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Python Programming Syllabus

Introduction to Python

Python is a high-level, interpreted, object-oriented programming language known for its simple syntax and readability. It is widely used in **web development, data science, artificial intelligence, automation, cybersecurity, and software development**.

Why Python?

Easy to learn and readable syntax

Large community support

Open source

Cross-platform compatibility

Large library ecosystem

Applications of Python

- Web Development
- Data Science
- Artificial Intelligence & Machine Learning
- Automation / Scripting
- Game Development
- Cyber Security
- Desktop Applications

Companies Using Python

- Google
- Netflix
- Instagram
- Amazon
- Facebook
- Microsoft

Module 1: Python Fundamentals

Topics:

• Python Installation (Anaconda / Python IDE)
    • Python Interpreter
    • Keywords and Identifiers
    • Variables
    • Data Types
    • Input and Output functions
    • Comments in Python
    • Type Casting

Practical:

• First Python Program
    • User input program
    • Type conversion examples

Module 2: Operators and Expressions

Topics:

• Arithmetic Operators
    • Comparison Operators
    • Logical Operators
    • Assignment Operators
    • Bitwise Operators
    • Membership Operators
    • Identity Operators
    • Operator Precedence

Practical:

• Calculator program
    • Even or Odd checker
    • Largest of 3 numbers

Module 3: Control Statements

Topics:

• Conditional Statements

- if statement
- if else
- nested if
- elif ladder

• Looping Statements

- for loop
- while loop
- nested loops

• Loop Control

- break
- continue
- pass

Practical:

• Number patterns

- • Multiplication table
- • Prime number check
- • Factorial program

Module 4: Data Structures

Topics:

Strings

• String creation

- • String indexing
- • String slicing
- • String methods

Lists

• List creation

- • List indexing
- • List methods

- Nested lists

Tuples

- Tuple basics
- Tuple operations

Sets

- Set creation
- Set operations

Dictionary

- Dictionary creation
- Keys and values
- Dictionary methods

Practical:

- Student record using dictionary
- List sorting program
- String reverse program

Module 5: Functions

Topics:

- Function definition
- Function calling
- Arguments types
- Default arguments
- Keyword arguments
- Variable arguments
- Return statement
- Lambda functions
- Recursive functions

Practical:

- Calculator using functions
- Fibonacci series

- Recursion examples

Module 6: Object Oriented Programming (OOP)

Topics:

- Classes and Objects
  - Constructor
  - Instance variables
  - Methods

OOP Concepts:

- Encapsulation
  - Inheritance
  - Polymorphism
  - Abstraction

Practical:

- Student class program
  - Bank management example
  - Inheritance example

Module 7: File Handling

Topics:

- File opening modes
  - Read file
  - Write file
  - Append file
  - File closing

Practical:

- Text file reader
  - Log file creator
  - Data storage program

Module 8: Exception Handling

Topics:

- Errors vs Exceptions
  - try block
  - except block
  - finally block
  - Custom exceptions

Practical:

- Division exception program
  - File exception handling

Module 9: Modules and Packages

Topics:

- Import statement
  - Built-in modules
  - Creating modules
  - Packages

Important Modules:

- math
  - random
  - datetime
  - os

Practical:

- Random password generator
  - Date time program

Module 10: Database Connectivity (Python + SQL)

Topics:

- SQLite connection
  - MySQL connection

- CRUD operations
- Python database connector

Practical:

- Student database project
- Login system

Module 11: Python for Web Development

Topics:

- Introduction to Flask
- Routing
- Templates
- Forms
- Database connection

Practical:

- Simple Flask website
- Login & Registration system
- CRUD application

Module 12: Python for Automation

Topics:

- OS automation
- File automation
- Email sending
- Web scraping basics

Libraries:

- os
- shutil
- smtplib
- BeautifulSoup

Module 13: Python for AI (Introduction)

Topics:

- Introduction to Data Science
  - NumPy basics
  - Pandas basics
  - Matplotlib basics
  - Machine Learning introduction

Practical:

- Data analysis example
  - Simple prediction model

Module 14: Mini Projects

Projects:

- Student Management System
  - Password Generator
  - To-Do List
  - Calculator GUI
  - Flask CRUD Project

Module 15: Final Project

Choose one:

- Web Application (Flask)
  - AI Mini Project
  - Automation Tool
  - Data Analysis Project

Course Outcome

After completing this course students can:

✓ Write Python programs

✓ Work with data structures

✓ Build web applications

✓ Connect databases

✓ Create automation scripts

✓ Understand AI basics

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