Multivariable Calculus
Math 251, Section H3
Fall 2011

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Office Hours: M 3:30-4:30pm, and by appointment

Peer Mentor: Katherine Sytwu

Time and Location: MTW 5:00-6:20pm, SEC 211, Busch

Prerequisites: Calculus II

Course Webpage: http://math.rutgers.edu/~ynaqvi/math251fa11/math251fa11.html

Course topics: This course extends the ideas of previous calculus courses to functions which depend on more than one variable or have outputs in more than one dimension. It will cover analytic geometry of three dimensions, partial derivatives, optimization techniques, multiple integrals, vectors in Euclidean space, and vector analysis.

Textbook: *Calculus: Early Transcendentals* (ISBN 1-4292-1113-X) by Jon Rogawski, published by W. H. Freeman and Company, 2008.

Calculator: Students may have a calculator available in class and while doing homework. Note, however, that calculators may not be used during quizzes and examinations.

Absences: You are expected to attend every class. An absence due to emergency may be excused, provided that you can supply acceptable written evidence if required, and that you notify the lecturer *as soon as possible*.

Homework: A list of homework problems for each chapter can be found on the course webpage. The first 40 minutes of each recitation period will be spent discussing problems for the chapters covered in the previous week. These problems will occasionally be handed in and graded by the peer mentor. It is a good idea solve the homework for each lecture before the next one in order to keep up with the class. Additional workshop problems may also be given during the recitations or lectures, which will count towards the homework grade.

Quizzes: A fifteen minute quiz will be given at the end of each recitation, and no make-ups will be given for these. The lowest quiz grade will be dropped in order to accomodate unavoidable absences.

Maple Labs: There are 4 graded Maple labs, as well as an ungraded Lab 0. Information for the Maple labs can be found on the course webpage.

Exams: There will be two eighty-minute midterm exams and a three-hour cumulative final exam. Make-up exams will only be allowed if you can supply *acceptable* written evidence, and that you notify the lecturer *before the end of the missed exam.*

Midterm Exam 1:	Tuesday, October 4
Midterm Exam 2:	Tuesday, November 8
Final Exam:	Thursday, December 22

Grading: The term grade will be based on the results of the examinations, the scores on written homework and workshops, and on class participation, which will be measured in various ways, including quizzes. It will be determined using the following point distribution:

Homework	50
Quizzes	200
Maple Labs	50
1st exam	100
2nd exam	100
Final exam	200
Total	700

Course Outline: The following plan for the course is tentative and may be subject to changes.

Lecture	Date	Sections	Topics
1	T 9/6	12.1	Vectors in the Plane
		12.2	Vectors in Three Dimensions
		12.3	The Dot Product
2	Th 9/8	12.4	The Cross Product
		12.5	Planes in Three-Space
3	T 9/13	13.1	Vector-Valued Functions
		13.2	Calculus of Vector-Valued Functions
4	W 9/14	13.3	Arc Length and Speed
		13.4	Curvature
		13.5	Motion in Three-Space
5	T 9/20	14.1	Functions of Several Variables
		14.2	Limits and Continuity in Several Variables
6	W 9/21	14.3	Partial Derivatives
		14.4	Differentiability and Tangent Planes
7	T 9/27	12.6	Quadric Surfaces
			Taylor Polynomials
8	W 9/28	14.5	The Gradient and Directional Derivatives
9	T 10/4		**FIRST MIDTERM EXAM**
10	W 10/5	14.6	Chain Rule
			The Jacobian
11	T 10/11	14.7	Optimization in Several Variables
12	W 10/12	14.8	Lagrange Multipliers
13	T 10/18	15.1	Integration in Several Variables
14	W 10/19	15.2	Double Integrals over General Regions
15	T 10/25	15.3	Triple Integrals
16	W 10/26	12.7	Cylindrical and Spherical Coordinates
17	T 11/1	15.4	Integration in Polar Coordinates
18	W 11/2	15.5	Change of Variables
19	T 11/8		**SECOND MIDTERM EXAM**
20	W 11/9	16.1	Vector Fields
21	T 11/15	16.2	Line Integrals
22	W 11/16	16.3	Conservative Vector Fields
23	M 11/21	16.4	Parametrized Surfaces and Surface Integrals
24	T 11/29	16.5	Surface Integrals of Vector Fields
25	W 11/30	17.1	Green's Theorem
26	T 12/6	17.2	Stokes' Theorem
27	W 12/7	17.3	Divergence Theorem
28	T 12/13		Review for Final Exam