iMSD

Python Course Core Components

INSTITUTE MEDIA STRATEGY DESIGN

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Python Course Outline

Duration: 3 Days

Related Courses:
Phython, C++, MATLAB, Java, C#, Lisp, Pascal, Scratch,

Course Overview and Objectives

This Python course is designed to provide a comprehensive introduction to Python programming, covering everything from basic syntax to more advanced concepts. Whether you are a complete beginner or an experienced programmer looking to learn Python, this course will equip you with the skills to develop Python applications, analyze data, and solve real-world problems.

The course emphasizes practical coding skills, best practices, and Python's extensive libraries and frameworks.

Pre-requisites:

Basic knowledge of mathematics (calculus and linear algebra) and programming (e.g., Python or C++) is recommended but not required.

Course Format:

Lectures, hands-on labs, assignments, and a final project.

Introduction to python

- Introduction to the course
- Setting up the environment (Python installation, IDE setup)
- Writing and executing the first Python script

Python Basics

- Syntax and indentation
- Variables and data types
- Basic operators (arithmetic, comparison, logical)
- Input and output functions
- Comments and documentation

Control Structures

- Conditional Statements
- `if`, `else`.
- `elif` statements'.
- Nested conditionals
- Conditional expressions.
- Ternary operators.

Python loops

- `while` loop
- `for` loop
- Nested loops
- Loop control statements (`break`, `continue`, `pass`)

Data Structures

- Strings
- String operations
- String methods
- String formatting

Python list

- List operations
- List methods
- List comprehensions
- Nested lists

Python tuples

- Tuple operations
- Tuple methods
- Use cases for tuples

Python Dictionaries

- Dictionary operations
- Dictionary methods
- Nested dictionaries
- Use cases for dictionaries

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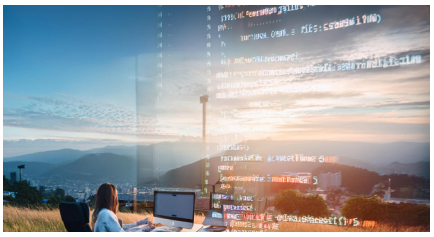
Understand the core syntax, structure, and principles of Python programming to build functional applications.



Programming
Develop problem-solving skills using Python: Utilize control flow statements, functions, and data structures to tackle complex programming challenges.

Handle data process is key
Perform data manipulation, analysis, and visualization using Python's powerful libraries like NumPy, Pandas, and Matplotlib.

Python sets
- Set operations
- Set methods
- Use cases for sets

Python functions
- Defining Functions
- Function definition and invocation
- Function arguments (positional, keyword, default, variable-length)
- Return values

Lambdar Functions
- Syntax and use cases
- Comparison with regular functions

Scope and Lifetime
- Local and global scope
- `global` and `nonlocal` keywords

Modules and Packages
- Importing modules
- Standard library modules
- Creating and using custom modules

Creating packages
- Importing from packages
- `__init__.py` and its role

File Handling
- File Operations
- Reading and writing files
- Working with file modes
- File methods
- Exception handling in file operations

Error and Exception Handling
- Exceptions
- Understanding exceptions
- `try`, `except`, `else`, and `finally` blocks
- Raising exceptions
- Custom exceptions

Object Oriented Programming (OOP)
- Classes and Objects
- Defining classes
- Creating objects
- `__init__` method
- `self` parameter

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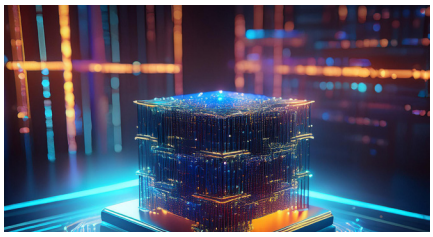
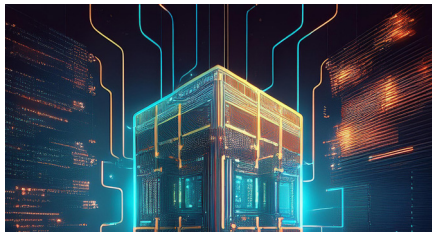
Work with files and manage data: Read, write, and process various file formats and understand the importance of data handling in Python.



Programming

Implement error handling and write robust code: Use exception handling to manage errors and ensure that Python programs are reliable and maintainable.



Design
Explore advanced Python features and frameworks: Gain exposure to advanced topics such as web development, machine learning, and concurrency in Python.

Class Attributes and Methods
- Instance vs. class attributes
- Instance vs. class methods
- Static methods

Python Inheritance
- Single and multiple inheritance
- Method overriding
- `super()` function

Polymorphism and Encapsulation
- Polymorphism principles
- Encapsulation and data hiding

Advanced topics
- Iterators and Generators
- Understanding iterators
- Creating and using generators
- `yield` keyword

Python Decorators
- Function decorators
- Class decorators
- Use cases for decorators

Context Managers
- Understanding context managers
- `with` statement
- Creating custom context managers

Regular Expressions
- Introduction to regular expressions
- Using the `re` module
- Common regex patterns.
- Use cases

Working with Libraries
- Popular Python Libraries
- NumPy for numerical computing
- Pandas for data manipulation
- Matplotlib.
- Seaborn for data visualization.
- Requests for HTTP requests

Project Development
- Project Planning
- Choosing a project
- Project requirements and scope

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Develop a comprehensive Python project: Design, implement, and present a complete Python application, demonstrating proficiency in the language libraries.

Project Implementation
- Writing code
- Testing and debugging

Project Presentation
- Documenting the project
- Presenting the project

Conclusion
- Course Review
- Summary of topics covered
- Best practices in Python programming
- Further learning resources

Advanced Python
Working with APIs and web scraping, Introduction to machine learning with Python, Parallel processing and multithreading Understanding Python's Global Interpreter Lock (GIL)

Web Development with Python
Introduction to web frameworks (Django, Flask)Understanding HTML, CSS, and JavaScript basics

We offer online support to clients on content covered on our courses.