MATH 550
D. Meade

University of South Carolina
Spring 1997

MATH 550 (Section 1) – Vector Analysis

Instructor Professor Doug Meade

Office Hours:	MWF 11:00–12:00 and by *prior* appointment
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WWW URL `http://www.math.sc.edu/~meade/math550-S97/`

Meeting Times MWF 9:05AM– 9:55PM, LC 405

Text Marsden and Tromba, *Vector Calculus*, (4^{th} ed.), W.H. Freeman and Company, 1996.

Prerequisite Completion of Math 241.

Course Content Vector analysis involves the study of functions whose domain and/or range is vector-valued. Some of the main topics include: representations of curves and surfaces, derivatives and integrals. The main goal of this course is to thoroughly develop and apply the integral theorems of Green, Gauss, and Stokes. This discussion requires a solid foundation in the geometry of curves and surfaces, as well as line integrals, surface integrals, and volume integrals.

These concepts should all be somewhat familiar from MATH 241. The material in Chapters 1 and 2 will be reviewed very quickly. Chapters 4 and 5 will be discussed in more detail, although most of the material should still be familiar. Approximately two-thirds of the course will be devoted to understanding Chapters 6, 7, and 8. The following listing summarizes some of the main topics in each chapter.

Chapter 1 The Geometry of Euclidean Space

- vectors and vector operations
- cylindrical and spherical coordinate systems

Chapter 2 Differentiation

- limits, continuity, and differentiation
- definition and properties of gradients and directional derivatives

Chapter 4 Vector-Valued Functions

- arclength
- vector fields, divergence and curl

Chapter 5 Double and Triple Integrals

- iterated integrals
- changing the order of integration

Chapter 6 The Change of Variable Formula and Applications of Integration

- Jacobians

Chapter 7 Integrals over Paths and Surfaces

- parameterization of lines and surfaces

Chapter 8 The Integral Theorems of Vector Analysis

- Green's theorem
- Stokes' theorem
- Gauss' theorem
- applications

Study Hints Before each class, you should both review your class notes and read the section to be discussed that day. This will allow you to better understand the terminology and concepts discussed in class, to identify concepts that are not clear to you, and to identify questions that you may need to ask during class.

MATH 241 is the prerequisite for this course. The review of this material will be brief. Be sure you take all necessary steps to refresh your memory and skills relating to the material in Chapters 1 and 2 of our textbook.

Grading Your grade in this course will be based on your performance on homework, three (3) mid-term exams, and a final exam. The weights assigned to each of these components will be:

Homework	10%
Mid-term exams (3)	60%
Final exam	30%

Course grades will be determined according to the following scale:

A	90 –100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

Note that the deadline to drop this course with a grade of W is Friday, February 21, 1996.

Exams There will be two (2) exams during the semester. *Tentative* dates and topics for these exams are:

Friday, February 14	Chapters 1, 2, 4, and 5
Friday, March 28	Chapters 6 and 7

Make-up exams will be given only for documented reasons of illness, family emergency or participation in a University sponsored event. Excuses such as oversleeping, forgetting the time or location of the exam, and lack of studying are explicitly noted as unacceptable grounds for the administration of a make-up exam.

A comprehensive final will be given at 9:00A.M. on Wednesday, April 30, 1997.
(Do not trust exam schedules published by unofficial sources, e.g.*, the Mortar Board.)*

Homework A minimum set of homework problems will be distributed at the beginning of each chapter. You are responsible for working these problems as we work through the book. All problems marked with an asterisk (*) will be collected and graded once each week (usually on Monday).

Your homework average will be determined after dropping your three (3) lowest homework scores No late homework will be accepted.

Attendance Regular class attendance is important. Consistent with the USC Undergraduate Bulletin, a grade penalty may be applied to any student missing more than four classes (10%) during the semester.

Academic Honesty Cheating and plagiarism will not be tolerated in this course. You may discuss homework problems with others, but do not copy solutions from another student or from a book. Violations of this policy will be dealt with in a matter consistent with University guidelines.