**VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM**

**(Autonomous)**

**Approved by AICTE, Accredited by NAAC- A++ , NBA& Affiliated to JNTUK, Kakinada**

**(R 20 Regulations)**

**Department of Basic Science**

**Syllabus: II B.Tech- I/II. Semester**

**(Common to AI&DS , AI &ML, CSE and IT)**

**Course Title: Probability and Statistics**

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**Course Objectives:**

To enable the students to

1. familiarize the students with the foundations of probability and statistical methods
2. impart probability concepts and statistical methods in various applications Engineering

**Unit-I: Descriptive statistics and methods for data science**

Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variables: dependent and independent Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of dispersion(Range, SD, MD and QD).),Skewness, Kurtosis.

**Unit-II: Correlation &Regression**

Correlation and Regression**:** Simple Bivariate Correlation: Karl Pearson‘s coefficient of correlation, Spearman‘s Rank correlation coefficient.

Linear Regression - Regression lines, Regression coefficients, properties.

Non- Linear Regression -Quadratic, Power and Exponential models using Least squares approximations

.**Unit-III: Probability Distributions**

Basic concepts on probability, random variables (discrete and continuous)**,** probability distributions- Binomial, Poisson and Normal distributions and their properties, fitting of Binomial distribution, Poisson distribution

**Unit-IV**:**Sampling Theory**:

Introduction – Population and samples – Sampling distribution of Means and Variance (definition only) – Central limit theorem (without proof) – Introduction to t, χ2 and Fdistributions – Point and Interval estimations – Maximum error of estimate.

**Unit-V :Tests of Hypothesis**:

Introduction – Hypothesis – Null and Alternative Hypothesis – Type I and Type II errors – Level of significance – One tail and two-tail tests – Tests concerning one mean and two means (Large and Small samples) – Tests on proportions.

**Text Books:**

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
2. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.
3. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014

**References:**

1. T.S.R. Murthy, Probability and Statistics for engineers, 1st edition, BS Publications, 2018.
2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
3. S. Ross, a First Course in Probability, Pearson Education India, 2002.

**Course Learning Outcomes:**

Upon completing this course, the student should be able to:

* + - 1. compute descriptive statistics and interpret in data science problems
      2. compute various linear and non linear regression models to the data
      3. calculate probability distribution and fit problems to data
      4. Infer the statistical inferential methods based on small and large sampling tests
      5. Design the components of a classical hypothesis test