



Department of Mathematics
Johns Hopkins University

110.405 Real Analysis I

Course Syllabus

The following list of topics is considered the core content for the course 110.405 Real Analysis I, and is the first course in a two semester course series along with 110.406 Real Analysis II. . The current text for the course is:

Text: [The Way of Analysis](#), *Rev. Ed.*, Strichartz, R., Massachusetts: Jones and Bartlett, June 2000, ISBN-10: 0763714976, ISBN-13: 9780763714970.

Course Topics

- **Preliminaries (1 week)**
 - 1.1 The Logic of Quantifiers
 - 1.2 Infinite Sets
 - 1.3 Proofs
 - 1.4 The Rational Number System
 - 1.5 The Axiom of Choice

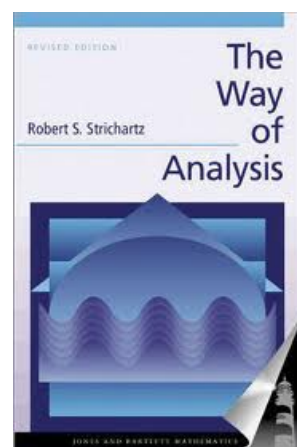
- **Construction of the Real Number System (1.5 weeks)**
 - 2.1 Cauchy Sequences
 - 2.2 The Reals as an Ordered Field
 - 2.3 Limits and Completeness

- **Topology of the Real Line (1.5 weeks)**
 - 3.1 The Theory of Limits
 - 3.2 Open Sets and Closed Sets
 - 3.3 Compact Sets

- **Continuous Functions (1.5 weeks)**
 - 4.1 The Concept of Continuity
 - 4.2 Properties of Continuous Functions

- **Differential Calculus (2 weeks)**
 - 5.1 Concepts of the Derivative
 - 5.2 Properties of the Derivative
 - 5.3 Calculus of Derivatives
 - 5.4 Higher Derivatives and Taylor's Theorem

- **Integral Calculus (1.5 weeks)**
 - 6.1 Integrals of Continuous Functions
 - 6.2 The Riemann Integral





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- **Sequences and Series of Functions (3 weeks)**
 - 7.1 Complex Numbers
 - 7.2 Numerical Series and Sequences
 - 7.3 Uniform Convergence
 - 7.4 Power Series
 - 7.5 Approximation by Polynomials
 - 7.6 Equicontinuity