



Student Guide for Sync Session

Week 2: Data Analysis Using R

This guide is your roadmap to making the most of our online session. Packed with essential tips and strategies, it's designed to keep you engaged, prepared, and ready to dive into a smooth and productive learning journey. Get ready to participate, learn, and thrive!

Session Overview

Session title	Data Analysis Using R													
Session duration	3 hours													
Session type	<ul style="list-style-type: none">Lectures: Conceptual understanding of data analysis techniques using R, data manipulation, and visualisation.Case Studies: Application of R for analysing retail sales data.													
Scope	<p>This session introduces fundamental data analysis techniques using R. It covers:</p> <ul style="list-style-type: none">Data manipulation and visualisation techniques.Time series analysis for sales forecasting.Customer segmentation for business insights.Sales performance evaluation using various metrics.													
Learning objectives	<table border="1"><thead><tr><th>Objective</th><th>Core capability</th></tr></thead><tbody><tr><td>Understand data manipulation techniques in R</td><td>Analytical thinking in data processing</td></tr><tr><td>Apply visualisation techniques for retail sales data</td><td>Ability to interpret and present insights effectively</td></tr><tr><td>Implement time series analysis for sales forecasting</td><td>Practical experience with R packages</td></tr><tr><td>Perform customer segmentation based on purchasing behaviour</td><td>Optimisation skills for targeted marketing</td></tr><tr><td>Analyse product performance using R</td><td>Business decision-making through data-driven insights</td></tr></tbody></table>		Objective	Core capability	Understand data manipulation techniques in R	Analytical thinking in data processing	Apply visualisation techniques for retail sales data	Ability to interpret and present insights effectively	Implement time series analysis for sales forecasting	Practical experience with R packages	Perform customer segmentation based on purchasing behaviour	Optimisation skills for targeted marketing	Analyse product performance using R	Business decision-making through data-driven insights
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Software/tools	<ul style="list-style-type: none">R Programming (Libraries: dplyr, ggplot2, tidyverse, lubridate)IDE: RStudioDataset: Retail Sales DatasetPresentation Tool: PowerPoint													

Pro Tips for Success

- Ask Bold Questions:** No question is too small—curiosity is the key to learning!
- Be Hands-On:** Experiment with R code to deepen your understanding.



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- Collaborate:** Share insights and learn from your peers.

Session Overview

Topic	A glimpse	Insight / Actionable
Introduction	Gain a quick understanding of the session objectives and topics.	Reflect on how data analysis improves business decisions.
Data Manipulation in R	Learn key data cleaning and transformation techniques.	Practice using dplyr functions like `mutate`, `filter`, `group_by`.
Data Visualisation	Explore the power of ggplot2 for data interpretation.	Create bar plots and histograms for retail sales trends.
Time Series Analysis	Understand how time series analysis helps in sales forecasting.	Use line plots to track sales trends over time.
Sales Distribution by Country	Evaluate regional sales performance with box plots.	Identify high-performing regions and expansion opportunities.
Customer Segmentation	Learn how to segment customers based on spending habits.	Implement clustering techniques for targeted marketing.
Product Performance Analysis	Analyse best-selling products for inventory management.	Use visual analytics to compare product sales.
Month-wise Sales Comparison	Examine monthly sales patterns across different regions.	Create facet grid visualisations for seasonal trends.
Customer Purchasing Patterns	Identify high-value customers through purchase analysis.	Evaluate metrics like average purchase value per customer.
Case Study: Retail Sales Analysis	Apply learned concepts to a real-world dataset in R.	Load, process, and visualise sales data to extract insights.
Exporting Visualisations	Learn how to save and share plots effectively.	Export graphs as PNG or PDF for documentation.

Post-Session Activities

Reflection challenge	What did you find most interesting about data analysis in R?
Explore more	<ul style="list-style-type: none">Read: R documentation on ggplot2 and dplyr.Watch: Tutorials on data manipulation and visualisation.Practice: Apply R techniques on different datasets.
Get inspired	Did you know data analysis is used in retail, healthcare, and marketing? Understanding it can unlock valuable career opportunities!
The journey ahead	Explore advanced topics like predictive analytics and machine learning with R!