

DSM112 Fundamentals of R Programming

Semester: I	Course Title: Fundamentals of R Programming	Credit: 4
Course Code: DSM112		(3 T + 1 P)

Course Outcomes: On successful completion of the course the learner will be able to

CO	COGNITIVE ABILITIES	COURSE OUTCOMES
CO1	REMEMBERING	Remember the syntax of R
CO2	UNDERSTANDING	Understand the concept of data types and data structures.
CO3	APPLYING	Understand control structures and apply them to real-world problems.
CO4	ANALYSING	Import the data from various sources and analyze.
CO5	EVALUATING	Evaluate the data and use of appropriate visualization charts.
CO 6	CREATING	Create exploratory data analysis report.

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	1	2	2	1	1
CO 2	1	1	1	2	-
CO 3	1	1	-	1	-
CO 4	1	2	1	1	-
CO 5	1	-	1	-	1
CO 6	1	1	1	1	1

Unit	Detailed Syllabus	No. of Hours of Teaching
I	<p>Introduction of R Language: Data Types in R. Syntax of R Expressions. Data Structures in R: Vector, Matrix Array, List, and Dataframe. Factors. RStudio: An IDE for R. Operators in R: Assignment operators, Arithmetic Operators, Relational Operators, Logical Operators, Precedence of Operators</p>	15
II	<p>Control flow Structures: Decision Making, if statement, if else statement, nested if else statement, ifelse statement, nested ifelse statement, for loop, while loop, repeat loop, return, break and next statements. Functions in R: Built-in functions, User-defined functions, Function Components, and Scoping Rules for functions. Family of apply functions.</p>	15
III	<p>Concept of Packages, Installation of packages, Data Importing in R (.txt, .csv, table format, etc.), data importing from other formats. Data aggregation and Data Wrangling (using tidyr, dplyr). Writing a data file. Exploratory Data Analysis: Summarizing Data, Data Visualization using graphics, Lattice and ggplot2 packages.</p>	15
IV	<p>Practical Component</p> <ul style="list-style-type: none"> Creating R Script and running R Script. 	15

	<ul style="list-style-type: none">• Practical based on vectors.• Practical based on array, matrix.• Practical based on data frames, lists.• Practical based on loops.• Practical based on Functions.• Practical based on data importing and data Summarization.• Practical based on data wrangling with tidyverse and dplyr.• Practical based on data visualization.	
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Suggested Reference Books:

1. Hadley Wickman and Garrett Grolemond. R For Data Science, O'Reilly Publication.
2. Andrie de Vries and Joris Meys, R For dummies.
3. Jared Lander, R For Everyone, Addison-Wesley Data and Analytics
4. Jared Lander, The Art of R Programming
5. Garrett Grolemond, Hands-on Programming with R, O'Reilly Publication.