Math 554/703I (Section 1) – Analysis I

Instructor	Professor Doug Meade
	Office Hours: TTh 10:00 – 11:00 and 1:45 – 2:45 and by *prior* appointment
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WWW URL	`http://www.math.sc.edu/~meade/math554-S01/`
Meeting Times	TTh 11:00AM– 12:15PM, LC 303B
Text	Manfred Stoll, *Introduction to Real Analysis*, Second Edition, Addison Wesley Longman, 2001.
Prerequisite	Completion of Math 241 with a grade of C or better; or consent of the Mathematics Department.

Overview While most of science is based on inductive reasoning, mathematics is based on deductive reasoning. This means that new results are formed from logical combinations of hypotheses and statements accepted as true. Every result and technique learned in calculus (and other mathematics courses) is logically consistent and can be derived in a rigorous manner. In this course we will begin to study some of basic properties used to develop the fundamental calculus results: max-min theorem for continuous functions, mean value theorem, l'Hôpital's rule, ...

   To be able to understand these results, and their proofs, it is necessary to develop a solid foundation in the real number system. It is also necessary to develop the ability to read, understand, and write mathematical proofs. One of the most important steps in the creation of a mathematical proof is a solid understanding of the basic definitions. Unlike most previous courses you have taken, it is essential to pay attention to the details and technicalities. While this may be slightly unnatural, it is a skill that can be acquired through practice and patience.

   Do not fall behind in this course. Do not assume that questions will be answered without being asked. When questions arise, ask!

Course Content Chapters 1 — 5 of the text will form the core component of this course. Additional topics from Chapters 6 and 7 will be included if time permits.

Chapter 1: The Real Number System
- sets and functions
- mathematical proofs
- Least Upper Bound property

Chapter 2: Sequences of Real Numbers
- sequences, subsequences, and Cauchy sequences
- limit, limit superior, and limit inferior
- Bolzano–Weierstrass Theorem
- series of real numbers

Chapter 3: Structure of Point Sets
- open, closed, and compact sets
- the Cantor set

Chapter 4: Limits and Continuity
- limit of a function at a point
- continuous and uniform continuous functions
- discontinuities
- Intermediate Value Theorem

Chapter 5: Differentiation
- Mean Value Theorem
- l'Hôpital's Rule
- Newton's Method

Grading   Your grade in this course will be based on your performance on homework, two (2) mid-term exams, and a final exam. The weights assigned to each of these components will be:

Homework	25%
Mid-term exams (2)	50%
Final exam	25%

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 <u>Monday, February 26, 2001</u>.

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

Tuesday, February 20
Tuesday, April 24

There will be no make-up exams. If you miss one exam due to a documented reason of illness, family emergency or participation in a University sponsored event, your score on the final exam will be used to replace the missing exam score. Excuses such as oversleeping, forgetting the time or location of the exam, and lack of studying are explicitly noted as unacceptable grounds for missing an exam.

A comprehensive final will be given at <u>2:00PM</u> on <u>Wednesday, May 9, 2001</u>.

Homework   Homework problems will be announced for each section that we discuss. The assigned problems will be collected each week, typically on Thursday. You will have an opportunity to ask questions before the homework problems are collected, particularly on Tuesdays. Homework papers are collected at the beginning of the class in which they are due. Your homework grade will be determined from your nine (9) highest homework scores.

No late homework will be accepted for a grade.

Study Hints   Before each class, you should both review the material from recent sections and read the section to be discussed that day. This will allow you to both understand my presentation of new material and identify questions that you have about earlier material.

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 are encouraged to discuss homework problems with others. Violations of this policy will be dealt with in a manner consistent with University guidelines.