

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Mathematics)
Semester: IV
Syllabus with Effect from: November-2013

Paper Code: PS04EMTH14	Total Credit: 4
Title Of Paper: Stochastic Analysis	

Unit	Description in detail	Weighting (%)
I	Random events and their properties, random variables, discrete and continuous random variables, functions of random variables, transformation of probability distribution.	25%
II	Order relations between random variables, two dimensional random variables and their properties, n-dimensional random variables, inequalities in probability theory, Chebyshev inequality, inequalities of Minkovski and Jensen, central limit theorem.	25%
III	Martingales in discrete time, filtration, stopping times, optional stopping theorem, Doob's Martingale inequalities, Doob's martingale convergence theorem, uniform integrability and L^1 convergence of martingales. Markov chains, examples, long time behavior of Markov chains: general case.	25%
IV	Stochastic processes in continuous time, Poisson process, construction of Poisson process. Ito stochastic integral, examples, properties of stochastic integral, stochastic differential and Ito formula, stochastic differential equations.	25%

Basic Text & Reference Books:-

- Brze zniak, Z. and Zastawniak, T., Basic Stochastic Processes, Springer, New York-Berlin, 1999.
- Beichelt, F., Stochastic Processes in Science, Engineering and Finance, Chapman & Hall CRC, Taylor & Francis Group, 2006.
- U Prabhu, N., Stochastic Processes: Basic Theory and its Applications, World Scientific Publishing Co. Pte. Ltd., Singapore, 2007.
- Oksendal, B., Stochastic Differential Equations: An Introduction with Applications, Springer-Verlag, Heidelberg, Sixth edition, 2004.

