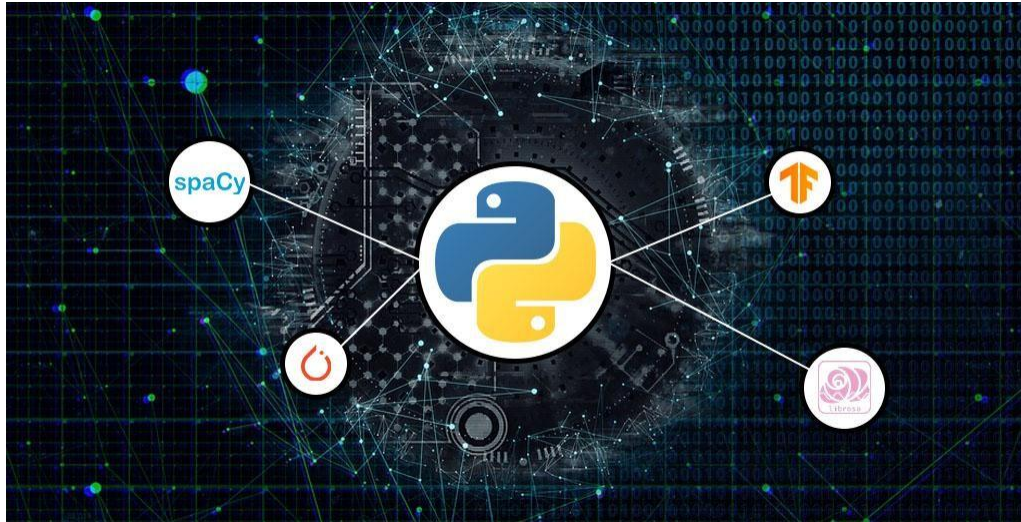


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# DATA SCIENCE WITH PYTHON COURSE SYLLABUS



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## Data Science With Python Course Syllabus

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### Python Data science introduction

- ❖ What is Data science
- ❖ Introduction to python data science
- ❖ Installation of Pandas, numpy, scipy, sklearn, seaborn, nltk
- ❖ Basic terminologies of DS
  - a. Data science
  - b. Data scientist
  - c. Data set
  - d. Data mining
  - e. Data visualization
  - f. Data modeling
  - g. Data wrangling
  - h. Big data
  - i. Machine learning
  - j. Algorithms
  - k. Deep learning



## Hands on with Pandas – Data Analysis library [Data Processing]

- ❖ Why Pandas?
- ❖ Features of Pandas
- ❖ Data structures in Pandas
  - a. Series
  - b. DataFrame
  - c. Panel
  - d. Panel4D
- ❖ Series creation
  - a. Using ndarray
  - b. Using dict
  - c. Using scalar values
  - d. Using list
- ❖ Accessing elements of Series
  - a. Using indexing
  - b. Using slicing
  - c. Using ranging
  - d. Using iloc method
  - e. Using loc method
- ❖ Vectorizing operations
  - a. Vector operations using same index values
  - b. Vector operations using different index values
- ❖ DataFrame creation
  - a. Using list
  - b. Using dict
  - c. Using ndarray
  - d. Using series
  - e. Using DataFrame
- ❖ Viewing DataFrame elements
  - a. Using describe function
  - b. Using column name
  - c. Using iloc method
  - d. Using iat method
  - e. Using head()
  - f. Using tail()
  - g. Using index method



## Working with Pandas Data

- ❖ Handling missing values
  - a. Using Dropna()
  - b. Using Fillna()
  - c. Using add between 2 vector series
- ❖ Data operations with customized functions
  - a. Using groupby()
  - b. Using sorting
  - c. Using merge
  - d. Using duplicate
  - e. Using concatenation
- ❖ Statistical functions in data operations
  - a. Max()
  - b. Min()
  - c. Mean()
  - d. Std()
- ❖ SQL operations in pandas
  - a. Creating table using sqlite3
  - b. Executing sql queries
  - c. Inserting values
  - d. Fetching records
  - e. Creating recordset
  - f. Display resultset
  - g. Converting resultset into DataFrame
- ❖ Data Processing
  - a. Processing CSV data
  - b. Processing JSON data
  - c. Processing XLS data
  - d. Date and time in data
  - e. Reading html contents



## Numpy – Mathematical Computation

- ❖ Why numpy?
- ❖ Powerful properties of numpy
- ❖ Types of arrays
  - a. One dimensional
  - b. Two dimensional
  - c. Three dimensional
- ❖ Attributes of ndarray
  - a. Using .ndim
  - b. Using .shape
  - c. Using .size
  - d. Using .dtype
- ❖ Basic operations
  - a. ( +, -, \*, /, %, //, &, |, ~, <, <=, >, >=, ==, != )
  - b. Accessing array elements using axis values
  - c. Indexing with Boolean array
- ❖ Creating functions for arrays
  - a. Using arange()
  - b. Using linspace()
  - c. Using ones()
  - d. Using zeros()
  - e. Using diag()
  - f. Using random.rand()
  - g. Using random.randn()
  - h. Using random.seed()
- ❖ Copy and view
  - a. Deep copy
  - b. Shallow copy
  - c. Simple assignment
- ❖ Universal functions
  - a. Sqrt
  - b. Cos
  - c. Floor
  - d. Exp



- ❖ Shape manipulation
  - a. Using flatten
  - b. Using reshape
  - c. Using resize
  - d. Using split
  - e. Using stack
- ❖ Broadcasting
  - a. Using tile()
  - b. Using ones()
  - c. Using newaxis()

### Hands on with Matplotlib library - [Basic Data Visualization]

- ❖ Chart properties
  - a. Creating a chart
  - b. Labeling the axes
  - c. Formatting line style and color
  - d. Saving the chart in a file
- ❖ Styling the chart
  - a. Adding annotations
  - b. Adding legends
  - c. Presentation style
- ❖ Types of presentation styles
  - a. Scatter plots
  - b. Heat maps
  - c. Bubble chart
  - d. Bar chart
  - e. Pie chart
  - f. XKCD style
  - g. 3D chart
  - h. Box and whisker plots
  - i. Time series plot
  - j. Graph data / line graph
  - k. Geographical data



## Hands on with Data Distributions (using numpy, pandas, seaborn)

- ❖ Why and How Data to be distributed?
  - a. Calculating mean
  - b. Calculating median
  - c. Calculating mode
  - d. Measuring variance
- ❖ Types of distribution
  - a. Uniform distribution
  - b. Normal / Gaussian distribution
  - c. Exponential PDF
  - d. Binomial distribution PMF
  - e. Poisson distribution PMF
  - f. Bernoulli distribution
  - g. P value
  - h. Correlation
  - i. Chi-square test
  - j. Linear regression

## Advanced Data Visualization using SEABORN

- ❖ Visualization techniques used
  - a. Histogram
  - b. Histogram with grid
  - c. Distplot
  - d. Pairplot
  - e. Scatterplot
  - f. Lmplot
  - g. box plot

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