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PYTHON BASICS		
In this module, the students will reinforce their knowledge of the core Python programming concepts. They will get hands-on experience on activities to apply their understanding of basic data types, conditionals, loops, typecasting, basic data types, functions and variables.		
SESSION	**CONCEPT**	**SKILLS**
1	Basic Python Commands	**Exploration and Sequencing** Exploring Python Interface and basic input/output commands. Comments in Python
2	Basic data types, variables and typecasting	**Numeracy, Logic** Converting one data type into another
3	Conditionals-I	**Decision Making** Exploring if and if else statements
4	Conditionals - II	**Pattern Recognition, Decision Making** Exploring iterative statements
5	Conditionals - III	**Pattern Recognition, Decision Making** Exploring iterative statements
6	Exceptions	**Logic and Error Detection** Identifying and handling exceptions
7	Functions- I	**Abstraction** Understand the working of builtin functions
8	Functions- II	**Abstraction** Create user defined functions
9	Functions- III	**Abstraction** Create user defined functions
10	**Formative Assessment**	Assessment of learning

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PYTHON DATA STRUCTURE - I

In this module, the students will explore advanced data structures of Python namely lists, dictionaries, tuples, strings, stacks and queues. they will be given practice to write code on how to manipulate data in these data structures using python functions.

SESSION	CONCEPT	SKILLS
11	Strings-I	Numeracy, Logic Work with strings and string manipulating functions
12	Strings-II	Generalization, Abstraction Practice string manipulation functions
13	Strings-III	Generalization, Abstraction Practice string manipulation functions
14	Lists- I	Numeracy,Logic Create and traverse a list
15	Lists- II	Logic , Abstraction Explore list operations
16	Lists- III	Logic , Abstraction Explore list operations
17	String to List Conversion/ List to String conversion	Pattern Recognition, Logic Explore methods of list to string conversion and vice-versa
18	**Formative Assessment**	Assessment of learning
19	Tuples -I	Pattern Recognition, Logic Explore methods of list to string conversion and vice-versa
20	Tuples -II	Logic , Abstraction Explore operations on tuples

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21	Sets	**Numeracy** Define sets and do operations on them
22	Dictionaries-I	**Numeracy, Logic** Define and traverse a dictionary
23	Dictionaries-II	**Problem-Solving** Explore dictionary functions
24	Dictionaries-III	**Problem-Solving** Explore dictionary functions
25	**Formative Assessment**	Assessment of learning
26	Sorting-I	**Stepwise Thinking, Logic** Sort lists, tuples, and strings using bubble sort
27	Sorting-II	**Stepwise Thinking, Logic** Sort lists, tuples, and strings using bubble sort
28	Searching-I	**Problem Solving, Logic** Search elements in lists, tuples, and strings using linear search
29	Searching-II	**Problem Solving, Logic** Search elements in lists, tuples, and strings using linear search
30	Stacks-I	**Generalization, Logic** Create stacks, perform push and pop operations on stacks
31	Stacks-II	**Generalization, Logic** Create menu-driven programs for stacks
32	Queue-I	**Numeracy** Create, insert and delete elements from a queue

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33	Queue-II	**Logic, Abstraction** Create menu-driven programs for queues
35	Application of Queues	**Numeracy, Abstraction** Perform operations on dequeue
36	Practice session	**Problem Solving, Logic** Practice problems on the concepts learned

PYTHON MODULES/LIBRARIES		
In this module, the students will learn how to import and use Python packages. They will explore Math and Random functions and use them in their code.		
SESSION	**CONCEPT**	**SKILLS**
41	Math Module Functions	**Numeracy** Import and use functions of Math module
42	Introduction to the Random Module	**Numeracy** Write simple algorithms for number manipulations, generate random numbers
43	Error Handling	**Problem Solving, Decomposition** Exploring types of errors and error handling techniques
44	Programming Methodology	**Stepwise Thinking, Logic** Discuss UI and input design

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45	**Formative Assessment**	Assessment of learning

FILE HANDLING IN PYTHON		
In this module, the students learn about the file types and the methods used to access them.		
46	Introduction to Files	**Organizing** Understanding types of files and file mode
47	File Handling Techniques- I	**Step wise Thinking, Abstraction** Open, Read and Write text file
48	File Handling Techniques- II	**Step wise Thinking, Abstraction** Open, Read and Write binary file
49	File Handling Techniques- III	**Step wise Thinking, Abstraction** Use of file handling modules
50	**Formative Assessment**	Assessment of learning
INTRODUCTION TO DATA SCIENCE		
In this module, the students will learn to apply statistics module functions to data. They will work to organize and manipulate data in arrays, series, and data frames using NumPy. They will also explore the Matplotlib library to represent data into different graphs.		
51	Introduction to Data and its Types	**Decomposition** Understand data, differentiate between structured/unstructured and quantitative/ qualitative data

