

Course Syllabus: Math 2580A
Calculus IV
Department of Mathematics and Computer Science
University of Lethbridge, Spring 2016

Course instructor: Sean Fitzpatrick **Email address:** sean.fitzpatrick@uleth.ca
Office: UHall C540 **Course website:** via moodle.uleth.ca
Lectures: TR 1:40 – 2:55 pm in D632
Office Hours: Monday and Wednesday 12:30 – 3:30 pm, or by appointment.

Note: Students in Math 2580 will be given priority during office hours from 12:30 – 1:30 pm. From 1:30 – 3:30 pm students in my other courses will have priority, but please feel free to drop by anyway. I may not be busy, and even if I am I'll try to fit in your questions.

Course Description

This course covers calculus in several variables, including vector calculus. We will begin with a review of linear algebra and the calculus of vector-valued functions (as seen in Math 2570). This will be followed by differential calculus in several variables, including partial derivatives, the general definition of the derivative of a function from \mathbb{R}^n to \mathbb{R}^m (as a matrix!), the general chain rule (matrix multiplication!), gradients, tangent planes, local maxima and minima, and optimization problems in several variables. We'll then move on to integral calculus in two and three variables (i.e. double and triple integrals), including integrals in polar, cylindrical, and spherical coordinates, the general change of variables theorem, and applications. Finally, we'll cover the classical vector calculus, including line and surface integrals, divergence and curl, and the various manifestations of the Fundamental Theorem of Calculus (we'll encounter four different theorems (but they're all really the same theorem)).

Required Textbook:

Calculus III, 2nd ed., by Jerrold Marsden and Alan Weinstein; Springer, New York, 1985.

The textbook can be downloaded for free, along with a student guide, from <http://www.cds.caltech.edu/~marsden/volume/Calculus/>. Hard copies are still published by Springer, but you are also allowed to print the PDF after downloading.

This is an older text, and it lacks the colour graphics and glossy pages of Stewart's text, but to be honest, very little has changed in the standard calculus content in almost a century. If you already own a copy of Stewart, keep it as a resource: you'll probably find it useful for a second opinion and additional exercises. If you don't already own a copy of Stewart, it's probably not worth the price.

If you want an additional free reference, the book *Vector Calculus*, by Michael Corral, is available at <http://www.mecmath.net/>.

Evaluation

Your grade will be determined according to the following table (see below for explanations of each component):

Component	Quizzes	Assignments	Tests
Weight	20	20	60

Quizzes:

Every lecture (except for the first one) will begin with a short quiz. The quiz will have two problems: one from the material covered in the previous lecture, and one from the material to be covered in that day's lecture. (The latter question will be a very basic question to check whether or not you've done the readings.) At the end of each lecture I'll provide a short list of questions to expect on the next quiz.

Quiz policies: Quizzes will begin at 1:40 pm sharp, so please be on time. No makeup quizzes will be given; however, you may miss up to four quizzes without penalty. (There will be 24 quizzes in total and I will count your best 20.) The purpose of the quizzes is twofold: first, so you can monitor your progress through the material, and second, so that I can give you frequent feedback.

Assignments:

There will be regular written assignments, consisting of two or three problems each. Assignments will be due each Thursday by the end of lecture. The first assignment will be due on Thursday, January 21st, and there will be no assignments due in weeks where a test is scheduled. Late assignments are not accepted without prior permission.

Note: I will sometimes assign challenging problems, with the expectation that you will seek help when necessary. I am usually quite happy to give significant hints during office hours. Group work is also allowed, and generally a good idea. **However**, there is a difference between discussing a solution and copying a solution. If you are unsure what the difference is, you should see me before submitting your work.

Tests:

There will be three tests, each worth 20% of your final grade. The first test, on February 11th, will cover differential calculus. The second test, on March 17th, will cover integral calculus. The first two tests will be 75 minutes in duration. The third test will take place during exam week. It will cover vector calculus, and be two hours in duration.

Note: The third test will take place during the final exam period as scheduled by the Registrar's Office. According to the generic exam schedule on the Registrar's Office website, this will be on Thursday, April 21st, from 2:00 - 4:00 pm. Please note however that the generic schedule is not set in stone: the official schedule will be released later in the semester. Students should not schedule any travel until the end of the exam period in case a change in the exam date is made by the Registrar.

Letter grade conversions:

The percentage grades earned in this class will be converted to letter grades according to the following table:

Letter grade:	A ⁺	A	A ⁻	B ⁺	B	B ⁻	C ⁺	C	C ⁻	D ⁺	D	F
Minimum % required:	95	85	80	77	73	70	67	63	60	55	50	0

Course policies

Participation:

Class participation is encouraged, but not required. We will have a class discussion forum at piazza.com available through Moodle for online participation. Piazza is a Q & A forum that supports mathematical notation and allows you to post anonymously, in case you're worried about posting a bad question or wrong answer.

Communication

Communication between students and myself can take place in several ways:

- Announcements on Moodle. Any updates and reminders will be posted on Moodle. These announcements will be sent to your uleth.ca email address by default, so be sure to monitor that account. It is also highly recommended that you log into Moodle on a regular basis to keep up to date on the course.
- In person, during office hours. (Recommended, especially if you are having trouble with a concept.)
- Online discussion forum, via Piazza.com. (This can also be used to earn participation credit; see below for details.)
- Email can be used for questions of an administrative nature. If your question involves mathematics of any sort, it should be posted to the forum or asked during office hours – I do not answer emails about homework or what was covered in lecture. You might also consider checking to see whether your question was already answered in this syllabus or on Moodle before sending an email.

Homework

In addition to the assignments, I'll post a list of suggested practice problems every week. As with any math class, the best way to learn the material is by solving problems.

Course schedule

We will cover the course material in the order presented in the textbook. Chapter 13 is a review of material from Math 1410, and will be covered quickly. Most of Chapter 14 is covered in Math 2570, and will be treated as review as well. A more detailed schedule will be provided on Moodle on a weekly basis.

Special arrangements

If you are a student who has registered for accommodations with the Accommodated Learning Centre, please ensure that I am informed of the necessary arrangements as soon as possible, and please feel free to meet with me if there are any adjustments I can make to improve your learning experience.

Academic honesty

Students are expected to be familiar with, and abide by, the rules laid out in the Academic Calendar regarding academic honesty, cheating, etc. and the penalties assessed for disregarding those rules.