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 1st August 2023 to 7th October 2023. 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 88, 85 students appeared and passed in both theory and practical examination. The result was prepared and certificates were distributed to the students.

Prof. R. N. Jugele Course Coordinator



Shri Shivaji Education Society, Amravati's **SCIENCECOLLEGE**



Congress Nagar, Nagpur-12(M.S.), India

AccreditedwithCGPAof3.51at8A+9gradebyNAAC,Bangalore A<CollegewithPotentialforExcellence=identifiedbyUGCNewDelhi. InstitutionalMemberofAPQNRecognizedCe ntreforHigherLearningandResearch MentorCollegeunder8PARAMARSHScheme9,UGC,NewDelhi

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

DEPARTMENT OF COMPUTER SCIENCE

Session 2023-2024

Free Certificate Course for College Students

Course Title: Certificate Course in R Programming

Duration-30 Hours (10 Weeks)

Course Start from 1 Aug 2023 to 7 Oct 2023

Course Coordinator: Prof. R. N. Jugele

To, The Principal SSES Amt'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

6/07/2023 Magper Yours sincerely

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SSES Amravati's Science College, Congress Nagar, Nagpur-12 DEPARTMENT OF COMPUTER SCIENCE

Date: 19-07-2023

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 28 July 2023. Looking forward to your active participation.

Course Details:

- Course Name: R Programming
- Duration:1 August 2023 to 7 October 2023
- Schedule:10 week
- Eligibility: Any Undergraduate

Course Coordinator Professor

Department of Computer Science S.S.E.S. Amil's Science

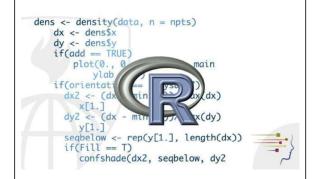
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Professor & Head Department of Computer Science

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CERTIFICATE COURSE IN R PROGRAMMING



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 SSES Amt 's Science College, Congress

Nagar, Nagpur

Free Certificate Course for College Students

Duration – 30 Hours (10 Weeks)
Process of Registration- Early
Birds will be admitted

* 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 classification, and clustering. The language is open-source and has a vast collection of **CRAN** packages available through (Comprehensive R Archive Network). enhancing its functionality. R's syntax is userfriendly, 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: 28 July 2023
For Registration Contact: Prof. 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 R Programming | Theory paper- R Programming * 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 | 1 |

Professor
Department of Computer Science
S S E S Amt's Science College.
Congress Nager Nagour

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

5.Data Visualization:

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

6. Programming Concepts:

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

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 |
| | | |

SSES AMT'S SCIENCE COLLEGE, CONGRESS NAGAR, NAGPUR-12

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 |

Professor & Head
Department of Computer Science
S.S.E.S. Amt's Science Cottage,
Congress Nagar, Nagpur

Professor

Professor

Department of Computer Science

S S E S Ant's Science College

Congress Nagar Nagpur

Student List for Registration (Addon Course–R Programming)

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S S E S Amravati's Science College, Congress Nagar, Nagpur-12 DEPARTMENT OF COMPUTER SCIENCE

Certificate Course (10 weeks) (R Programming)

Students Registration List

Session 2023-24

| Sr. No. | Name of Student |
|---------|-------------------------|
| 1 | Jagruti P Bairagi |
| 2 | Kasturi A Guhe |
| 3 | Disha I Bhelwa |
| 4 | Aatma V Gajbhiye |
| 5 | Aditi V Tarar |
| 6 | Akshata K Nagpurkar |
| 7 | Anchal R Tiwari |
| 8 | Hemanshu V Parshionikar |
| 9 | Himanshu A Rane |
| 10 | Rutuik P Kawre |
| 11 | Sahil J Mendhe |
| 12 | Bhagyashri C Kumre |
| 13 | Divya V Watkar |
| 14 | Divyani G Daware |
| 15 | Firdosh S Kazi |
| 16 | Gauri D Bhakare |
| 17 | Harshada B Badane |
| 18 | Harshneet Kaur J Virdi |
| 19 | Tulsi K Choudhary |
| 20 | Twinkle B Madavi |
| 21 | Vidya O Manmode |
| 22 | Yogita M Sahare |
| 23 | Yukta D Mangam |
| 24 | Vivek V Indurkar |
| 25 | Yash S Hattewar |
| 26 | Abhay Singh |
| 27 | Adarsh H Mandwe |
| 28 | Payal D Bagle |
| 29 | Payal R Gupta |
| 30 | Pornima J Sahu |
| 31 | Ajay B Ahirwar |
| 32 | Akash A Pawar |
| 33 | Pranali D Pillare |
| 34 | Sanika G Varpatkar |
| 35 | Toshan N Deshmukh |

| 36 Vansh T Chopde 37 Khush Rang Bhendarkar 38 Mahendra Dwangan 39 Ujjwal Mnkar 40 Vaibhav Sryavanshi 41 Yashika Barade 42 Abhisakti Ghugal 43 Ajinkya Ingle 44 Shreya Bagde 45 Lavanya R Talnikar 46 Madhua S Maske 47 Falguni A Singalwar 48 Gunjan B Radke 49 Neha Khandate 50 Prachi Thakre 51 Divya Kamble 52 Harshal Umredkar 53 Harshit Mourya 54 Rahul Nasare 55 Ayushi K Lichade 56 Chetana M Pardhi 57 sarvesh Daware 58 Sonu Chanode 59 Tanhvi Mohature 60 Sagar Bisen 61 Vishaka M Khiani 62 Osheen D Arora 63 Gunjan V Mourya 64 Harshal B Rangari 65 Kiran Rao 66 Jayant J Haldar 67 Parth S Virkhare 68 Rohan K Nimje 69 Shreya N Dhokwal 70 Vedanti P Doble 71 Sweth A Pimpalkar 72 Vipul D Sangitrao 73 Tanvi H Raut 74 Priya Kumari Prasad Deonath 75 Ishita S Shrivastava 76 Janhai P Diwakar 77 Stuti Karotiya | | |
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| 78 Sudhanshu Sakare | 78 | Sudhanshu Sakare |
| 79 Ayesha A Siddique | 79 | |
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| 81 | Ekta V Sant |
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| 82 | Dhruvika O Gotmare |
| 83 | Anjali Jaiswal |
| 84 | Trupti A Mondhe |
| 85 | Vaidehi S Jibhakate |
| 86 | Jyoti D Chavan |
| 87 | Kashish H Bawangade |
| 88 | Sanjana M Ghatole |

