Details of Course

Course Title	Course Structure			Pre-Requisite
	L	T	P	
MC 205: Probability & Statistics	3	0	2	Nil

Course Objective: To acquire knowledge on descriptive statistics, random variables, specific probability distributions and their real life applications specifically, in science and engineering. Acquaintance with the tools for the large and small sample testing.

Course Outcome (CO):

CO1	Prepare the data set and Summarize its main features. (exploratory data analysis). Also student shall be able to calculate and infer for real problems on the basis of probabilistic theory.
CO2	Describe and identify the various probability distribution function and infer their statistical properties. The student shall be able to derive the relation between bivariate random variables.
CO3	Analyze and apply the laws of Sampling. Also, be able to perform random sampling, identify the methods of estimation and main properties of estimators and find confidence intervals for parameter estimates.
CO4	Compute and interpret the results of Bivariate Regression and Correlation Analysis, for forecasting and investigating the relationships between them. Define and perform hypothesis testing and perform ANOVA.
CO5	Demonstrate the qualitative and quantitative properties of data using appropriate diagrams, tabulations, hypotheses testing and summaries using SPSS.

S.No	Contents	Contact Hours
1	Descriptive statistics**,** Axioms on probability, Conditional probability, Addition and multiplication rules, Bayes' Theorem. Random variables: Discrete and Continuous, Probability mass and density functions, Joint marginal and conditional distributions.	8
2	Mathematical Expectation, Variance, Covariance, Moment generating function, Markov's inequality, Chebyshev's inequality. Correlation and Regression, Rank Correlation.	8
3	Binomial, Negative binomial, Poisson, Geometric, Hypergeometric, Uniform, Normal, Exponential, Gamma, Weibull, Erlang and Beta distributions.	8
4	Central limit theorem. Types of sampling, Parameter and statistic. Sampling distribution, Confidence intervals, Hypothesis testing, Sampling of attributes and variables, Tests of significance for large sample testing.	9
5	Exact sampling distributions: Chi-square, Student's t, Snedecor's F and their applications. ANOVA: one and two-way classification.	9
	Total	**42**

Suggested Books

S.No	Name of Books/Authors/Publishers	Year of Publication
1	Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Academic Press.	2021
2.	Probability and Statistics for Engineers and Scientists, Walpole	2013
3	Fundamentals of Mathematical Statistics, S C Gupta & V K Kapoor, Sultan Chand and Sons.	2017
4	Meyer, Introductory Probability and Statistical Application, Oxford and IBH Publishing.	2002
5	Kishor S. Trivedi, Probability and Statistics with Reliability, Queuing and Computer Science Application, Wiley.	2006