CAAM 501: Analysis I (Fall 2014)

Time and Location: Tuesday, Thursday at 10:50 am – 12:05 pm, HBH 21

Website: www.caam.rice.du/~caam501

Instructor: Paul Hand
Office: Dunan Hall 3086
Email: hand@rice.edu

Office Hours: Monday 3:00pm – 5:00pm or by appointment

Textbook: "Undergraduate Analysis" by Serge Lang

Course Description: 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. This course in intended to assist CAAM graduate students in preparing for the qualifying exams.

Grade: 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. One homework will be accepted up to a week late without consequence. In that time, you may not look at the posted solutions. Subsequent late submissions will not be accepted, unless by prior permission of the instructor or by a truly exceptional circumstance.

Classroom participation: Each day of class, one or two students will present a theorem from that day's content. The classroom participation grade will be based on the sincerity of your preparation for these presentations.

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

Disabilities: Any student with a disability needing academic accommodations is requested to speak with me as soon as possible. All discussions will remain confidential. Students should also contact Disability Support Services in the Ley Student center.

Course topics with the corresponding section 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)