

Math 617, Real Analysis III, Spring 2015

Class Time:	MWF 1-2:50p.m. in 210 Deady Hall
Instructor:	Dr. Marcin Bownik
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Office:	323 Fenton
Office Phone:	346-5622
Office Hours:	11:30a.m.-12:30p.m. Mon., Wed., and Fri., or by appointment
Textbook:	<i>Real and Complex Analysis</i> , W. Rudin, 3rd ed., McGraw-Hill

- 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: Fourier analysis, Cauchy theorem for holomorphic functions, power series representation, calculus of residues, the Riemann mapping theorem, and the Weierstrass factorization theorem. The course, which is the last of three in the sequence, covers most of the chapters 9, 10, 12, 14, and 15 of the textbook.
- 2. Learning Outcomes.** Students should be able to solve problems by providing clear and logical proofs involving the following concepts:
 - Fourier transform, the Inversion Theorem, the Plancherel theorem, translation-invariant spaces, the Schwartz class, tempered distributions,
 - holomorphic functions, path integrals, the Cauchy formula, the power series representation, the open mapping theorem, the calculus of residues, the Laurent series,
 - the maximum modulus theorem, the Schwarz lemma, the Phragmen-Lindelöf theorem, the Hausdorff-Young theorem,
 - conformal mappings, linear fractional transformations, normal families, the Riemann mapping theorem,
 - infinite products, the Weierstrass factorization theorem, Jensen's formula, Blaschke products.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. 5/6, and a final exam on Tue. 6/9, 2:45–4:45p.m.
- 4. Homework.** Homework problems will be assigned every other week and be due in class on Wednesday on the material of the previous 2–3 weeks. No late homework will be accepted. Group work on homework is encouraged, but each student must individually write and turn in her/his own assignment.

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

Homework:	40%
Midterm Exam:	20%
Final Exam:	40%