

Course Coordinator Report

Course Name: R Programming

A free Add-On Course for UG students in the Department of Computer Science, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur was held from 15th December 2023 to 24th February 2024. The course title was "R Programming". It is the complete beginner to Expert Course was perfect for anyone who wants to learn R Programming. R programming is a powerful language and environment for statistical computing and graphics. It is widely used by statisticians, data scientists, and researchers for data analysis and visualization.

In this course the students learned about environment for statistical computing. They learned to import, clean, transform, and summarize data from various sources (CSV, Excel, databases). Students gained proficiency in using data manipulation using packages such as **dplyr** and **tidyr**. Students were able to perform descriptive statistics and exploratory data analysis.

The course duration was 10 weeks (30 hours). Two theory classes were engaged on Friday & Saturday and one Practical was engaged in every week. The structure of marking system was 60 marks on theory paper and 40 marks on practical execution. The question paper of theory examination was in MCQ type of 60 questions with four multiple choices. Practical examination was also taken on this course for 40 marks. Out of 51, 50 students appeared and passed in both theory and practical examination. The result was prepared and certificates were distributed to the students.



Course Coordinator
Professor
Department of Computer Science
B.S.E.S. Am's Science College,
Congress Nagar, Nagpur

To,
The Principal
SSES Am's Science College,
Congress Nagar, Nagpur-12

Subject: For permission to conduct the add on courses in Computer Science department during the session 2023-2024

Respected Sir,

This is to request you that, the teachers of Computer Science department have prepared the syllabus and modules of the 30 hours certificate courses for the session 2023-2024.


The details of the course module, syllabus and time table is submitted here with.

Hence please permit to run the add on courses and oblige me.

Thanking you

Yours sincerely

6/07/2023
Nagpur


Professor S. H. H. H.
Department of Computer Science
S. S. S. Am's Science College,
Congress Nagar, Nagpur

Permitted
NSH

SSES Amravati's Science College, Congress Nagar, Nagpur-12

DEPARTMENT OF COMPUTER SCIENCE

Date: 01-12-2023


Notice

All the students of B.Sc. are hereby informed that Department of Computer Science is conducting a skill based course titled R Programming. This course aims to enhance your practical skills and knowledge in R Programming. Register on or before 11December 2023. Looking forward to your active participation.

Course Details:

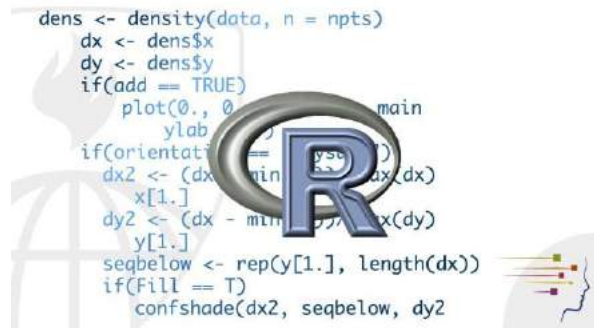
- **Course Name:** R Programming
- **Duration:** 15 December 2023 to 24 February 2024
- **Schedule:** 10 week
- **Eligibility:** Any Undergraduate


Course Coordinator
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Professor & Head
Department of Computer Science
S.S.E.S. Am's Science College
Congress Nagar Nagpur

CERTIFICATE COURSE IN R PROGRAMMING

```
dens <- density(data, n = npts)
dx <- dens$x
dy <- dens$y
if(add == TRUE)
  plot(0., 0, main,
       ylab,
       if(orientati
          dx2 <- (dx - min
                x[1.]
                dy2 <- (dx - min
                y[1.]
                seqbelow <- rep(y[1.], length(dx))
                if(Fill == T
                   confshade(dx2, seqbelow, dy2
```



Free Certificate Course for College Students

Duration – 30 Hours(10 Weeks)

Process of Registration- Early

Birds will be admitted

Course Objectives:

- 1) To Understand the basics of R and RStudio, including installation, setup, and an overview of the R programming environment.
- 2) To Gain proficiency in data manipulation using packages such as **dplyr** and **tidyr**.
3. To Learn to import, clean, transform, and summarize data from various sources (CSV, Excel, databases).
- 4) Able Perform descriptive statistics and exploratory data analysis.
- 5) Able to design and interpret different types of graphs and plots to effectively communicate data insights.



Department of Computer Science
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Nagar, Nagpur

* R programming is a powerful language and environment for statistical computing and graphics. It is widely used by statisticians, data scientists, and researchers for data analysis and visualization. R provides a wide array of statistical techniques such as linear and nonlinear modeling, time-series analysis, classification, and clustering. The language is open-source and has a vast collection of packages available through CRAN (Comprehensive R Archive Network), enhancing its functionality. R's syntax is user-friendly, making it accessible for beginners while being robust enough for advanced users. It integrates well with other programming languages like C, C++, and Python.

Last Date of Registration: 11 December 2023
For Registration Contact: Dr. R. N. Jugele (Coordinator)

SSES Amravati's Science College, Congress Nagar, Nagpur-12

DEPARTMENT OF COMPUTER SCIENCE

COURSE MODULE AND SYLLABUS

Course Title: Certificate Course in R Programming

Course Coordinator: Dr. R. N. Jugele

Course description:

The R Programming course is designed to introduce students to the fundamentals of R, a powerful language for statistical computing and data analysis. Participants will start with an overview of R and RStudio, learning to navigate the environment and write basic scripts. The course covers essential topics in data manipulation, allowing students to clean and transform datasets using packages like `dplyr` and `tidyr`. Students will gain skills in data visualization with `ggplot2`, creating a variety of plots to effectively communicate findings. Additionally, the course delves into statistical analysis and modeling, equipping students to perform hypothesis tests and build predictive models. Advanced programming techniques, including writing custom functions and debugging, are also covered, preparing students for more complex data tasks.

Course Objectives:

- 1) To Understand the R programming environment and its ecosystem.
- 2) To Understand and utilize basic data types in R (numeric, character, logical) and to Work with complex data structures (vectors, matrices, lists, data frames).
- 3) To be able Import and export data from various sources (CSV, Excel, databases), Perform data cleaning and preprocessing and use `dplyr` and `tidyr` packages for data manipulation.
- 4) To be able to Understand and apply various statistical models.
- 5) To be able Customize and enhance plots for presentation

Instructional Strategies: Theory class, Practical, Video clips, Models etc.

