INSTRUCTOR CONTACT INFORMATION

Instructor: Paul E. Hand
Office: Duncan 3086
Email: hand@rice.edu
Office Hours: Mondays 4-6 PM
Website: www.caam.rice.edu/~caam501

COURSE OBJECTIVES AND LEARNING OUTCOMES

The objectives of this course are: (1) to provide you with a firm understanding of the basic ideas of mathematical analysis; (2) to improve your proof writing skills up to a professional level; (3) to improve problem solving skills needed for the CAAM analysis qualifier exam; and (4) to improve your mathematical communication skills. The specific analysis topics covered include Real numbers, completeness, sequences and convergence, compactness, continuity, the derivative, the Riemann integral, the fundamental theorem of calculus. vector spaces, dimension, linear maps, inner products and norms.

REQUIRED TEXTS AND MATERIALS
"Undergraduate Analysis" By Serge Lang

OUTSIDE RESOURCES
You are not allowed to use the Problems and Solutions book accompanying Lang's Undergraduate Analysis text for any of the homeworks.

HOMEWORKS
This class has homework problems of two types: practice problems and portfolio problems. Practice problems are only graded for completion. Portfolio problems are problems that are similar to qualifier problems. They will be graded in a binary manner, taking into account the correctness, the elegance, and the exposition. Portfolio problems can and should be revised until they are judged to be of professional quality. Two homework assignments will be pledged and will serve as simulated qualifier exams.

GRADE POLICIES

Homework assignments will be given weekly. They will be posted on Wednesdays and will be due the following Tuesday. Two assignments will be pledged and will each count as 20% of the grade. The other homework assignments will count for 50% of the grade. Classroom participation will count as 10% of the grade. Homeworks should be handed in on time.

ABSENCE POLICIES
You are expected to attend class (almost) every day. If you miss more than 4 classes, the classroom participation part of your grade will drop to zero.

RICE HONOR CODE

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at http://honor.rice.edu/honor-system-handbook/. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

DISABILITY SUPPORT SERVICES

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Disability Support Services (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

COURSE TOPICS

The course will cover the following topics that correspond to the provided sections in Lang's book

- Real Numbers (I.1 – I.4)
- Convergence of sequences of real numbers (II.1)
- Limits and continuity of functions (II.2)
- Derivatives (III.1-III.3)
- Riemann integrals (V.1-V.2)
- Series (IX.1 – IX.3)
- Normed vector spaces (VI.1-VI.3)
- Dimensionality of vector spaces (Not in Lang)
- Completeness of normed vector spaces (VI.4)
- Open and closed sets in normed vector spaces (VI.5)
- Limits in normed vector spaces (VII.1-VII.3)
- Completion of normed vector spaces (VII.4)
- Compact subsets of normed vector spaces (VIII.1-VIII.2, VIII.4)
- Integrals (X.1-X.7)