

MATHEMATICAL ANALYSIS I

MATH 4230/8236

Course Description:

Provides a theoretical foundation for the concepts of elementary calculus. Topics include ordered fields And the real number system, basic properties of complex numbers, metric space topology, Sequences and series in $\mathbb{R}^k$, limits and continuity in a metric space, monotonic functions.

3 credits

Prerequisites:

MATH 3230/8235 or equivalent

Overview of Content and Purpose of the Course:

To provide students with a theoretical foundation for the concepts of advanced calculus and to provide the background for more advanced courses in analysis.

Major Topics:

1. Real and complex number systems, ordered fields
2. Elementary topology
 - a. Euclidean n -space
 - b. Metric spaces
 - c. Compactness (in either setting), Bolzano-Weierstrass Theorem, Heine Borel
3. Limits and Continuity (metric space)
4. Differentiation in $\mathbb{R}$
5. Infinite series and infinite products

Methods:

The class will be presented in lecture/discussion form with student questions and discussion encouraged. Graduate students will be required to complete assignments not required of undergraduates.

Textbook:

Rudin, Walter. *Principles of Mathematical Analysis*, 3rd ed. New York: McGraw-Hill Education, 1976.

January 2016