M375T: Multivariable Analysis (Unique number: 56820)

Professor: Dan Freed, RLM 9.162.

Lectures: Tuesday, Thursday 11:00–12:15, RLM 6.116.

Course Content: To begin we will solidify the idea of the differential of a nonlinear function as its linear approximation, thus combining calculus and linear algebra more tightly than in lower level courses, and we will prove the basic theorems of multivariable calculus: the inverse function theorem, existence of solutions to linear ordinary differential equations, etc. We will then learn about differential forms and integration, culminating in the general Stokes’ theorem. There will be many other topics along the way. Throughout I will include applications to differential geometry and to physics (mechanics and electromagnetism, perhaps special relativity).

Prerequisites: Linear algebra, Analysis I

Office Hours: Tuesdays, Wednesdays 2:00–3:00. These times are subject to change if there are too many conflicts with student schedules. Also, I would like to meet each of you, so please come by in the first week or two of class. Office hours are an excellent opportunity to ask questions, learn more, seek advice, etc. Take advantage!

Class Web site: http://www.ma.utexas.edu/users/dafr/M375T. Homeworks will be posted here as well as additional readings, notes, etc.

Text: There is no text for the course. Take careful notes in lectures! I will also post readings and notes on the website.

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. Office hours are an excellent opportunity to get help. 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. Homework will be collected at the beginning of the Thursday lecture. No late homework is accepted.

Tests: There will be 2 midterm exams and a final exam. They are tentatively scheduled for February 19 and April 2. The scope of the exam will be announced a week prior to the exam. The final exam is Friday, May 10 at 9:00 AM and will cover the entire class. You must take the final exam. There are no makeup exams. No calculators or computers are allowed on exams. If you have any conflicts, such as religious holidays, on these dates please notify me as soon as possible.

Grading Scheme: The lowest two homework grades will be dropped and the rest will count as 25% of your class grade. The final counts double, making 4 total exam grades. I will drop the lowest of these and each of the remaining 3 grades is 25% of your class grade. From your class grade I will determine letter grades: a 90 will be at least an A–, an 80 will be at least a B–, etc. I reserve the right to curve the letter grades in favor of the students.

Honor Code: The class will be governed by the University of Texas at Austin Honor Code: The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect towards peers and community.
**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. 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.)