Math 608 / AMCS 608: Complex Analysis  
Fall 2011  
TTh 3:00–4:30, DRL 4C8

Philip Gressman  
Office: DRL 4N28  
gressman@math.upenn.edu  
898-7845  

Office Hours: Thursday 4:30–6:00 or by appointment

Course Description: This year we will reverse the roles of 608 and 609, meaning that we will study complex analysis in the fall and real analysis in the spring. The official description of 609 as listed on the math department website is as follows:

**MATH 609**  
Complex numbers, analytic functions, Cauchy’s theorem and consequences, isolated singularities, analytic continuation, open mapping theorem, infinite series and products, harmonic and subharmonic functions, maximum principle, fractional linear transformations, geometric and local properties of analytic functions, Weierstrass Theorem, normal families, residues, conformal mapping, Riemann mapping theorem, branch points, second order linear O.D.E.’s.

There is significant overlap between this material and the topics covered in the undergraduate course on complex analysis:

**MATH 410**  
Complex numbers, DeMoivre’s theorem, complex valued functions of a complex variable, the derivative, analytic functions, the Cauchy-Riemann equations, complex integration, Cauchy’s integral theorem, residues, computation of definite integrals by residues, and elementary conformal mapping.

Although this course will be self-contained, anyone who has limited familiarity with these topics may find that 608 will proceed too quickly for a first course in complex analysis. It will also be assumed that you have taken 508/509 or some equivalent:

**MATH 508**  
Construction of the real numbers, the topology of the real line and the foundations of single variable calculus. Notions of convergence for sequences of functions. Basic approximation theorems for continuous functions and rigorous treatment of elementary transcendental functions. The course is intended to teach students how to read and construct rigorous formal proofs. A more theoretical course than Math 360.

**MATH 509**  

Depending on the interest of the students, the course will consist of a relatively quick development of the Cauchy theory and its consequences, followed by a study of various topics of interest which may include: factorization theorems, elliptic functions, the prime number theorem, asymptotics, the Picard theorems, the Gamma function and Stirling’s formula, Phragmen-Lindelof theorems, Riemann surfaces, Weierstrass products and Mittag-Leffler series on arbitrary domains, the Kobe one quarter theorem, or other topics.


Course Website: <https://courseweb.library.upenn.edu/> (coming online soon). Homework assignments will be posted on a weekly basis, usually on Thursday.

Grade System: Homework will be worth 30% of the grade. Weekly assignments are due in Ted Spaide’s mailbox in the math office before 3pm on Friday. There will be an in-class midterm on Tuesday, October 18th which is worth 30% of the grade as well. The final exam will be Friday, December 16th at 12:00; it will be worth the remaining 40% of the grade.