

MATH 280A, Multivariate Calculus

Fall 2012

Bryan Smith

August 21, 2012

Logistics

Professor Bryan Smith	Thompson 390D	879-3562	bryans[at]ups.edu
Math 280A	Thompson 383 Thompson 383	M,F T,Th	8:00 - 8:50 A.M. 8:30 - 9:20 A.M.
Office Hours		Tuesday and Thursday	8:00 - 8:25 A.M. 10:30 - 10:55 A.M. 3:00 - 3:25 P.M.
		Tuesday	3:30 - 4:30 P.M.
		Other by Appointment	

Course Overview

Multivariate Calculus (MATH 280) is the third course in the department's introductory calculus sequence and its primary purpose is to extend the one-dimensional ideas introduced in MATH 180 and MATH 181 into two, three or even higher dimensions. This higher dimensional analysis is in keeping with history since calculus developed as a means of understanding the physics of the world around us.

Course Goals This course has been designed with the following goals in mind:

- to understand relevant calculus concepts,
- to gain skill with the associated computational techniques,
- to work with historical and current applications,
- to improve the ability to read and write mathematics, and
- to refine logical and critical thinking skills.

The department also maintains a topic syllabus for this course that you can find at [MATH 280 Syllabus](#).

Daily Process During most class days we will discuss the new material from the assigned reading, address questions that arise from that reading, and work through assigned problems you wish to discuss. We will use simple examples when introducing new material to highlight how the concepts fit into the “big picture” and will address the details and refinements necessary for a deeper understanding after you have worked on the associated homework problems – usually the next class period.

I expect you to do the assigned reading, work on the assigned problems, and actively participate in classroom discussions. You should expect me to ask you individually for ideas on how to proceed in a given problem or develop a new concept and should develop the habit of contributing to the discussion even if you are not confident your idea will work out. Many studies have shown that the best way to learn something is to actively engage it, make mistakes, think carefully about what led to the mistakes, rectify them, and repeat.

One resource for some examples on how to implement the above process is the website “How to Study”.

Course Information

Textbook Our textbook is *University Calculus*, Hass, Weir, and Thomas, ©2007, Pearson Education, Inc.

Reading Outside of class, you are to carefully read the relevant sections of the text. In particular, you should

- work through the reasoning of the arguments and fill in any omitted steps,
- keep a list of specific questions that arise during your reading,
- make sure you find answers to those questions in class, with me outside of class, working with study partners or with a tutor.

Homework As mentioned above, spending considerable time engaging the material is essential to developing mathematical understanding and skill. To this end, I will assign homework problems from the textbook and we will begin most class sessions by addressing your questions from the homework or your reading. Each class day I will usually assign one or two problems to be submitted for grading. To receive full credit, your work should be complete, clear, correct and organized. The reason for homework is to help you master concepts. It is not just for developing computational skills. When you finish a homework problem you should ask yourself if you understand the ideas and skills necessary to get a correct answer. If not, you should think carefully about what you need to acquire that understanding and develop questions whose answers will lead to that understanding.

Projects There will be three writing-based projects assigned this semester. These projects are designed to help you better understand the current topic and develop better writing skills. For each project, you are to present a written report. This should be done using complete sentences and with enough detail for a reader to follow your reasoning and reconstruct your work. All graphs should be done on graph paper or with appropriate computer assistance. I encourage you to work on the mathematics of these projects in small groups but you are **not** to work together on the actual writing. The first project will focus on writing to give you both practice and feedback on how to express mathematical ideas well.

Due Date Policy Each problem set and project will have a due date. If you wish to turn an assignment in late, you must talk with me before the due date. For reasonable circumstances, I will grant individual extensions for deadlines. If you submit an assignment after a deadline (or an extension we have agreed upon), I will assess a penalty equal to 10% of the assignment's maximum point value for each working day that the assignment is late.

Assessment

For assessment purposes we will have four examinations. The date for each exam will be given at least one week in advance and the fourth exam will occur during the Final Examination period for this course, 8:00-10:00 A.M. on Wednesday December 12, 2012. **Do not make travel arrangements that conflict with this scheduled examination.** You should not be surprised if the first three exams occur in weeks 3, 7, and 11 of the semester.

Grades To determine your course grade, I will drop your lowest two homework problem scores and then calculate an overall homework percentage. If this homework percentage is greater than the lowest of your exam percentages, your lowest exam percentage will be replaced by the average of that percentage and your homework percentage. (If not, homework will play no direct role in your course grade.) I will then calculate a total course score with projects weighted at 15%, your next lowest exam weighted 13% and all other exams weighted 24%. I assign a preliminary course grade based on an objective standard (93.3-100% for an A, 90.0-93.2% for an A-, 86.7-89.9% for a B+, 83.3-86.6% for a B, etc.). I then look at each student's performance subjectively. Occasionally I will assign a course grade that is higher than the objective standard. For example, if a student has a grade of B according to the objective standard but has shown steady improvement, I might assign a course grade of B+.

If you wish I will post, on my university web page, a grade report with your current standing in the class. You should keep track of your grades on the various assignments and check them against these reports. If there are any discrepancies they should be dealt with immediately.

To have your information posted you need to print your name, the class (MATH 280A), and a code on a sheet of paper. Then sign the paper and physically hand it to me. The code is to be a sequence of up to 23 symbols I can type on a keyboard.

Computing Technology You might find it useful to have a calculator (or equivalent technology) with the following capabilities: function graphing, numerical equation solving, numerical differentiation, and numerical integration. Many brands have suitable models. I am most familiar with Texas Instrument calculators. Among Texas Instrument calculators, the TI-83, TI-84, TI-86, and TI-89 models have appropriate features. Note that for some exams, I may forbid the use of symbolic computing features on calculators such as the TI-89. Texas Instruments provides support, including access to Manuals at <http://education.ti.com/educationportal/sites/US/sectionHome/support.html>.

Many graphing calculators are limited to two-dimensional plots. We will also want to look at three-dimensional plots and for these we will turn to other computing technology. I plan on using Sage for most of these but there are a number of other tools that you can also use.

Additional Information

Course Web Site My website for Math 280A is located at http://math.ups.edu/~bryans/Current/Fall_2012/280AIndex_Fall2012.html (or go to math.pugetsound.edu/~bryans and follow the obvious links.) On the course web site, I will maintain a list of assignments and due dates along with a list of daily topics and relevant sections of the text. I will also post announcements and comments about questions or issues that come up in class. You should check the web site for new announcements several times each week. Handouts will be available on the website to download as PDF files in case you lose your copy or miss class.

Office Hours Again

Office Hours	Tuesday and Thursday	8:00 - 8:25 A.M. 10:30 - 10:55 A.M. 3:00 - 3:25 P.M.
	Tuesday	3:30 - 4:30 P.M.
	Other by Appointment	

Except for exceptional circumstances, I guarantee I will be in my office for the posted office hours. However, I am usually in my office anytime I am not in class, eating, exercising or at a meeting so feel free to look for me. You may also make an appointment by phone, email, or talking with me after class.