

## Programming with PYTHON (introduction and advanced)

Course duration: 40 hours

### Syllabus:

- Introduction to Python Programming
- Introduction to Open-Source Language
- Python Core and Versions
- Pycharm, Anaconda
- Jupyter, Qt console, Notebook, Ipython, Anaconda Navigator
- Reserved Words and Naming Conventions
- Python Data Structure
- Arithmetic operations
- Python Collections (Lists, Tuples, Sets and Dictionaries)
- Import Clause
- Copying Collections (Deep and Shallow Copy)
- Intro to Classes, Functions
- Read and write Output/Input
- Formatting Output/Input and Dialog Boxes
- Access and Permission
- Handling I/O Exceptions
- Typecasting and Parsing
- Functions and Classes
- Built-in Modules (Sys, Math, Time, Pickle, ...)
- Access Modifiers (Public- Private -Protected)
- User-Defined Classes
- Constructors, Copy Constructor, Object Instantiation
- User-defined Methods
- Set and Get methods
- Finalizers
- Overloading versus Overriding Methods
- Four fundamental Object-oriented programming (OOP) concepts
- Inheritance, Polymorphism, Abstraction and Encapsulation
- Interfaces (Abstract base) and Packages
- Regular Expressions
- Scipy - Basic Image Manipulation and Processing
- PIL - Basics Creating an image. Save Image. Load Image. Show image
- OpenCV - Designed to solve Computer Vision problem
- Scikit-Image - Collection of Algorithms for Image Processing
- Conventional Machine Learning (Essential Framework)
- Scikit-learn Package (Installation and Implementation)
- Learning models in sklearn
- k-means Clustering, Decision Trees, Linear Regression,
- Built-in Modules (Re...)
- Simple Character Matches
- Special Characters
- Greedy Matches
- Grouping
- Substituting
- Splitting a given String
- Compiling Regular Expressions
- Serialization and Deserialization (Pickle...)
- Python Programming Dives into Data Science (Level ۰۲)
- Data Integration
- Plain Text (Standard and UTF-۸)
- Excel /CSV Format
- Multimedia Files and Services (Read / Write)
- Web Crawler (urllib, request, soup, scrapy...)
- Data Serialization (Pickle, Dill, JSON, YAML...)
- PyDI: Python Data Integration package
- Introduction to Pentaho: Data Integration, Business Analytics and Big Data
- Database Connectivity (SQL/NoSQL connections)
- Essential Data Science Libraries
- NumPy - Numeric Computation
- Pandas - Data structures and Exploratory Analysis.
- Matplotlib - Plotting and Visualization Tool
- IPython - Interactive shell to Explore Data and Debug Errors.
- SciPy - Extends NumPy with more Mathematical Functionality
- Image Processing (Essential Framework)
- Introduction to general concepts in image processing
- Deep Learning Package (Installation and Implementation)
- GPU programming in Python (CUDA, ...)
- TensorFlow; High-performance serving system for machine learning models
- TF Learn Introduction (A given Example)
- TF-Slim Introduction (A given Example)
- Caffe; Deep learning framework

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- K-Nearest-Neighbors, Predictive Models, Logistic Regression,
- Support Vector Machines,
- Dimensionality Reduction
- K-Fold Cross-Validation and Confusion matrices
- Keras; Deep Learning library for Theano and TensorFlow
- Introduction to Natural language processing (NLP)
- Web and Text Mining
- Review on Web Crawler Library
- NLTK Exploration; The Natural Language Toolkit
- NLTK Stanford; Sentiment Analysis and Text Classification
- HAZM “Farsi Mining”; Library for Digesting Persian Text

✓ پس از پایان دوره در صورت موفقیت در آزمون نهایی ، به شرکت کنندگان مدرک بین المللی و مورد تایید سازمان فنی و حرفه ای کشور اعطاء می گردد.

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