Math 554 – Analysis I

Instructor Professor Doug Meade
 Office Hours: MW 11:00am – 12:30pm, and by *prior* appointment
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Course Website `http://www.math.sc.edu/~meade/math554-S12/`

Meeting Times Lecture: TTh 11:00am– 12:15pm, LC 405

Text Gaughan, *Introduction to Analysis*, AMS, 5th ed., 1998.

Prerequisite Completion of Math 241 with a grade of C or better. (But, in practice, most students in this course should have a C or better in, at least, Math 574 and 544 (or 526).

Learning Outcomes Successful students in Analysis I will become knowledgeable about and will master concepts of real analysis. They will improve their ability to write and read mathematical proofs, particularly those related to the least upper bound axiom, compactness, sequences, continuity, uniform continuity, differentiation, Riemann integration, and the fundamental theorem of calculus.

Course Content 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:

- convergence of sequences
- limit of a function
- continuity (pointwise and uniform)
- derivative of a function
- Rolle's theorem and the mean-value theorem
- l'Hospital's rule
- inverse function theorem
- Riemann integrals
- fundamental theorem of calculus
- derivatives of integrals

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!

Study Hints   Reading the textbook **in advance** of the lecture is strongly encouraged. Benefits of this preparation include obtaining a familiarity with the terminology and concepts that will be encountered (so you can distinguish major points from side issues), being able to formulate questions about the parts of the presentation that you do not understand, and having a chance to review the skills and techniques that will be needed to apply the new concepts.

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

Homework/Quizzes	25%(highest 10 scores)
Mid-term exams (2)	40%
Final exam	35%

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

The deadline to drop this course with a grade of W is Monday, February 27, 2012.

Exams   *Tentative* dates and material for the two mid-term exams are:

Thursday, February 16	Chapters 0 – 2
Thursday, March 22	Chapters 3 – 4

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 a make-up exam.

A comprehensive (Chapters 0-5) final will be given at 9:00A.M. on Monday, April 30, 2012.

Homework   Problems will be assigned for each section. You are expected to work all of these problems. Selected problems will be collected weekly (generally on Thursday). Some assignments might be accepted electronically. Details about this will be given as appropriate.

Your homework grade will be based on your ten (10) highest homework scores.

Graduate Credit   Graduate students enrolled in this course will be assigned additional work throughout the semester.

Attendance   Attendance at every class meeting is important – and expected. Students missing more than 10% of the class meetings (3 days) can have their grade lowered.

Academic Honesty   Cheating and plagiarism will not be tolerated. You may discuss homework problems with others, but do not copy work from another student or from a book. Violations of this policy will be dealt with in accordance with the USC Honor Code and other University guidelines.