Evaluation Strategies: Oral discussions and Final MCQ examination.

Course outline:

1. **Introduction to R:**
2. **Data Types and Structures:**
3. **Data Manipulation:**
4. **Statistical Analysis:**
5. **Data Visualization:**
6. **Programming Concepts:**

Course Outcomes (COs):


Students will be able to:

1. Proficiently Use R and RStudio
2. Perform Data Manipulation
3. Create Data Visualizations
4. Conduct Statistical Analyses
5. Implement Advanced Programming Techniques


Duration of course: Ten weeks (30 Hours)

The Structure of Syllabus and system of evaluation -

Course	Theory Papers and Practical	Total Marks	
		Theory	Practical
Certificate Course in Artificial Intelligence	Theory paper- Artificial Intelligence * Theory examination will be of MCQ pattern having 60 or 80 questions each with equal marks.	60	40
	* Practical examination will be based on performance evaluation in the laboratory	100	


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Congress Nagar, Nagpur


Internal Quality Assurance Cell
(IQAC)
S. S. E. S. A. Science College
Congress Nagar, Nagpur.


Principal
S. S. E. S. Amravati's
Science College, Nagpur.

SYLLABUS

Certificate course (10 weeks)
(R Programming)

Theory-

UNIT- I

1. Introduction to R:

- Introduction to R and its applications
- Installing R and RStudio
- Overview of RStudio interface
- Basic R commands and functions
- Data types in R (numeric, character, logical)
- Vectors and vector operations
- Basic functions and data type conversions

2. Data Structures

- Introduction to matrices and arrays
- Lists and data frames
- Accessing and modifying elements in data structures

UNIT – II

3. Data Import Export

- Reading and writing CSV files
- Importing data from Excel
- Connecting to databases

4. Statistical Analysis:

- Descriptive statistics and exploratory data analysis
- Hypothesis testing (t-tests, chi-square tests)
- Introduction to linear regression

UNIT – III

1. Data Visualization:

- Basics of ggplot2
- Creating various types of plots (scatter, line, bar, histogram)
- Customizing plots with themes and annotations

2. Programming Concepts:

- Writing functions in R
- Control structures (if-else, loops)
- Debugging and error handling

Practicals

1. Program to implement vector operations on Student dataset.
2. Program to create data frame and implement various functions.
3. Program to demonstrate use of functions to create Calculator.
4. Program program to display Quicksort implementation on Overdose dataset.
5. Program to implement Markov Chain and display its proportions.
6. Program to demonstrate Normal Distribution using various functions on Volcano dataset.
7. Program to demonstrate Binomial Distribution using various functions.
8. Program to display use of Statistical functions on Matrix.
9. Program to demonstrate use of Correlation and Covariance on dataset.
10. Program to implement functions related to reading and writing files.
11. Program to demonstrate use of Graphs in R programming.
12. Program to demonstrate K-means Clustering on dataset.

Distribution of marks: -


UNIT I- 20 marks (Theory)

UNIT II- 20 marks(Theory)

UNIT III- 20 marks (Theory)+40 (practicals)

Week-wise teaching plan:


Week	Hrs.	Syllabus
Week 1	1	Introduction to R and its applications Installing R and RStudio
	2	Overview of RStudio interface
Week 2	1	Basic R commands and functions
	2	Data types in R (numeric, character, logical)
Week 3	1	Vectors and vector operations
	2	Basic functions and data type conversions
Week 4	1	Introduction to matrices and arrays
	2	Lists and data frames
Week 5	1	Accessing and modifying elements in data structures
	2	Reading and writing CSV files
Week 6	2	Importing data from Excel
	1	Connecting to databases
Week 7	2	Descriptive statistics and exploratory data analysis
	1	Hypothesis testing (t-tests, chi-square tests)
Week 8	2	Introduction to linear regression
	1	Basics of ggplot2
Week 9	2	Creating various types of plots (scatter, line, bar, histogram)
	1	Customizing plots with themes and annotations
Week 10	1	Writing functions in R
	2	Control structures (if-else, loops) Debugging and error handling


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**Certificate Course in R Programming
Time Table**

Day	Theory
Friday	RNJ (B9) Theory 4.00 PM – 5.00 PM
Saturday	RNJ (B9) Theory, 4.00 PM – 5.00 PM
	RNJ (Computer Laboratory) practical, 5.00 PM – 6.00 PM



Course Coordinator
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List of Students Enrolled

1	Anjali M Neware	31	Taniya M Ukey
2	Antara S Sakhare	32	Tanushka M Bhagat
3	Ayasha R Murade	33	Trupti A Hatwar
4	Bhagyashri C Kumre	34	Trupti S Humne
5	Bhagyashri N Surkar	35	Ayush H Barsagade
6	Bhagyashri P Barsagade	36	Bhavesk K Ghodmare
7	Bhavna D Dehariya	37	Gaurav D Kakde
8	Deepa R Gangboir	38	Sarvesh S Pujari
9	Devyani S Shivankar	39	Sasant A Chahande
10	Disha I Bhelwa	40	Shirish R Gawade
11	Lavanya D Padole	41	Siddesh N Ravi
12	Madhuri D Bawankar	42	Soham V Tambde
13	Manika D Parihar	43	Mugdha R Dakhole
14	Mayuri A Raut	44	Neha G Gawande
15	Mayuri D Dahake	45	Neha Khandate
16	Megha M Nagalwade	46	Prachi Thakre
17	Prajakta S Ramteke	47	Pranjal Parate
18	Sanika Kashikar	48	Prateeksha Bhayde
19	Pratiksha R Ramteke	49	Prerna Patil
20	Priyanka Kulsange	50	Smita Gaidhane
21	Punam S Gaidhane	51	Sonu Chanode
22	Rashika R Kolarkar		
23	Reetika R Uikey		
24	Rozina Z Sheikh		
25	Rudrayani S Hargude		
26	Samiksha R Manwatkar		
27	Princy Gupta		
28	Priya Tiwari		
29	Punisha kodane		
30	Rajvi Mamulkar		

SSES Amravati's Science College, Congress Nagar, Nagpur-12


DEPARTMENT OF COMPUTER SCIENCE


Date: 27-02-2024

Notice

All the students who are registered for the Certificate course in R Programming are hereby informed that the theory and practical examination is scheduled as given below.

