

Revised Syllabus for Math Subject Paper

March 15, 2013

I. Finite Dimensional Linear Vector Space

Linear Independence, Span, Basis, Orthonormal Set, Gram-Schmidt Orthogonalization Process, Inner Product, Dual Space, Eigen Space, Rank of a Matrix, Cayley-Hamiltonian Theorem, Similar Matrices, Linear Operator, Hermetian, Unitary and Normal Matrices, Spectral Decomposition.

II. Group, Ring and Field

Basic Concepts of Groups, Cyclic Group, Cosets, Elementary Concepts of Rings and Fields.

III. Real Analysis

Concepts of sets of Real numbers, Sequence of Real Numbers, Continuous and Differentiable Functions, Rolle's Theorem, Mean Value Theorem and Taylor Series, Reimann Integration

IV. Probability Theory

Conditional Probability, Bayes Theorem, Random variable, PDF and CDF, Moment Generating Function, Theoretical Distribution (Binomial, Poisson, Normal, Uniform and Hyper geometric).

V. Complex Analysis

Analytic functions, Integration, Cauchy's Integral Theorem, Cauchy's Integral formula, Taylor and Laurent Series, Residue, Contour Integration.

VI. Ordinary Differential Equation

Equation of First order and First Degree, Second order Linear Equation with Constant coefficients.

VII. Optimization

Linear Programming Problem.