



# Python for Data Analysis & Machine Learning

## 1. Introduction to Python

- What is Python
- The application areas of Python
- Download and install Python
- Execute Python program from command prompt and using IDLE
- Save programs with .py extension and execute it from prompt

## 2. Python Basics

- Data types and variables
- Operators and operator precedence
- Data type conversions
- Command line argument
- Data input
- Comments
- Import modules

## 3. Python Flow Control

- If statement
- If.. elif.. else statement
- While loop
- For loop
- Break & continue
- Else clause

## 4. Introduction to Python IDE – PyCharm

## 5. Python Sequences

- Range
- String
- List
- Tuple
- Dictionary
- Set

## 6. Shallow and deep copy

## **7. Functions and modules**

- What is function
- Define a function
- Pass arguments
- Arguments with default values
- Arbitrary arguments
- Local and global variables
- Return a value from function
- Return multiple values
- Documentation Strings

## **8. Python built in functions**

- Mathematical functions
- Random number functions
- Mathematical constants

## **9. Python Modules**

- What is module?
- Import module using import statement
- Use from... import statement
- Use from ... import\* statement
- Location modules
- PYTHONPATH variable
- Namespaces and scoping
- Dir(), globals(), locals() and reload()

## **10. File Handling**

- Reading
- Writing
- File manipulations
- Directories

## **11. Exception Handling**

- What is exception?
- Python built-in exceptions
- Try
- Except
- Finally
- Raise exceptions
- User defined exception
- Assertions

## **12. Python classes and objects**

- Class definition
- Creating objects
- Constructors
- Accessing attributes
- Built-in class attributes
- Destructors
- Inheritance
- Overriding
- Overloading
- Data hiding

## **13. Regular Expressions**

- Match()
- Search()
- Search and replace
- Modifiers
- Patterns
- Character classes
- Repetitions



#### **14. Database programming**

- With SQLite
  - Installing SQLite browser
  - Creating database
  - CRUD operations
- With MySQL
  - MySql datatypes
  - CRUD operations

#### **15. Python Graphics**

- Turtle

#### **16. Python GUI Programming with Tkinter**

- Widgets
- Geometry managers / layout managers
- Variable classes
- Events and binds

#### **17. Packages**

- Creating packages
- Installing packages using PIP

#### **18. Functional Programming**

- Iterators
- Generators
- The lambda construct
- Comprehensions
- Map, reduce and filter

#### **19. Introduction to web programming**

Web server  
Web client  
HTML  
CSS  
jQuery

## **20. Python CGI Programming**

What is CGI?  
CGI architecture  
Web server support and configuration  
HTTP header  
CGI environment variables  
GET/POST methods  
Cookies  
File upload

## **21. What is Django framework?**

## **22. Introduction to Data analysis and machine learning**

- Learning methods
  - Supervised learning
  - Unsupervised learning
  - Reinforcement Learning
  - Semi-supervised Learning
  - Active Learning
- Data
- Algorithms
  - Linear Regression
  - Logistic Regression
  - Clustering
  - Decision Tree induction
  - Support vector machines
  - Naive Bayes

## **23. Data Analysis and Machine Learning with Python**

NumPy  
SciPy  
Matplotlib  
Pandas  
Scikit-Learn