Examination	Date	Place	Time
Theory	07-03-2024	Computer laboratory	11:00 to 1:00
Practical	09-03-2024	Computer laboratory	11:00 to 1:00


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Congress Nagar, Nagpur

SSES Amravati's Science College, Congress Nagar, Nagpur-12

DEPARTMENT OF COMPUTER SCIENCE

COURSE MODULE AND SYLLABUS

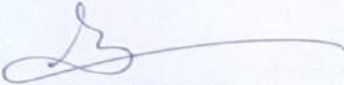
Course Title: Certificate Course in R programming


Date: 05-03-2024

Attendance Sheet: Theory/Practical Examination

Roll . No.	Name of Student	Theory Examination 7-3-2024	Practical Examination 9-3-2024
B2RProg-1	Anjali M Neware	<u>Aneware</u>	<u>Aneware</u>
B2RProg-2	Antara S Sakhare	<u>SakhareA</u>	<u>SakhareA</u>
B2RProg-3	Ayasha R Murade	<u>Ayashat</u>	<u>Ayashat</u>
B2RProg-4	Bhagyashri C Kumre	<u>BKumre</u>	<u>BKumre</u>
B2RProg-5	Bhagyashri N Surkar	<u>BS</u>	<u>BS</u>
B2RProg-6	Bhagyashri P Barsagade	<u>Bbarsagade</u>	<u>Bbarsagade</u>
B2RProg-7	Bhavna D Dehariya	<u>BD</u>	<u>BD</u>
B2RProg-8	Deepa R Gangboir	<u>Deepa</u>	<u>Deepa</u>
B2RProg-9	Devyani S Shivankar	<u>DShivankar</u>	<u>DShivankar</u>
B2RProg-10	Disha I Bhelwa	<u>DBelwa</u>	<u>DBelwa</u>
B2RProg-11	Lavanya D Padole	<u>Laranyat</u>	<u>Laranyat</u>
B2RProg-12	Madhuri D Bawankar	<u>MBawankar</u>	<u>MBawankar</u>
B2RProg-13	Manika D Parihar	<u>MParihar</u>	<u>MParihar</u>
B2RProg-14	Mayuri A Raut	<u>MAut</u>	<u>MAut</u>
B2RProg-15	Mayuri D Dahake	<u>MDahake</u>	<u>MDahake</u>
B2RProg-16	Megha M Nagalwade	<u>MNagalwade</u>	<u>MNagalwade</u>
B2RProg-17	Prajakta S Ramteke	<u>PRamteke</u>	<u>PRamteke</u>
B2RProg-18	Sanika Kashikar	<u>SKashikar</u>	<u>SKashikar</u>
B2RProg-19	Pratiksha R Ramteke	<u>PRamteke</u>	<u>PRamteke</u>
B2RProg-20	Priyanka Kulsange	<u>PKulsange</u>	<u>PKulsange</u>
B2RProg-21	Punam S Gaidhane	<u>PGaidhane</u>	<u>PGaidhane</u>
B2RProg-22	Rashika R Kolarkar	<u>RKolarkar</u>	<u>RKolarkar</u>
B2RProg-23	Reetika R Uikey	<u>RUkey</u>	<u>RUkey</u>
B2RProg-24	Rozina Z Sheikh	<u>RZSheikh</u>	<u>RZSheikh</u>
B2RProg-25	Rudrayani S Hargude	<u>RHargude</u>	<u>RHargude</u>
B2RProg-26	Samiksha R Manwatkar	<u>SManwatkar</u>	<u>SManwatkar</u>
B2RProg-27	Princy Gupta	<u>PGupta</u>	<u>PGupta</u>
B2RProg-28	Priya Tiwari	<u>PTiwari</u>	<u>PTiwari</u>
B2RProg-29	Punisha kodane	<u>PKodane</u>	<u>PKodane</u>
B2RProg-30	Rajvi Mamulkar	<u>RMamulkar</u>	<u>RMamulka</u>
B2RProg-31	Taniya M Ukey	<u>TUkey</u>	<u>TUkey</u>
B2RProg-32	Tanushka M Bhagat	<u>TBhagat</u>	<u>TBhagat</u>
B2RProg-33	Trupti A Hatwar	<u>THatwar</u>	<u>THatwar</u>

B2RProg-34	Trupti S Humne	Trupti	Trupti
B2RProg-35	Ayush H Barsagade	A Barsagade	Absent
B2RProg-36	Bhavesh K Ghodmare	Bhavesh	Bhavesh
B2RProg-37	Gaurav D Kakde	Kakde	Kakde
B2RProg-38	Sarvesh S Pujari	Sarvesh	Sarvesh
B2RProg-39	Sasant A Chahande	S Chahande	S Chahande
B2RProg-40	Shirish R Gawade	Shirish	Shirish
B2RProg-41	Siddesh N Ravi	Siddesh	Siddesh
B2RProg-42	Soham V Tambde	Soham	Soham
B2RProg-43	Mugdha R Dakhole	MD	MD
B2RProg-44	Neha G Gawande	Neha	Neha
B2RProg-45	Neha Khandate	Neha	Neha
B2RProg-46	Prachi Thakre	Prachi	Prachi
B2RProg-47	Pranjal Parate	Pranjal	Pranjal
B2RProg-48	Prateeksha Bhayde	P Bhayde	P Bhayde
B2RProg-49	Prerna Patil	Prerna	Prerna
B2RProg-50	Smita Gaidhane	Smita	Smita
B2RProg-51	Sonu Chanode	Sonu	Sonu


 Course Coordinator
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 Head of Department
 Professor & Head
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 Congress Nagar, Nagpur

Certificate course in R Programming
Theory Examination

Date: 07/03/2023

Max Marks : 60

Time :11:00 am to 1:00 pm

Roll No :

Name of Student :

Note: 1. All questions are compulsory and carry equal marks
2. Tick only one correct option

1. Which package allows writing data frames to Excel files in R?

- A) `readxl`
- B) `writexl`
- C) `openxlsx`
- D) Both B and C

2. Which package in R is commonly used to connect to relational databases?

- A) `RMySQL`
- B) `DBI`
- C) `RSQLite`
- D) All of the above

3. Which function from the DBI package is used to execute a SQL query on a connected database?

- A) `dbExecute()`
- B) `dbSendQuery()`
- C) `dbQuery()`
- D) `dbSendStatement()`

