School of Mathematics

Course 224 - Geometry (SF Mathematics SF & JS Two-Subject Moderatorship)

Lecturer: Prof. D. J. Simms

Requirements/prerequisites:

Duration: 24 weeks

Number of lectures per week: 3 including totorials

Assessment:

End-of-year Examination: 3-hour end of year exam

Description:

- Generalised eigenspaces; Unique factorisation of polynomials; Minimal polynomial of a linear operator; Direct sums of vector spaces; Primary decomposition theorem; Jordan form.
- Linear forms and duality; Diagonalisation of scalar products (including hermitian); Quadratic forms; Sylvester's theorem; Spectral theorem for normal operators on finite dimensional Hilbert space.
- Multilinear algebra; Wedge product; Hodge star operator.
- Derivative as a linear operator; Equality of mixed partials.
- Introduction to manifolds; Differential forms; Poincare lemma and Stokes theorem; Gaussian curvature.
- Inverse function theorem; Implicit function theorem.

March 27, 2007