* once and probably a half-dozen times, by the end of the semester. *Multivariable Calculus* is not a class that you can "do well" on your own.

We will be making (infrequent) use of the Mathematica computer algebra system as well as several online web resources. I expect a lot of participation in class and will facilitate this through the use of daily class formats (worksheets), group work, in-class computer exercises, abbreviated lectures, take-home quizzes, online communication and COPIOUS homework!

GOALS OF THE CLASS The goals of the class are to extend your understanding of the Calculus to functions of more than one variable. In particular, by the end of the class you should be able

- to manipulate vectors, vector-valued functions and functions of vectors.
- to take partial derivatives of multivariable functions.
- to set up and evaluate double (and triple!) integrals.
- to understand and evaluate the gradient / divergence / curl of a given vector field.
- to appreciate and be familiar with "doing Calculus" in multiple dimensional space.

As always, a central goal of any class I teach is to develop and encourage the communication of mathematical ideas. Specifically, in this class I want you to

- Clearly articulate concepts in multivariable calculus in both oral and written forms.

- Perform routine calculations related to fundamental concepts in multivariable calculus.

- Develop a deep and flexible understanding of fundamental concepts in multivariable calculus.

- Develop an appreciation of selected applications of concepts in multivariable calculus.

TESTS There will be **four (4)** exams in this course. To be precise, there will be three in-class tests and a final exam. The exams are scheduled for

- TEST 1: Friday, February 24, 2006
- TEST 2: Friday, March 31, 2006
- TEST 3: Friday, April 28, 2006
- FINAL : Wednesday, May 10, 2006 (1-4pm)

Of course, these dates are subject to change (with at least one week's notice). It should be noted that students generally think that my tests are too hard. One of these tests **may** be a group / oral exam. In collaboration with Professor McDonald, I am writing a research article about different techniques for assessing student learning in multivariable calculus courses.

QUIZZES There will be quizzes given every week. These quizzes will almost always be take-home, weekend quizzes given out on class on Friday to be handed in in class on Monday. When a quiz is distributed, it is due at the beginning of the next class. They will consist of relatively simple homework problems which you work on by yourself and will be a way in which you can assure yourself you are keeping up with the course. There will often be Bonus Quizzes available only online. **Quizzes are to be completed alone and should be treated like mini take-home exams.** LATE QUIZZES WILL NOT BE ACCEPTED.

HOMEWORK Homework should be done in **pencil**. Homework will be assigned daily with the specific assignment available on the course website. Homework will be due at the beginning of the next class. You are **strongly** encouraged to work on the homework together. However, whatever you hand in must represent your own understanding of the material. Copying homework is cheating and will be dealt with accordingly. **Late homework will NOT be accepted.**

COURSE POLICIES Make-up tests will not be given except for compelling reasons which have been communicated to me well-in advance (i.e. at least 7 days) of the test date.

If you are late to a test, you will only be allowed the time remaining in which to complete your test.

Absolutely no late homework or quizzes will be accepted. That's why there's BONUS quizzes and extra credit HW.

Bonus points may be capped at some point.

This is not an exhaustive list of course policies.

GRADES Your course grade will be composed of the following:

- Three (3) Tests **30%**
- Final Exam **20%**
- Quizzes **20%**
- Homework **20%**
- In-Class Participation **10%**

To receive full credit on a problem, your solution or explanation must be easy to read. Be tidy. Dont skip steps. Emulate the way I present examples in class. Write as if you were explaining the solution to a fellow student who is trying to learn the material. Always be thinking both about the math and about how you can make your thoughts clear. You will use communication skills every day of your life. Practice them!

OTHER NOTES We will not have class on Monday February 20 (President's Day), March 13-17 (Fall Break). I will be out of town on Monday March 20. I will let you know at least a week ahead of time if there may be other days that we will not have class. In addition, you should know that **we will have our last class on Thursday May 4**.

ON-LINE MATERIALS I have set up a web page for the course, where the official version of this syllabus and all class materials will be available. The URL is `http://faculty.oxy.edu/ron/math/212/06/`. There is a class mailing list, which all students are on, at `math212-L@oxy.edu`.