# Python ToC – Oracle

***Objectives:***

To enhance the skill set of prospective audience in python, the following objectives are set:

1. To gain insight into and practical exposure to fundamental and advanced python features
2. To understand basic design patterns in python
3. To learn web applications development and testing
4. To learn python tools for data analysis

***Audience:***

Professionals with prior programming knowledge willing to explore python

(This program will be medium paced)

***Pre-requisites:***

1. Computer programming knowledge (not mandatory)

PS: Participants who are new to python can get an overview through any of the convenient YouTube channels/videos such as the following:

https://www.youtube.com/watch?v=rfscVS0vtbw&t=9980s

https://www.youtube.com/watch?v=YYXdXT2l-Gg&list=PL-osiE80TeTskrapNbzXhwoFUiLCjGgY7

***Duration:***

5 working days (40 Hours)

***Schedule:***

| Day | Morning | Afternoon |
|---|---|---|
| **1** | Python fundamentals | Python fundamentals |
| **2** | Advanced features in python | Advanced features in python - OOP |
| **3** | Useful design patterns in python | Working with databases and persistence |
| **4** | Web application development using flask | Testing in python, Regex |
| **5** | Data analysis in python | Network programming |

PS: Ideally each half day session consists of concept discussion, live demonstration, and guided practical hand-on sessions. Though sessions might be dynamically adjusted to suit the learning requirements of the participants in the specific batch. Relevant portions will be given as study assignments to participants.

***Deliverables:***

1. Training on the topics mentioned in the table of contents
2. Reference material in the form of ebooks, slides and website links
3. Recording of the live demonstration (to be hosted by the client)
4. Github repository of all worked out examples and practice sessions
5. Learning support for participants for about a week.

***Table of Contents***


1. Python fundamentals
    a. Computer programming essentials
    b. Datatypes in python
    c. Branching and Looping
    d. User defined functions and modules
    e. File IO
    f. Lab session
2. Advanced Features in Python
    a. Special modules in python(introduction):
        i. datetime
        ii. itertools
        iii. functools
        iv. collections
        v. operator
    b. System control in python using OS, shutil and subprocess modules
    c. Lambda functions
    d. Comprehensions
    e. Exception handling
    f. Lab session
3. Advanced Features in Python – OOP
    a. Overview of OOP: Class, Object, Inheritance and Polymorphism
    b. Operator overloading
    c. Multiple inheritance techniques
    d. Developing custom exceptions
    e. Lab session
4. Useful Design Patterns in Python
    a. Introduction to software design patterns
    b. Generators and iterators
    c. Factory Method
    d. Decorator
    e. Lab session
5. Working with databases/persistence in python
    a. Pickle and shelve modules in python
    b. SQL databases
    c. Lab session
6. Web application development using python-flask
    a. Download and installation
    b. Basic workflow
    c. Flask routes and dynamic routing
    d. Templates and Forms
    e. Databases with Flask
    f. Introduction to Rest API
    g. Lab session

7. Testing in python
    a. Unittest module
    b. Selenium webdriver
    c. Lab session
8. Regular Expressions and Working with Common File Types
    a. The re Module
    b. Metacharacters for building regular expressions
    c. Working with JSON (json), XML(ElmentTree) and HTML files(BS4)
    d. Working with csv (csv) and Excel (openpyxl) files
    e. Lab sessions
9. Data analysis using python
    a. Pandas
    b. Matplotlib
    c. Lab session
10. Network programming
    a. The socket module
    b. Creating a server and client
    c. Developing network applications
    d. Lab session

***Hardware requirement:***

1. Laptop with Linux/windows and internet connectivity

***Software requirement:***

1. Python for windows
2. Atom IDE or Visual Studio Code
3. Anaconda suite

PS: webex/zoom/gotomeeting or like with a client account is suggested to record the live examples

***APPENDIX:***

Details of Lab sessions

| | |
|---|---|
| Lab #1 | Developing a python code for word jumble game |
| Lab #2 | Extract the physical address from network interface data (ipconfig -all) |
| Lab #3 | Develop a employee class with tax calculation methods |
| Lab #4 | Use of decorators in python programming |
| Lab #5 | CRUD operations on SQL databases |
| Lab #6 | Setting up flask to serve web pages |
| Lab #7 | Developing unit test for python design components |
| Lab #8 | Exploratory data analysis of financial data with visualization (guided practice) |
| Lab #9 | Python program to develop a simple chat engine using sockets |
| Lab #10 | Python program to extract all the email IDs from a text report |

PS: These lab experiments are subject to change.