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52	Data Processing Cycle	**Step wise Thinking** Understand the steps of the Data processing cycle.
53	Basic statistical methods for understanding data	**Numeracy** Explore Mean, Median, Mode, Standard deviation, and variance functions
54	Python Modules	**Generalization** Working with Python statistics module
55	Python Packages	**Abstraction** Working with introduction, main packages
56	Packages	**Problem solving** Practice programs using packages and modules
57	**Formative Assessment**	Assessment of learning
58	Data handling using NumPy	**Numeracy** Introduction to NumPy library
59	Working with Arrays	**Step wise Thinking** Create NumPy Arrays, Loading text files into Arrays
60	Operations on 1d Arrays- I	**Problem Solving, Abstraction** Indexing, Slicing, and Iteration on 1d arrays
61	Operations on 1d Arrays- II	**Generalization, Decomposition** Concatenating and Splitting an Array
62	Statistical Methods in NumPy-I	**Numeracy** Calculating max, min, count, sum on NumPy arrays

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63	Statistical Methods in NumPy-II	**Numeracy** Calculating mean, median, mode, standard deviation, and variance on NumPy arrays
64	Statistical Methods in NumPy-III	**Problem Solving, Numeracy** Practice problems using statistical methods in NumPy
65	**Formative Assessment**	Assessment of learning
67	Operations on Series- I	**Numeracy** Perform mathematical operations on Series
68	Operations on Series- II	**Numeracy, Abstraction** Perform head and tail functions; Selection, Indexing and Slicing in Series.
69	Introduction to Dataframes	**Abstraction** Create Dataframes from the dictionary of Series, list of dictionaries, Text/CSV files
70	Operations on Data Frames- I	**Numeracy** Performing mathematical operations on Dataframes
71	Operations on Data Frames- II	**Numeracy** Performing mathematical operations on Dataframes
72	Operations on Data Frames- III	**Numeracy, Abstraction** Perform head and tail functions, Indexing using labels in Data Frames.
73	**Formative Assessment**	Assessment of learning
74	Working with CSV files and Dataframes	**Abstraction , Logic** Import/Export data between CSV files and Data frames.
75	Grouping data in Data Frames	**Data Manipulation** Use aggregation, group by functions in Data Frames.

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76	Sorting data in Data Frames	**Logic, Abstraction** Perform sort operations in Data Frames
77	Operations on Data Frames- IV	**Numeracy** Delete and Rename Index in Data Frames
78	Operations on Data Frames- V	**Numeracy** Summarize and convert data using pivot table
79	Operations on Data Frames- VI	**Data Manipulation** Handle missing values in Dataframes using dropping and filling.
80	**Formative Assessment**	Assessment of learning
81	Introduction to Data visualization	**Data visualization** Introduction of Matplotlib
82	Plotting Graphs using Matplotlib- I	**Data Representation** Plot line graph, bar graph, histogram, pie chart
83	Plotting Graphs using Matplotlib- II	**Data Representation** Plot frequency polygon, box plot and scatter plot
84	Customizing Graphs- I	**Data Representation** Customize plots: color, style (dashed, dotted), width
85	Customizing Graphs- II	**Data Representation** Adding label, title, and legend in plots
86	**Formative Assessment**	Assessment of learning

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INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING		
In this module, the students will start with discussing what AI is and then explore the applications, limitations, biases, ethics, and future of AI. They will gain an understanding of the basic AI terms such as supervised learning, unsupervised learning, deep learning, and neural networks.		
87	Intelligence and its Types	**Exploration, Analyzing** What is Intelligence and types of intelligence
88	Human vs Machine Intelligence	**Generalization** Differentiate between Human and Machine Intelligence
89	What is AI?	**Exploration** Explore the AI basics
90	Impact and Applications of AI	**Analyzing, Logic** Explore the real-life applications of AI
91	Cognitive Computing	**Exploration, Analyzing** Explore the big Ideas of AI- Perception, Learning, Reasoning
92	AI Terms	**Exploration, Analyzing** Explore the terms- AI, ML, Neural networks, Deep Learning, Machine learning and examples
93	Supervised vs Unsupervised learning	**Exploration, Abstraction** Understand supervised, unsupervised and reinforced learning using examples
94	Deep Learning	**Exploration** Understand deep learning through examples

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95	Neutral Networks	**Exploration** Understand neural networks through examples
96	Applications of AI	**Creativity, Analyzing** Hands on activities to explore the applications of AI
97	AI - Concerns and Bias	**Logic, Analyzing** Hands on activities to detect the bias in AI
98	AI - Ethics	**Logic, Analyzing** Importance of being ethical in AI
99	Future with AI	**Exploration** Exploring the future experiments in AI
100	**Formative Assessment**	Assessment of learning