

Python / Data Pre-Processing / Database / Flask (API) / Pytest Course Content

1) Introduction to Python

- ☐ What is Python?
- ☐ Why should we learn Python?
- ☐ Installing Python
- ☐ Installation & walkthrough of Visual Studio Code Editor for Python Programming
- ☐ Different ways of execution of Python scripts
- ☐ Understanding Python Syntax, Indentation, Code Execution, Comments
- ☐ Memory management while running Python Scripts

2) Variables and Data types

- ☐ Python Variables
- ☐ Python Numbers
- ☐ Python Strings
- ☐ Python Lists
- ☐ Python Tuples
- ☐ Python Dictionaries
- ☐ Python Sets
- ☐ Python Arrays
- ☐ Python Operators

3) Conditional Statements and Loops in Python

- ☐ Python If...Else, If Elif else Loop
- ☐ Python While else Loops
- ☐ Python For else Loops

- ☐ Global vs Local variable in Python

4) Control Statements in Python

- ☐ Return Statement
- ☐ Continue Statement
- ☐ Break statement
- ☐ Pass statement

5) Functions

- ☐ Functions Concept in Python
- ☐ creating a function
- ☐ calling a python function
- ☐ Arguments in function – Formal and Actual Arguments
- ☐ Types of Actual Arguments – Positional, Keyword, Default, Variable length, Keyword variable length
- ☐ Built-in functions – Filter, Map, Reduce
- ☐ Function Recursion
- ☐ Decorators
- ☐ Generators in Python
- ☐ Iterators in Python
- ☐ Search algorithms in Python – Binary\Selection\Bubble

6) Modules and Packages

- ☐ Importing Modules
- ☐ Creating Module
- ☐ Use a Module using pip commands.
- ☐ Understanding PyPI repository
- ☐ modularizing your project with modules
- ☐ Built-in Modules
- ☐ Special Variable `__name__`
- ☐ Multithreading in Python

7) Classes and Objects

- ☐ Understanding Class and Object - Conceptual
- ☐ `__init__` - Understanding role of constructor
- ☐ Types of variables and methods in Class
- ☐ What is an Inner Class in Python?
- ☐ Class Inheritance – Single level, Multi-level and Multiple
- ☐ Method Resolution Order
- ☐ Abstraction in Python
- ☐ Polymorphism – Duck Typing, Method Overloading, Method Overriding, Operator Overloading
- ☐ Encapsulation in Python

8) File and Exception Handling

- ☐ File handling\Read files
- ☐ Write\Create files
- ☐ Delete files
- ☐ Try...except...finally statement

9) Python Libraries

- ☐ Essential Python Libraries
- ☐ Anaconda Installation & Setup
- ☐ Jupyter Lab\Notebook Overview (Anaconda Distribution)

10) Numpy Arrays

- ☐ Create multi-dimensional arrays
- ☐ Numpy Data Types
- ☐ Array attributes
- ☐ Indexing and Slicing
- ☐ Manipulate array shapes

11) Introduction to Pandas

- ☐ Introduction to Python Pandas
- ☐ Basics of Pandas Dataframe and Series
- ☐ Multiple ways of creating Pandas Dataframe
- ☐ Read/Write Static files (Excel / CSV)
- ☐ Handling missing data using fillna / dropna / interpolate methods
- ☐ Handle missing data using Pandas replace method
- ☐ Perform Split-Apply-Combine operation using Pandas GroupBy method
- ☐ Concatenate Dataframes
- ☐ Merge Dataframes
- ☐ Perform Pivot operation using Pivot table
- ☐ Reshape Dataframe using melt operation
- ☐ Perform Stack-Unstack operations on multiple Dataframes
- ☐ Crosstab operation on Pandas Dataframes
- ☐ Read-write data from database using read_sql , to_sql methods

12) Time Series analysis with Python / Pandas

- ☐ DateTime Index and Resample
- ☐ Date_range
- ☐ Holidays
- ☐ To_datetime
- ☐ Period and PeriodIndex
- ☐ Timezone Handling
- ☐ Shifting and Lagging
- ☐ Read Write data from database(read_sql, to_sql)
- ☐ Reading in JSON Data
- ☐ Read in HTML Data

