JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

MCA I Semester
Probability and Statistics

Course Objectives:
This course aims to provide an understanding of the basic concepts in probability theory and statistical analysis. Students will learn the fundamental theory of distribution of random variables, the basic theory and techniques of parameter estimation and tests of hypotheses. After taking this course, students will be able to use calculators and tables to perform simple statistical analyses for small samples and use popular statistics packages, such as SPSS, S-Plus, R or Mat Lab, to perform simple and sophisticated analyses for large samples.

Course Outcomes(COs): At the end of the course, student will be able to

- Demonstrate the basic knowledge on fundamental probability concepts, including random variable, probability of an event, additive rules and conditional probability.
- Derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions
- Demonstrate the basic statistical concepts and measures
- Discuss several well-known distributions, including Binomial, Geometrical, Negative Binomial, Normal and Exponential Distribution
- Prove hypotheses testing

UNIT I:
Probability: Sample space and events, Probability – The axioms of probability, Some Elementary theorems - Conditional probability, Baye's theorem, Random variables, Discrete and continuous distributions - Distribution function.

UNIT II:
Binomial, Poisson, normal distribution – related properties, Moment generating function, Moments of standard distributions – properties.

UNIT III:
Population and samples, Sampling distribution of mean (with known and unknown variance), proportion, variances, Sampling distribution of sums and differences, Point and interval estimators for means, variances, proportions.

UNIT IV:
Statistical Hypothesis – Errors of Type I and Type II errors and calculation, One tail, two-tail tests, Testing hypothesis concerning means, proportions and their differences using Z-test, Tests of hypothesis using Student's t-test, F-test and χ^2 test.. Test of independence of attributes, ANOVA for one-way and two-way classified data.

UNIT V:
Statistical Quality Control methods, Methods for preparing control charts, Problems using x-bar, p, R charts and attribute charts, Simple Correlation and Regression, Queuing Theory: Pure Birth and Death Process M/M/1 Model and Simple Problems.

Text Books:

1. Probability and Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India
2. Probability and Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers

Reference Books:

1. Probability, Statistics and Random processes. T. Veerrajan, Tata Mc.Graw Hill, India
2. Probability, Statistics and Queuing theory applications for Computer Sciences, 2 ed, Trivedi, John Wiley