



DATA SCIENCE - PYTHON

During these classes, students will explore and understand different types of data and their real life applications. They will be introduced to the working of Google Sheets and will learn how to use the Python Numpy module to analyse data. Students will explore the Python Panda library commands to create dataframes. Using Pandas, students learn how to read data from the CSV file and use dataframes to analyze data. Students will learn how to visually represent the data using the methods of the Python Matplotlib library. The data is represented using different types of charts and infographics

SESSION	CONCEPT	SKILLS
01	Introduction to Python Packages	Exploration, Comprehension, Logic What is a package ? How to use packages and package content ? Introduction to some of the important Python packages.
02	Using Python Packages: Pandas	Logic, Creativity Data Structures in Pandas -Series , DataFrame , Cleaning the data .
03	Using Python Packages - Matplotlib	Exploration, Comprehension, Logic What is data visualisation? Using Matplotlib for drawing graphs and Pie Charts.
04	Using Python Packages - NumPy	Exploration, Comprehension, Logic Using NumPy : One and Multi-dimensional arrays , Arithmetic Operations on NumPy arrays.
05	Introduction To Modules - The Statistics Module	Exploration, Comprehension, Logic What is Statistics ? Mean, Median and Mode of Ungrouped data.
06	The Math Module - I	Exploration, Comprehension, Logic Math Module - Concept and use.
07	The Math Module - II	Exploration, Comprehension, Logic Number - theoretic and representation functions.



08	The Random Module - I	Exploration, Comprehension, Logic What is 'random'? The random module methods.
09	The Random Module - II	Exploration, Comprehension, Logic Generating random integers within a range , Generating random floats.
10	Errors And Error Handling	Exploration, Comprehension, Logic Errors and Types of errors in Python : Syntax errors, Logical errors, Runtime errors (Exceptions), Handling errors
11	Formative Assessment	Assessment of Learning
12	Introduction To Files	Exploration, Comprehension, Logic What are files ? Types of Files , Text file management in Python.
13	Working With Text Files	Exploration, Comprehension, Logic Writing to a text file , Modifying records in a file , Deleting a file.
14	Working With Binary Files	Exploration, Comprehension, Logic Converting numbers to binary , Converting letters to binary , Binary files.
15	Classes And Objects - I	Exploration, Comprehension, Logic What are Classes and Objects ? Object Oriented Programming : Creating and printing a list of objects.
16	Classes And Objects - II	Exploration, Comprehension, Logic Using Multiple Classes.
17	Principles Of OOP - I	Exploration, Comprehension, Logic Encapsulation, Data hiding and data abstraction .

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18	Principles Of OOP - II	Exploration, Comprehension, Logic Polymorphism, Inheritance.
19	Storing state of objects using the Pickle module	Exploration, Comprehension, Logic Introduction, Storing the object data in the file, Reading the stored object data from the file, Differences between binary and text files.
20	Formative Assessment	Assessment Of Learning
21	Understanding Data	Exploration, Comprehension, Logic Data Collection and Structuring, Data Processing.
22	Big Data	Exploration, Comprehension, Logic Explore : What other sources of big data can you think of? Is your own data becoming part of a big data collection somewhere? Big Data and AI : What is the role of Big Data in ML ? Predictive Data Analysis.
23	Statistical Analysis Of Data - Terms And Plotting	Statistical terms, Classification of Data, Graphing data.
24	Statistical Analysis Of Data - Statistical Measures	Measures of Central Tendency, Measures of Dispersion.
25	Formative Assessment	Assessment Of Learning
26	Exploring The Numpy Package	Exploration, Comprehension, Logic Basic numpy methods, Using a Colab notebook, Iterating through a numpy array, The numpy random module.
27	Operations On Numpy Arrays - I	Exploration, Comprehension, Logic Numpy array methods, Sorting.

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28	Operations On Numpy Arrays - II	Exploration, Comprehension, Logic FNumPy array operations.
29	Working With File Data In Numpy	Exploration, Comprehension, Logic Loading data from a text file into a numpy array, Loading data from a csv file into a numpy array.
30	Statistical Methods In Numpy	Exploration, Comprehension, Logic Measures of central tendency, Measures of Dispersion, Analytics and deriving insights.
31	Exploring The Pandas Package - Series	Exploration, Comprehension, Logic Pandas data structures - Creating Series, Operations on Series.
32	Operations On Pandas Dataframes - I	Exploration, Comprehension, Logic Creation and display of a Dataframe, Sorting the data in a dataframe.
33	Operations On Pandas Dataframes - II	Exploration, Comprehension, Logic Customizing the dataframe, Creating subsets from a dataframe .
34	Filtering Dataframes	Exploration, Comprehension, Logic Filtering a dataframe : Meaning and Implementation.
35	Data Cleaning	Exploration, Comprehension, Logic Fixing bad data, Making changes to the original dataframe.
36	Formative Assessment	Assessment Of Learning
37	Matplotlib - Line Plot	Exploration, Comprehension, Logic Hands on experience of Creating line plots for given data.



38	Matplotlib - Pie Plot	Exploration, Comprehension, Logic Hands on experience of Creating Pie Charts for given data.
39	Matplotlib-Bar Plot And Histogram - I	Exploration, Comprehension, Logic Hands on experience of Creating Bar graphs for given data.
40	Matplotlib-Bar Plot And Histogram - II	Exploration, Comprehension, Logic Hands on experience of Creating Histograms for given data.
41	Matplotlib-Scatter Plot - I	Exploration, Comprehension, Logic Making a scatter plot.
42	Matplotlib-Scatter Plot - II	Exploration, Comprehension, Logic Making a scatter plot.
43	Data Science Project - I	Exploration, Logic, Application Of Knowledge Project 1-The impact of climate change on food production.
44	Data Science Project - II	Exploration, Logic, Application Of Knowledge Project 1-The impact of climate change on food production.
45	Data Science Project - III	Exploration, Logic, Application Of Knowledge Project 2- World Happiness Index : Report Analysis.