Semester	**ONE**
Paper Number	**2**
Paper Code	**MDTS 4112**
Paper Title	**Probability**
No. of Credits	**6**
Course description	CORE Composite Paper One Module. Applications Using R No. of classes assigned Theory: 4 classes per week Practical: 3 classes per week
Course Objective	At the end of the course, the students are expected to have • Knowledge of basic ideas of Probability. • Knowledge of different types of random variables and their probability distributions. • Knowledge of different discrete and continuous standard theoretical distribution and their uses in modelling data through R. • Construction of Mixed distributions and their uses modelling data through R. • Basic knowledge of prior and posterior distributions.
Syllabus	Introduction to Probability: random experiments, sample space, events and algebra of events. Definitions of Probability – classical, statistical and axiomatic. [5] Conditional Probability: Theorem of compound probability, theorem of total probability, Bayestheorem and its applications, independent events. [4] Random variables and their probability distributions: PMF, PDF and CDF, statement of properties of CDF,Empirical distribution functions and their properties, illustrations and properties of random variables. Moments. Joint, marginal and conditional probability distributions, Joint PMF, PDF and CDF, statement of properties of Joint CDF, independence of variables. Markov's and Chebyshev's inequalities. Mixed random variables. Construction of probability distributions of mixed random variables. [12] Standard Univariate Discrete Theoretical Distributions: Binomial, Poisson, geometric, negativebinomial, hypergeometric, uniform (Genesis, Statement of properties and applications). [8] Standard Univariate Continuous Theoretical Distributions: Rectangular, normal, exponential, Cauchy, beta, gamma, lognormal, logistic, double exponential and Pareto (Genesis, Statement of properties andapplications). [10]

	Bivariate Normal Distribution (Genesis, Statement of properties and applications). [4] Truncated Distributions. [5]	
Practical	Based on the theory topics	
Reading/Reference Lists	1. Ronald E. Walpole; Raymond H. Myers; Sharon L. Myers; Keying E. Ye *Probability and Statisticsfor Engineers and Scientists*, by Pearson, Ninth Edition (2013). 2. Sheldon Ross *A First Course in Probability*, Pearson, Ninth Edition (2018). 3. Prabhanjan N. Tattar, Suresh Ramaiah, B. G. Manjunath, *A Course in Statistics with R*; Wiley,(2018).	
Evaluation	Theory CIA: 10 End Sem Exam: 50 Total : 60	Practical Continuous Assessment: 30 End Sem Viva: 10 Total: 40
Paper Structure for End Semester Theory	Short questions: 5 marks each	Long questions: 10 marks each
	2 out of 4	4 out of 6