S S E S Amravati's Science College, Congress Nagar, Nagpur-12 DEPARTMENT OF COMPUTER SCIENCE

Certificate Course (10 weeks) (R Programming)

Theory and Practical Attendance Sheet

| _ | NAME OF TAXABLE PARTY. | | | | | | | | | | | | | 202 | | | 7 | | 202 | 93 | | - | _ | | | | | | | | |
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| 6 | Akshata K Nagpurkar | P | P | P | P | P | P | P | 6 | P | P | | P | 6 | P | P | 8 | P | 8 | P | P | _ | 6 | * | P | - | | - | 1 | 0 | |
| 7 | Anchal R Tiwari | P | P | | P | P | P | P | P | P | | 6 | 8 | 4 | P | C | P | 8 | P | 8 | 4 | P | P | . F | - | P | _ | 8 | • | - | |
| 8 | Hemanshu V Parshionikar | P | P | P | 8 | P | - | 6 | P | P | 1 | 4 | | | P | 8 | | P | P | P | P | P | 9 | | P | P | | P | 1 | P | 1 |
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| 1.3 | Divya V Watker | 0 | P | P | P | 6 | P | P | | P | P | | 6 | P | P | 8 | - | 8 | P | 1 | 4 | 8 | P | 0 | P | é | 0 | 1 | P | - | P |
| 14 | Divyani G Daware | 8 | P | P | P | P | B | P | P | P | - | 1 | 0 | 1 | 6 | F | - | P | 0 | | P | - | * | - | - | - | 0 | 0 | 0 | 0 | 0 |
| 15 | Firstoch & Kazi | 8 | P | P | P | P | P | 14. | P | P | P | | - 6 | - | | P | 8 | P | 8 | P | P | P | 0 | t. | P | 4 | - | B | 100 | - | 6 |
| 16 | Gauri D Bhakare | P | P | 8 | 2 | P | P | P | P | | P | | P | P | 0 | P | | P | P | - | 8 | T | V | P | 8 | 0 | P | | P | 0 | 0 |
| 27 | Harshoda & Badane | P | 18 | P | 8 | 16 | HP. | P | | P | P | 6 | | 18 | 8 | 9 | 8 | P | 6 | 0 | , | 0 | P | 0 | P | 8 | 0 | | 0 | 0 | P |
| 18 | Harshneet Kaur J Virdi | | P | P | 1 | P | 10 | 6 | P | P | 6 | 18 | F | 8 | - | 0 | P | P | 0 | P | P | 3 | P | 10 | - | 0 | 0 | 0 | 0 | 0 | |
| 19 | Tulsi K Choughary | P | P | 1 | 18 | P | P | P | | 8 | 1 | | P | 1 | P | P | P | P | P | P | P | 0 | P | 0 | P | P | - | P | P | 18 | P |
| 20 | Twinkle B Madavi | P | P | P | P | | P | E | | - | P | r | 6 | P | 1 | P | - | 8 | P | P | 0 | P | - | - | P | 0 | P | | P | r | 1 |
| 21 | Vidya O Manmode | P | P | P | P | - | P | P | P | - | 1 | 1 | 1 | F | 10 | 0 | P | 0 | + | P | P | 0 | 6 | - | 0 | 10 | P | P | | 10 | TF |
| 22 | Yogita M Sahare | P | 1 | P | P | 8 | P | P | - | 16 | 1 | 1 | 10 | P | 10 | 0 | P | 1 | P | | P | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 10 | 18 | 10 |
| 23 | Yukta D Mangam | 18 | P | P | 8 | P | P | | P | | 1 | 1 | P | P | P | 1 | 10 | 1 | 10 | 1 | 10 | 6 | 1 | P | 1 | 10 | P | 1 | -1 | 12 | P |
| 24 | Vivek V Indurkar | 10 | P | P | P | P | P | IP | P | P | 8 | 1 | 1 | P | 1. | 1 0 | 1 | 10 | 16 | 1 | P | 10 | 1 | 1 | 1 . | 10 | 10 | 10 | _ | - | 10 |
| 25 | Yash S Hattewar | P | P | 1 | P | | IP | 18 | P | P | F | 1 | 18 | , | 1 | 10 | 10 | 1 | - 0 | 0 | 1 | 0 | 10 | 0 | 1 | 10 | - | _ | - | _ | 51 |
| 26 | Abhay Singh | P | P | 18 | P | P | 18 | 1 8 | 1 | P | P | ut. | 8 | IC | 18 | 11 | P | - 1 | 1 | 11 | 10 | 14 | 10 | 11 | 10 | 14 | 1. | 10 | 1 | - | - |

