

MATH 475/577

Complex Analysis (3 units)

Course Outline

Sections	Topics	# of weeks
1–11	Complex Numbers: Definition; algebraic properties; exponential form and geometric representation; roots.	1.5
12–26	Analytic Functions: Functions of a complex variable; limits and continuity of functions of a complex variable; differentiability and the Cauchy–Riemann equations; analytic and harmonic functions. Sections 23–26 are covered as time permits.	2.5
29–36	Elementary Functions: The exponential function; the logarithmic function and its branches; trigonometric functions; complex exponents and inverse trigonometric functions; hyperbolic and inverse hyperbolic functions. Sections 33, 35, and 36 are covered as time permits.	1.5
37–54	Integrals: Contours and contour integrals; Goursat’s theorem; Cauchy’s theorem; Cauchy’s formulas and their consequences; Liouville’s theorem. Sections 53 and 54 are covered as time permits.	2.5
55–62	Series: Convergence of sequences and series of complex numbers; Taylor series; Laurent series.	1.5
68–76	Residues and Poles: Isolated singularities; residues; Cauchy’s residue theorem; zeros and poles of analytic functions; residues at poles.	2.0
78–85	Applications of Residues: Applications of the residue theorem to integral calculus. Sections 81–84 are covered as time permits.	1.5
	Tests	1.0

Textbook: *Complex Variables and Applications*, 8th edition, by J.W. Brown and R.V. Churchill.

Adopted: Fall 2007; Revised: Spring 2013.