

MATH 70300 – FALL 2015

Functions of a Complex Variable

Instructor: Sudeb Mitra

This is the standard graduate course on Complex Analysis. Topics to be covered will include: Properties of holomorphic functions (as in Chapter 10 of *Real and Complex Analysis* by W. Rudin, 3rd edition), the Cauchy theory in details, the Maximum Modulus Principle, Schwarz lemma, Schwarz-Pick lemma and applications, holomorphic automorphisms of the open unit disk, of the complex plane, and of the Riemann sphere; Normal families, the Riemann mapping theorem and conformal mappings, simply connected regions; Harmonic functions, Poisson integrals, Mean value property and Schwarz reflection. If time permits, we will also cover the Mittag-Leffler theorem, the Weierstrass theorem, Analytic continuation and the Monodromy theorem.

No texts required, but here are some basic references. (I will give notes in class.)

Complex Analysis by Lars V. Ahlfors (3rd edition).

Complex Analysis In the Spirit of Lipman Bers

by Rubí E. Rodríguez, Irwin Kra, and Jane P. Gilman (2nd edition)

Real and Complex Analysis by W. Rudin (3rd edition).

Functions of one complex variable – I by John B. Conway (2nd edition).

Complex Analysis (Princeton Lectures in Analysis II)

by Elias M. Stein and Rami Shakarchi (2003).