

Math 413/513, Introduction to Analysis I, Fall 2021

Class Time: TuTh 8:30-9:50a.m. in 252 Straub
Instructor: Dr. Marcin Bownik
E-Mail: mownik@uoregon.edu
Office: 323 Fenton
Office Phone: 541-346-5622
Office Hours: M 1p.m.-2p.m., Tu 10-11a.m., and F 11a.m.-12p.m., or by appointment
Textbook: *Principles of Mathematical Analysis*, Walter Rudin, 3rd edition

1. **Background and Goals.** This course introduces students to the subject of mathematical analysis. The course, which is the first of three in the sequence, covers most of the chapters 1–5 of the textbook.
2. **Learning Outcomes.** Students should be able to solve problems by providing clear and logical proofs involving the following concepts:
 - real and complex fields, supremum and infimum, Euclidean space \mathbb{R}^d ,
 - topology of metric spaces, compact sets,
 - sequences in metric spaces, series of numbers, root and ratio tests, power series, absolute convergence,
 - limits of functions, continuous functions, monotonic functions,
 - derivatives of functions of one variable, the mean value theorem, L'Hôpital's rule, Taylor's theorem.

Students should be able to give examples and counterexamples illustrating connections between the above concepts and to critically analyze all steps of a mathematical argument for correctness and clarity. In particular, self-check one's own work to find insufficiently explained steps.

3. **Exams.** There will be a midterm in-class exam on Tue. Nov. 2 and a final exam on Tue. Dec. 7, 8:00-10:00.
4. **Homework.** Homework problems will be assigned every week and be due in on Wednesday on the material of the previous 1–2 weeks. Homework needs to be submitted on Canvas. Group work on homework is encouraged, but each student must individually write and turn in her/his own assignment.

Most homework problems consists of proofs. In particular, if a problem asks for an example or counterexample, you must prove that your example has the required properties. Likewise, if a problem asks if something is true, you must not only decide whether it is true, but also provide a proof or counterexample.

5. **Grading.** The grading distribution will be as follows:

Homework	25%
Midterm Exam	25%
Final Exam	50%