PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

23ANMIL121: FUNDAMENTALS OF R PROGRAMMING

Offered to: All UG Programs **Semester**: II

60Hours **Credits: 3**

Course Type: Minor – I

Course Objective

The course objective is to provide a practical introduction to the R programming language. By the end of this course, the students will be comfortable operating in the R environment, including importing external data, manipulating data for specific needs, and running summary statistics and visualizations.

Course Outcomes

CO1: Able to load data in to R and spot problems in data loaded. **(PO4, PO5, PO6)**

CO2: Document and transfer the results and communicate the findings using visualization techniques. **(PO4, PO5, PO6)**

CO3: Able to organize data in R with Co-relation and Regression. **(PO4, PO5, PO6)**

CO4: Able to organize data in R with Sampling. **(PO5, PO6)**

CO5: Able to do Time Series Analysis. **(PO5, PO6)**

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) & PSOs

CO	BTL	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1					M	H	H			
CO2					M	H	H			
CO3					M	H				
CO4					M	H				
CO5					M	H				

Syllabus		
Unit No.	**Learning Units**	**Lecture Hours**
I	**UNIT 1** **Fundamentals of r:** Introduction to R Installation, Running, Features of R, Variables in R, Basics of R Programming Calculations – Arithmetic, Logical, Mathematical, Data types, Important Built-in functions	**12**
II	**UNIT 2** **Measures of Central Tendency:** Mean, Median, Mode, Geometric mean, Harmonic mean. **Measures of dispersion:** Range or Variation, Variance, Standard deviation. **Measures of Skewness:** Meaning, Difference between dispersion and skewness, Tests of Skewness, Measures of Skewness (Absolute & Relative measures).	**12**
III	**UNIT3** **Vectors:** Creating Vectors, accessing elements of a Vector, Operations on Vectors, Vector Arithmetic, **Lists:** Creating lists, manipulating list elements, merging lists, converting lists to vectors, **Arrays:** Creating arrays, Accessing array elements, Calculations across array elements	**12**
IV	**UNIT 4**	**12**

	Matrices: Creating matrices, accessing elements of a Matrix, Operations on Matrices, Matrix transpose **Data Frames In R:** Creating data frame, Operations on data frames, accessing data frames, creating data frames from various sources. Correlation and regression analysis in r	
V	**UNIT5** **Data Visualization in R:** Need for data visualization, Bar plot (Horizontal & Vertical), Stacked bar plot, Histogram, Pie chart, Scatter plot, Box plot, Heat map, ggplot.	**12**

Text Books:

1. S. No Author Title Publisher 1 Robert Kabacoff 'R'-in action - Data Analysis and Graphics with R MANNING Publication
2. Michael J.Crawley "The R Book" John Wiley & Sons

Websites of Interest:

1. https://www.w3schools.com/r/r_intro.asp
2. https://www.geeksforgeeks.org/central-tendency-in-r-programming/
3. https://bookdown.org/taragonmd/phds/getting-started-with-r.html
4. https://bookdown.org/siju_swamy/Stat_Lab/correlation-and-regression-analysis-in-r.html
5. https://www.analyticsvidhya.com/blog/2015/07/guide-data-visualization-r/

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MODEL QUESTION PAPER

23ANMIL121:FUNDAMENTALS OF R PROGRAMMING

Max.Time : 3Hrs **Max.: 70 Marks**
Min. Pass:28

SECTION - A

Answer the following questions **(5 x 4M = 20 Marks)**

1. **a)** Explain the features of R-Programming. (L1)

   (Or)

   b) What are the variables in R-Programming (L2)

2. **a)** Explain the measures of central tendency (L2)

   (Or)

   b) Explain the measures of skewness briefly (L1)

3. **a)** Define i) VECTOR ii) LIST (L1)

   (Or)

   b) Define i) MATRIX ii) ARRAY (L1)

4. **a)** Write a short note on frame in R-Programming (L2)

   (Or)

   b) Write a short notes correlation analysis in R-Programming (L2)

5. **a)** Describe the need for data visualization (L2)

   (Or)

   b) Explain bar plot (horizontal and vertical) in R-Programming. (L2)

SECTION – B

Answer the following questions **(5 x 10 M = 50 Marks)**

6. **a)** Explain arithmetic and logical functions in R – Programming with suitable examples. (L2)

   (Or)

   b) Explain important in-built functions in R-Programming. (L2)

7. **a)** Explain measures of central tendency in R-Programming with proper syntax and examples. (L2)

   (Or)

   b) What are the differences between Dispersion and Skewness. (L2)

8. **a)** How to create a vector? Explain types of vectors with examples. (L2)

(Or)

b) Create X, Y are two 4*4 matrices. Explain the Mathematical operations on matrices (L2)

9. **a)** Create a data frame and explain the operations on data frame. (L3)

(Or)

b) Correlation and regression analysis in R-Programming. (L3)

10. **a)** Use the following data to create i) Histogram ii) Pie chart iii) Box plot in R-Programming (L3)

YEAR	YIELD OF CROP OBTAINED (in Kgs)	Amount of fertilizer used (in Kgs)
2000	280	96
2001	200	80
2002	160	55
2003	215	82
2004	195	75
2005	188	68
2006	156	59

(Or)

b) Explain Stacked bar plot and Heat map with suitable examples. (L3)

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