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| 41 turbila Barada | P | P | TP | P | TP | | T | T | P | P | 1 | | P | P | P | - | P | I.P. | P | P | P | | P | P | P | P | | P | P | 18 | P |
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| 46 Wadna S Marke | P | P | P | 10 | P | 1 | 2 | PI | P | P | 0 | P | P | P | IP | 16 | F | | P | P | P | 4 | F | * | 100 | 19 | P | 18 | 18 | P | 6 |
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| 48 Surject Number | P | P | 1 | 16 | PIP | P | T | 1 | P | P | P | 18 | 6 | P | P | TP | | IP | P | 8 | * | P | P | P | P | P | | PP | P | F | 9 |
| 45 Nana Khandate | P | P | P | 1 1 | 19 | 2 4 | 2 | P | P | P | P | IP | 3 | P | * | IP. | 16 | P | P | 8 | P | P | P | P | - | P | , | 18 | 16 | IF | 7 |
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| 51 Divya Kamble | P | P | 18 | TP | P | P | Т | p. | | P | P | 18 | 13 | P | IP | IP | 16 | TP | IP | 18 | P | | * | P | P | IF | E | > 0 | 6 | P | 1 + |
| 52 Harshal Univediar | P | P | P | 10 | P | P | | P | P | P | - | 10 | 18 | | P | 1 | 1 | 1-8 | P | + | P | P | P | 8 | F | P | IP | 1 | 16 | IP | 16 |
| 53 Harshit Mourya | | P | P | TP | P | TP | | PI | | P | 8 | IP | 0 | P | | 11 | 18 | 18 | IP | P | 9 | P | P | 18 | 大 | P | IP | IP | 16 | 1 8 | 18 |
| 54 Rahul Neury | P | P | P | TP | 1 | IP | 1 | | PT | P | P | W | 17 | P | 18 | 16 | IP | 4 | P | IP | P | 31 | 18 | P | | 16 | | | P (| 3 8 | 16 |
| 55 Avoshi E Lichade | | P | P | P | 8 | P | | 2 | P | P | P | 4 | 8 | E | P | IP | IP | P | 18 | 10 | 10 | P | P | P | 1 | 18 | | 216 | > (| 3 8 | 7 4 |
| S& Charana M. Pardhi | P | P | P | P | 1 | P | 1 | D | P | P | P | P | 10 | 17 | 18 | R | P | | P | 4 | 18 | 18 | 10 | 18 | 1 | 7 8 | | 2 1 | 2 8 | 3 6 | 1 |
| | - | P | P | TF | P | | 10 | 51 | | P | P | R | 17 | 1 | R | TP | IP | IP | P | 6 | 18 | R | 1 | IP | 1 | 18 | 18 | | 211 | 216 | |
| and the same of th | | P | P | P | P | P | 17 | 0 | P | 4 | D | | TV | 18 | 17 | 18 | 10 | 0 | IF | 16 | IP | P | 10 | P | 16 | 51 | 210 | | 0. | 18 | |
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| 61 Vishska M Khiani | | P | PP | | 16 | 20 | 10 | P | P | Ò | 7 | 0 | 1 | P | P | - | 10 | 1 | P | D | 0 | P | - | 10 | 0 | Ö | 15 | 6 | | ŧ |
| 62 Oshoon D Arosu | 1 | 0 1 | 0 7 | 5 6 | 0 | 10 | P | - | P | - | D | - | P | 0 | b | 0 | 10 | 0 | 0 | - | 4 | ò | .0 | 15 | b 10 | 10 | D | 5 | 0 | t |
| 63 Gorjan V Moorya | 1 6 | > 0 | | 1 | 0 | P | 0 | | P | 0 | 6 | D | 0 | 10 | 17 | 10 | P | 18 | 1 | 0 | 0 | 0 | 6 | 0 | 10 | - | - | 15 | 6 | ŧ |
| 64 Harshal B Ranguri | IP | 7 | IP | 1 | P | P | P | | P | 0 | 1 | 1 | 1 | 10 | 0 | P | 1 | 10 | 0 | 6 | 6 | D | 13 | 10 | 0 | 0 | P | VS | P | ŧ |
| 65 Kirat Rao | P | F | 10 | 1 4 | P | P | P | | P | P | D | | D | P | 1 | 10 | 0 | 16 | 15 | 1 | 0 | 5 | D | 0 | 0 | 10 | 8 | - 1 | P | - |
| 66 Jayret J Haldur | 1 | IP | P | P | P | P | 1 | P | P | - | 0 | P | P | P | | P | P | 0 | 1 | D | 5 | 15 | D | 0 | 0 | 0 | 0 | VS | - | ŧ |
| 6.7 Parth S. Virkhare | P | P | 1 | 10 | | P | P | D | P | 0 | D | D | D | 0 | D | P | D | 1 | 15 | 6 | 15 | 10 | 0 | 1 | 0 | 1 | 5 | 0 | 0 | ŧ |
| 68 Roban K Nimje | 6 | 8 | P | - | 1 | 0 | | 0 | P | 0 | 5 | 4 | 4 | 0 | 1 | 10 | 15 | 00 | 15 | - | 0 | - | 1 | 0 | 0 | - 75 | 1 | 15 | 1 | ā |
| 69 Shreya N Dhokwal | | P | P | 8 | P | 10 | P | P | P | 0 | 6 | D | 6 | 0 | 0 | 0 | 16 | 100 | 1 | 0 | 1 | B | - | P | 10 | 6 | 10 | 6 | 6 | ł |
| 70 Vedami P Doble | 10 | P | 1 | | P | P | P | P | P | 0 | b | 6 | P | 10 | 1 | P | 1 | 10 | 0 | 0 | 100 | 5 | 6 | 0 | 1 | - | 5 | 0 | - | â |
| 71 Swell A Pimpaliur | P | P | P | P | P | P | P | 1 | 0 | 1 | - | P | | 0 | - | 0 | 0 | 5 | 3 | 5 | K | 1 | 0 | 10 | 6 | 0 | 1 | 5 | E | â |
| 72 Vipul D Sargitrao | 10 | P | P | 1 | 10 | 10 | 0 | P | D | D | 0 | 0 | 0 | 5 | | 0 | 6 | 6 | 0 | D | - | 5 | 1 | - | 1 | K | F | I | - | A |
| 73 Tinvi H Raut | 0 | P | TP | F | P | P | | | P | D | 0 | | 0 | 10 | 0 | 0 | 6 | - | 1 | - 5 | X | 1 | P | P | F | P | E | P | 0 | 4 |
| 74 Deceath | P | P | P | F | | P | P | P | P | D | 1 | P | P | | 4 | P | P | P | P | 0 | D | P | D. | P | P | P | 0 | 0 | 5 | i |
| 75 Ishim S Shrivastava | P | P | P | P | P | P | - | D | P | 0 | 0 | 0 | b | 0 | 0 | D | P | P | B | 0 | 0 | 0 | 85 | D | 0 | 4/3 | 1 | - | 15 | 4 |
| 76 Janhavi P Diwakar | 0 | P | P | 10 | 1. | P | P | P | 0 | - | 6 | - | 6 | P | P | P | | | 1 | 10 | - | 1 | K | P | 1 | K | F | 10 | - | 4 |
| 77 Stati Karotiya | P | 8 | P | P | P | B | | DI | 5 | D | D | D | 20 | 20 | 0 | D | 6 | 0 | 0 | | 5 | K | 1 | F | 0 | 10 | P | F | K | 4 |
| 78 Sudharshu Sakare | R | - | P | 0 | P | D | P | P | P | 6 | b | P | 1 | 15 | 1 | - 5 | 13 | 1 | 4 | 0 | 1 | 10 | P | P | P | P | P | - 8 | E | 4 |
| 79 Ayeshi A Siddique | P | D | P | 10 | P | | | P | P | 0 | 01 | P | 0 | 0 | 0 | 0 | 3 | 5 | 75 | 10 | 7 | 0 | H | - | 1 | F | P | 1 | - | 4 |
| 80 Avani V Adhav | | P | P | P | P | P | P | 0 | 0 | 0 | - | D | 0 | P | P | P | b | 5 | 0 | | 6 | 6 | R | R | - | 1 | 100 | P | P | 4 |
| B1 Eun V Sast | P | P | 1 | 10 | P | P | | 6 | P | 10 | D | 0 | - | P | B | - | 6 | 1 | 13 | - | 1 | 1 | 1 | F | 0 | 1 | P | 13 | * | + |
| 32 Dhravika O Gotmare | 0 | P | P | | P | B | | | P | 0 | 6 | 1 | D | B | 3 | P | - | 10 | 5 | 8 | K | 5 | + | P | Y | K | Y | 2 | + | 4 |
| 3 Arjali Jaiswal | P | P | ~ | P | D | P | 0 | | 5 | 0 | 5 | D | 0 | 0 | P | 20 | 0 | 1 | - | - | 5 | P | 4 | P | P | 1 | PP | P | 3 | 4 |
| 14 Trupti A Mondhe | P | P | P | P | P | P | PI | - | 5 | DI. | | 701 | 6 | B | D | 1 | 5 | 6 | 13 | - 11 | K | K | P | P | P | P | P | P | 15 | 4 |
| 5 Vridehi S Abhakare | P | 8 | P | P | | P | | PIG | > | 01 | 0 | - | 0 | 0 | 6 | -0 | 0 | 0 | 4 | 7 | K | K | 8 | * | 10 | 6 | P | 16 | P | 4 |
| 6 Jyon D Chavas | 0 | P | P | b | | D | 0 | 1 11 | 5 | D | P | D | 1 | 6 | | 5 | 5 | 1 | | P | 4 | P | 9 | P | P | P | P | P | | 1 |
| 7 Kashish H Bawangade | | P | P | 0 | P | P | - | 51 | 5 | 5 | 0 | 2 | 0 | 0 | 0 | 1 | V | P | 2 | 1 | 0 | | R | P | P | P | 0 | 10 | P | J |
| Surgara M Ghatole | P | 8 | - | 0 | P | 5 | - | 0 | 3 | 01 | 5 | 5 | 5 | - | 2 | + | _ 14 | E | K | 6 | 2 | R | 8 | P | 6 | F | P | P | P | 4 |

