Python for Data Analytics and Machine Learning

Oracle Database

DURATION	MODULES	COURSE CODE
5 Days	**15 Lectures**	**—**

Course Overview

Python for Data Analytics and Machine Learning

What You Will Learn

Role of Python in Data Analytics and Machine Learning

- Learning Objectives
- Data Analysis
- Data Analysis Tools
- Types of Data Analysis
- Phases in a Typical Data Analysis Process
- Introduction to Artificial Intelligence (AI)
- Introduction to Machine Learning
- Types of Machine Learning
- Machine Learning Process
- Some Application Areas of Machine Learning
- Python in Data Analysis and Machine Learning
- Summary
- Practices for 1: Overview

Python and Its Interpreter

- Learning Objectives
- What Is Python?
- Evolution of Python Language
- Applications of Python Programming
- Features of Python
- Comparing Languages
- Python Interpreter Environment – Source Code Encoding
- Invoking the Python Interpreter

- Python Interpreter in Interactive Mode
- Examples of Interactive Mode
- Anaconda and Jupyter Notebook
- Jupyter Notebook – Kernel and Cells
- Jupyter Notebook – Cell Types
- Sample Python Program
- Apache Zeppelin
- Apache Zeppelin Notebook – Creating an Interpreter
- Notebooks in Oracle Machine Learning
- Oracle Machine Learning Notebook – Example
- Creating a Notebook
- Editing a Notebook
- Summary
- Practices for 2: Overview

Python Datatypes

- Learning Objectives
- Python Data Types
- Numbers in Python
- Strings in Python
- Example of String Indexing
- String Operators
- Python String – Example
- List
- Accessing Values in Lists
- List – Example
- Tuples
- Accessing Values in Tuples
- Tuples – Example
- Set
- Accessing a Set in Python
- Dictionaries
- Dictionaries – Example
- Accessing Values in Dictionary
- Summary
- Practices for Lesson 3: Overview

Control Structures in Python

- Learning Objectives
- if statement
- if statement – Example
- else statement
- else statement – Example
- Loop Statements
- for Loop

- for Loop – Example
- Python For-Loop – Range Function
- for Loop – else Statement
- Python while Loop
- while Loop – Example
- while loop – else statement
- Nested Loops
- Loop Control Statements
- Break Statement
- Break Statement – Example
- Continue Statement
- Continue Statement – Example
- Pass Statement
- Summary
- Practices for 4: Overview

Functions in Python

- Learning Objectives
- Functions in Python
- Defining Functions in Python
- Function Invocation
- Pass by Reference
- Function Arguments
- Function Arguments – Required Arguments
- Function Arguments – Default Arguments
- Function Arguments – Keyword Arguments
- Function Arguments – Variable-Length Arguments
- **kwargs
- Scope of Variables
- Lambda Functions with Example
- Using map() function with Lambda Functions
- Recursive Functions
- Summary
- Practices for 5: Overview

Lists in Python

- Learning Objectives
- Sequence Data Types in Python
- Characteristics of Lists in Python
- Accessing Values in Lists
- Negative Indexing in Lists
- Nested Lists in Python
- Slicing a List
- Shallow Copy of a List
- Methods of List Objects

- Examples of List Methods
- List Concatenation: Another Example
- Using a List as a Stack
- Using a List as a Queue
- List Comprehensions
- The del Statement
- Summary
- Practices for 6: Overview

Tuples in Python

- Learning Objectives
- Features of Tuples in Python
- Accessing Values in Tuples
- Negative Indexing in Tuples
- Slicing a Tuple
- Concatenating Tuples
- Immutability of Tuples
- Immutability of Tuples: Deletion of Elements
- Membership Test in Tuples
- Iterating the Elements in a Tuple
- Extending Tuple Elements with *
- Functions Used with Tuples in Python
- Functions Used with Tuples in Python: Example
- Summary
- Practices for 7: Overview

Sets in Python

- Learning Objectives
- Features of Sets in Python
- Accessing a Set in Python
- Updating the Elements in a Set
- Removing the Elements from a Set
- Operations on Sets
- Operations on Sets – Example
- Python Built-in Functions for Sets
- Operations on Sets – Example
- Other Operations on Sets
- Set Comprehension
- Summary
- Practices for 8: Overview

