MATHEMATICS 10A-010: CALCULUS OF SEVERAL VARIABLES I

Text: *Vector Calculus*, by J. E. Marsden and A. J. Tromba, 6th edition

Instructor: Zhuang-dan Daniel Guan
Class: MWF 10.10–11am, WAT 1101
First Class: Sept. 23, Friday
Office Hours: F 2.00–3.00pm, Surge 237 or by appointment.

This course covers the basics of differential calculus for functions of two and three variables, including the vector approach to Euclidean geometry, partial derivatives, gradients, the chain rule in several variables, Taylor polynomial approximations in several variables, and basic constructions associated to vector fields.

Outline for Mathematics 10A

We plan to cover the following sections and expect your eager and sincere participations.

TOPICS	SUGGESTED NO. OF WEEKS' COVERAGE
Vectors (§§ 1.1–1.3, 1.5)	2.5
Vectors, Euclidean spaces, dot product, cross product, planes.	
Partial differentiations (§§ 2.1–2.2, first part of 2.3, 3.1, 2.5)	2.5
Graphs of functions and level surfaces, limit and continuity, partial derivatives without differentiability, the chain rule.	
Vector valued functions (§§ 2.6, 4.2–4.3)	1.5
Directional derivatives and gradients, parameterized curves, arclength, vector fields.	
Maxima and minima (§§ second part of 2.3, 3.2–3.4)	2.5
Differentiation and tangent plane, Taylor's Theorem, extrema, Lagrange multipliers.	

Tests: Midterm around Oct. 31; Final: Dec. 9, Friday 8.00am–11.00am.
Homework: Homework assigned after some of the lectures is due in about a week. We shall use WebAssign. Homework is important, it counts for 20% of the total credit.
Quizzes: There will be four quizzes in the discussion sections in the third, fifth, ninth and eleventh week. Quizzes are also important, they count for another 20% of the total credit. Midterm counts 20%, and Final counts 40%. **Attendances are required.** There might be some pop-up quizzes in the lectures. We might use clickers and there will be 1% bonus or deduction for participations.