Department of Computer Science I S.S.E.S. Amis Science College, Congress Hagilf, Napour

SSES Amravati's Science College, Congress Nagar, Nagpur-12 DEPARTMENT OF COMPUTER SCIENCE

Date:09-10-2023

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 | 18-10-2023 | Computer laboratory | 11:00 to 1:00 |
| Practical | 19-10-2023 | Computer laboratory | 11:00 to 1:00 |

Department of Computer Science

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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: 18-10-2023

Attendance Sheet: Theory Examination

| Roll . No. | Name of Student | Signature |
|------------|----------------------------|-------------|
| RProg-1 | Jagruti P Bairagi | Paugi |
| RProg-2 | Kasturi A Guhe | Kashirig |
| RProg-3 | Disha I Bhelwa | Dedwa |
| RProg-4 | Aatma V Gajbhiye | - AGH bhiye |
| RProg-5 | Aditi V Tarar | Afrai |
| RProg-6 | Akshata K Nagpurkar | ALMGRURKAR |
| RProg-7 | Anchal R Tiwari | ARNOM |
| RProg-8 | Hemanshu V Parshionikar | Hardi. |
| RProg-9 | Himanshu A Rane | Heardach |
| RProg-10 | Rutuik P Kawre | KKanre |
| RProg-11 | Sahil J Mendhe | Menda |
| RProg-12 | Bhagyashri C Kumre | Kurone |
| RProg-13 | Divya V Watkar | Okalton |
| RProg-14 | Divyani G Daware | 260 |
| RProg-15 | Firdosh S Kazi | FXAZI. |
| RProg-16 | Gauri D Bhakare | Goldle |
| RProg-17 | Harshada B Badane | Librare |
| RProg-18 | Harshneet Kaur J Virdi | 34.5 |
| RProg-19 | Tulsi K Choudhary | Tula Cay |
| RProg-20 | Twinkle B Madavi | (LING |
| RProg-21 | Vidya O Manmode | Hola |
| RProg-22 | Yogita M Sahare | Joseph |
| RProg-23 | Yukta D Mangam | 700 |
| RProg-24 | Vivek V Indurkar | Drawlan |
| RProg-25 | Yash S Hattewar | Modlows 1 |
| RProg-26 | Abhay Singh | 15 info |
| | Adarsh H Mandwe | Aprandur |
| RProg-27 | Payal D Bagle | Drake |
| RProg-28 | Payal R Gupta | Physics |
| RProg-29 | Pornima J Sahu | PSahu |
| RProg-30 | Pornima J Saliu | |

| RProg-31 | Ajay B Ahirwar | M-Lund 1 |
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| RProg-32 | Akash A Pawar | ALTI |
| RProg-33 | Pranali D Pillare | PillariP |
| RProg-34 | Sanika G Varpatkar | Starrathan |
| RProg-35 | Toshan N Deshmukh | Deskmuch |
| RProg-36 | Vansh T Chopde | Vanet. |
| RProg-37 | Khush Rang Bhendarkar | KhushRanGB |
| RProg-38 | MahendraDwangan | Mahinton |
| RProg-39 | UjjwalMnkar | Vilwall. |
| RProg-40 | VaibhavSryavanshi | Staibhar |
| RProg-41 | YashikaBarade | Ybarado |
| RProg-42 | AbhisaktiGhugal | -AbbiRhucal |
| RProg-43 | Ajinkya Ingle | Ande: |
| RProg-44 | Shreya Bagde | Shade. |
| RProg-45 | Lavanya R Talnikar | Dalvi Kar |
| RProg-46 | Madhua S Maske | Malelon |
| RProg-47 | Falguni A Singalwar | Himlery. |
| RProg-48 | Gunjan B Radke | Fredon |
| RProg-49 | NehaKhandate | Hardate |
| RProg-50 | PrachiThakre | Frakse |
| RProg-51 | DivyaKamble | CAS . |
| RProg-52 | HarshalUmredkar | -A Dorredkoo |
| RProg-53 | HarshitMourya | ADDONAG |
| RProg-54 | Rahul Nasare | Plane |
| RProg-55 | Ayushi K Lichade | Alichade |
| RProg-56 | Chetana M Pardhi | Andhi. |
| RProg-57 | sarveshDaware | Spanare |
| RProg-58 | SonuChanode | Haredo |
| RProg-59 | TanhviMohature | Mehabare |
| RProg-60 | SagarBisen | AD . |
| RProg-61 | Vishaka M Khiani | Hoini |
| RProg-62 | Osheen D Arora | Adaga. |
| RProg-63 | Gunjan V Mourya | Gunjant |
| RProg-64 | Harshal B Rangari | Rayari |
| RProg-65 | Kiran Rao | Han. |
| RProg-66 | Jayant J Haldar | THOLAN |
| RProg-67 | Parth S Virkhare | Printpare |
| RProg-68 | Rohan K Nimje | Patieno |
| RProg-69 | Shreya N Dhokwal | |
| RProg-70 | Vedanti P Doble | Vedanti |
| RProg-71 | Sweth A Pimpalkar | Ab |
| Contract of the last of the la | | |