Dictionaries in Python

- Learning Objectives
- Features of Dictionaries

- Accessing Values in Dictionary with Keys
- Updating the Elements in a Dictionary
- Deleting the Elements in a Dictionary
- Properties of Dictionary Keys
- Python Built-in Functions for Dictionary
- Built-in Functions in Dictionary – Example
- Python Built-in Functions for Dictionary
- Operations on Dictionaries – Example
- Dictionary Comprehensions
- Summary
- Practices for 9: Overview

Regular Expressions in Python

- Learning Objectives
- Regular Expression
- Regular Expression: Example
- Metacharacters in Regular Expressions
- Metacharacters in Regular Expression
- Metacharacters in Regular Expressions: Example
- Special Sequences in Regular Expressions
- Special Sequences in Regular Expressions: Examples
- Compiling the Regular Expressions
- Options for Compiling Regular Expressions
- Compiling Regular Expressions: Example
- Summary
- Practices for 10: Overview

Functions of the re Module

- Learning Objectives
- Functions in Regular Expression
- Regular Expression Functions: findall()
- Regular Expression Functions: search()
- Regular Expression Functions: search() – Example
- Regular Expression Functions: split()
- Regular Expression Functions: split() – Example
- Substrings: sub()and subn()
- Regular Expression Functions: match()
- Regular Expression Functions: group()
- Summary
- Practices for 11: Overview

Working with NumPy

- Learning Objectives
- Python Standard Library

- NumPy
- Ndarray Object in NumPy
- Examples of Ndarray Object Creation
- Array Creation
- Array Creation: Example
- Methods to Create Arrays: Example
- Attributes of a NumPy Array
- Attributes of a NumPy Array: Example
- Array Indexing in NumPy
- Array Indexing in NumPy: Example of Slicing
- Array Indexing in NumPy: Integer and Boolean
- Some Arithmetic Operations in Numpy
- Arithmetic Operations in NumPy: Examples
- NumPy: String Functions
- NumPy String Functions: Example
- NumPy String Functions: Example 2
- Descriptive Statistics Using NumPy
- Random Sampling in NumPy
- Sort, Search, and Counting Functions in NumPy
- Sort, Search, and Counting Functions: Example
- Summary
- Practices for 12: Overview

Working with Pandas

- Learning Objectives
- Introduction to Pandas
- Data Structures in Pandas
- Series in Pandas
- Creating a Series: From a NumPy Array
- Creating a Series: From a Dictionary
- Creating a Series: From a List
- DataFrame in Pandas
- Creating a DataFrame: Example
- Adding a New Column to a DataFrame
- Indexing in Dataframes
- DataFrame Indexing: Examples
- join() in Pandas
- join() in Pandas: Example
- Summary
- Practices for 13: Overview

Accessing Data Sources in Python

- Learning Objectives
- Database Access in Python
- Oracle Database Connection in Python

- Oracle Database Connection Using cx_Oracle
- Oracle Database Connection: Example
- Creating a Table Using cx_Oracle
- Insert Operation on Tables Using cx_Oracle
- Update Operation Using cx_Oracle
- Row Delete on Table Data Using cx_Oracle
- Summary
- Practices for 14: Overview

Data Visualization in Python

- Learning Objectives
- Matplotlib
- Matplotlib Functions
- Figure Functions in Matplotlib
- Axis Functions in Matplotlib
- Simple Plot: Example
- Example of Figure: Matplotlib
- Setting Axis Limits and Formatting Axes: Example
- Bar Plot: Matplotlib
- Bar Plot: Matplotlib – Example
- Histogram, Pie Chart, and Scatter in Matplotlib
- Histogram: Example
- Pie Chart: Example
- Scatter Plot: Example
- Seaborn Plotting
- Seaborn Plotting: Example
- Seaborn Plotting Functions
- Seaborn Plotting Functions: Strip Plot
- Seaborn Plotting Functions: Swarm Plot
- Summary
- Practices for 15: Overview