Prospectus of R Programming for Everyone

Cosmic Charade

R Programming for Everyone

The Training Course in the R Programming Language, **R Programming for Everyone** is designed to give you a foundation in learning to use R: The Statistical Programming Language. R is a powerful and flexible Open Source application for data analysis and data visualization. R is used widely by businesses, academia, government, and corporations around the world. We are going to show how you can do (literally) everything with R, from Astronomy to Zoology, R has the capabilities to visualize your data, findings, and conclusion efficiently. The core philosophy of this course will be to get familiar with R as your day-to-day automation tool rather than a simple programming language and engage with lots of examples, stories, and fun. R Programming for Everyone, our training course will give you a starting point in using R for many kinds of data analysis and visualization. You do not have to be a hardcore programmer to use R in our training course. The R Programming Language can be customized for many purposes and in this training course you'll take the first step towards unlocking a wealth of powerful analytical and graphical tools.

Course Objectives:

Learn to use R: The Statistical Programming Language in this training course for beginners who are new to this powerful and flexible Open Source tool. Our foundation training course R Programming for Everyone is designed to give you a good beginning to the range of analytical and graphical tools that R can provide. In this R training course, you will:

- Learn to use R to import data.
- Learn to use R to summarise data.
- Learn to use R to visualize data.
- Draw some inferences after analyzing data.

You'll also learn a few other important aspects of using R, such as how to manage data items, how to extend the capabilities of R, Interactive Web Applications using R/R Shiny, and Building a blogging Website using R (Quarto)

You do not have to be a programmer to use R; in our training course, you will learn how to get started using R for data analysis and data visualization. Our R Programming Training Course will give you the foundation you need to master this powerful program.

Course Overview

In this course, you will learn how to program in R and how to use R for effective data analysis and visualization. "Turn raw data into understanding, insight, and knowledge" using R to import, prepare, understand, and communicate your data findings.

The course begins with developing a basic understanding of the R working environment. Next, you will be introduced to the necessary arithmetic and logical operators, Data wrangling and Pre-Processsing, and getting help using R. Next, the common data structures, variables, and data types used in R will be demonstrated and applied. You will write R scripts and build R markdown documents to share their code with others. They will utilize the various packages available in R for visualization, reporting, data manipulation, and statistical analysis.

They can import, transform and manipulate those datasets for various analytical purposes. You'll learn how to use loops and conditional statements to traverse, sort, merge, and evaluate data. Finally, you'll create interactive applications that allow you to data query and data exploration. This course is designed for those who have no experience in R or programming. The sessions will help you to upgrade your skill sets in R and introduce you to 1) A new way of thinking 2) A new programming language for speaking and reading (vectors, matrices, lists, data frames, functions, objects, etc., and 3) A new syntax for writing, e.g.

```
c(), print(), cat(), sort(), require(), subset()
```

for data analysis and presentation.

Prerequisites

No prerequisites are needed, this course is designed for novices and no R programming or statistical knowledge is required at all.

Learning Outcomes

By the end of the course, you'll be confident and equipped with all the knowledge required to perform computational and analytical activities in R. Specifically,

- **Understand** the fundamental syntax of R through readings, practice exercises, demonstrations, and writing R code.
- **Apply** critical programming language concepts such as data types, iteration, functions, and boolean operators by writing R programs through examples.
- **Import** a variety of data formats into R using RStudio.
- **Preparation** of tidy data for analysis.
- **Analyze** a data set in R and present findings using the appropriate R packages.
- **Visualize** data attributes using ggplot and other R packages.

Pedagogy for Course Delivery

The sessions will be taught using theory and practical methods. In addition to numerical applications, real-life problems and situations will be assigned to the learners and they are encouraged to get a feasible solution that could deliver meaningful and acceptable to the end users. The online course will be delivered using Zoom/ G-meet / Teachmint (will inform you later). Support material is supplied online usually via Google Classroom.

Instructor

Samrit Pramanik and Abhirup Moitra

Course Curriculum

- What is R?
- Why R?
- Invention of R as a Programming Language
- Download and install R and RStudio (Posit Software)
- R as a calculator
- Reading & Writing Data using R
- Basic R operations, Loops and Functions

- R Libraries/Packages
- Basic Data Analysis (Data Wrangling and Pre-processing)
- Data Visualizations
- Statistical Analysis and Model Building
- R in Astronomy/Cosmology
- R in Medical Science
- R in Criminology
- R in Sports
- Interactive Web Application using R Shiny
- Building Blogging Website using R (Quarto)

**Topics are subject to be modified on demand*

Books

1. **R for Excel users by Julie Lowndes, Allison Horst**
2. **A Beginner's Guide to Clean Data by Benjamin Greve**
3. **A sufficient Introduction to R by Derek l. Sonderegger**
4. **An Introduction to R by Alex Douglas, Deon Roos, Ana Couto, Francesca Mancini, David Lusseau**
5. Best Coding Practices for R by Vikram Singh Rawat
6. **Hands-On Programming with R by Garrett Grolemund**
7. **R Basics: An Introduction to Programming for Researchers by Nick Ulle**

Official Website: Cosmic Charade

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