4. What is the argument to skip the first row while reading a CSV file using `read.csv()`?

- A) `skip = 1`
- B) `header = FALSE`
- C) `rows.skip = 1`
- D) `start.row = 2`

5. Which argument in `read.csv()` is used to specify how missing values are represented in the CSV file?

- A) `na.strings`
- B) `missing.values`
- C) `na.values`
- D) `missing`

6. Which function is used to fetch all results of a SQL query sent to the database in R?

- A) `fetch()`
- B) `dbFetch()`
- C) `dbGetQuery()`
- D) `dbReadTable()`

7. Which function in the `dplyr` package is used to select specific columns from a dataframe?

- A) `filter()`
- B) `select()`
- C) `mutate()`
- D) `arrange()`

8. What is the primary purpose of the `dplyr` package in R?

- A) Data visualization
- B) Statistical modeling

- C) Data manipulation and transformation
 - D) Machine learning
9. **Which dplyr function is used to filter rows based on a condition?**
- A) arrange()
 - B) select()
 - C) filter()
 - D) summarize()
10. **How do you create a new variable or modify an existing one in a dataframe using dplyr?**
- A) group_by()
 - B) mutate()
 - C) summarize()
 - D) select()
11. **Which function would you use to sort a dataframe by one or more variables in dplyr?**
- A) arrange()
 - B) filter()
 - C) select()
 - D) mutate()
12. **How can you summarize data, such as calculating the mean or sum, using dplyr?**
- A) select()
 - B) summarize()
 - C) arrange()
 - D) filter()
13. **What does the group_by() function do in dplyr?**
- A) It groups the dataset by one or more variables to perform operations on each group.
 - B) It selects specific columns from the dataframe.
 - C) It filters rows based on a condition.
 - D) It arranges rows in a specific order.
14. **Which function in the tidyr package is used to convert data from wide format to long format?**
- A) spread()
 - B) gather()
 - C) separate()
 - D) unite()

15. **What does the separate() function do in the tidyr package?**
- A) Combines multiple columns into one.
 - B) Converts data from long to wide format.
 - C) Splits a single column into multiple columns.
 - D) Converts data from wide to long format.
16. **Which function would you use to combine multiple columns into a single column in tidyr?**
- A) gather()
 - B) spread()
 - C) separate()
 - D) unite()
17. **What is the primary goal of tidying data with tidyr?**
- A) To perform statistical analysis
 - B) To visualize data
 - C) To ensure that data is in a consistent and structured format suitable for analysis
 - D) To clean and preprocess text data
18. **What is the primary purpose of the ggplot2 package in R?**
- A) Data manipulation
 - B) Statistical modeling
 - C) Data visualization
 - D) Data cleaning
19. **Which function is used to initialize a ggplot2 plot?**
- A) ggplot()
 - B) plot()
 - C) gg_init()
 - D) geom_plot()
20. **In ggplot2, what does the aes() function specify?**
- A) The appearance settings of the plot
 - B) The aesthetics, mapping variables to axes and other plot properties
 - C) The dataset to be used
 - D) The type of plot to be created

21. **Which function would you use to create a scatter plot in ggplot2?**
- A) `geom_point()`
 - B) `geom_line()`
 - C) `geom_bar()`
 - D) `geom_histogram()`
22. **Which geom function is used to create a line plot in ggplot2?**
- A) `geom_point()`
 - B) `geom_line()`
 - C) `geom_bar()`
 - D) `geom_histogram()`
23. **To create a bar plot in ggplot2, which geom function should be used?**
- A) `geom_point()`
 - B) `geom_line()`
 - C) `geom_bar()`
 - D) `geom_histogram()`
24. **What function would you use to create a histogram in ggplot2?**
- A) `geom_point()`
 - B) `geom_line()`
 - C) `geom_bar()`
 - D) `geom_histogram()`
25. **Which ggplot2 function is used to add titles and labels to axes?**
- A) `theme()`
 - B) `labs()`
 - C) `aes()`
 - D) `annotate()`
26. **How can you add text annotations to a ggplot2 plot?**
- A) `geom_text()`
 - B) `annotate()`
 - C) `labs()`
 - D) `theme()`
27. **What argument would you use within the `theme()` function to change the plot background color in ggplot2?**
- A) `plot.background`

- B) `plot.color`
 - C) `background.fill`
 - D) `theme.background`
28. **What is the purpose of exploratory data analysis (EDA)?**
- A) To confirm hypotheses with statistical tests
 - B) To summarize the main characteristics of the data using visualizations and summary statistics
 - C) To build predictive models
 - D) To clean and preprocess data
29. **Which test would you use to compare the means of two independent groups?**
- A) Chi-square test
 - B) Paired t-test
 - C) Independent t-test
 - D) ANOVA
30. **Which of the following statements correctly calls a function named `calculateSum` with arguments 5 and 10?**
- A) `calculateSum[5, 10]`
 - B) `calculateSum(5, 10)`
 - C) `calculateSum{5, 10}`
 - D) `calculateSum<- 5, 10`
31. **What is R primarily used for?**
- A) Web development
 - B) Statistical computing and graphics
 - C) Game development
 - D) Mobile app development
32. **Which of the following is NOT a step in installing R and RStudio?**
- A) Downloading R from CRAN
 - B) Downloading RStudio from the RStudio website
 - C) Running RStudio without installing R
 - D) Installing R first, then RStudio
33. **Which pane in RStudio is primarily used for writing and editing R scripts?**
- A) Console pane
 - B) Environment/History pane
 - C) Source/Editor pane

- D) Files/Plots/Packages/Help pane
34. Which of the following commands is used to calculate the mean of a numeric vector in R?
- A) `sum()`
 - B) `mean()`
 - C) `median()`
 - D) `mode()`
35. After installing R and RStudio, which command is used to check the version of R installed?
- A) `version()`
 - B) `R.version()`
 - C) `R.version`
 - D) `getVersion()`
36. What will be the result of the following operation in R: $3 + 5 * 2$?
- A) 13
 - B) 16
 - C) 10
 - D) 11
37. Which of the following is NOT a basic data type in R?
- A) Numeric
 - B) Character
 - C) Boolean
 - D) Logical
38. How can you create a numeric vector with the numbers 1 to 5 in R?
- A) `c(1, 2, 3, 4, 5)`
 - B) `1:5`
 - C) `seq(1, 5)`
 - D) All of the above
39. Which function is used to combine elements into a character vector?
- A) `cbind()`
 - B) `paste()`
 - C) `c()`
 - D) `combine()`

