



The Graduate Center of CUNY

Ph.D. Program in Mathematics

Course Description

Fall 2022

Course Title: Functions of a Complex Variable

Course #: Math 70300

Day & Time: MW 11:45-1:15

Instructor Name: David Aulicino

Contact Information: david.aulicino@brooklyn.cuny.edu

Prerequisites:

Office Hours: MW 1:15-2:15

Mode:  In Person

### Course Description

This is the first course in Complex Analysis in preparation for the qualifying exam. This course will cover Chapters 1 to 7 of A Course in Complex Analysis by Saeed Zakeri. This will include the following list of topics, among others:

Definition of a holomorphic function, the Cauchy-Riemann equations, Complex integration, local Cauchy's theorem, Liouville's theorem, Morera's theorem, Power series representation of holomorphic functions, Local normal forms, the open mapping theorem, The maximum modulus principle, Winding numbers, Zeros, poles, and essential singularities. The Riemann sphere, meromorphic functions, Laurent series, Residue theorem, the argument principle, Rouché's theorem, Compact convergence, the Arzela-Ascoli theorem, Theorems of Weierstrass and Hurwitz, Normal families, Montel's theorem, Automorphism groups of the disk, plane, and sphere, Elementary properties of conformal mappings, The Riemann mapping theorem, Harmonic functions, relations to holomorphic functions, Schwarz reflection principle, Analytic continuation along curves, homotopy invariance, the monodromy theorem