

Data Science Using Python

Lesson 1: Data Science Fundamentals

- What is Data Science?
- A comparative study between Data Science and Big Data Analytics.
- Types of Data.
- The Data Science Lifecycle

Lesson 2: Data Science Implementation

- Data Acquisition and Preparation
- Data Modeling and Visualization
- Data Science Roles

Lesson 3: The Impact of Data Science

- Benefits of Data Science
- Challenges of Data Science
- Business Use Cases for Data Science

Lesson 4: Introduction to Analytics and Statistics

- Concept of Analytics and Statistics
- Categories of Analytics
- Properties of Measurement
- Scales of Measurement
- Concept of Data visualization
- Measures of Central Tendency
- Measures of Dispersion
- Moments, Skewness and Kurtosis
- Concept of Correlation and Covariance
- Introduction to Probability Theory
- Probability Distributions
- Sampling and Estimation
- Testing of Hypothesis

Lesson 5: Introduction to Python Programming

- Introduction to python
- History of Python
- Internal & External IDLE
- Installation of Python & Anaconda

- Compiler & Interpreter
- Write your first program
- Data types, Input and output function

Lesson 6: Fundamentals of Python Programming

- Types of Operators
- Conditional Statement: if-else, if-elif-else, Nested if else
- Loop: While loop, For loop
- Nested while loop, Nested for loop Break, Continue and Pass

Lesson 7: Python Data Types

- Basic Data Types- Numeric & String
- Tuple and it's operation
- List and it's operation
- Dictionary and it's operation
- Sets and It's operation

Lesson 8: Python OOPs concept and Function

- Basics Defining function
- Function call Return statement
- Function with parameter and without parameter
- Local and global variable
- Recursion, Anonymous (lambda) function
- User defined functions
- OOPS concepts Defining
- Class Creating object, Constructor
- Method vs function Calling methods
- Method Overriding, List of objects Inheritance

Lesson 9: Python File Handling

- Defining a file, Types of file and it's operations
- Python read Files
- Python Write/Create Files
- Python Delete Files
- Pickle Module

Lesson 10: Data Analysis with Python and Visualization

- Introduction to Numpy, Pandas, Matplotlib
- Array, Array indexing, Array operation
- Data frame, series, Groupby
- Missing values
- Box plot, Scatter plot, Chart styling
- Histogram, Bar chart etc.
- Group by plotting

Lesson 11: Introduction to Machine Learning

- Concept of Supervised learning
- Concept of Unsupervised learning
- Concept of Reinforcement learning

Lesson 12: Linear Regression Analysis

- Simple Linear Regression
- Multiple Linear Regression
- Implementation of Linear Regression
- Advanced Topics: Normal Equation, Polynomial Regression, R-sq Score
- Python Implementation

Lesson 13: Logistic Regression Analysis

- Concept and Theory
- Sigmoid function
- Mathematical Concepts of Logistic Regression
- Binary and Multivariate Classification Problems
- Implementation of Logistic Regression

Lesson 14: Other Classification Algorithms

- K-Nearest Neighbors-Concept and Theory
- Implementation of K-Nearest Neighbors
- Support Vector Machine(SVM)-Concept and Theory
- Implementation of Support Vector Machine
- Naïve Bayes Classifier- Concept
- Implementation of Naïve Bayes Classifier
- Decision Tree Classifier-Concept
- Implementation of Decision Tree Classifier
- Random Forest Classifier-Concept
- Implementation of Random Forest Classifier

Lesson 15: Dimensionality Reduction

- Dimensionality Reduction Problem- Curse of Dimensionality
- Principal Component Analysis(PCA)
- Implementation of PCA

Lesson 16: Clustering Techniques

- K-Means Clustering- Concept
- Implementation of K-Means Clustering
- Hierarchical Clustering- Concept
- Implementation of Hierarchical Clustering
- DBSCAN Clustering-Concept
- Implementation of DBSCAN Clustering

Lesson 17: Introduction to Neural Network

- Introduction of Deep Learning and Neural Network
- Types and Applications of Neural Network
- Skills required for Neural network

Lesson 18: Software and Libraries for Neural Network

- Why Python is best for Neural Network
- Anaconda Installation: Spyder & Jupyter Notebook
- Introduction to Keras & Tensor Flow
- Installation of Keras & Tensor Flow

Lesson 19: Artificial Neural Network (ANN)

- ANN and Neuron Structure
- How does Neural Network Works?
- Practical Implementation of ANN
- Train-Test Splitting

Lesson 20: ANN Implementation

- ANN model Training
- Activation Function
- Fit all the Layers
- Backpropagation
- Fitting to the training Dataset and finding Accuracy

Lesson 21: Convolution Neural Network (CNN)

- Image Reading and CNN Process
- Steps of CNN
- Conclusion of CNN Process
- Importing Required libraries
- Reading Cat & Dog Dataset
- Applying CNN layers
- Fitting the Dataset in Model
- Visualization of Accuracy and Loss
- Prediction with single image

Lesson 22: Recurrent Neural Network (RNN)

- Introduction and Application
- Process of RNN, Types of RNN, Gradient Problem
- LSTM & GRU Explanation
- Steps of LSTM
- Creation of Data Structure with Time Steps
- LSTM layers
- Google Stock market prediction