M375T: Multivariable Analysis (Unique number: 53660)

Professor: Dan Freed, RLM 9.162.
Professor’s Office Hours: Wednesday 2:00–3:30. I would like to meet each of you, so please come by in the first few weeks of class. Office hours are an excellent opportunity to ask questions, learn more, seek advice, etc. Take advantage in all of your classes!

TA: Max Stolarski, RLM 9.132.
TA Office Hours: To be announced.

Prerequisites: firm grasp of Real Analysis, Linear Algebra, and (preferably) Algebraic Structures.
Class Web site: http://www.ma.utexas.edu/users/dafr/M375T. Homeworks and perhaps partial solutions will be posted here, as will be notes and additional readings.

Text: There is no text. I strongly suggest you take notes during lecture. I intend to write some notes, but there are no guarantees at all, so you will need your notes.

Syllabus: Topics to be covered include many of the following: affine geometry, linear spaces, geometric structures and symmetry groups, moduli spaces in affine and linear geometry, the differential, vector fields, bilinear forms, higher differentials and extrema, curves and curvature, Galilean and Minkowski spacetimes, inverse and implicit function theorems, surfaces and curvature, ordinary differential equations, exterior algebra and differential forms, integration and Stokes’ theorem, smooth manifolds, Lie groups.

Homework: The only way to learn mathematics is to do mathematics! So you will have plenty of problems to work on. I encourage you to form study groups, help each other, and to seek help elsewhere (friends, parents) if you like. The best places for help are office hours. An optimal strategy is to try each problem yourself first, then get together with others to discuss your solutions and questions, and finally write up the solutions yourself. Please work out problems neatly—don’t hand in your scratch work. One of the goals is to sharpen your mathematical writing skills, and homework is an ideal place to practice. Homework will be collected at the beginning of the Thursday lecture. No late homework is accepted. Homework problems will be posted on the website.

Tests: There will be 2 midterm exams and a final exam. They are tentatively scheduled during class on February 21 and April 11. The final exam is Wednesday, May 15, 9:00 AM-12:00 noon. You must take the final exam. There are no makeup exams for any reason (see below).

Grading Scheme: You will receive 5 grades: a homework grade, the 2 midterm exams, and the final which counts double. I will drop the lowest grade and average the remaining 4 grades. (The lowest two or three weekly homework scores will be dropped to determine your overall homework grade.) The policy of dropping the lowest grade justifies the no makeup policy.

Policy: The University of Texas provides appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-6441 TTY. If you plan on using accommodations, you need to notify your Instructors early in the semester.

Remark: Above all I hope you have fun in this course. This is a difficult, high-level course, almost at the level of a graduate course, so please be sure you have adequate preparation. I’ll give you interesting, sometimes challenging, problems in addition to the routine problems you must do to develop your technique. When you get frustrated please seek help—from classmates, from me, or from whomever you have around to help. If you never get frustrated, then please come see me; I’ll arrange for something more challenging. (I’m serious.)