

Math 318-Spring 2016

Calculus of Several Variables

General information

Location: Wilson 214

Time: MWF 12-1pm

Professor: Greg Knese

Office location: Cupples I room 211A

Office hours: Monday 3-4pm, Wednesday 10-11am, Friday 10-11am, by appointment, or just drop by.

Email: geknese at wustl dot edu

Course description/Prerequisites

Official description: Differential and integral calculus of functions of n -variables making some use of matrix algebra, and at a level of rigor intermediate between that of Calculus III and upper level analysis courses. Students may not receive credit for both Math 308 and 318. Prereq: Math 233 and 309 (not concurrent)

This course will emphasize the connections between calculus and linear algebra. We will prove many things in this course (especially points where calculus and linear algebra connect) but certain theorems have proofs which really belong in upper level analysis (such as Math 4111). We will state those theorems without proof and focus on understanding and using them. It is very important that you are comfortable with the core material of Math 309: matrix algebra, determinants, and linear transformations. We will not have time to review this material, although our textbook does contain a treatment of these topics which is complete enough for our purposes if you need to refresh your memory. You should also be comfortable with the computational/mechanical side of Math 233. For instance, we will not have time to review computing partial derivatives.

Textbook

The official textbook is **Multivariable Calculus** by Jerry Shurman. This book can be found online here: <http://people.reed.edu/~jerry/211/vcalc.html>

I highly recommend that you get a paper copy of the book. I have provided Hi/Tec copy (located at the corner of Big Bend and Forest Park Parkway) with the pdf and told them that I would be using the book for this course. You can call them at 314-863-4111 or email design@hiteccopy.com to get a copy printed or reserved. The printed book costs around \$30.

Exams

There will be two in-class midterms: **February 19** and **March 30**. The final exam is in our regular classroom on **May 11, 10:30am-12:30pm**. The March 30 exam and the final will be cumulative.

Your lowest midterm exam score will be replaced with your final exam score if this increases your grade. For this reason, there will be no make-up exams. If for some reason you miss a midterm exam, the missed exam grade will be replaced with your final exam grade. No one should miss both midterms nor the final without some serious and documentable excuse.

Homework

There will be weekly homework assignments. These should be written up clearly and in detail. You may discuss the homework verbally with other students provided you have already given the homework a serious attempt. If you have already solved a problem and someone asks you about it, then any help you provide should consist of hints or suggestions and not complete solutions.

In particular, homework should be written up independently and it should not be possible to tell who worked with whom. Do not search or post requests for solutions to HW. Do not post any course materials online without my permission.

Your two lowest homework scores will be dropped. For this reason, there will be no late homework allowed. If for whatever reason you cannot turn in or forget to turn in a homework, it will count as one of your dropped homework scores.

Grade breakdown

Homework: 15%
Midterm exam 1: 25%
Midterm exam 2: 25%
Final exam: 35%

Course topics

Basic topology of \mathbb{R}^n , continuity, a detailed study of the determinant, the derivative for multivariable functions, extreme values for multivariable functions, the inverse and implicit function theorems, Lagrange multipliers. Time permitting, we will delve into multivariable integral calculus, the change of variable formula, and in a perfect world we would get to integration of differential forms and Stokes' theorem.