UNIVERSITY OF CALGARY

FACULTY OF SCIENCE
Department of Mathematics and Statistics

PURE MATHEMATICS 521
"COMPLEX ANALYSIS"

Calendar Description: H(3-0)
A rigorous study of functions of a single complex variable. Consequences of differentiability. Proof of the Cauchy integral theorem, applications.
Prerequisite: Pure Mathematics 435 or consent of the Division.
Note: Credit for both Pure Mathematics 521 and 421 will not be allowed.
Suggested Text: "Complex Analysis", by Serge Lang, 3rd edition.

Syllabus

Topics	**Number of Hours**
Complex numbers: algebraic and geometric representation, topology	2
Complex functions: Cauchy Riemann equations, analyticity, power series, trig functions	6
Analytic functions as mappings: arcs, conformal mappings, linear fractional transformations, elementary Riemann surfaces, Schwarz lemma, Max modulus principle	4
Complex integration: line integrals, Cauchy's theorem, Cauchy Integral formula, local properties of analytic functions, winding number, calculus of residues, argument principle, definite integrals	8
Series and product development: Taylor and Laurent series, singularities, Casorati-Weierstrauss, Picard theorems, infinite products, normal families, equicontinuity, Arzela-Ascoli theorem	4
Riemann mapping theorem for simply connected regions	4
Harmonic functions: Dirichlet problem, applications, maximum modulus principle	4
Analytic continuation: Schwarz reflection, along arcs, Monodromy theorem, Riemann surfaces	4
TOTAL HOURS	**36**

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2002:07:01 Effective Fall 2002
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