MAMT-02

Paper – II: Real Analysis and Topology

Unit 1: Algebra and algebras of sets. Algebras generated by a class of subsets. Borel sets.

Unit 2: Lebesgue measure of sets of real numbers. Measurability and Measure of a set. Existence of Non-measurable sets.

Unit 3: Measurable functions. Realization of non-negative measurable function as limit of an increasing sequence of simple functions. Structure of measurable functions. Convergence in measure. Egoroff's theorem.

Unit 4: Weierstrass's theorem on the approximation of continuous function by polynomials. Lebesgue integral of bounded measurable functions. Lebesgue theorem on the passage to the limit under the integral sign for bounded measurable functions.

Unit 5: Summable functions. Space of square summable functions.

Unit 6: Fourier series and coefficients. Parseval's identity. Riesz-Fisher Theorem.

Unit 7: L^p-spaces. Holder-Minkowski inequalities. Completeness of L^p-spaces.

Unit 8: Topological spaces. Subspaces. Open sets. Closed sets. Neighbourhood system.

Unit 9: Bases and sub-bases, Continuous mapping and Homeomorphism.

Unit 10: Separation axioms (T_0, T_1, T_2, T_3, T_4).

Unit 11: Compact and locally compact spaces.

Unit 12: Tychonoff's one point compactification.

Unit 13: Connected and Locally connected spaces.

Unit 14: Product and Quotient spaces.

Unit 15: Nets, Filters.