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# PYTHON COURSES

## Basic

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | General Introduction | * Informal introduction to Python * Installation instructions * Python Version * Python Ecosystem * Interpreted Languages * The interactive shell * Widely used editors * Some sample programs * Reading material that students can refer to for further study | Basic | 4 | * Setting the context * Students should get a feel of the language * Different ways in which developers create Python apps |
| 2 | Variables in Python | * Strings * Numbers * Integers * Boolean Values * Custom data types | Basic | 4 |  |
| 3 | Conditional Execution | * If statements * If-Elif | Basic | 4 |  |
| 4 | Iteration | * While loops * For Loops | Basic | 4 |  |
| 5 | Functions in Python | * Some sample functions * Importance of functions * Arguments to a function * \*args, \*\*kwargs * Lambda expressions | Basic | 8 | * Explain the need to have re-usable code * Avoiding duplication |
| 6 | Data Structures | * Lists * Tuples * Dictionary * Sets * Using lists as Stacks, Queues, etc. * Looping through data structures * A brief intro to some more advanced data structures | Basic | 12 | * Explain the importance of data structures in Python and other languages * This is a key concept in Python and is very widely used especially in Data sciences |
| 7 | Exception Handling and Logging | * Importance of writing good code with logging and exception handling * Raising exceptions * User defined exceptions * Handling exceptions * Logging information for debugging purposes | Basic | 4 |  |
| 8 | Python Coding Guidelines | * PEP8 * Static Code Analysis * Python modules for actually doing static analysis | Basic | 4 | * Coding standards and static code analysis are mandatory in most LIVE projects * Intro to PyLint – static code checker |
| 9 | Modules | * What is a module ? * Third party modules * Installing third party modules * Using multiple modules in your code * Design considerations | Basic | 4 |  |
| 10 | Packages | * Design considerations * Introduction to packages * Different ways to group applications into packages * \_\_init\_\_.py | Basic | 4 | * This is an important concept * Most Python apps use packages |
| 11 | Classes | * Introduction to OOP * Polymorphism * Inheritance * Constructors * Objects * Getter/Setters | Basic | 12 | * This is a key concept in Python * All Python provided modules use this concept * Third party provided modules also use Classes |

## INTERMEDIATE COURSE CONTENTS

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Python’s standard library | * Walkthrough of the standard library * Using Python standard library for file processing * String operations * JSON processing * Mathematical operations | Intermediate | 8 | * Even the simplest python module will use the standard library * This will provide an introduction which developers can build upon |
| 2 | Advanced Data Structures/ Collections | * Review data structures/collections covered in the basic course * Third party modules for using various types of collections/data structures * Multi dimensional data structures | Intermediate | 12 | * Understanding of advanced data structures is vital for using Python in Data sciences * Pandas and NumPy are two widely used third party modules * These are deep concepts that require detailed explanations |
| 3 | Virtual Environments | * What are virtual environments * Setting up a virtual environment * Using multiple virtual environments * Setting up projects with packages * Using pip to install modules in virtual environments | Intermediate | 8 | * In practice, Python developers will develop code using virtual environments * Developers must be able to setup and use virtual environments |

## INDUSTRY SPECIFIC PYTHON TOPICS (Advanced)

### Database Management

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Using Python with PostgreSQL | * Installing and using third party modules * Performing various database operations |  | 12 | * PostgreSQL is a widely used relational database |
| 2 | Using Python with MongoDB | * Installing and using third party modules * Performing various database operations |  | 12 | * MongoDB is a NoSQL database |

### Python and Data Sciences with NumPY and PANDAS – An Intro

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Using Python with NumPY and PANDAS | * Installing and using the relevant third party modules * Introduction to Pandas and NumPY * High performance data structures available * Series, data frames, Panels and other concepts |  | 32 | Over two weeks, 4 days per week |

### Python and Web Development – An Intro using Flask

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Web development using Flask | * Installing and using the relevant third party modules * Walkthrough of the web app to be developed |  | 32 |  |

### Python and Web Development – An Intro using DJango

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Web development using DJango | * Installing and using the relevant third party modules * Web app to be developed |  | 32 |  |

### Python and REST API development

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Using Python for REST API development | * Installing and using the relevant third party modules |  | 16 |  |

### Python and Test Driven Development – An Intro using Pytest

| **#** | **TOPIC** | **SUB TOPICS** | **LEVEL** | **HRS** | **REMARKS** |
| --- | --- | --- | --- | --- | --- |
| 1 | Test driven development using Python | * Installing and using the relevant third party modules * Use Stories that will be covered |  | 32 |  |

# TRAINING METHODOLOGY

|  |  |  |
| --- | --- | --- |
| **#** | **Topic** | **Prerequisites / Remarks** |
| 1 | Mix of theory and practical  [The ratio varies depending upon the topic and the students] |  |
| 2 | Spend first 15/20 minutes discussing what was covered on the previous day |  |
| 3 | During the course, students raise queries and also talk about topics that will not be covered in the course  A parking lot is created. This parking lot is documented along with responses.  During the course, the trainer will try to discuss these items | Whiteboard required |
| 4 | During the practice sessions, students will be required to write code/pseudo code on the whiteboard | Whiteboard required  Ideally one workstation per student.  At the most 2. Reduce participants if required |
| 5 | Whenever required, explicitly state the alternate ways of doing the same task | Students can then explore these alternate options on their own |
| 6 | Ice breaker topics | On each day, at specific intervals, ask different questions just to make the sessions more interesting |
| 7 | Once a week Quiz | This gets the students excited especially if there are prizes for students who answer questions correctly. |
| 8 | Regularly emphasize on the course contents | This is to avoid students digressing |
| 9 | Mobile phones off | During the breaks, students can answer to calls |
| 10 | Take up bad behavior with management/relevant people | Bad behavior will not be tolerated.  Students misbehaving will be reported to management |
| 11 | Sessions need to start early and end early | Preferably 9 AM onwards |