**Marathwada Mitra Mandal’s**

**College of Engineering, Karvenagar, PUNE - 411 052**

**Accredited with ‘A++’ Grade by NAAC,**

**Recipient of “Best College Award 2019” by SPPU**

**Foundations of Python for AI and ML**

**Session 1: Introduction to Python**

* Overview of Python and its popularity in data science and machine learning.
* Setting up a Python environment (Anaconda, Jupyter Notebooks).

**Session 2: Python Fundamentals**

* Variables and data types (int, float, str, bool).
* Basic arithmetic operations.
* Print statements and comments.
* Introduction to Python's dynamic typing.
* Conditional statements (if, elif, else).
* Loops (for, while).
* Control flow examples and exercises
* Defining functions.
* Function parameters and return values.
* Scope of variables.

**Session 3: Lists,Tuples,Dictionaries and Set**

* Lists: indexing, slicing, methods.
* Tuples: immutable sequences.
* Dictionaries and Sets
* Dictionaries: key-value pairs.
* Sets: unordered collections.

**Session 4:Python libraries**

* NumPy and Basic Stats
* Converting Lists to NumPy Arrays
* Calculating the Mean of the Test Score
* Finding the Median from a Collection of Income Data
* Skewed Data and Outliers
* Finding the Standard Deviation from Income Data
* Matrices
* Creating an Array to Implement NumPy Computations

**Session 5: File Handling**

* Reading and writing text files.
* CSV and JSON file formats.

**Session 6 : The pandas Library and Processing dataset**

* Using DataFrames to Manipulate Stored Data
* DataFrame Computations with the Data
* Computing DataFrames within DataFrames
* Loading Data:
* Exploring the Dataset
* Handling Missing Data
* Data Cleaning and Transformation
* Aggregation and Grouping
* Saving Processed Data
* Splitting of data

**Session 7: Introduction to Visualization with Matplotlib**

* Basic plotting with Matplotlib.
* Visualization examples.
* **Basic Plotting Elements**

**Line Plots**

* Customizing line styles, colors, and markers.
* Adding labels and a title to the plot.

**Scatter Plots**

* Creating scatter plots with scatter().
* Customizing marker styles and colors.

**Subplots and Layouts**

* Subplots
* Creating multiple plots in a single figure using subplots().
* Customizing subplot layouts.
* Axis Labels and Legends
* Adding axis labels and legends to enhance plot clarity

**Bar and Histogram Plots**

* Bar Plots
* Creating bar plots using bar() and barh().
* Grouped and stacked bar plots.
* Histograms
* Generating histograms using hist().

**Projects and Case Studies: Integrate small projects or case studies to allow participants to apply what they've learned.**