| RProg-72 | Vipul D Sangitrao | Wanidyan |
|----------|-------------------------------|------------|
| RProg-73 | Tanvi H Raut | TO L |
| RProg-74 | PriyaKumari Prasad Deonath | Prigades |
| RProg-75 | Ishita S Shrivastava | Tiwakas |
| RProg-76 | Janhavi P Diwakar | A section |
| RProg-77 | StutiKarotiya | Skarotuje |
| RProg-78 | SudhanshuSakare | Salane |
| RProg-79 | Ayesha A Siddique | Asidtique |
| RProg-80 | Avani V Adhav | AAda |
| RProg-81 | Ekta V Sant | Absent |
| RProg-82 | Dhruvika O Gotmare | Motomare |
| RProg-83 | Anjali Jaiswal | Ational |
| RProg-84 | Trupti A Mondhe | Manche |
| RProg-85 | Vaidehi S Jibhakate | Withalhate |
| RProg-86 | Jyoti D Chavan | Jestic |
| RProg-87 | Kashish H Bawangade | Hawan |
| RProg-88 | Sanjana M Ghatole | Lats le |

Course Coordinator

Professor

Department of Computer Science 1

8.S.E.S. Amt's Science College,
Congress Nagar, Nagour

Head of Department

Professor & Head

Department of Computer Science

S S E.S. Amt's Science College

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: 19-10-2023

Attendance Sheet: Practical Examination

| Name of Student | Signature |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jagruti P Bairagi | Bauge |
| Kasturi A Guhe | Kasturia |
| Disha I Bhelwa | Drelma |
| Aatma V Gajbhiye | Norightiye |
| Aditi V Tarar | Atacks |
| Akshata K Nagpurkar | AVAGPURKAR |
| Anchal R Tiwari | Aliman |
| Hemanshu V Parshionikar | - Harshi |
| Himanshu A Rane | * Hemanhu |
| Rutuik P Kawre | ! KENT! |
| Sahil J Mendhe | Handh |
| Bhagyashri C Kumre | Kurone |
| Divya V Watkar | Dilatto |
| Divyani G Daware | GOSA) |
| Firdosh S Kazi | TRAZI: |
| Gauri D Bhakare | globakoe |
| Harshada B Badane | Madare |
| | 307 |
| Tulsi K Choudhary | Total Of |
| Twinkle B Madavi | 7160 |
| Vidya O Manmode | THINK OF THE PROPERTY OF THE P |
| Yogita M Sahare | Sahare |
| Yukta D Mangam | (A) |
| Vivek V Indurkar | Transfer |
| Yash S Hattewar | Motlewal |
| Abhay Singh | Augh |
| | Africadure |
| | Bagle |
| | Phyla |
| Pornima J Sahu | Pshu |
| | Jagruti P Bairagi Kasturi A Guhe Disha I Bhelwa Aatma V Gajbhiye Aditi V Tarar Akshata K Nagpurkar Anchal R Tiwari Hemanshu V Parshionikar Himanshu A Rane Rutuik P Kawre Sahil J Mendhe Bhagyashri C Kumre Divya V Watkar Divyani G Daware Firdosh S Kazi Gauri D Bhakare Harshada B Badane Harshneet Kaur J Virdi Tulsi K Choudhary Twinkle B Madavi Vidya O Manmode Yogita M Sahare Yukta D Mangam Vivek V Indurkar Yash S Hattewar Abhay Singh Adarsh H Mandwe Payal D Bagle Payal R Gupta |

| RP(Og-1) | Ajay B Ahirwar | Allbirthar |
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| KING 12 | Akash A Pawar | -AKAN- |
| RProg-11 | Pranali D Pillare | DINIP |
| RPTOR-34 | Sanika G Varpatkar | 2 Dayattay |
| RPTEN-35 | Toshan N Deshmukh | Absent |
| RProg-36 | Vansh F Chopide | TANKS. |
| RProg-37 | Khush Rang Bhendarkar | LAWALINE |
| RPTON-38 | MahemiraDwangan | Maheritad |
| RP108-39 | UjjwalNtnkar | Charles. |
| RProg-40 | ValbhavSryavanshi | Jairles |
| Rivog-41 | YashikaBarade | Marak |
| RProg-42 | AbhisaktiGhugal | -Albhi Chenel |
| RProg-43 | Ajinkya Ingle | della |
| RProg-44 | Shreya Bagde | SACE |
| RProg 45 | Lavanya R Talnikar | Lahila |
| RProg-46 | Madhua S Maske | Mades |
| RPYOR-47 | Falguni A Singalwar | Asimahan |
| RProg-48 | Gunjan B Radke | Townson! |
| RPvog-49 | NehaKhandate | N Ample |
| RProg-50 | PrachiThakre | Director |
| RProg-51 | DivyaKamble | CDS . |
| RProg-S2 | HarshalUmredkar | -12 breekers |
| RPTOK-S3 | HarshitNtourva | 2 Albani |
| RProg-54 | Rahul Nasare | Were |
| RProg-SS | Ayushi K Lichade | Nichade |
| RProg-56 | Chetana M Purdhi | Daidhi |
| RProg-57 | sarveshDaware | Dalyare |
| RProg-SS | SonuChanode | Chanales |
| RProg-S9 | TanhviAlohature | Malatore |
| RProg-60 | SagarBisen | |
| MANAGEMENT OF THE PARTY OF THE | Vishaka M Khiani | Glocki |
| RProg-61 | Oshcen D Arom | Means |
| RProg-62 | Gunjan V Mosnya | Gunant? |
| RProg-63 | Harshal B Rangari | |
| RProg-64 | NAME AND ADDRESS OF THE OWNER, TH | 18:00 |
| RProg-65 | Kiran Rao | Midden |
| RProg-66 | Jayant J Hakkar | 1137 |
| RProg-67 | Parth S Virkhare | Middale |
| RProg-68 | Rohan K Nimie | 1 2/45 |
| RProg-69 | Shreya N Dhokwal | 80 |
| RProg-70 | Vedanti P Doble | " desta" |
| RProg-71 | Sweth A Physolkar | She) |

