Math 414/514, Introduction to Analysis II, Winter 2023

Class Time:	MWF 9:00-9:50 in 202 Cascade
Instructor:	Dr. Marcin Bownik
E-Mail:	mbownik@uoregon.edu
Office:	323 Fenton
Office Phone:	541-346-5622
Office Hours:	M 11am-12pm, W 10am-11am, and F 10am-11am, or by appointment
Textbook:	*Principles of Mathematical Analysis*, Walter Rudin, 3rd edition

1. **Learning Outcomes.** This course introduces students to the subject of mathematical analysis. The course, which is the second of three in the sequence, covers most of the chapters 6–9 of the textbook. Students should be able to solve problems by providing clear and logical proofs involving the following concepts:
   - Riemann-Stieltjes integral, change of variable, integration by parts, the fundamental theorem of calculus,
   - uniform convergence of sequences and series of functions, equicontinuous families of functions, Stone-Weierstrass Theorem,
   - power series, exponential and logarithmic functions, trigonometric functions, Fourier series, the Gamma function,
   - differentiation of functions of several variables, the inverse function theorem, the implicit function theorem, the rank theorem, and differentiation of integrals with parameter.
2. **Exams.** There will be a midterm in-class exam on Wed. Feb. 15 and a final exam on Wed. Mar. 22, 10:15-12:15.
3. **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. Though you are strongly encouraged to work together on the problems, you must write up your solutions independently. Late homework is accepted, but it is subject to reduced credit.
   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.
4. **Attendance and classroom behavior:** Attendance, while strongly encouraged, is not required for this course. Students are expected to behave respectfully toward each other and toward the instructor during class time. This includes refraining from using cell phones during lectures.
5. **Grading.** The grading distribution will be as follows:

Homework	40%
Midterm Exam	20%
Final Exam	40%

   The precise translation of raw scores into final grades will not be determined until the end of the term. However, when the mid-term examination is returned, I will give an

indication of what score range roughly corresponds to each letter grade. This determination will be made in accordance with the following grading standards, published on the Mathematics Department web page:

A: Correctly states important theorems and definitions. Applies the important theorems from the course. Constructs counterexamples when hypotheses are weakened. Constructs complete and coherent proofs using the definitions, ideas and theorems from the course. Applies ideas from the course to construct proofs that the student has not seen before.

B: Correctly states important theorems and definitions. Applies the important theorems from the course. Constructs counterexamples when hypotheses are weakened. Constructs complete and coherent proofs using the definitions, ideas and theorems from the course.

C: Correctly states important theorems and definitions. Applies the important theorems from the course when the application is direct. Constructs simple proofs using the definitions when there are very few steps between the definitions and the conclusions. Explains the most important counterexamples.

D: Can do some single step proofs and explain some counterexamples.

F: Unable to do even single step proofs or correctly use definitions.

A grade of A+ will be given only in exceptional circumstances, if a student exceeds the expectations of the class.

6. **University policies:** University policies on academic misconduct, accessible education and accommodations, mandatory reporting obligations, and emergency policies can be found at: `https://provost.uoregon.edu/standard-university-syllabus-language`