Pandit Deendayal Energy University School of Technology

20MSM504T					Probability And Statistics					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs. / Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	0	4	4	25	50	25	--	--	100

COURSE OBJECTIVES

- To be able to understand of data collection, its distribution and testing and Goodness of Fit.
- To be able to apply the central measure of various data related to real world problem.
- To be able to analyze the data using analysis of variance related to various field of science and engineering.
- To be able to evaluate problems related to probability and distribution.

UNIT 1 THEORY OF PROBABILITY **12 Hrs.**

Sample Space, Discrete probability, Independent Events, Baye's Theorem, Random Variables and Distribution Functions (Univariate and Multivariate) Expectation and Moments, Independent Random Variables, Marginal and Conditional Distributions, Characteristic Functions, Probability Inequalities, Techbyshef, Markov, Jensen, Modes of Convergence, Weak and Strong Laws of Large Numbers, Central Limit Theorems (i.i.d. case), Markov Chains with Finite and Countable State Space

UNIT 2 PROBABILITY DISTRIBUTION **08 Hrs.**

Standard Discrete and Continuous Univariate Distribution, Sampling Distributions, Standard Errors and Asymptotic Distribution. Functions of random variables, joint distributions, multivariate distributions.

UNIT 3 STATISTICAL INFERENCES **10 Hrs.**

Method of Estimation Properties of Estimators, Confidence Intervals, Type I and Type II errors, Neyman-Pearson Lemma and Applications. Tests of Hypothesis, Likelihood Ration Tests, Analysis of Discrete Data and Chisquare Test of Goodness of Fit, Large Sample Tests, Simple Non-parametric Tests for One and Two Sample Problem.

UNIT 4 GAUSS MARKOV MODEL **10 Hrs.**

Gauss Markov Models, Estimability of Parameters, Best Linear Unbiased Estimators, Tests for Linear Hypothesis and Confidence Intervals, Analysis of Variance and Covariance. Fixed, Random and Mixed Effects Models, Simple and Multiple Linear Regression, Elementary Regression Diagnostics, Logistic Regression, Multivariate Normal Distribution.

40 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to
CO1 – Identify the use of probability and distribution functions in engineering aspects.
CO2 – Understand the concept of sampling and hypothesis test.
CO3 – Apply appropriate tool/method to extract the statistical solutions of engineering problems.
CO4 – Analyze the obtained solution of data analysis in context with theory.
CO5 – Appraise mathematical/statistical problems from real to complex domain.
CO6 – Design mathematical model in context with real world problem.

TEXT/REFERENCE BOOKS

1. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, Cenage Learning.
2. Ronald E. Walpole, Sharon L. Myers and Keying Ye, Probability & Statistics For Engineers & Scientists, 8th ed., Pearson Education.
3. Sheldon M. Ross, Introduction to Probability Models, 10th ed., Academic Press.
4. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists,4th ed., Academic Press.
5. S.C. Gupta & V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th ed., Sultan Chand & Sons.

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