| RProg-72 | Vipul D Sangitrao | Maretras |
|----------|-------------------------------|------------|
| RProg-73 | Tanvi H Raut | TRaut |
| RProg-74 | PriyaKumari Prasad Deonath | Absent |
| RProg-75 | Ishita S Shrivastava | Princo |
| RProg-76 | Janhavi P Diwakar | Tilgankar |
| RProg-77 | StutiKarotiya | Skarting 9 |
| RProg-78 | SudhanshuSakare | Salare |
| RProg-79 | Ayesha A Siddique | XSTUGUE. |
| RProg-80 | Avani V Adhav | After' |
| RProg-81 | Ekta V Sant | Cant . |
| RProg-82 | Dhruvika O Gotmare | The trouve |
| RProg-83 | Anjali Jaiswal | Alayshan |
| RProg-84 | Trupti A Mondhe | Made |
| RProg-85 | Vaidehi S Jibhakate | Vibhallho |
| RProg-86 | Jyoti D Chavan | Jatic |
| RProg-87 | Kashish H Bawangade | Kenesau |
| RProg-88 | Sanjana M Ghatole | Statole |

Course Coordinator
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Congress Nagar Nagpur

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

DEPARTMENT OF COMPUTER SCIENCE

Certificate course in R Programming Theory Examination

Date: 18/10/2023

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. What is R primarily used for?

- A) Web development
- B) Statistical computing and graphics
- C) Game development
- D) Mobile app development

2. 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

3. 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

4. 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 ()

5. 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()

| 6. | What will be the result of the following operation in R: 3 + 5 * 2? |
|----|-----------------------------------------------------------------------------------|
| • | A) 13 |
| • | B) 16 |
| • | C) 10 |
| • | D) 11 |
| 7. | Which of the following is NOT a basic data type in R? |
| • | A) Numeric |
| • | B) Character |
| • | C) Boolean |
| • | D) Logical |
| 8. | 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 |
| 9. | Which function is used to combine elements into a character vector? |
| • | A) cbind() |
| • | B) paste() |
| • | C) c() |
| • | D) combine() |
| 10 | . 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 |
| 11 | . Which function would you use to find the smallest number in a numeric vector? |
| • | A) min() |
| • | B) max () |
| • | C) mean() |
| • | D) sum() |
| 12 | . What is the result of as.numeric("123.45") in R? |
| • | A) "123.45" |
| • | B) 123.45 |
| • | C) NA |
| • | D) Error |
| 13 | . 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 |
| | |
| | |
| | |

14. 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) 15. Which function calculates the average value of a numeric vector in R? A) mean() B) median() • C) sum() D) avg() 16. 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} 17. 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 18. Which function is used to create a list in R? A) list() • B)c() • C) combine() • D) vector() 19. 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 20. 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) 21. 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

```
22. 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)

23. 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

24. 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
25. 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))
26. How do you add an element "d" with value 4 to an existing list my list?
A) my list["d"] <- 4</li>
• B) my list$d<- 4
• C) my list<- append(my list, 4, after=3)
• D) my list<- c(my list, d=4)
27. Which function is used to read a CSV file into R?
A) read.csv()
• B) import.csv()
• C) read.table()
D) csv.read()
28. 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()
29. Which package in R is commonly used to import data from Excel files?
A) xlsx
• B) readxl

    C) openxlsx

    D) excelR
```

30. 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") 31. Which package allows writing data frames to Excel files in R? A) readxl B) writexl C) openxlsx • D) Both B and C 32. Which package in R is commonly used to connect to relational databases? A) RMySQL B) DBI C) RSQLite • D) All of the above 33. 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() 34. 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 35. 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 36. 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()

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

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

38. 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

39. Which dplyr function is used to filter rows based on a condition?

- A) arrange()
- B) select()
- C) filter()
- D) summarize()

40. 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()

41. Which function would you use to sort a dataframe by one or more variables in dplyr?

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

42. How can you summarize data, such as calculating the mean or sum, using dplyr?

- A) select()
- B) summarize()
- C) arrange()
- D) filter()

43. 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.

44. 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()

45. 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.

46. Which function would you use to combine multiple columns into a single column in tidyr?

- A) gather()
- B) spread()
- C) separate()
- D) unite()

47. 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

48. What is the primary purpose of the ggplot2 package in R?

- A) Data manipulation
- B) Statistical modeling
- C) Data visualization
- D) Data cleaning

49. Which function is used to initialize a ggplot2 plot?

- A) ggplot()
- B) plot()
- C) gg_init()
- D) geom_plot()

50. 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

51. Which function would you use to create a scatter plot in ggplot2?

- A) geom_point()
- B) geom_line()
- C) geom_bar()
- D) geom_histogram()

52. Which geom function is used to create a line plot in ggplot2?

- A) geom_point()
- B) geom_line()
- C) geom_bar()
- D) geom_histogram()

53. 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()

54. What function would you use to create a histogram in ggplot2?

- A) geom_point()
- B) geom_line()
- C) geom_bar()
- D) geom_histogram()

55. Which ggplot2 function is used to add titles and labels to axes?

- A) theme()
- B) labs()
- C) aes()
- D) annotate()

56. How can you add text annotations to a ggplot2 plot?

- A) geom_text()
- B) annotate()
- C) labs()
- D) theme()

