

Course Outline



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Email: training@ptr.co.uk Web: www.ptr.co.uk

Python Programming Fundamentals

Course Description:

Python is a widely used general-purpose, high-level programming language, that supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles.

It features a dynamic type system and automatic memory management and has a large and comprehensive standard library.

Python interpreters are available for most operating systems, allowing Python code execution on a wide variety of systems.

The course provides an introduction to the key features of the language. Delegates should have experience with another programming language and have a basic background in programming and knowledge of programming principals as covered by PTR's Fundamentals of Computer Programming Course.

Pre-requisites:

Course Content:

- **Overview**
- History
- Python distributions
- Windows and Python
- Linux and Python
- Anaconda
- Mapping with Python
- The Ipython Notebook
- On line documentation

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- **An Introduction to Python**
 - Running programs using the interpreter
 - Running programs using files
 - Other options

- **Python base types, operators and expressions**
 - Built-in Types
 - Python symbols
 - Numeric Types
 - Iterator Types
 - Sequence Types
 - Text Sequence Type
 - Binary sequence types
 - Set types
 - Mapping types
 - Context manager types
 - Other types
 - Problems

- **Arithmetic**
 - Arithmetic in Python

- **Arrays using the array module**
 - Types supported by the array module
 - Array methods
 - Basic array usage in Python

- **Arrays using the Numpy module**
 - Numpy as the fundamental package for
 - Scientific computing with Python
 - Data types supported by Numpy
 - Numpy methods
 - One d arrays in Numpy
 - Two d arrays in Numpy
 - Sections and slicing
 - Shape manipulation
 - On line documentation

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- **Text in Python: Strings**
 - The python string methods
 - Examples illustrating basic string usage in Python

- **Control Structures**
 - Compound statements
 - The if statement
 - The while statement
 - The for statement
 - The try statement
 - The with statement
 - The pass statement

- **Functions**
 - Intrinsic maths functions
 - Writing you own functions
 - Parameter passing in Python
 - Functional programming in Python

- **Object oriented programming and classes in Python**
 - Base class syntax in Python
 - Classes using modules
 - Inheritance and derived classes
 - Polymorphism and dynamic binding in Python

- **IO**
 - Basic file usage in Python
 - Reading and writing with files
 - Text and Binary files
 - Network and internet file access
 - CSV in Python and the csv module

- **An Introduction to Algorithms and the Big**
 - Basic background on algorithm performance
 - Array and linked list performance

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- **Sequence types, Iterators and Lists**
 - Iterator types
 - Sequence types
 - Lists
 - Tuples
 - Basic usage of the above
- **Set types**
 - Basic set type usage
- **Mapping types**
 - Basic Map type usage
- **Operator overloading**
 - Short introduction to operator
 - Overloading in Python
- **Decimals, fractions, random numbers**
 - Using the decimal, fractions and random number modules
- **Databases and sqlite**
 - Introduction to database management systems
 - SQL based systems and Python
 - SQLite
 - Basic database usage in Python
- **Regular expressions and pattern matching**
 - Basic pattern matching and regular expression usage in Python
- **Built in exceptions**
 - Introduction to exception handling in Python
 - The Exception hierarchy
- **Concurrent execution**
 - Thread based parallelism
 - Examples illustrating thread based parallelism
 - Process based parallelism
 - Examples illustrating process based parallelism
 - Other types of parallelism

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- **Modules**
 - Introduction to modules
 - Executing modules as scripts
 - The Module Search Path
 - Compiled Python files
 - Standard Modules
 - The dir() Function
 - Packages
 - Importing
 - Intra-package References
 - Packages in Multiple Directories

- **SciPy**
 - Introduction
 - Documentation
 - Tutorials
 - Reference material

- **Windows programming in Python**
 - Introduction to Windows programming
 - Tkinter
 - Simple Tkinter usage
 - Tkinter on line examples and resources
 - Other options
 - QT Creator

- **Graphics programming in Python**
 - Graphics plotting with matplotlib
 - The jupyter qtconsole on Windows
 - Mapping in Python

- **Python performance comparison to other programming languages**
 - Python solution with timing
 - C++ solution with timing
 - Java solution with timing
 - Fortran solution with timing

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- **SQL background**
 - Introduction to the SQL model
 - Brief history
 - Short Bibliography
- **Functional programming**
 - Brief background to functional programming

Course Duration:

3 Days

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