Pomona College
Department of Mathematics

Mathematics 107. Vector Calculus

Fall 2007

Course Outline

Time and Place:	MWF 11:00 am - 11:50 am Millikan 207
Instructor:	Dr. Adolfo J. Rumbos
Office:	Andrew 259
Phone / e-mail:	ext. 18713 / arumbos@pomona.edu
Office Hours:	MWF 9:15 am-9:50 am, Tu 9:15 am-10:50 am, 2:30 pm- 3:30 pm or by appointment
Text:	*Second Year Calculus* by David M. Bressoud Undergraduate Texts in Mathematics, Springer 2000
Prerequisites:	Math 60 (Linear Algebra) or equivalent course.

Course Description. The main goal of this course is the development of differential and integral calculus ideas, which students learned in a single-variable calculus courses, in dimensions higher than 1. The main objects of study are functions from *n*-dimensional Euclidean space to *m*-dimensional Euclidean space (also known as **Vector Fields**) and their differentiation and integration properties. We will also be concerned with the study of subsets of Euclidean space on which those functions act. The culmination of the course will be the multivariable version of the **Fundamental Theorem of Calculus** (also known as the generalized **Stokes' Theorem**). In the process leading to Stokes' Theorem, the machinery of **differentiable manifolds** and **differential forms** will be introduced and developed.

The specific topics to be covered are listed in the attached **Tentative Schedule of Lectures and Examinations**.

Assigned Readings and Problems. Readings and problem sets will be assigned at every lecture. Homework assignments will be collected on an alternate basis. Students are strongly encouraged to work on every assigned problem. **Late homework assignments will not be graded**.

Grading Policy. Grades will be based on the homework, two 50-minute examinations, plus a comprehensive final examination. The grades will be computed as follows:

homework	20%
Two 50-minute exams	50%
final examination	30%

Final Examination.

Time: Tuesday, December 18 9:00 am
Place: Millikan 207

Math 107 **Fall 2007**

Tentative Schedule of Lectures and Examinations

Date			Topic
W	Sep.	5	*n*-Dimensional Euclidean Space
F	Sep.	7	*n*-Dimensional Euclidean Space (continued)
M	Sep.	10	Continuous Functions on Euclidean Space
W	Sep.	12	Differentiable Functions on Euclidean Space
F	Sep.	14	Differentiability
M	Sep.	17	The Chain Rule
W	Sep.	19	Partial derivatives, the gradient and directional derivatives
F	Sep.	21	Problems and examples
M	Sep.	24	Differential forms
W	Sep.	26	Differential forms (continued)
F	Sep.	28	Differentiable manifolds
M	Oct.	1	Differentiable manifolds (continued)
W	Oct.	3	Line integrals
F	Oct.	5	Line integrals (continued)
M	Oct.	8	Double integrals
W	Oct.	10	Integrals over surfaces
F	Oct.	12	Integrals over surfaces (continued)
M	Oct.	15	Review
W	Oct.	17	**Exam 1**
F	Oct.	19	Problems and Examples
M	Oct.	22	**Fall recess: No Classes**
W	Oct.	24	Triple integrals
F	Oct.	26	Change of variables
M	Oct.	29	Change of variables (continued)
W	Oct.	31	Orientation of manifolds
F	Nov.	2	Integration on manifolds
M	Nov.	5	Integration on manifolds (continued)
W	Nov.	7	The fundamental Theorem of Calculus
F	Nov.	9	Stokes' Theorem

Date		Topic
M	Nov. 12	The Divergence Theorem
W	Nov. 14	Green's Theorem
F	Nov. 16	Problems and examples
M	Nov. 19	Quadratic functions
W	Nov. 21	Quadratic functions (continued)
F	Nov. 23	**Thanksgiving recess**
M	Nov. 26	Locating extrema.
W	Nov. 28	Taylor's formula
F	Nov. 30	Lagrange multipliers
M	Dec. 3	Problems and examples
W	Dec. 5	Review
F	Dec. 7	**Exam 2**
M	Dec. 10	Review
W	Dec. 12	Review
Tu	Dec. 18	**Final Examination**