Suggested Teaching Guidelines for

Statistical Analysis with R - PG-DBDA Aug 19

Duration: 40 hours class room and 30 hours Lab

Objective: To perform basic statistical analysis using R

Prerequisites: Good Knowledge of Basic Mathematics

Evaluation method: Theory exam– 40%
Lab Exam - 40%
Internal exam- 20%

List of Books / Other training materials

Text Book:

1. Statics Using R by Sudha Purohit, Pub: Narosa

Reference:

1. Beginning R – The Statistical Programming Language by Dr. Mark Gardener PUB: WILEY
2. Art of Programming in R, by Norman Matloff
3. Statistics for Management by Levin
4. Business Analytics: Methods, Models, and Decisions by James R Evans
5. Introductory Statistics with R (Statistics and Computing) by Peter Dalgaard
6. R in a Nutshell by Joseph Adler (O'REILLY)
7. R Cookbook by Paul Teetor (O'REILLY)
8. The R Book, Second Edition
9. Statistics Using R, Shailaja Deshmukh, Sudha Purohit, Sharad Gore, Pub: Narosa

Note: Each session having 2 Hours

Session 1 & 2
Lecture

- Introduction to Statistics- Descriptive Statistics
- Summary Statistics - Central Tendency & Dispersion (Mean, Median, Mode, Quartiles, Percentiles, Range, Interquartile Range, Standard Deviation, Variance, and Coefficient of Variation)

Session 3 & 4
Lecture

- Statistical Probability
- Normal Distribution
- Inferences
- Data Summarization

Session 5 & 6
Lecture

- Sample & population, uni-variate and bi-variate sampling, re-sampling
- Sample Spaces and Events
- Joint, Conditional and Marginal Probability
- Bayes' Theorem

Session 7 & 8
Lecture

- Random Variable
- Probability Distribution
- Continuous and discrete distribution – (Normal, Bernoulli, Binomial, Negative Binomial, Geometric and Poisson distribution, Exponential distribution)
- Central Limit theorem

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Session 9 & 10
Lecture

- The R project for Statistical Computing
- Why R
- Introduction & Installation of R
- Exploring RGui
- Exploring RStudio
- Basic Mathematical & Arithmetic operations in R

Session 11 & 12
Lecture

- Data Objects- Data Types & Data Structures (e.g. lists. Arrays, matrices, data frames)
- Packages in R
- Working with Packages
- Handling Data in R Workspace
- Reading & Importing data From Text files, Excel files, Multiple databases
- Exporting Data from R

Session 13 & 14
Lecture

- Introduction to tidyverse (group of packages)
- Manipulating and Processing Data in R
- Creating, Accessing and Sorting data frames
- Extracting, Combining, Merging, reshaping data frames

Session 15 & 16
Lecture

- Functions
- Built in functions in R (numeric, character, statistical)
- Interactive reporting with R markdown
- Introduction to R Shiny

Session 17 & 18
Lecture

- Statistical Inference Terminology (types of errors, tails of test, confidence intervals etc.)
- Hypothesis Testing
- Parametric Tests: ANOVA, t-test
- Non-parametric Tests- chi-Square, U-Test

Session 19 & 20
Lecture

- Data Exploration and Preparation
- Correlation, Covariance, Outliers
- Data Summarization