

Math 656: Complex Analysis I–Spring 2008

January 9, 2008

Dr. Michael Siegel, Cullimore Hall 515B, 596-5835, misieg@m.njit.edu

Office Hours: T, Th 11:00-12:00, F 3-4

Text Book: Complex Variables by Ablowitz and Fokas

Other Recommended References: Ahlfors, Complex Analysis; Bak and Newman, Complex Analysis; Carrier, Crook and Pearson, Functions of a Complex Variable; Schaum's Outline in Complex Analysis. The book by Ahlfors is more theoretical, but imparts a lot of insight. Bak and Newman is a good reference at the undergraduate level. Carrier et al. is very applied and is a good source for difficult problems. The Schaums outline is also a very good source of problems.

TOPICS TO BE COVERED

- Analytic functions; Cauchy-Riemann equations; power series; multivalued functions and Riemann surfaces
- Complex integration; Cauchy's theorem and integral formula; Liouville's Theorem; Morera's Theorem; Maximum Modulus Theorem; Open Mapping Theorem; generalized Cauchy formula
- Singularities; classification of singularities; residues; Laurent series; analytic continuation and natural barriers; infinite products
- Residue theorem; evaluation of definite integrals; principal value integrals and integrals with branch points; the argument principle; Rouché's theorem.
- Basic conformal mapping; Möbius transformations
- Applications to fluid flow, electrostatics
- Transform methods (time permitting)

Grading: There will be 5 graded homeworks (30%), a midterm exam (30%) and a final exam (40%)