

18.100B Analysis I

Welcome to 18.100B! The purpose of this course is to familiarize you with the basic language and methods of mathematics. The course emphasizes proof writing and is meant as a first introduction to rigorous mathematics. It will cover point set topology, metric spaces, continuity, differentiability, sequences and series and integration.

General Information. Lecture MW 3-4:30 in room 12-142

Lecturer: Izzet Coskun,

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office: 2-167

office hours: M 9-11

Textbook. W. Rudin, *The Principles of Mathematical Analysis*, McGraw-Hill 3rd edition.

Homework: There will be weekly homework. The homework is due on Wednesdays at the beginning of class. Late homework will not be accepted. You are allowed to discuss problems; however, the write-up must be your own and should reflect your own understanding of the problem.

Grading: There will be two midterm evaluations on October 12 and November 16 and a final examination during final exam week. The time and place of the final exam will be announced later by the Registrar. Each of the midterms and the homework will count for 20% of your grade. The final will account for 40% of your grade.

Other references: Rudin's book is a great work of mathematics; however, it may strike the beginner as terse and hard to follow. There are many introductory texts in analysis. Below is a random sample that you might want to consult in those instances when reading Rudin brings you to tears.

- Maxwell Rosenlicht, *Introduction to analysis*, Dover 1985.
- James Munkres, *Topology*, Prentice-Hall 2000.
- Georgi Shilov, *Elementary real and complex analysis*, Dover 1996.

A tentative guide for the topics to be covered.

- Sep 7 Ordered sets, least upper bound property, fields
- Sep 12 Real numbers
- Sep 14 Countability

Sep 19 No classes
Sep 21 Metric spaces
Sep 26 Closed sets, limit points
Sep 28 Compact sets
Oct 3 Compact sets and limit points
Oct 5 Compact sets of R^k
Oct 10 Columbus Day no classes
Oct 12 Midterm 1
Oct 17 Convergent sequences, Cauchy sequences
Oct 19 Monotonic sequences, special sequences
Oct 24 Series
Oct 26 Power series
Oct 31 Limits of functions, continuity
Nov 2 Continuity and compactness
Nov 7 Differentiable functions
Nov 9 Mean Value Theorem
Nov 14 Taylor's Theorem
Nov 16 Midterm 2
Nov 21 Integration, Change of variables
Nov 23 Integration and Differentiability
Nov 28 Uniform convergence and continuity
Nov 30 Uniform convergence and differentiability
Dec 5 Stone-Weierstrass Theorem
Dec 7 Uniform boundedness, equicontinuity
Dec 12 Trigonometric functions and Fourier series
Dec 14 Review