MSC NEP

Course Type	Course Code	Name of the Course	L	T	P	Credits
DC	NMCC513	Probability & Statistics	3	1	0	4

Course Objective

- To offer a foundation in probability theory and random process in order to solve applied problems and to prepare for more advanced courses in probability and statistics

Learning Outcomes

- This course will provide a solid undergraduate foundation in both probability theory and mathematical statistics and at the same time provides an indication of the relevance and importance of the theory in solving problems in the real world..

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Concepts of probability-various approaches, properties. Random variables, probability functions- pmf and pdf, cdf. Expectation and its properties. Moment generating & characteristics functions. Transformation of random variables.	10L+2T	To render knowledge in probability theories and their applications
2.	Markov and Chebyshev inequalities and its application. Sequence of random variables: various modes of convergence. Law of large numbers- WLLN, SLLN. CLT-Liapunov's and Lindberg's condition, Lindeberg-Levy form.	8L+3T	To obtain the different probability bounds of data and to understand different mode of convergence
3.	Some discrete probability distributions- Uniform, Bernoulli, Binomial, Negative Binomial, Geometric, Hyper Geometric, Poisson and Multinomial distribution. Some continuous probability distributions- Uniform, Normal, Exponential, Gamma, Beta, Weibull, Bivariate Normal distributions. Definitions & uses of sampling distributions: Chi-square, t and F, distributions of order statistics.	8L+3T	To understand the concept of random variable and analyse the ideal patterns of data.
4.	Concept of correlation coefficients-product moment correlation coefficient, Spearman rank correlation coefficient, multiple and partial correlation coefficients. Concept & derivations of linear regression model (maximum 3 variables), properties of regression coefficients.	8L+3T	To know the relationship between variables and predict (estimate) the value of dependent variables.
5.	Introduction to stochastic process auto-covariance auto-	8L+3T	To render knowledge

	correlation functions, stationarity, Markov Process, Markov chain, transition probability matrix.		about stochastics processes and their applicability
Total		**4** **2**L+14T	

Text Books

1. Sheldon M. Ross, First Course in Probability, A, 9th Edition, Pearson, Boston, 2014.
2. V.K. Rohatgi and A.K. Md. Ehsanes Saleh, An Introduction to Probability and Statistics, John Wiley & Sons, 3rd Edition, 2015

Reference Books

1. Hogg, R.V., McKean, J.W. and Craig, A.T., Introduction to Mathematical Statistics. 7th Edition, Pearson, Boston, 2013.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics (A Modern Approach) 10th Edition, Sultan Chand & Sons, 2002.