40. What will be the output of the following R code: `c(TRUE, FALSE, TRUE) & c(TRUE, TRUE, FALSE)`?
- A) `TRUE FALSE TRUE`
 - B) `TRUE FALSE FALSE`
 - C) `FALSE FALSE TRUE`
 - D) `TRUE TRUE FALSE`
41. Which function would you use to find the smallest number in a numeric vector?
- A) `min()`
 - B) `max()`
 - C) `mean()`
 - D) `sum()`
42. What is the result of `as.numeric("123.45")` in R?
- A) "123.45"
 - B) 123.45
 - C) NA
 - D) Error
43. What will be the result of the following operation: `c(1, 2, 3) + c(4, 5, 6)`?
- A) `5 7 9`
 - B) `4 5 6`
 - C) `1 2 3 4 5 6`
 - D) Error
44. How can you create a vector with 10 repetitions of the number 3 in R?
- A) `c(3, 10)`
 - B) `rep(3, 10)`
 - C) `seq(3, 10)`
 - D) `replicate(3, 10)`
45. Which function calculates the average value of a numeric vector in R?
- A) `mean()`
 - B) `median()`
 - C) `sum()`
 - D) `avg()`
 -

46. How would you access the third element of a vector `v` in R?

- A) `v[2]`
- B) `v(3)`
- C) `v[3]`
- D) `v{3}`

47. How can you create a 3x3 matrix filled with numbers 1 to 9 in R?

- A) `matrix(1:9, nrow=3, ncol=3)`
- B) `array(1:9, dim=c(3,3))`
- C) Both A and B
- D) Neither A nor B

48. Which function is used to create a list in R?

- A) `list()`
- B) `c()`
- C) `combine()`
- D) `vector()`

49. What is a data frame in R?

- A) A multi-dimensional array
- B) A list of vectors of equal length
- C) A matrix with row and column names
- D) A single vector

50. How do you access the element in the second row, third column of a matrix `m`?

- A) `m[2, 3]`
- B) `m[3, 2]`
- C) `m[2][3]`
- D) `m(2, 3)`

51. How do you change the value of the element in the second row, first column of a data frame `df` to 10?

- A) `df[2, 1] <- 10`
- B) `df[1, 2] <- 10`
- C) `df(2, 1) <- 10`
- D) `df(1, 2) <- 10`

52. Which function would you use to create an identity matrix of size 4x4 in R?

- A) `diag(4)`
- B) `identity(4)`
- C) `matrix(1, 4, 4)`
- D) `eye(4)`

53. What is the output of the following code: `my_list<-list(a=1, b=2, c=3); my_list$c?`

- A) 1
- B) 2
- C) 3
- D) NULL

54. How do you access the column named "Age" in a data frame `df`?

- A) `df["Age"]`
- B) `df$Age`
- C) `df[, "Age"]`
- D) All of the above

55. Which command creates a data frame with two columns, "Name" and "Age", with three rows of data?

- A) `data.frame(Name=c("John", "Jane", "Doe"), Age=c(25, 30, 35))`
- B) `list(Name=c("John", "Jane", "Doe"), Age=c(25, 30, 35))`
- C) `c(Name=c("John", "Jane", "Doe"), Age=c(25, 30, 35))`
- D) `matrix(Name=c("John", "Jane", "Doe"), Age=c(25, 30, 35))`

56. How do you add an element "d" with value 4 to an existing list `my_list`?

- A) `my_list["d"] <- 4`
- B) `my_list$d<- 4`
- C) `my_list<- append(my_list, 4, after=3)`
- D) `my_list<- c(my_list, d=4)`

57. Which function is used to read a CSV file into R?

- A) `read.csv()`
- B) `import.csv()`
- C) `read.table()`
- D) `csv.read()`

58. Which function is used to write a data frame to a CSV file in R?

- A) `write.csv()`
- B) `save.csv()`
- C) `write.table()`
- D) `csv.write()`

59. Which package in R is commonly used to import data from Excel files?

- A) `xlsx`
- B) `readxl`
- C) `openxlsx`
- D) `excelR`

60. How do you read an Excel file named "data.xlsx" with the sheet name "Sheet1" into R using the readxl package?

- A) `read_excel("data.xlsx", sheet = "Sheet1")`
- B) `read_excel("data.xlsx", sheetname = "Sheet1")`
- C) `read_excel("data.xlsx", "Sheet1")`
- D) `read.xlsx("data.xlsx", sheet = "Sheet1")`

Answer Key

1. **Answer: D) Both B and C**
2. **Answer: D) All of the above**
3. **Answer: B) dbSendQuery()**
4. **Answer: A) skip = 1**
5. **Answer: A) na.strings**
6. ****Answer: B) dbFetch()**
7. **Answer: B) select()**
8. **Answer: C) Data manipulation and transformation**
9. **Answer: C) filter()**
10. **Answer: B) mutate()**
11. **Answer: A) arrange()**
12. **Answer: B) summarize()**
13. **Answer: A) It groups the dataset by one or more variables to perform operations on each group.**
14. **Answer: B) gather()**
15. **Answer: C) Splits a single column into multiple columns.**
16. **Answer: D) unite()**
17. **Answer: C) To ensure that data is in a consistent and structured format suitable for analysis**
18. **Answer: C) Data visualization**
19. **Answer: A) ggplot()**
20. **Answer: B) The aesthetics, mapping variables to axes and other plot properties**
21. **Answer: A) geom_point()**
22. **Answer: B) geom_line()**
23. **Answer: C) geom_bar()**
24. **Answer: D) geom_histogram()**
25. **Answer: B) labs()**
26. **Answer: A) geom_text()**
27. **Answer: A) plot.background**
28. **Answer: B) To summarize the main characteristics of the data using visualizations and summary statistics**
29. **Answer: C) Independent t-test**
30. **Answer: B) calculateSum(5, 10)**
31. **Answer: B) Statistical computing and graphics**
32. **Answer: C) Running RStudio without installing R**
33. **Answer: C) Source/Editor pane**
34. **Answer: B) mean()**
35. **Answer: B) R.version()**
36. **Answer: A) 13** (because multiplication is performed before addition)
37. **Answer: C) Boolean**
38. **Answer: D) All of the above**
39. **Answer: C) c()**
40. **Answer: B) TRUE FALSE FALSE**
41. **Answer: A) min()**
42. **Answer: B) 123.45**
43. **Answer: A) 5 7 9**
44. **Answer: B) rep(3, 10)**
45. **Answer: A) mean()**
46. **Answer: C) v[3]**
47. **Answer: C) Both A and B**
48. **Answer: A) list()**
49. **Answer: B) A list of vectors of equal length**
50. **Answer: A) m[2, 3]**
51. **Answer: A) df[2, 1] <- 10**
52. **Answer: A) diag(4)**
53. **Answer: C) 3**
54. **Answer: D) All of the above**
55. **Answer: A) data.frame(Name=c("John", "Jane", "Doe"), Age=c(25, 30, 35))**
56. **Answer: B) my_list\$d <- 4**
57. **Answer: A) read.csv()**
58. **Answer: A) write.csv()**
59. **Answer: B) readxl**
60. **Answer: A) read_excel("data.xlsx", sheet = "Sheet1")**

