

**About the course:**

This course is an introduction to vector calculus, suitable for students with a background in Math 120 or APSC 171–172, and with at least one course in linear algebra.

The most obvious difference between vector (or multivariable) calculus and the first year version is that there is simply more of everything: more variables, more types of integrals, and certainly much more notation.

But, along with the sometimes bewildering profusion of new symbols comes something wonderful. The procedure of going from one to several variables is not just mindless generalization, and the process reveals something genuinely new about calculus, something which we don't see in the one variable version.

What's new is that we see that calculus is intimately related to geometry. At first, geometry enters on a very basic level; in order to describe multivariable functions and various integrals we'll naturally need to use the geometric language of curves, surfaces, and vector fields. But later on, geometry returns in a much deeper way. The correct generalization of the fundamental theorem of calculus to the multivariable world intimately links the process of integration to the geometric features of the object being integrated over.

The course has a reputation for being difficult, but in fact it is easier than it initially seems. There are a few fundamental ideas, and everything in the course consists of variations on those themes.

What is true is that fairly rapidly the pace in the course becomes relentless, with a new variation or type of integral being introduced every day. For this reason it is vital to keep up to date in the course. Some courses are forgiving if you fall behind; vector calculus is not one of them.

**Goals of the course:**

The primary goal of the course is computation. I want you to be able to set up and compute all types of the integrals and derivatives which appear. The secondary goal is that you understand what all these things mean and how they fit together.

Because the main goal is to learn how to compute, there is a very easy way to test if you're keeping up in the course: If you can calculate everything in sight, then you're doing fine. If not, then at least you know exactly what you should be working on. The textbook is filled with problems, and answers to the odd numbered questions are in the solution manual, so there is plenty of opportunity for practice.

**Grading Scheme:**

Homework	10%
Mid term	30%
Final Exam	60%

The homework is due weekly. There are twelve homework assignments, and the lowest two grades will be dropped when computing the homework mark.

The homework is due Wednesday, at the beginning of class. The first assignment is due on Wednesday, Sept. 22.

**Web stuff:**

The schedule of lectures and the homework assignments can be found at

<http://www.mast.queensu.ca/~mikeroth/calculus/calculus.html>

There is also a Web CT site for the course where you will be able to check your grades, go to the web page above, or post questions to the class. You can log in to Web CT from the above page, or directly from the university's Web CT page.

**Tutorials:**

There are two tutorials for the course, Wednesday 12:30–13:20, and Thursday 11:30–12:20, both in Jeff 118. The tutorials are a chance to go over some of the ideas in the class that week; there will be a small presentation about one of the topics, some practice problems, and people who can answer questions about these problems and the ideas in class. The tutorial is *not* meant to answer specific questions about the homework.

Because the pace of the course is so rapid, it is essential to attend the tutorials, where some of the course material will be reviewed and expanded upon. I will be assuming that anything done in the tutorials is known to everyone.

**Other resources:**

I am anticipating that there will be a space in the Math department where it will be possible to meet and study for the course, as well as designated times when someone will be there to answer questions about the course. I will also be having office hours. The times for these will be announced next week.

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