INSTITUTE OF MATHEMATICS
College of Science
University of the Philippines Diliman

Math 128 Course Syllabus

A. Course Catalogue Description

Course Number	Math 128
Course Title	Complex Analysis
Course Description	Complex numbers and properties; analytic functions and the Cauchy-Riemann equations; power series representation of analytic functions; complex integration; Cauchy integral formula and its consequences; singularities, Laurent series, and residues; applications to definite integrals
Prerequisite	Math 123.1/equiv.
Course Credit	3 units
Number of Hours	3 hours/week

B. Course Content

I. Course Introduction and Orientation

II. Complex Numbers
   1. Representations and properties of a complex number
   2. Powers and roots of complex numbers
   3. The point of infinity and topological notions in the extended complex plane

III. Complex Functions
   1. Images of curves under elementary mappings
   2. Exponential and related functions
   3. Multiple-valued functions and branch cuts
   4. Limits and continuity
   5. Derivative of a complex function
   6. Analyticity and Cauchy-Riemann equations

IV. Complex Series
   1. Sequences and series
   2. Power series and its radius of convergence
   3. Analyticity of power series

V. Complex Integration
   1. Contour integrals and its properties
   2. ML-Inequality Estimate
   3. Cauchy-Goursat Theorem and Independence of Path

VI. Cauchy Integral Formula and its Consequences
   1. Cauchy's integral formula
   2. Estimates of derivative of analytic functions
   3. Power series representation of analytic functions
   4. Liouville's theorem and the fundamental theorem of algebra
   5. Uniqueness and identity theorems
   6. Maximum modulus principle

VII. Singularities and Residues
   1. Classification of isolated residues
   2. Laurent series representation of meromorphic functions
   3. Cauchy's residue theorem
   4. Argument Principle and Rouché's theorem
   5. Evaluation of improper integrals

For a more detailed syllabus, send an email request to ddapr@math.upd.edu.ph.