Grading Scheme

Marks	-	Grade
91-100	-	O
81-90	-	A+
71- 80	-	A
61-70	-	B+
51-60	-	B
46-50	-	C



Course Coordinator

Professor

Department of Computer Science
S.S.E.S. Amal's Science College,
Congress Nagar, Nagpur

SSES Amravati's Science College, Congress Nagar, Nagpur-12

DEPARTMENT OF COMPUTER SCIENCE

Course Title: Certificate Course in Artificial Intelligence

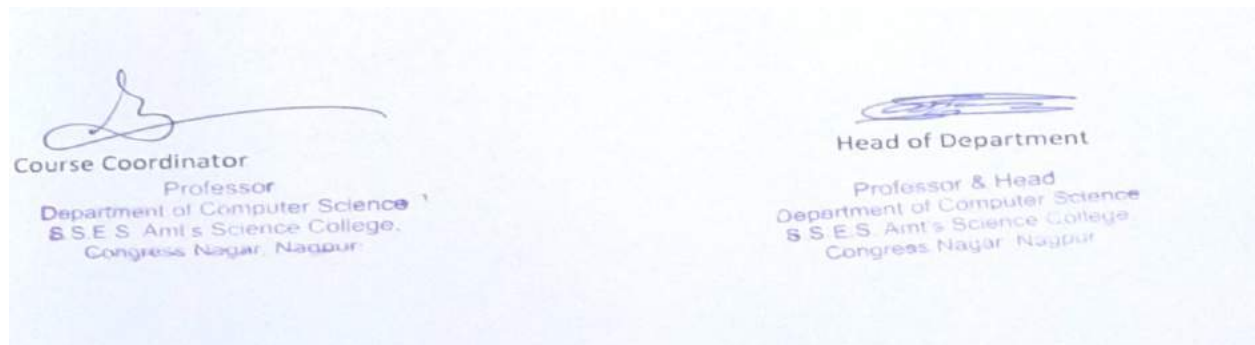
Course Coordinator : Dr. R. N. Jugele

Marksheet

Date: 16-03-2024

Sr. No	Name of Student	Theory(60)	Practical(40)	Total (100)	Grade
B2RProg-1	Anjali M Neware	39	30	69	B+
B2RProg-2	Antara S Sakhare	53	35	88	A+
B2RProg-3	Ayasha R Murade	44	32	76	A
B2RProg-4	Bhagyashri C Kumre	38	32	70	B+
B2RProg-5	Bhagyashri N Surkar	47	37	84	A+
B2RProg-6	Bhagyashri P Barsagade	38	37	75	A
B2RProg-7	Bhavna D Dehariya	43	31	74	A
B2RProg-8	Deepa R Gangboir	57	33	90	A+
B2RProg-9	Devyani S Shivankar	38	40	78	A
B2RProg-10	Disha I Bhelwa	57	34	91	O
B2RProg-11	Lavanya D Padole	44	35	79	A
B2RProg-12	Madhuri D Bawankar	58	30	88	A+
B2RProg-13	Manika D Parihar	44	31	75	A
B2RProg-14	Mayuri A Raut	50	34	84	A+
B2RProg-15	Mayuri D Dahake	39	38	77	A
B2RProg-16	Megha M Nagalwade	55	38	93	O
B2RProg-17	Prajakta S Ramteke	35	30	65	B+
B2RProg-18	Sanika Kashikar	42	30	72	A
B2RProg-19	Pratiksha R Ramteke	48	32	80	A
B2RProg-20	Priyanka Kulsange	51	30	81	A+
B2RProg-21	Punam S Gaidhane	59	30	89	A+
B2RProg-22	Rashika R Kolarkar	40	31	71	A
B2RProg-23	Reetika R Uikey	40	37	77	A
B2RProg-24	Rozina Z Sheikh	51	34	85	A+
B2RProg-25	Rudrayani S Hargude	46	34	80	A
B2RProg-26	Samiksha R Manwatkar	40	38	78	A
B2RProg-27	Princy Gupta	56	35	91	O
B2RProg-28	Priya Tiwari	38	36	74	A
B2RProg-29	Puneshkodane	49	32	81	A+
B2RProg-30	Rajvi Mamulkar	39	36	75	A
B2RProg-31	Taniya M Ukey	38	39	77	A
B2RProg-32	Tanushka M Bhagat	50	32	82	A+
B2RProg-33	Trupti A Hatwar	41	39	80	A

B2RProg-34	Trupti S Humne	48	36	84	A+
B2RProg-35	Ayush H Barsagade	58	Absent	58	Absent
B2RProg-36	Bhavesh K Ghodmare	49	35	84	A+
B2RProg-37	Gaurav D Kakde	39	36	75	A
B2RProg-38	Sarvesh S Pujari	53	34	87	A+
B2RProg-39	Sasant A Chahande	51	39	90	A+
B2RProg-40	Shirish R Gawade	42	40	82	A+
B2RProg-41	Siddesh N Ravi	60	35	95	O
B2RProg-42	Soham V Tambde	45	30	75	A
B2RProg-43	Mugdha R Dakhole	36	31	67	B+
B2RProg-44	Neha G Gawande	56	40	96	O
B2RProg-45	Neha Khandate	42	31	73	A
B2RProg-46	Prachi Thakre	52	37	89	A+
B2RProg-47	Pranjal Parate	42	38	80	A
B2RProg-48	Prateeksha Bhayde	53	39	92	O
B2RProg-49	Prerna Patil	37	36	73	A
B2RProg-50	Smita Gaidhane	45	39	84	A+
B2RProg-51	Sonu Chanode	44	31	75	A



