# Learning Path For
EARLY ACHIEVERS

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

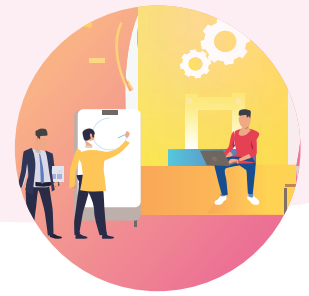| SESSION	CONCEPT	SKILLS
01	Introduction to Python Packages	**Exploration, Comprehension, Logic** What is a package ? How to use packages and package content ? Introduction to some of the important Python packages.
02	Using Python Packages: Pandas	**Logic, Creativity** Data Structures in Pandas -Series , 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.
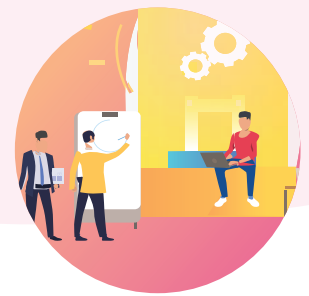
08	The Random Module - I	**Exploration, Comprehension, Logic** What is 'random'? The random module methods.
09	The Random Module - II	**Exploration, Comprehension, Logic** Generating random integers within a range , Generating random floats.
10	Errors And Error Handling	**Exploration, Comprehension, 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.

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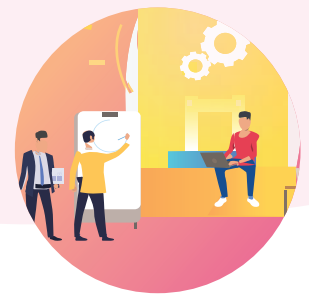
38	Matplotlib - Pie Plot	**Exploration, Comprehension, Logic** Hands on experience of Creating Pie Charts for given data.
39	Matplotlib-Bar Plot And Histogram - I	**Exploration, Comprehension, Logic** Hands on experience of Creating Bar graphs for given data.
40	Matplotlib-Bar Plot And Histogram - II	**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.