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# BASIC COURSE CONTENTS

| **#** | **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 |
| 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 |  | 16 |  |