Specimen AnswerSheet



Shri Shivaji Education Society, Amravati's
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<u>Add-on Course</u>							
Course Exam Name: Certificate Course in R Programming							
Name of Student:		INSTRUCTIONS FOR FILLING THE SHEET 1. This sheet should not be folded or crushed. 2. Use only blue/ black ball point pen to fill the circles. 3. Use of pencil is strictly prohibited. 4. Circles should be darkened completely and properly. 5. Cutting and erasing on this sheet is not allowed. 6. Do not use any stray marks on the sheet. 7. Do not use marker or white fluid to hide the mark.					
Roll No.:	<input type="text"/>	Session: 2023-24					
Test Date: 07/03/2024		Max. Marks: 60					
Invigilator Signature		Obtained Marks:	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">WRONG METHODS</td> <td style="text-align: center;">CORRECT METHOD</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </table>	WRONG METHODS	CORRECT METHOD		
WRONG METHODS	CORRECT METHOD						

A B C D	A B C D	A B C D	A B C D	A B C D	A B C D
1 ○○○○	11 ○○○○	21 ○○○○	31 ○○○○	41 ○○○○	51 ○○○○
2 ○○○○	12 ○○○○	22 ○○○○	32 ○○○○	42 ○○○○	52 ○○○○
3 ○○○○	13 ○○○○	23 ○○○○	33 ○○○○	43 ○○○○	53 ○○○○
4 ○○○○	14 ○○○○	24 ○○○○	34 ○○○○	44 ○○○○	54 ○○○○
5 ○○○○	15 ○○○○	25 ○○○○	35 ○○○○	45 ○○○○	55 ○○○○
6 ○○○○	16 ○○○○	26 ○○○○	36 ○○○○	46 ○○○○	56 ○○○○
7 ○○○○	17 ○○○○	27 ○○○○	37 ○○○○	47 ○○○○	57 ○○○○
8 ○○○○	18 ○○○○	28 ○○○○	38 ○○○○	48 ○○○○	58 ○○○○
9 ○○○○	19 ○○○○	29 ○○○○	39 ○○○○	49 ○○○○	59 ○○○○
10 ○○○○	20 ○○○○	30 ○○○○	40 ○○○○	50 ○○○○	60 ○○○○

Solved Answer sheets



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Add-on Course			
Course Exam Name: Certificate Course in R Programming			
Name of Student: Neha Gawande		INSTRUCTIONS FOR FILLING THE SHEET 1. This sheet should not be folded or crushed. 2. Use only blue/black ball point pen to fill the circles. 3. Use of pencil is strictly prohibited. 4. Circles should be darkened completely and properly. 5. Cutting and erasing on this sheet is not allowed. 6. Do not use any stray marks on the sheet. 7. Do not use marker or white fluid to hide the mark. WRONG METHODS CORRECT METHOD 	
Roll No.: B2RP/44	Session: 2023-24		
Test Date: 07/03/2024	Max. Marks: 60		
Invigilator Signature	Obtained Marks: 56		

A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D													
1	○	○	○	●	✓	11	●	○	○	○	○	✓	21	○	○	○	○	X	31	○	○	○	○	/	41	○	○	○	○	✓	51	○	○	○	○	/
2	○	○	○	○	✓	12	○	○	○	○	○	✓	22	○	○	○	○	✓	32	○	○	○	○	/	42	○	○	○	○	/	52	○	○	○	○	/
3	○	○	○	○	✓	13	○	○	○	○	○	✓	23	○	○	○	○	✓	33	○	○	○	○	/	43	○	○	○	○	/	53	○	○	○	○	/
4	○	○	○	○	✓	14	○	○	○	○	○	✓	24	○	○	○	○	/	34	○	○	○	○	X	44	○	○	○	○	/	54	○	○	○	○	/
5	○	○	○	○	✓	15	○	○	○	○	○	✓	25	○	○	○	○	/	35	○	○	○	○	/	45	○	○	○	○	/	55	○	○	○	○	/
6	○	○	○	○	✓	16	○	○	○	○	○	✓	26	○	○	○	○	✓	36	○	○	○	○	/	46	○	○	○	○	/	56	○	○	○	○	X
7	○	○	○	○	X	17	○	○	○	○	○	✓	27	○	○	○	○	✓	37	○	○	○	○	/	47	○	○	○	○	/	57	○	○	○	○	/
8	○	○	○	○	✓	18	○	○	○	○	○	✓	28	○	○	○	○	✓	38	○	○	○	○	/	48	○	○	○	○	/	58	○	○	○	○	/
9	○	○	○	○	✓	19	○	○	○	○	○	✓	29	○	○	○	○	✓	39	○	○	○	○	/	49	○	○	○	○	/	59	○	○	○	○	/
10	○	○	○	○	✓	20	○	○	○	○	○	✓	30	○	○	○	○	/	40	○	○	○	○	/	50	○	○	○	○	/	60	○	○	○	○	/

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Add-on Course			
Course Exam Name: Certificate Course in R Programming			
Name of Student: <u>Prajakta S. Ramteke</u>		INSTRUCTIONS FOR FILLING THE SHEET 1. This sheet should not be folded or crushed. 2. Use only blue/ black ball point pen to fill the circles. 3. Use of pencil is strictly prohibited. 4. Circles should be darkened completely and properly. 5. Cutting and erasing on this sheet is not allowed. 6. Do not use any stray marks on the sheet. 7. Do not use marker or white fluid to hide the mark.	
Roll No.:	<u>B2RR17</u>		
Test Date: 07/03/2024		Max. Marks: 60	
Invigilator Signature <u>[Signature]</u>		Obtained Marks:	<u>36</u>
		WRONG METHODS	CORRECT METHOD
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D				
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	21	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	41	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	51	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	42	<input type="checkbox"/>	<input checked="" type="checkbox"/>	52	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	23	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	33	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	43	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	53	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	34	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	44	<input type="checkbox"/>	<input checked="" type="checkbox"/>	54	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	25	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	35	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45	<input checked="" type="checkbox"/>	<input type="checkbox"/>	55	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	36	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	46	<input type="checkbox"/>	<input checked="" type="checkbox"/>	56	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	27	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	37	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	47	<input type="checkbox"/>	<input checked="" type="checkbox"/>	57	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	28	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	38	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	48	<input checked="" type="checkbox"/>	<input type="checkbox"/>	58	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	29	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	39	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	49	<input type="checkbox"/>	<input checked="" type="checkbox"/>	59	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	40	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50	<input type="checkbox"/>	<input checked="" type="checkbox"/>	60	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Certificates



Shri Shivaji Education Society Amravati's
**SCIENCE COLLEGE, CONGRESS NAGAR,
NAGPUR**
Accredited with CGPA of 3.51 at 'A+' Grade
A College with Potential for Excellence



CERTIFICATE

Mr./Ku. **Neha Gawande** is awarded with certificate on successful completion of the course entitled,
Certificate course in "R Programming".

