

# Python Essentials Training

## 5-day session

<b>Overview</b>	Understanding principles of Object Oriented Programming Understanding the structure of a Python program Understanding module, class and object Understanding Polymorphism and Inheritance Practical labs with Python 3.x Interpreter
<b>Duration</b>	Five days - 40 hours (8 hours a day) 50% of lecture, 50% of practical labs.
<b>Trainer</b>	<a href="http://www.linkedin.com/in/pravinkumarsinha">http://www.linkedin.com/in/pravinkumarsinha</a>
<b>Audience</b>	Professional embedded Software developers Embedded developers. People supporting large scale products.
<b>Prerequisite</b>	<b>Knowledge of Shell Scripting programming</b> In particular, participants should be familiar with writing scripts in Unix Shell Programming. Basic syntax and execution flow knowledge is required. Shell Programming training agenda is available at <a href="http://www.minhinc.com/training/li/advance-li-agenda.php">http://www.minhinc.com/training/li/advance-li-agenda.php</a>  and can be downloaded from <a href="http://www.minhinc.com/training/advance-li-agenda.pdf">http://www.minhinc.com/training/advance-li-agenda.pdf</a>  <b>Knowledge of Object Oriented Concepts</b> Ops concept like Abstraction, Inheritance, Polymorphism would help.
<b>Setup</b>	Machine with Python 3.x interpreter installed.

## Lecture

Lecture session will be course content presentation through the trainer.  
Any source code example related to the topic will be demonstrated, it would include executing the binaries.  
Complete lecture material can be downloaded from  
<http://www.minhinc.com/training/advance-py-slides.pdf>

## Labs

Labs session would be completely hands on session where each example (with example data and execution instruction) would be provided to the students. Students can verify their results with the results provided in the material.

## Day 1 Morning

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### Lecture - Basic structure of Python program

- Interactive Mode
- Scripting mode
- Main module
- Library modules
- Various namespaces
- Python Identifiers
- Lines and indentation
- Quotation
- Comments
- Multi Line statements

### Lecture - Python execution model

- Self-Organizing Maps
- Boltzmann Machine
- Auto Encoders

### Lecture - Variable types

- Number (integer, long, float, complex)
- String
- Declaring and initializing variable
- Performing arithmetic calculation
- Mutable types
  - List
  - Dictionary
- Non mutable types
  - Tuple

## Day 1 Afternoon

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### Lab

- Installing Python
- Writing simple python program
- Executing program on command shell
- Executing program through interpreter
- Converting various data types to other types
- Practicing built in functions.

## Day 2 Morning

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### Lecture - Defining and Calling functions

- Function definition
- Function arguments
  - Pass by reference and value
  - Required arguments
  - Keyword arguments
  - Default arguments
  - Variable length arguments
- Function local, non local and global variable.
- Function object
- Method object

### Lecture - Control statement

- if else elif statement
- for in statement
- while statement
- break, continue and pass
- Iterator
- Generator

### Lecture - Regular Expression

- Module re
- match(), search(), sub()
- Modifiers

## Day 2 Afternoon

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### Lecture - Basic Operators

- Arithmetic operator
- Relation operator
- Assignment operator
- Bitwise operator
- Membership operator
- Identity operator

### Lab

- Write sample application with a function defined.
- Pass arguments as
  - Keyword arguments
  - Default arguments
  - Variable length arguments
- Write regular expression to search and modify a string.

## Day 3 Morning

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### Lecture - Module

- Namespaces in dictionary
- Importing namespace to other
- Loading a module and accessing symbols
- Locating module
- dir function listing dictionary
- globals(), locals() function
- Reloading a module
- Packages,

### Lecture - Class and Object

- Class variable
- Function object
- Inheritance
- Polymorphism
- Private and Public member
- Object instance
- Object member variable
- Method object
- Operator overloading

## Day 3 Afternoon

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### Lab

- List module namespace dictionary
- Import a module in main module and call module functions
- Import external modules symbols in current module' namespace
- Reload a module
- Write package and sub packages
- Write a small class with class variable and function object
- Add object variable and method objects.
- Call methods from other method
- Inherit from the class and override

## Day 4 Morning

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### Lecture - Inheritance and Polymorphism

- Reusing functionality through inheritance
- Tracing the scope in namespace
- Extending methods from base class
- Overriding methods for dynamic behaviour
- Polymorphic behaviour of class
- Class decorators
- Multiple inheritance
- Similarity and dissimilarity with C++
- inheritance and polymorphis

### Lecture - File I/O

- Unbuffered file I/O
  - os module
  - File descriptor
- Streaming I/O
  - open()
  - File object

## Day 4 Afternoon

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### Lab

- Inherit from the class and override methods
- Instantiate base and derived class separately and check inheritance and polymorphism functionality.

## Day 5 Morning

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### Lecture - Operator overloading

- `__init__`, `__del__`
- `__sub__`
- `__add__`
- `__or__`
- `__repr__`, `__str__`
- `__getattr__`, `__getattribute__`, `__setattr__`, `__delattr__`
- `__getitem__`, `__setitem__`, `__delitem__`
- `__len__`, `__bool__`
- `__lt__`, `__gt__`, `__le__`, `__ge__`, `__eq__`, `__ne__`
- `__radd__`, `__iadd__`, `__iter__`, `__next__`
- `__contains__`
- `__index__`
- `__enter__`, `__exit__`
- `__get__`, `__set__`
- `__delete__`
- `__new__`

### Lecture - Exception

- Exception objects
- Assertion
- try, except, finally
- Raising an exception
- User defined exceptions

## Day 5 Afternoon

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### Lab

- Implement operator overloading methods
- Raise exception
- Catch in except block
- Implement finally

# Python Essentials

Python Essentials- Training Course

**Minh, Inc.**

## DISCLAIMER

Text of this document is written in Bembo Std Otf(13 pt) font.

Code parts are written in Consolas (10 pts) font.

This training material is provided through **Minh, Inc.**, B'lore, India

Pdf version of this document is available at <http://www.minhinc.com/training/advance-py-slides.pdf>

For suggestion(s) or complaint(s) write to us at [sales@minhinc.com](mailto:sales@minhinc.com)

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## Day 1 Morning

### 1. Basic structure of Python program

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