



TuxAcademy Python Programming

Python Syllabus: Beginner to Advanced
Build Strong Python Foundations and Real-World Programming Skills

Course Objective

This program takes learners from Python basics and programming fundamentals through functions, OOP, advanced Python concepts, libraries, database connectivity, APIs, and real-world project work.

Module 1: Introduction to Python

- What is Python?
- Features of Python
- Installing Python and IDEs (IDLE, VS Code, Jupyter)
- First Python program (Hello World)
- Python Syntax and Indentation

Module 2: Variables and Data Types

- Variable declaration
- Data Types: int, float, str, bool, complex
- Type conversion and casting
- input() and print() functions

Module 3: Operators

- Arithmetic, Assignment, Comparison
- Logical, Bitwise, Identity, Membership

Module 4: Control Flow

- if, if-else, elif statements
- Nested conditions
- pass, break, continue

Module 5: Loops

- for loop, while loop
- Nested loops
- Loop control statements

Module 6: Strings

- String creation, slicing, indexing
- String functions and methods
- f-strings and formatting

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Module 7: Lists, Tuples, Sets, Dictionaries

- List operations and methods
- Tuples and immutability
- Sets and set operations
- Dictionaries: keys, values, items

Module 8: Functions

- Defining and calling functions
- Arguments (positional, keyword, default)
- *args and **kwargs
- Lambda functions
- Scope: Local vs Global

Module 9: File Handling

- Reading from and writing to files
- Working with .txt and .csv
- File modes and context manager (with)

Module 10: Exception Handling

- Try, Except, Else, Finally
- Raising exceptions
- Custom exceptions

Module 11: Object-Oriented Programming (OOP)

- Classes and Objects
- __init__ constructor
- Instance vs Class variables
- Inheritance and Polymorphism
- Encapsulation and Abstraction

Module 12: Modules and Packages

- Creating and importing modules
- math, datetime, os, random, sys
- pip and installing external libraries

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Module 13: Advanced Python Concepts

- List comprehension
- Dictionary and Set comprehensions
- Generators and Iterators
- Decorators
- Closures

Module 14: Working with Libraries

- NumPy – arrays, operations
- Pandas – DataFrames, reading CSV/Excel, data cleaning

Module 15: Regular Expressions

- re module
- Pattern matching
- Search, findall, match, sub

Module 16: Database Connectivity

- MySQL with Python
- CRUD operations

Module 17: Working with APIs

- REST API basics
- Using requests to interact with APIs
- JSON handling

Module 18: Project Work

- Real-world projects based on:
- Data analysis
- Web scraping
- File automation
- Mini web app or GUI