Session 2023-24 under Add-on course conducted for 30 hours from 15/12/2023 to 24/02/2024 by
Department of Computer Science, SSES's, Science College, congress Nagar, Nagpur 440012.

He/She has passed the Examination with 'O' Grade.


Prof. R. N. Jugele
Coordinator, Department of Computer Science


Prof. M. P. Dhore
Principal, Science College, Nagpur



Shri Shivaji Education Society Amravati's
**SCIENCE COLLEGE, CONGRESS NAGAR,
NAGPUR**
Accredited with CGPA of 3.51 at 'A+' Grade
A College with Potential for Excellence



CERTIFICATE

Mr./Ku. **Prajakta Ramteke** is awarded with certificate on successful completion of the course entitled,
Certificate course in "R Programming".

Session 2023-24 under Add-on course conducted for 30 hours from 15/12/2023 to 24/02/2024 by
Department of Computer Science, SSES's, Science College, congress Nagar, Nagpur 440012.

He/She has passed the Examination with 'B+' Grade.


Prof. R. N. Jugele
Coordinator, Department of Computer Science


Prof. M. P. Dhore
Principal, Science College, Nagpur

Action Taken:

A free Add-On Course for UG students in the Department of Computer Science, Shri Shivaji Education Society Amravati's Science College, Congress Nagar, Nagpur was held from 15th December 2023 to 24th February 2024. The course title was "R Programming". 50 students appeared and passed in both theory and practical examination. The result was prepared and certificates were distributed to the students.

**Shri Shivaji Education Society Amravati's Science College,
Congress Nagar, Nagpur**

Add on Course in R Programming Feedback Form

Name of Student.....

Please rate the following aspects of the program on a scale from 1 to 5, with

1. Best	2. Excellent	3. Good	4. Satisfactory	5. Fair
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Q.1 How would you rate the organization and structure of the course?

1 2 3 4 5

Q.2 How do you rate the quality of the delivery of the units by the Teacher?

1 2 3 4 5

Q.3 How useful were the hands-on assignments and projects in enhancing your practical understanding of R programming?

1 2 3 4 5

Q.4 How well-organized was the course structure, including the sequencing of topics and the pacing of the material?

1 2 3 4 5

Q.5 Overall, how would you rate your learning experience in this R Programming?

1 2 3 4 5

Q.6 Any Suggestions:

Feedback Analysis

1. Number of Students Registered for the Course : 51
2. Number of Students submitted the Feedback : 48
3. Question wise analysis of the Feedback:

Sr. No	Question	Responses in Percentage (%)				
		Best	Excellent	Good	Satisfactory	Fair
1)	How would you rate the organization and structure of the course?	39.58	25	20.83	14.58	0
2)	How do you rate the quality of the delivery of the units by the Teacher?	31.25	20.83	22.91	18.75	6.5
3)	How useful were the hands-on assignments and projects in enhancing your practical understanding of R programming?	25	20.8	18.75	20.83	14.58
4)	How well-organized was the course structure, including the sequencing of topics and the pacing of the material?	29.16	22.91	18.75	18.75	10.41
5)	Overall, how would you rate your learning experience in this course?	35.41	20.83	16.66	16.66	10.41
6)	Any Suggestions	No Suggestions: 30.1% Remaining Comments: Good Course, Nice Course, Change the timing of Classes				

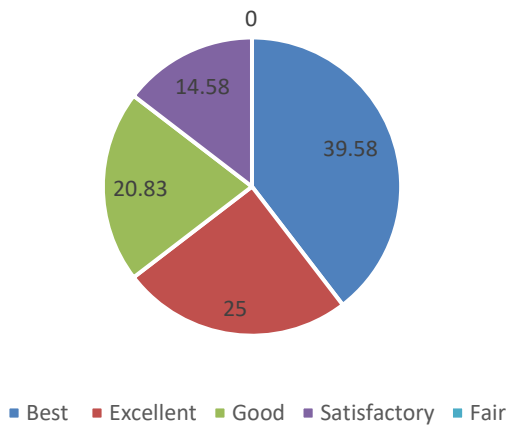
Remark: Students commented that the course will be useful in professional life.

Department will keep on improving the quality of the course and try to incorporate the feedback results.

Certificate course: R Programming (2023-24)

Feedback Analysis

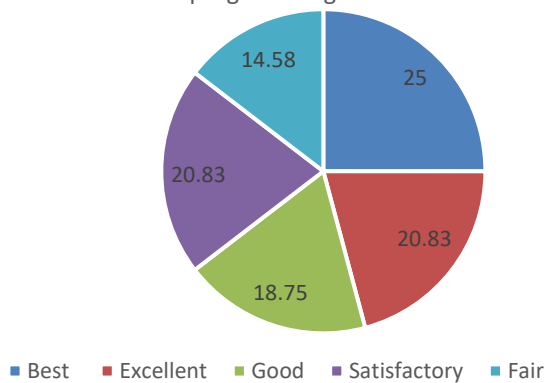
Q.1 How would you rate the organization and structure of the course?



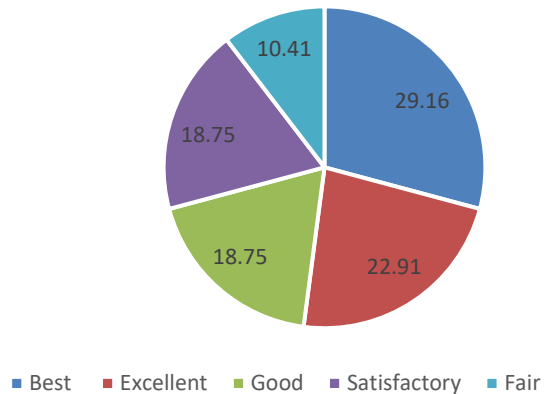
Q. 2 How do you rate the quality of the delivery of the units by the Teacher?



Q. 3 How useful were the hands-on assignments and projects in enhancing your practical understanding of R programming?



Q. 4 How well-organized was the course structure, including the sequencing of topics and the pacing of the material?



Q. 5 Overall, how would you rate your learning experience in this course?