13) Introduction to Data Visualizations

- ☐ What is Data Visualization
- ☐ Some Theoretical Principles Behind Data Visualization
- ☐ Histograms-Visualize the Distribution of Continuous Numerical Variables
- ☐ Boxplots-Visualize the Distribution of Continuous Numerical Variables
- ☐ Scatter Plot-Visualize the Relationship Between 2 Continuous Variables
- ☐ Create Barplot
- ☐ Create Pie Chart
- ☐ Create Line Chart

14) Python Regular Expressions (3 hours)

- ☐ Match function
- ☐ Search function
- ☐ Match vs String function
- ☐ Search and Replace
- ☐ Extended Regular Expression
- ☐ Wildcards

15) Connecting to Database (MySQL)

- ☐ Download and Install MySQL on Windows 10
- ☐ Database Connectivity
- ☐ Create Database
- ☐ Create Table
- ☐ Inserting Data into Table
- ☐ Inserting Multiple Records
- ☐ Extracting Data from Table
- ☐ Update Table Records
- ☐ Delete Record from Table
- ☐ Import Excel in MySQL DB using Python

16) ETL Concepts

- ☐ What is ETL?
- ☐ Conceptual Design Framework for ETL
- ☐ Importance of Staging Area
- ☐ Incremental and Full ETL
- ☐ Extracting from SQL Table
- ☐ Storing and Retrieving Data from Cloud Storage
- ☐ Merging Data Streams

- ☐ Data Cleansing and Improving Data Quality
- ☐ Sampling Data
- ☐ Data Preparation
- ☐ Outputting Cleaned Data
- ☐ Performing Analytics \ Transformation
- ☐ Creating Reports in Tools such as PowerBI / Alteryx / Tableau

17) Pytest Framework

Introduction to Pytest

- What is Pytest used for?
- Types of Testing
- PyTest Inputs and Outputs
- Creating Simple Tests Files in PyTest
- Creating Tuples to Tests
- Using Tuples to Test Multiple Components
- Understanding PyTest Output description
- How to use PyTest Options

Writing Test Functions

- Writing Test Functions with PyTest
- Create Test Project
- Test Functions: Add Tests
- Test Functions: API Exceptions

Testing Test Functions

- Using the Assert Statement
- Exceptions
- Running Test Functions
- Skipping Tests
- Expected Fail Tests
- Running Subsets
- Parameterized Testing

PyTest Fixtures

- Introduction to Fixtures
- Using and Sharing Fixtures
- Tracing Fixture execution
- Using Fixture for test data
- Using Multiple Fixtures
- Specifying Fixture Scope
- Create Global Pytest fixture with Conftest.py
- Fixture Specialization and Autouse
- Renaming and Parameterizing Fixtures
- Introduction to Markers
- Run your Tests with Markers and in Parallel Mode

Built-In Fixtures

- PyTest Built-In Fixtures
- tmpdir and tmpdir-factory fixtures
- Using Pytest config Fixtures
- Using cache Fixture
- Using capsys Fixture
- Using recwarn Fixture
- Using monkeypatch Fixture
- Creating Custom Fixture and Fixture Factory

Plugins

- Plugins Finding
- Creating Plugins
- Testing Plugins
- Creating Distributions

PyTest Configuration

- PyTest Configuration
- Command Line and Markers
- Specifying Test Directory Locations
- Filename Collisions

Reporting

- PyTest HTML Report Generation using pytest-html module
- Custom Reporting in pytest

18) Python Flask API

Introduction and getting started with Flask

- Flask Templates
- Handling POST and GET Requests with Flask
- Database with Flask – SQLAlchemy
- Add Authentication to Web App with Flask – Login
- Building Flask CRUD Application
- Message Flashing in Flask
- Pagination in Flask
- Deploy Python Flask App on Heroku

Flask API

- Create RESTFul API with Flask – Introduction
- Create RESTFul API with Flask RESTful
- Handling GET and POST in Flask
- Handling PUT and DELETE in Flask
- Flask and SQLAlchemy