School of Mathematics

Course 221 — Real and Complex Analysis 1998-99
(SF Mathematics, SF Theoretical Physics, SF Two-subject Moderatorship with Economics & JS Two-subject Moderatorship)

Lecturer: Prof. D.J. Simms

Requirements/prerequisites: 121

Duration: 24 weeks

Number of lectures per week: 3

Assessment: Some assignments, which do not contribute to the final grade

End-of-year Examination: One 3-hour end of year examination

Description: Introduction to measures. Definition of Lebesgue integral on the real line. General integration, monotone and dominated convergence theorems, Fubini's Theorem.

Derivative as a linear operator for functions between finite dimensional real vector spaces, partial derivatives in $\mathbf{R^n}$, chain rule, equality of mixed partials, criterion for differentiability. tangent space, differentials, push-forward, pull-back,

inverse function theorem, C^n functions, coordinate systems and partial derivatives, manifold, implicit function theorem, Exterior derivative, closed and exact forms, angle form, line integral, change of variable in multiple integral. integration of forms,

Functions of a complex variable, differentiability, contour integration. Cauchy's integral formula, Taylor and Laurent series, conformal property, zeros and poles, residues, evaluation of integrals, analytic continuation, maximum modulus principle.

June 10, 1998