

IIM Guest Lecture Curriculum

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Week	R/Tableau	Topic
1	R	R Fundamentals - 1
2	R	R Fundamentals - 2
3	R	R Fundamentals - 3
4	R	Univariate Statistics with R
5	R	Data Visualization using ggplot2
6	Tableau	Overview & Functionalities of Tableau
7	Tableau	Functionalities, Managing Data Sources & Creating Dynamic Visualization - 1
8	Tableau	Creating Dynamic Visualization - 2

R- Fundamentals - 1	
1	<u>Object Assignment:</u> <i>Assigning values to a particular variable to make our calculations more understandable. Creating objects within a variable and understanding its importance.</i>
2	<u>Object Name Restriction:</u> <i>We'll discuss some of the restriction that we have while defining the name of the variable.</i>
3	<u>Data Types:</u> <i>We'll discuss and understand the behaviour of different data types of the variables.</i>
4	<u>Numeric Operators:</u> <i>Perform Arithmetic operations on numeric variables. We'll also perform some complex mathematical calculations (e.g., sinusoidal) using inbuilt function.</i>
5	<u>Concatenation, Substitution, Extraction, Count Characters:</u> <i>We'll perform operations like concatenation, substitution, extraction and count character on character data type variables where we'll combine the strings, extract substring from a string and count occurrences of certain element.</i>

6	<p><u>Logical Operators:</u> <i>We'll understand the types of logical data types and perform logical operations on logical (Boolean) variables such as AND, OR and NOT.</i></p>
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R- Fundamentals - 2	
1	<p><u>Vectors:</u> <i>A collection of similar basic data types to make our operations and calculations easy. We'll access a particular element or many elements from the vectors. Also perform arithmetic operations on two or more vectors.</i></p>
2	<p><u>Lists:</u> <i>To counter the limitations of Vectors data type we'll understand the characteristics of a List. We'll access a particular element or many elements from the Lists.</i></p>
3	<p><u>Data Frames:</u> <i>It's a structured data type which is a special kind of list data types having rows and columns.</i></p>
4	<p><u>For Loops:</u> <i>Perform iterative or repetitive operations using For Loops. Understanding its syntax and implementing it.</i></p>

R- Fundamentals - 3	
1	<p><u>While Loops:</u> <i>Perform certain operations until the conditions are being satisfied. Can be used to perform iterative or repetitive operations like for loops. Understanding its syntax and implementing it.</i></p>
2	<p><u>Optimizing For Loops:</u> <i>Instead of performing the whole FOR loop you might prefer to stop early. We'll understand the syntax of IF, ELSE and ELSE IF and implement it.</i></p>
3	<p><u>Functions:</u> <i>Create user defined functions that would perform certain operations and return the result.</i></p>

Univariate Statistics with R	
1	<p><u>Central Tendency:</u> <i>Understanding the average behaviour of the data using mean, median and mode.</i></p>

2	<u>Variability:</u> <i>To overcome some limitations of Central Tendency we will try to understand more about the Range, Standard Deviation, Variance, IQR (Inter Quartile Range) and optionally MAD (Mean Absolute Deviation).</i>
3	<u>Shape:</u> <i>Plotting a frequency bar chart (a.k.a. Histogram) and understanding its skewness. Discussing types of skewness: Negatively Skewed, No Skew and Positively Skewed.</i>
4	<u>Outliers:</u> <i>Identifying outliers in dataset and understanding its existence</i>
5	<u>Summary Stats:</u> <i>Using an inbuilt function, we will understand the overall behaviour of the dataset.</i>

Data Visualization using ggplot2	
1	<u>Data Layer and Aesthetic Mapping:</u> <i>Creating a Data Layer and Aesthetic Mapping before creating a static data visualization. All the graphics that you'll generate are made up of some aesthetic and data mapped on that aesthetics in R.</i>
2	<u>Adding geometric layer:</u> <i>Adding geometric object layer(s) on top of the Data Layer to create a static data visualization.</i>
3	<u>Manipulating color of the geometric layer:</u> <i>We'll add colors to have visibly distinguished data points and make the plots more appealing.</i>

Overview & Functionalities of Tableau	
1	<u>What is Data Visualization:</u> <i>Understanding what data visualization means and discussing on why do need it.</i>
2	<u>What is Tableau:</u> <i>A brief introduction about the software, understanding its versions and Installing Tableau Public 2021.4.</i>
3	<u>Worksheet, Calculated Field, Parameters, Filters:</u> <i>Understanding the basics of Tableau and the use of Worksheet, Calculated Field, Parameters and Filters.</i>
4	<u>Lines:</u> <i>Understanding the need of lines and creating a basic dynamic data visualization.</i>

5	<u>Clustering:</u> <i>Understanding the need of clustering and creating a scatter plot.</i>
6	<u>Forecasting:</u> <i>Understanding Forecasting, its Algorithm and implementation in Tableau.</i>

Functionalities, Managing Data Sources & Creating Dynamic Visualization - 1

1	<u>Types of Joins:</u> <i>Understanding the need of combining datasets from different sources, building relationships between those datasets using joins. We'll discuss about types of joins: Inner, Outer, Left and Right join.</i>
2	<u>Grouping & blending:</u> <i>Grouping various categories into a single category and understanding its need. We'll discuss the differences between joins and data blending and, understanding when do we need to use it.</i>
3	<u>Worksheet:</u> <i>Creating a Data Visualizations in a worksheet and understanding it. Modifying its Marks like Color, Size, Text, Details and Tooltip.</i>

Creating Dynamic Visualization - 2

1	<u>Dashboard:</u> <i>Understanding and creating dashboards from the worksheets. Designing and adding new objects to the dashboard.</i>
2	<u>Story:</u> <i>One of key feature available on Tableau that enable us to narrate a story visually from the dataset.</i>
3	<u>Practice:</u> <i>We'll spend some time exploring and practice on Tableau by creating worksheets, dashboards and story using a Dataset.</i>
4	<u>Questions & Answers</u>