

# Artificial Intelligence, Machine Learning and Data Science with Python

(Total duration: 20 hrs.)

## 1. Introduction (2 hrs.)

What is Data Science, Machine Learning and Artificial Intelligence. Industrial and daily life applications. Concepts of machine learning models.

## 2. NumPy (3 hrs.)

NdArrays (NumPy arrays), 1D, 2D and multidimensional arrays, array operations like generating data arrays, multiplication, inverse, filtering, reshaping and manipulating arrays etc. Linear algebra. Speed and space efficiency analysis. Different NumPy functions and their applications.

## 3. Pandas (3 hrs.)

Overview of Pandas and file handling with formats like CSV, Excel, JSON, SQL. File R/W operations. Real life applications, cleaning data and generating summaries. Exploring and understanding the data structure of random data. Filtering and Selection. Pivot tables and applications.

## 4. Matplotlib (3 hrs.)

Simple line plots, bar graphs, scatter plots, histogram, pie charts. Graph parameters and customization functions like xlabel, ylabel, legend, xlim, ylim etc. Object Oriented API for subplotting, subplot function, 3D plots and applications

## 5. SciPy (3 hrs.)

SciPy introduction, constants, optimization, minimize and root functions, sparse matrices and applications, differentiation, integration, interpolation.

## 6. Scikit-learn (3 hrs.)

Introduction, model building in scikit-learn, inbuilt datasets, data normalization, feature selection, scikit-learn for data processing, supervised and unsupervised learning.

## 7. Bonus (3 hrs.)

Live Project. Q&A for Interviews.