Probability and Statistics (Code: A40008)

UNIT - I

Single Random variables and probability distributions: Random varaibles - Discrete and continuous. Probability distributions, mass function/ density function of probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT - II

Multiple Random varaibles, Correaltion & Regression: Joint probability distributions- Joint probability mass/ density function, Maginal probability mass / density functions. Covariance of two random variables, Correlation Coefficient of correlation, The rank correlation. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT - III

Sampling Distributions and Testing of Hypothesis: Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of mean and sampling distribution of variance.

Parameter estimations - likelihood estimate, interval estimations.

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors - critical region, confidence interval, Level of significance, Once sided test, Two sided test,

Large sample tests:

i. Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
ii. Tests of significance of difference between sample S.D and population S.D.
iii. Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F-distribution and it's properties. Test of equality of two population variances.

Chi-square distribution, it's properties, Chi-square test of goodness of fit

UNIT - IV

Queuing Theory: Structure of a queuing system, Operating characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue.

UNIT - V

Stochastic processes: Introduction to Stochastic Processes - Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of seats - Examples of Markov Chains, Stochastic Matrix.