Name of the Course: Statistics with R Programming

Sr. No.	Heading	Particulars
1	**Description the course:**	**Introduction:** This course provides an immersive exploration into the world of statistical computing and data analysis. Developed specifically for statistical computing and graphics, R is an open-source language that has become a standard tool for professionals in various fields. **Relevance:** In the era of big data and analytics, R programming is highly relevant. It is widely used for statistical modeling, data visualization, and machine learning, making it an indispensable skill for individuals in data-centric roles. **Usefulness:** The course equips participants with the ability to manipulate data, perform statistical analyses, and create visualizations. R's versatility makes it valuable for both beginners entering the field and seasoned professionals enhancing their analytical toolkit. **Application:** R programming finds application across diverse domains, including finance, healthcare, marketing, and academia. Participants can apply R to solve real-world problems, extract insights from data, and make informed decisions. **Interest:** The R programming course often sparks interest due to its hands-on nature. Participants engage in practical exercises, exploring datasets, creating visualizations, and developing statistical models, fostering a deep understanding of data analytics. **Connection with Other Courses:** This course forms a symbiotic connection with other data-centric courses. It complements studies in statistics, machine learning, and data science, providing a foundation for advanced analytics. **Demand in the Industry:** Professionals with R programming skills are in high demand. Industries ranging from finance to healthcare seek individuals who can leverage R for data analysis and

		decision-making, contributing to evidence-based practices. **Job Prospects:** Graduates from an R programming course find diverse job prospects. Roles may include data analyst, statistician, business intelligence analyst, and data scientist. These professionals are sought after for their ability to derive actionable insights from data.
2	**Vertical:**	SEC
3	**Type:**	Practical
4	**Credits:**	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):** **CO 1.** Understand R basics, set up R Studio, and customize the environment.. **CO 2.** Master R expressions, assignments, loops, and decision-making. **CO 3.** Develop proficiency in using R data structures: vectors, matrices, lists, and data frames. **CO 4.** Demonstrate expertise in character strings manipulation in R. **CO 5.** Apply built-in statistical functions, regression analysis, and distribution functions fluently.	
8	**Course Outcomes (OC):** **OC 1.** Confidently navigate Studio, R GUI, and manage data in R. **OC 2.** Fluent implementation of expressions, assignments, and loops in R. **OC 3.** Use R data structures for effective data management. **OC 4.** Efficiently manipulate and operate on character strings in R. **OC 5.** Apply statistical functions, regression analysis, and distribution functions with confidence.	
9	**Modules:-** **Module 1 (30 hours):**	
	Exploring R Language and Setting Up environment: Introduction to R, Terminologies in R, R Environment, Installing R, Studio, and R Commander, Customizing Studio, Data Management in Studio, R Graphical User Interface (R GUI), Working with R Scripts **Implementing ting Expression:** Expressions, assignment, Decision making, Loops, data and time options in R **Essential Data Structures in R:** Vectors, Matrix, Arrays, Lists, Data frames, Functions **Implementing Strings in R**: Character strings in R, Character Strings, , Strings and R objects, String Manipulation: Printing Characters, Basic String Manipulations, String Operations	

<table>
<tr><td></td><td colspan="2">Module 2 (30 hours):</td></tr>
<tr><td></td><td colspan="2">Built-in statistical functions in R: mean() function, Median, Standard Deviation, Some other built-in statistical functions,

Regression Analysis: Regression Analysis-Linear Regression and Multiple Regression, Normal Distribution- dnorm(),,pnorm(),qnorm(),rnorm()

Binomial Distribution: dbinom(),pbinom(),qbinom(),rbinom() Functions, Time Series Analysis

Visualizing and analysing Data in R: Tabulation, Contingency Tables, Making R Contingency Tables, Making R Custom Contingency Tables, Selection of Parts in a Table Object, Conversion of an Object into the Table, Testing Table Objects, Making R Complex Tables, Representing data through Cross Tabulation

Graphical Models & analysis: Plots made of Single Plots made of Two Variables , Variable, Plots made of Multiple Variables, Special Plots, Storing Graphics</td></tr>
<tr><td>10</td><td colspan="2">Text Books
1. Statistical Programming in R, K.G. Srinivasa G.M. Siddesh,Chetan Shetty , Oxford University Press, 2017
2. Learning R: A Language for Data Analytics and Visualization, Sybgen Learning, R. K. Maurya, 2021
3. Introduction to Statistics and Data Analysis With Exercises, Solutions and Applications in R: Heumann, Christian, Schomaker, Michael, Shalabh, Publisher” Springer 2016</td></tr>
<tr><td>11</td><td colspan="2">Reference Books
1. Learning R Programming, Kun Ren, Packt Publishing, 2018
2. R Programming for Statistics and Data Science(Video), 365 Careers, Packt, 2018
3. R Programming Fundamentals, Kaelen Medeiros, Oreily-Packt Publishing</td></tr>
<tr><td>12</td><td>Internal Continuous Assessment: 40%</td><td>Semester End Examination: 60%</td></tr>
<tr><td>13</td><td>The internal evaluation will be determined by the completion of practical tasks and the submission of corresponding write-ups for each session. Each practical exercise holds a maximum value of 5 marks. The total evaluation, out of 100 marks, should be scaled down to a final score of 20 marks.

Total: 20 marks</td><td>A Semester End Practical Examination of 2 hours duration for 30 marks as per the paper pattern given below.

Certified Journal is compulsory for appearing at the time of Practical Exam

Total: 30 Marks</td></tr>
<tr><td>14</td><td colspan="2">Format of Question Paper:

Total Marks: 30 Duration: 2 Hours
<table>
<tr><th>Question</th><th>Practical Question Based On</th><th>Marks</th></tr>
<tr><td>Q. 1</td><td>Module 1</td><td>12</td></tr>
<tr><td>Q. 2</td><td>Module 2</td><td>12</td></tr>
<tr><td>Q. 3</td><td>Viva</td><td>06</td></tr>
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