MATH 4331/6312
Introduction to Real Analysis
Fall 2019

Class: Tu&Th 8:30-9:50am, F154

Instructor: Bernhard Bodmann, *bgb* @math.uh.edu

Office: PGH 604; Tu 10-11am, W 1-2pm

Objectives: This course provides a rigorous introduction to deeper properties of the real numbers, continuous functions, and differentiability needed for advanced study in mathematics, science and engineering. It is assumed that the student is familiar with the material of Math 3333, including an introduction to the real numbers, basic properties of continuous and differentiable functions on the real line, and an ability to do epsilon-delta proofs.

Contents:

Topic	Approx. Time
The topology of $\mathbb{R}^n$	1 week
Cauchy sequences, limits, compactness	1 week
Continuity, monotonicity and intermediate values	1 week
Differentiation and the Riemann Integral	2 weeks
Fundamental Theorem of Calculus	2 weeks
Normed vector spaces	2 weeks
Inner product spaces	1 week
Convergence of sequences of functions	2 weeks
Compactness in function spaces	1 week

Prerequisites: Math 3333 or 3334, as well as Math 3325.

Text: Kenneth Davidson and Allan Donsig, "Real Analysis with Applications: Theory in Practice", Springer, 2010; or (out of print) Kenneth Davidson and Allan Donsig, "Real Analysis with Real Applications", Prentice Hall, 2001.

Exams: Midterms: October 3 and November 14, 2019; in-class exams. Final exam (cumulative): Dec 10, 2019; 8-11am.

Assignments: You will be asked to hand in approximately ten assignments, which will be due on Thursdays in the lecture. Solutions will be posted online.

Final Grade: Final exam contributes 30%, midterms 20% each, assignments 30%. All grades are summed and divided by the total number of points you can collect in the course. A percentage of 46% or more is D- , 54% or more is D, 62% or more is C, 70% is B-, 77% is B, 85% or more is A- , of 90% or more is A.

Disabilities: If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify the instructor as soon as possible. Students are also welcome to contact the Center for Students with DisABILITIES at 713-743-5400 or uhcsd@central.uh.edu to discuss a range of options to removing barriers in the course, including reasonable academic adjustments/auxiliary aids in accordance with the Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 guidelines.

Counseling: Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html