

## Math 618, Real Analysis III, Spring 2021

**Class Time:** MWF 8-8:50a.m.  
**Zoom meeting:** <https://uoregon.zoom.us/j/95787181032> passcode: math618  
**Instructor:** Dr. Marcin Bownik  
**E-Mail:** [mownik@uoregon.edu](mailto:mownik@uoregon.edu)  
**Zoom office:** <https://uoregon.zoom.us/j/7414672099>  
**Office Hours:** M 10:30–11:30am, W 12–1pm, and F 10:30–11:30am, or by appointment  
**Textbook:** *Real and Complex Analysis*, W. Rudin, 3rd ed.

- 1. Background and Goals.** This course introduces students to the subject of real analysis, and to a lesser extent, complex and functional analysis. Topics include foundations of Fourier analysis and complex analysis. The course, which is the last of three in the sequence, covers most of the chapters 8, 9, 10, 12, and 14 of the textbook.
- 2. Learning Outcomes.** Students should be able to solve problems by providing clear and logical proofs involving the following concepts:
  - convolutions, distribution functions, Hardy-Littlewood maximal function, the Marcinkiewicz interpolation theorem,
  - Fourier transform, the inversion theorem, the Plancherel theorem, translation-invariant spaces
  - the Schwartz class, tempered distributions and their basic properties,
  - holomorphic functions, path integrals, the Cauchy formula, the power series representation, the open mapping theorem, the calculus of residues, Rouché’s theorem, Laurent series,
  - the maximum modulus theorem, the Schwarz lemma, the Phragmen-Lindelöf theorem, the Riesz-Thorin interpolation theorem,
  - conformal mappings, linear fractional transformations, normal families, and the Riemann mapping 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 one midterm in-class exam on Wed. 5/5, and a final exam on Wed. 6/9, 10:15a.m.–12:15p.m.
- 4. Homework.** Homework problems will be assigned every week and be due on Wednesday on the material of the previous 1–2 weeks. Group work on homework is encouraged, but each student must individually write and turn in her/his own assignment.

Homework:	40%
Midterm Exam:	20%
Final Exam:	40%
- 5. Grading.** The grading distribution will be as follows: