You are invited to attend a virtual course hosted by ICCSSA
Introduction to R

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Dr Priyanka Nagar started her academic studies at the University of Pretoria where she obtained her BSc in Actuarial and Financial Mathematics, BSc (Hons), MSc and PhD in Mathematical Statistics. Her research interests are in the field of directional statistics and distribution theory with various applications. Her PhD thesis focused on applications in wind energy and orthopaedics.

From 2017 to 2020 Priyanka was appointed as a lecturer in the Department of Statistics at the University of Pretoria. During her appointment she taught courses focused on the foundational topics of Mathematical Statistics at a first and second year level. She also developed a course for second year students focused on Applications in Data Science which introduced a more practical side of statistics at an undergraduate level. During 2021 Priyanka spent a year working in the telecommunications industry as a full stack data scientist. In 2022 she re-joined the Department of Statistics at the University of Pretoria as a lecturer where she uses R software to facilitate teaching of data science techniques. Priyanka developed an interest in data science during her postgraduate studies and explores machine learning applications in her spare time.

INTRODUCTION TO R

COURSE DESCRIPTION
This course introduces programing and data analysis in R using RStudio. The course covers navigating RStudio, R syntax, packages and libraries, arithmetic and operations, importing data, calculating summary statistics from data and data visualization.

COURSE CONTENT
The following topics will be presented:

1. Setting up your R environment
2. Navigating RStudio
3. Introduction to R syntax
4. Packages and Libraries
5. Arithmetic and Logical operators
6. Importing data
7. Summary statistics
8. Data visualization

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LEARNING OUTCOMES
The learning outcomes are:

1. Setting up your R environment
   - Install latest version of R.
   - Install latest version of RStudio.
   - Setting your working directory.
2. Navigating RStudio and help
   - Navigate the RStudio GUI.
   - Describe the purpose and use of each pane in the RStudio IDE.
   - Locate buttons and options in the RStudio IDE.
   - To be able to read R help files for functions and special operators.
   - To be able to use CRAN task views to identify packages to solve a problem.
   - To be able to seek help from your peers.
3. Introduction to R syntax
   - Define the following terms as they relate to R: object, assign, call, function, arguments, options.
   - Assign values to objects in R.
   - Learn how to name objects.
   - Use comments to inform script.
   - Understand the difference between script file and console.
   - Demonstrate useful shortcuts.
4. Packages and Libraries
   - Install additional packages using the packages tab.
   - Install additional packages using R code.
   - Load libraries into R session.
5. Arithmetic and Logical operators
   - Use mathematical and comparison operators.
   - Call functions.
   - Solve simple arithmetic operations in R.
   - Call functions and use arguments to change their default options.
   - Inspect the content of vectors and manipulate their content.
6. Importing data
   - Describe what a data frame is.
   - Load external data from a .csv file into a data frame.
   - Load external data from an excel workbook into a data frame.
   - Load external data from a text file file into a data frame.
7. Summary statistics
   - Obtain a five-number summary of the data.
   - Use functions to compute descriptive statistics of the data.
   - Obtain frequency tables.
10. Data visualization
   - To be able to use ggplot2 to generate quality graphics.
   - Produce scatter plots, boxplots, histograms and barplots using ggplot.
   - To manipulate the aesthetics of a plot using different colors, shapes, and lines.
   - To improve data visualization through transforming scales and paneling by group.
   - To save a plot created with ggplot.

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