Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2018). *Services Marketing: Integrating Customer Focus Across the Firm* (7th ed.). McGraw-Hill.

Semester-VIII

Discipline Specific Elective-DSE -II 8.3

Title of the Paper: Application to Data Analytics with R

Offered by Economics Department, College of Vocational Studies

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Semester	Course title & Code	Credits	Duration (per week)			Eligibility Criteria	Prerequisite
			Lecture	Tutorial	Practical/ Practice		
VIII	Application to data analytics with R	4	2	0	2	Class 12th Pass	Nil

Learning Objectives:

This Paper provides a comprehensive introduction to R programming language and data analysis, with focus on vocational fields. It will equip learners with foundational knowledge and skills to use R for statistical computing and data analysis. Key learning objectives include understanding basic R syntax, working with data structures, performing data manipulation and analysis, and creating visualisations. Students will be able to grasp the reading, cleaning and transforming and manipulating data using the built-in functions and packages.

Learning Outcomes:

The students will be able to:

- Understand the basics of R programming language, including data types, variables, and control
- Learn to import, manipulate, and visualize data in R
- Apply statistical concepts and methods to real-world data using R
- Understand how to perform inferential statistics, including hypothesis testing and confidence intervals.
- Interpret the results of statistical analyses and communicate findings effectively

Unit I: Overview of R and its'IDEs, Basics of R syntax and programming concepts, Data types, variables and operations in R, Control structres, Array, Matrix, Vectors, Factors, R packages, Handling missing values

(7 hours)

Unit II: Data manipulation and preparation: Importing and exporting data in text, excel, Stata format, Data cleaning, sorting and preparation with dplyr, Data transformation using tidyr. Functions: Built in functions, Creating custom functions, conditional statements, Loops, apply, Lapply, sapply **(15 hours)**

Unit III: Data analysis and statistics: Descriptive statistics and exploratory data analysis, Hypothesis testing and inferential statistics, Regression analysis vs correlation, Simple regression, multiple regression,OLS,Assumptions of classical Normal Linear regression model, Auto correlation, heteroscedasticity, Time series data

Data visualisation with R: Adding layers, themes and customization using ggplot2, interactive visualisation with plotly

(15 hours)

Unit IV: Advanced analytics and introduction to machine learning.

Project work : Extracting unit level data and Analysing it with the help of appropriate tools (8 hours)

Practical Exercises:

The learners are required to:

1. Loading and cleaning of data sets
2. Performing data analysis, creating visualisation and generating reports

Suggested Readings:

- Gardner,M. (2008). *Beginning R: The statistical programming*, Wiley&Sons.
- Verzani,J (2014). *Using R for introductory statistics (*2nd ed.). Chapman&Hall
- The R Guide
- Gujrati, D.N. et al (2018*) Basic Econometrics* (5th ed), McGraw Hill India.

Notes:

1. Suggested readings shall be updated and uploaded on the college website from time to time.
2. Examination scheme and mode shall be prescribed by the Examination branch, University of Delhi from time to time.