Semester	**TWO**
Paper Number	**HSTCR2032T & HSTCR2032P**
Paper Title	**Probability and Probability Distributions II**
No. of Credits	**6**
Theory/Composite	**Composite**
No. of periods assigned	Th: 4 Pr: 3
Modules	Single
Course description/objective	*At the end of the course a student should* o Know about different aspects of univariate and bivariate continuous probability distributions. o Know about probability inequalities and their applications. o Know about different generating functions and their uses. o Know about univariate and bivariate transformations. o Be able to apply the distributions appropriately.
Syllabus	**UNIT 1:** *Continuous random variables***:** p.d.f. and c.d.f., illustrations and properties, univariate transformations with illustrations Derivation of moments (continuous situation). Probability Inequalities: Markov & Chebyshev. [12L] **UNIT 2:** *Two dimensional random variables:* continuous type, joint, marginal and conditional, p.d.f., and c.d.f.. Independence of two random variables, bivariate transformations with illustrations. Moments. Conditional expectation and variance. Correlation coefficient. [14L] **UNIT 3:** *Generating functions:* Moment generating function, cumulant generating function and characteristic function. Uniqueness and inversion theorems (without proof) along with applications. [10L] **UNIT 4:** *Standard continuous probability distributions:* uniform, normal, exponential, Cauchy, beta, gamma, lognormal, logistic, double exponential and Pareto along with their properties and limiting/approximation cases. Bivariate Normal Distribution and its properties. [16L]
List of Practical	1. Problems based on the property of normal distribution. 2. To find the ordinate for a given area for normal distribution.

	3. Application based problems using normal distribution.
	4. Fitting of normal distribution when parameters are given .
	5. Fitting of normal distribution when parameters are not given.
	6. Fitting of some other continuous distributions.
Reading/Reference Lists	1. Hogg, R.V., Tanis, E.A. and Rao J.M. (2009): Probability and Statistical Inference, Seventh Ed, Pearson Education, New Delhi.
	2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
	3. Myer, P.L. (1970): Introductory Probability and Statistical Applications, Oxford & IBH Publishing, New Delhi .
	4. S.M. Ross : A First Course in Probability.
	5. K.L. Chung : Elementary Probability Theory with Stochastic Process.

Evaluation	**Theory**	**Practical**
	CIA: 10 End-Sem: 50 Total: 60	Continuous assessment: 40
Paper Structure for End Sem Theory	Short questions (5 marks each)	Long questions (15 marks each)
	4 out of 6	2 out of 3