

ST1 C03: PROBABILITY THEORY

UNIT I

Sequences and limit of sets, field, sigma field, measurable space, minimal sigma field, Borel field of \mathbb{R} and of \mathbb{R}^n , Random variables, vector random variables and limit of random variables.

UNIT II

Probability space, monotone and continuity property of probability measure, independence of finite number and sequence of events, Borel - Cantelli Lemma, Borel 0-1 law, conditional probability and Baye's Theorem for a finite number of events.

UNIT III

Distribution function:- properties - decomposition theorem, correspondence theorem (without proof), distribution function of vector random variables, mathematical expectation and properties, moments, basic, Markov, Jensen, Cr-inequalities.

UNIT IV

Convergence of random variables, convergence in probability, almost sure convergence, convergence in distribution, and convergence in r^{th} mean, properties and relations among them, independence of finite and sequence of random variables, weak and complete convergence of distributions, Helly-Bray lemma (statement only), Helly-Bray theorem (statement only).

Reference Books:

1. Bhat B.R (1981) Modern Probability theory, Wiley Eastern LTD, New Delhi.
2. Rohatgi V.K (1990) An introduction to probability theory and Mathematical statistics, Wiley Eastern ltd.
3. Billingsley P (1985) Probability and Measure, Wiley Eastern ltd.
4. Ash R.B (1972) Real Analysis and Probability, Academic press.
5. Laha R.G and Rohatgi V.K (1979) Probability theory, Van Nostrand.
6. Loeve M (1963) Probability Theory, Van Nostrand, Princeton.