

Programme	B.Sc. IT Honours (Data Science)			Branch	Computer Applications				
Semester	V			Version	1.0.0.0				
Effective from Academic Year		2026-27		Effective for the batch Admitted in		June 2024			
Subject code	U75A2IRP1		Subject Name	INTRODUCTION TO R PROGRAMMING - I					
Teaching scheme				Examination scheme (Marks)					
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CCE	SEE	Total
	L	TU	P	TW					
Credit	2	-	2	-	4	Theory	50	50	100
Hours	2	-	4	-	6				

Objective:

- To introduce students to the fundamentals of R programming, enabling them to write simple programs, manipulate basic data structures, and perform basic data input/output operations
- Students will gain hands-on skills to visualize and explore data using base R

Pre-requisites:

Basic Programming Concepts and Mathematics

Learning Outcome:

Name of CO	Description
CO1	Understand the R environment, syntax, and basic data types and structures
CO2	Manipulate and organize data using vectors, matrices, lists, and data frames
CO3	Write and execute R programs using control structures and user-defined functions
CO4	Perform file operations and preprocessing tasks such as reading data, handling missing values and string operations
CO5	Create visual summaries and perform descriptive statistical analysis using built-in and external packages to explore datasets effectively

Mapping of CO and PO:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	1	2	2	2	1	2	2
CO2	3	3	3	2	3	1	2	2	3	2	2	2
CO3	3	3	2	3	3	1	2	2	2	1	1	2
CO4	3	3	2	3	3	1	2	2	2	2	1	1
CO5	3	3	3	2	3	1	2	3	3	2	3	3

Content:

Unit	Content	Hrs.
1	Introduction to R Overview of R and RStudio, Installation, Environment setup, R script, Getting help, Data types, Variables, Operators, Expressions, Comments, Basic I/O	06
2	Data Structures and Operations Vectors, Lists, Matrices, Arrays, Data Frames, Factors, Indexing, Subsetting, and manipulating data structures, R packages	06
3	Control Flow and Functions Conditional Statements, Vectorized conditions with ifelse(), Loops, break, next, Built-in functions-math, summary, User-defined functions, Scope, Lazy Evaluation, The apply() family, Anonymous and recursive functions	06

4	Data Handling and Preprocessing Reading and writing files: CSV, TXT ,Importing from Excel and web data, String operations and manipulations, Handling missing values (NA), duplicates ,Sorting, filtering, and renaming columns, Type conversion and date-time formats	06
5	Basic Visualization and Descriptive Statistics Base R plotting: plot(), hist(), barplot(), boxplot(), pie() , Customizing plots: labels, titles, colors, legends, Summary statistics: mean, median, mode, sd, var, Frequency tables and proportions, Random sampling and probability basics, Installing and using packages (e.g., ggplot2 introduction)	06
Practical Content:		
List of practical specified by subject teacher based on above mentioned topics		
Reference Books:		
1	The Art of R Programming by Norman Matloff, No Starch Press, 2011	
2	R for Data Science, O'Reilly by Hadley Wickham & Garrett Golemund, Media, 2017	
3	Hands-On Programming with R by Garrett Golemund, O'Reilly Media, 2014..	
Web Reference:		
1	https://www.geeksforgeeks.org/r-language/r-tutorial/	
2	https://www.programiz.com/r	
3	https://www.datacamp.com/courses/free-introduction-to-r	
MOOC/Certificate Course:		
1	www.coursera.org/learn/r-programming	
2	www.edx.org/learn/r-programming/harvard-university-data-science-r-basics	
3	www.udemy.com/course/r-programming/	
Question Paper Scheme:		
	End Semester Examination Duration: (2 Hours Theory Examination)	
	Note for Examiner: - Q-1 Any Five out of Seven (25 Marks) Q-2 Any Two out of Three (06 Marks) Q-3 Mandatory question (05 Marks) Q-4 Any Two out of Three (08 Marks) Q-5 Any Two out of Three(06 Marks)	
	*The question paper must comprehensively address all Course Outcomes (COs), align with Bloom's Taxonomy levels, and ensure complete syllabus coverage	