57. 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

58. 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

59. 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

60. 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

SSES Amravati's Science College, Congress Nagar, Nagpur-12 DEPARTMENT OF COMPUTER SCIENCE Course Title: Certificate Course in R Programming Course Coordinator : Dr. R. N. Jugele

Marksheet

Date: 26-10-2023

| Sr. No | Name of Student | Theory(60) | Practical(40) | Total (100) | Grade |
|------------------------------------|----------------------------|------------|---------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| gprog-1 | Jagruti P Bairagi | 39 | 30 | 69 | B ⁺ |
| RProg-2 | Kasturi A Guhe | 53 | 35 | 88 | A+ |
| RProg-3 | Dishad Bhelwa | 44 | 32 | 76 | A |
| RProg-4 | Aatma V Gajbhiye | 38 | 32 | 70 | B ⁺ |
| RProg-5 | Aditi V Tarar | 47 | 37 | 84 | A+ |
| RProg-6 | Akshata K Nagpurkar | 38 | 37 | 75 | A |
| RProg-7 | Anchal R Tiwari | 43 | 31 | 74 | A |
| RProg-8 | Hemanshu V Parshionikar | 57 | 33 | 90 | A ⁺ |
| RProg-9 | Himanshu A Rane | 38 | 40 | 78 | A |
| RProg-10 | Rutuik P Kawre | 57 | 34 | 91 | A STATE OF THE PARTY OF THE PAR |
| RProg-11 | Sahil J Mendhe | 44 | 35 | 79 | A+ |
| RProg-12 | Bhagyashri C Kumre | 58 | 30 | 88 | A |
| RProg-13 | Divya V Watkar | 44 | 31 | 75 | A A ⁺ A |
| RProg-14 | Divyani G Daware | 50 | 34 | 84 | A |
| RProg-15 | Firdosh S Kazi | 39 | 38 | 77 | A |
| RProg-16 | Gauri D Bhakare | 55 | 38 | 93 | 0 B ⁺ |
| RProg-17 | Harshada B Badane | 35 | 30 | 65 | A |
| RProg-18 | Harshneet Kaur J Virdi | 42 | 30 | 72 | |
| RProg-19 | Tulsi K Choudhary | 48 | 32 | 80 | A |
| RProg-20 | Twinkle B Madavi | 51 | 30 | 81 | A ⁺ |
| RProg-21 | Vidya O Manmode | 59 | 30 | 89 | |
| THE RESERVE OF THE PERSON NAMED IN | Yogita M Sahare | 40 | 31 | 71 | A |
| RProg-22 | Yukta D Mangam | 40 | 37 | 77 | A |
| RProg-23 | Vivek V Indurkar | 51 | 34 | 85 | |
| RProg-24 | | 46 | 34 | 80 | |
| RProg-25 | Yash S Hattewar | 40 | 38 | 78 | |
| RProg-26 | Abhay Singh | 56 | 35 | 91 | THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAME |
| RProg-27 | Adarsh H Mandwe | 38 | 36 | 7. | A |
| RProg-28 | Payal D Bagle | 49 | 32 | 8 | 1 A |
| RProg-29 | Payal R Gupta | 49 | | | |

| RProg-30 | Pornima J Sahu | 39 | 36 | 75 | A |
|----------|-----------------------|----|----|----|----------------|
| RProg-31 | Ajay B Ahirwar | 38 | 39 | 77 | A |
| RProg-32 | Akash A Pawar | 50 | 32 | 82 | 4+ |
| RProg-33 | Pranali D Pillare | 41 | 39 | 80 | A |
| RProg-34 | Sanika G Varpatkar | 48 | 36 | 84 | A+ |
| RProg-35 | Toshan N Deshmukh | 58 | Ab | 58 | Ab |
| RProg-36 | Vansh T Chopde | 49 | 35 | 84 | A+ |
| RProg-37 | Khush Rang Bhendarkar | 39 | 36 | 75 | A |
| RProg-38 | MahendraDwangan | 53 | 34 | 87 | A+ |
| RProg-39 | UjjwalMnkar | 51 | 39 | 90 | A ⁺ |
| RProg-40 | VaibhavSryavanshi | 42 | 40 | 82 | A+ |
| RProg-41 | YashikaBarade | 60 | 35 | 95 | 0 |
| RProg-42 | AbhisaktiGhugal | 45 | 30 | 75 | A |
| RProg-43 | Ajinkya Ingle | 36 | 31 | 67 | B+ |
| RProg-44 | Shreya Bagde | 56 | 40 | 96 | 0 |
| RProg-45 | Lavanya R Talnikar | 42 | 31 | 73 | A, |
| RProg-46 | Madhua S Maske | 52 | 37 | 89 | A+ |
| RProg-47 | Falguni A Singalwar | 42 | 38 | 80 | A |
| RProg-48 | Gunjan B Radke | 53 | 39 | 92 | 0 |
| RProg-49 | NehaKhandate | 37 | 36 | 73 | A |
| RProg-50 | PrachiThakre | 45 | 39 | 84 | A+ |
| RProg-51 | DivyaKamble | 44 | 31 | 75 | A |
| RProg-52 | HarshalUmredkar | 35 | 38 | 73 | A |
| RProg-53 | HarshitMourya | 37 | 30 | 67 | B+ |
| RProg-54 | Rahul Nasare | 53 | 40 | 93 | 0 |
| RProg-55 | Ayushi K Lichade | 53 | 33 | 86 | A+ |
| RProg-56 | Chetana M Pardhi | 37 | 30 | 67 | B ⁺ |
| RProg-57 | sarveshDaware | 41 | 38 | 79 | |
| RProg-58 | SonuChanode | 57 | 37 | 94 | 0 |
| | TanhviMohature | 40 | 30 | 70 | BT |
| RProg-59 | SagarBisen | 45 | 39 | 84 | A+ |
| RProg-60 | Vishaka M Khiani | 48 | 33 | 81 | A+ |
| RProg-61 | Osheen D Arora | 39 | 36 | 75 | A |
| RProg-62 | | 57 | 36 | 93 | 0 |
| RProg-63 | Gunjan V Mourya | 47 | 38 | 85 | A+ |
| RProg-64 | Harshal B Rangari | 39 | 30 | 69 | B+ |
| RProg-65 | Kiran Rao | 49 | 38 | 87 | A+ |
| RProg-66 | Jayant J Haldar | 42 | 31 | 73 | A |
| RProg-67 | Parth S Virkhare | | 34 | 70 | Bt |
| RProg-68 | Rohan K Nimje | 36 | 33 | 69 | Bt |
| RProg-69 | Shreya N Dhokwal | 36 | 39 | 74 | A |
| RProg-70 | Vedanti P Doble | 35 | 33 | | |

