UNIVERSITY OF MYSORE
Department of Studies in Mathematics, Manasagangotri, Mysore - 6

M. Phil. (Mathematics): General Paper

Part A – Algebra:

Finite Abelian groups- Direct product of groups, Fundamental theorem of Finite Abelian groups, the isomorphism classes of finite Abelian groups.

Modules – Definition and examples, Direct sums, Free modules, Quotient modules, Homomorphisms, Simple modules, Modules over P. I. D's.

Modules with chain conditions – Artinian Modules, Noetherian Modules, Modules of Finite length, Artinian rings, Noetherian rings, Hilbert basis theorem, Nil Radical and Jacobson Radical, Nakayama Lemma.

Part B – Analysis:

Banach Algebra - Algebras and Banach algebras, Regular and singular elements, Topological divisors of zero. The spectrum and the resolvent. The formula for spectral radius. Commutative Banach algebras – The Gelfand mapping. The maximal ideal space. Applications of the spectral radius formula, Involutions in Banach algebras. The Gelfand – Neumark theorem .

Functions of several variables – Implicit function theorem, Inverse function theorem, Taylor's theorem .

Fourier Series – Trigonometric series and Fourier Series, Orthogonal system, Bessel's inequality, The Riemann Lebesgue theorem, Dirichlet's integral and convergence tests, summability of Fourier series, Fejer's theorem, The Fourier integral theorem. Applications – Trigonometric approximation, Weleratrass theorem on polynomial approximation, Least square approximation, Parseval's theorem.

Books for Reference:

1. Contemporary Abstract Algebra by J. A. Gallien, Narosa Publishing House (1999).

2. Introduction to Rings and Modules by C. Musili, Narosa Publishing House (1994).
3. Topics in Algebra by I. N. Herstein, Pub. New York, Blaisdell, (1964).
4. G. F. Symmons – Introduction to topology and Modern Analysis.
5. Walter Rudin – Functional Analysis
6. Walter Rudin – The Principle of Mathematical Analysis
7. David V. Widder – Advanced calculus
8. T. M. Apostal – Mathematical Analysis
9. Zygmund – Trigonometric Series

Elective Subjects: (to be choose two subjects of the following)

1. Theory of Partitions
2. Numerical Methods and their Computer Programs
3. Advanced Number Theory
4. Galois Theory
5. Theory of Quadratic Forms
6. Functional Analysis
7. Advanced Graph Theory
8. Lie Groups and Lie Algebra
9. Vector Bundles