III Year I Semester

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Code: 17CS501

STATISTICS WITH R PROGRAMMING

Course Objectives:

COB 1 : To enable the students to learn discrete and continuous random variables and fundamentals of R.
COB 2 : To demonstrate probability distribution models and R functions for distribution models.
COB 3 : To discuss sampling distribution, estimation and R functions for constructing confidence intervals.
COB 4 : To illustrate hypothesis testing for means and variance and related R functions.
COB 5 : To explain correlation and regression models and R functions for graphics.

UNIT- I

Discrete probability distributions and Introduction to R Descriptive Statistics –Random variables –Discrete random variable –Expectation –Binomial, Poisson distributions.
Introduction to R software –Vectors –Matrices –Arrays –Lists –Data frames –Basic arithmetic operations in R –Importing and exporting files in R.

UNIT-II

Continuous Probability distribution and Computing with R Continuous random variable –Normal distribution –Properties –Gamma distribution –Weibul distribution. R commands for computing probability distributions.

UNIT III

Sampling Theory and Test of Hypothesis Sampling –Central limit theorem (without proof) –Sampling distribution of means –point estimation –interval estimation. Construction of confidence intervals using R.

UNIT-IV

Test of Significance: Introduction to test of Hypothesis –Type-I Error –Type-II Error –One tail and Two tail tests concerning single mean and two means–single proportion –two proportions.
R programming for Z-test, t-test and F-test and Chi square test.

UNIT-V

Analysis of Variance: ANOVA for one way classification –ANOVA for two way classification.
R programming –ANOVA for one way classification –ANOVA for two way classification.

UNIT-VI

Correlation and regression: Simple correlation and regression –Regression by the method of least squares –Rank correlation–Multiple linear regression. R programming for correlation and regression.

Course Outcomes:

At the end of this course, students will be able to:

CO 1 :Identify discrete and continuous random variables and data structures in R. **CO 2** :Apply discrete and continuous probability distributions to the given data and execute R-functions for probability distributions.

CO 3 :Explain sampling distribution, estimation and R-functions for constructing confidence intervals.

CO 4 :Write R program for standard statistical test.

CO 5 :Apply the concepts of correlation and regression to the given statistical data using R-function and making use of R-graphic functions to visualize the data.

Text Books:

1. Miller and John E. Freund, Probability and Statistics for Engineers, Prentice Hall of India.
2. G. Jay Kerns, Introduction To Probability And Statistics Using R, First Edition (Free E-Book From R Software Website)

Reference Books:

1. Jay L. Devore, Probability And Statistics For Engineering And Sciences, Eighth Edition, Cengage Learning.
2. R Cookbook, Paul Teetor, Oreilly.
3. R In Action, Rob Kabacoff, Manning.
4. R For Everyone, Lander, Second Edition, Pearson.
5. The Art Of R Programming, Norman Matloff, No Starch Press.
6. Probability And Statistics: Dr.T.K.V.Iyengar, Dr.B. K. Krishna Gandhi, S.Ranganatham, Dr. M.V.S.S.N. Prasad, S.Chand Publications.

Web Links:

1. https://onlinecourses.nptel.ac.in/noc17_ma17/preview
2. https://onlinecourses.nptel.ac.in/noc16_ma03/preview
3. https://www.tutorialspoint.com/r/
4. http://www.stat.umn.edu/geyer/old/5101/rlook.html
5. http://www.r-tutor.com/elementary-statistics