| RProg-71 | Sweth A Pimpalkar | 46 | 30 | | |
|----------|-------------------------------|----|----------|----------|----------------------------------|
| RProg-72 | Vipul D Sangitrao | 55 | 30 | 76 | A |
| RProg-73 | Tanvi H Raut | 54 | 36 | 91 | 0 |
| RProg-74 | PriyaKumari Prasad Deonath | 53 | 38 Ab | 92 | Ab |
| RProg-75 | Ishita S Shrivastava | 47 | 40 | 53 | 4+ |
| RProg-76 | Janhavi P Diwakar | 37 | 30 | 87 67 | A ⁺ B ⁺ |
| RProg-77 | StutiKarotiya | 58 | 34 | 92 | 0 |
| RProg-78 | SudhanshuSakare | 55 | 40 | 95 | 0 |
| RProg-79 | Ayesha A Siddique | 53 | 32 | 85 | A+ |
| RProg-80 | Avani V Adhav | 42 | 39 | 81 | A+ |
| RProg-81 | Ekta V Sant | Ab | 35 | 35 | Ab |
| RProg-82 | Dhruvika O Gotmare | 40 | 36 | 76 | A |
| RProg-83 | Anjali Jaiswal | 40 | 35 | 75 | A |
| RProg-84 | Trupti A Mondhe | 47 | 39 | 86 | A+ |
| RProg-85 | Vaidehi S Jibhakate | 58 | 37 | 95 | 0 |
| RProg-86 | Jyoti D Chavan | 57 | 35 | 92 | 0 |
| RProg-87 | Kashish H Bawangade | 48 | 32 | 80 | A |
| RProg-88 | Sanjana M Ghatole | 59 | 37 | 96 | 0 |

25

Course Coordinator

Department of Computer Science 1

8 S E S Amt's Science College,
Congress Nagar, Nagpur

Head of Department

Professor & Head

Department of Computer Science

S.S.E.S. Amt's Science College

Congress Nagar Nagar



Shri Shivaji Education Society, Amravati's SCIENCE COLLEGE

Congress Nagar, Nagpur-12 (M.S.), India



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Mentor College under 'PARAMARSH Scheme', UGC, New Delhi

| Course Ex | Add-on Cou | rse in P Programming |
|-----------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 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. |
| Roll No.: | Session: 2023-24 | 3. Use of pencil is strictly prohibited. Circles should be dead prohibited. |
| Test Date: 18/10/2023 | Max. Marks: 60 | 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. |
| Invigilator Signature | Obtained Marks: | 7. Do not use marker or white fluid to hide the mark. WRONG METHODS CORRECT METHOD S S S O C O O O |

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| LEE | 80000 | 18 0000 | 28 0000 | 38 0000 | 48 0000 | 58 | 0000 |
| | 90000 | 19 0000 | 29 0000 | 39 0000 | 49 0000 | 59 | 0000 |
| | 0000 | 20 0000 | 30 0000 | 40 0000 | 50 0000 | 60 | 0000 |
| - | | | | | | de es | |

Answer Key



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| Add-on Course 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. | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|--------|-------------------------|----------------------------------------------|-----------|-------------|-----------|----------------------------|--|
| | | | | | | | | Roll No.: | Roll No.: Session: 2023-24 | |
| Test Date: 18/ | 10/2023 | Max. Marks: 60 | | 5. Cutting 6. Do not | and erasing on this shuse any stray marks or | eet is no | ot allowed. | | | |
| Invigilator | Signature | Obtained Marks: | | WRONG | | | IETHOD | | | |
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Mentor College under 'PARAMARSH Scheme', UGC, New Delhi

| Course Exa | Add-or m Name: Certific | Cours | Se arse in R Programming | | |
|-----------------------|----------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| some of Student: | Session: 20 Max. Marks: 60 | | 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. | | |
| Invigilator Signature | Obtained Marks: | 57 | 7. Do not use marker or white fluid to hide the mark. WRONG METHODS CORRECT METHOD Solution (Correct Method) | | |

| I | Invigilator | | | | | |
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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

Session 2023-24 under Add-on course conducted for 30 hours from 01/08/2023 to 07/10/2023 by Department of Computer Science, SSESA's, Science College, congress Nagar, Nagpur 440012.

He/She has passed the Examination with ' $\underline{\mathcal{O}}$ Grade.

Prof. R. N. JugeleCoordinator, 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 1st August 2023 to 7th October 2023. The course title was "R Programming". 85 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 | | | | | | | | |
| 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 | | | | | | | | |
| ${f Q.4}$ 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 AI course? | | | | | | | | |
| 1 2 3 4 5 | | | | | | | | |
| Q.6 Any Suggestions: | | | | | | | | |
| | | | | | | | | |

Feedback Analysis

Number of Students Registered for the Course: 88
 Number of Students submitted the Feedback: 85

3. Question wise analysis of the Feedback:

| Sr. | Question | Responses in Percentage (%) | | | | | |
|-----|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------|-------|--------------|------|--|
| No | | Best | Excellent | Good | Satisfactory | Fair | |
| 1) | How would you rate the organization and structure of the course? | 42.85 | 14.28 | 16.66 | 22.61 | 3.57 | |
| 2) | How do you rate the quality of the delivery of the units by the Teacher? | 36.9 | 23.8 | 22.61 | 17.85 | 0 | |
| 3) | How useful were the hands-on assignments and projects in enhancing your practical understanding of AI? | 40.47 | 22.61 | 17.85 | 14.28 | 4.76 | |
| 4) | How well-organized was the course structure, including the sequencing of topics and the pacing of the material? | 40.47 | 17.85 | 13.69 | 22.61 | 5.95 | |
| 5) | Overall, how would you rate your learning experience in this course? | 35.71 | 14.28 | 23.8 | 23.61 | 2.57 | |
| 6) | Any Suggestions | No Suggestions: 29.4% 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.

Certificate course: R Programming (2023-24)

Feedback Analysis

