Stat-322 Probability and Measure Theory

50 Marks: 02 Credits

Number of Class: 20-26

Theory of Large Samples, Convergence of Random Variable, Modes of Convergence, Law of Large Number (Strong Law and Weak Law), Central Limit Theorem, Inversion Theorem, Standard Errors of Estimators in Large Samples.

Sets and Classes of Events: Algebra of sets, Relations, Open and closed set on R^n. The events and classes of events.

Measure: σ-Algebra, Measurable set, The concept of measurability, Lebesgue measure on the real line, Elementary properties of measures, Borel set.

Random Variables and Function: Random variable, Limit of Random variables,

Function, Inverse function, Measurable function, Simple function, Borell function, Characteristic function, Random variable as measurable functions.

Integral of Measureable Function: Lebesgue integral of simple functions, Integrable functions, Sequences of integrable functions, The general and the Reimann-Stieltje's integral.

Probability Measure: Definition of probability, Some simple properties, Discrete probability space, General probability space, Induced probability space, Extension of probability, Probability measure, Lebesgue-Stieltje's measure, Signed measure, Borel-Cantellilemmas, Zero-one Law, Kolmogorov's Zero-one law.

Text

1. Billingsley, P. (1995): *Probability and Measure*, Wiley, New York.
2. Rohatgi, V.K., Saleh, A.K. Md. E., (2001): *An Introduction to Probability and Statistics*, John Wiley and Sons, New York.

References

1. Bhat, B.R. (1988): *Modern probability theory*, Wiley Eastern.
2. ingman, J.F.C and S.J. Taylor (1997): *Introduction to Measure and Probability*, C.U.P., London.
3. Dudley (1994): *Real Analysis*, McGraw-Hill, New York.
4. Gnedenko, B.V. and A. N. Kolmogorov (1984): *Limit Distribution for Sums of Independent Random Variables*, Addison-Wesley, New York.
5. Halmos, P.R. (1974): *Measure Theory*, Spring-Verlag, New York.
6. Loeve, M. (1960): *Probability Theory*, Wiley, New York.
7. Pitt, H.R (1985): *Integration Measure and Probability*, Oliver and Boyd.
8. Rudin, W. (1994): *Real and Complex Analysis*, McGraw-Hill, New York.