# python – Syllabus

Generated on: 2025-06-18 14:58:00

## Python Programming (15 Weeks)  
  
\*\*Course Objectives:\*\* Students will gain a comprehensive understanding of Python programming, including its syntax, data structures, and common libraries. They will be able to write, debug, and execute Python programs to solve a variety of problems. Emphasis will be placed on best teaching practices through clear explanations, hands-on activities, and regular assessment.  
  
  
\*\*Week 1: Introduction to Programming and Python\*\*  
\* Main Topic: What is Programming? Introduction to Python. Setting up your environment.  
\* Subtopics: Algorithms, Flowcharts, Variables, Data Types (Integers, Floats, Strings, Booleans), Operators.  
\* Activity: Simple Python programs (e.g., Hello World, basic calculations).  
  
  
\*\*Week 2: Control Flow\*\*  
\* Main Topic: Conditional Statements and Loops.  
\* Subtopics: `if`, `elif`, `else` statements; `for` and `while` loops; `break` and `continue` statements. Nested loops.  
\* Activity: Lab assignment involving conditional logic and loops (e.g., calculating factorials, creating patterns).  
  
  
\*\*Week 3: Data Structures I: Lists and Tuples\*\*  
\* Main Topic: Lists and Tuples – Creation, Manipulation, and Iteration.  
\* Subtopics: List indexing, slicing, methods (append, insert, remove, etc.), list comprehensions, tuples and their immutability.  
\* Activity: Quiz on control flow and basic data types. In-class exercise using lists and tuples.  
  
  
\*\*Week 4: Data Structures II: Dictionaries and Sets\*\*  
\* Main Topic: Dictionaries and Sets – Key-Value Pairs and Unique Elements.  
\* Subtopics: Dictionary creation, accessing values, methods (keys(), values(), items()), set operations (union, intersection, difference).  
\* Activity: Lab assignment involving dictionaries and sets (e.g., creating a simple address book, analyzing text for unique words).  
  
  
\*\*Week 5: Functions\*\*  
\* Main Topic: Defining and using functions.  
\* Subtopics: Function parameters, return values, scope, docstrings, lambda functions.  
\* Activity: Case study involving functions to solve a problem (e.g., calculating statistics from a dataset).  
  
  
\*\*Week 6: Modules and Packages\*\*  
\* Main Topic: Importing and using modules and packages.  
\* Subtopics: `math`, `random`, `datetime` modules; installing external packages using `pip`.  
\* Activity: Lab assignment using external modules (e.g., generating random numbers, working with dates and times).  
  
  
\*\*Week 7: File Handling\*\*  
\* Main Topic: Reading and writing files.  
\* Subtopics: Opening, reading, writing, and closing files; different file modes; exception handling.  
\* Activity: Lab assignment involving file I/O (e.g., reading data from a file, writing data to a file).  
  
  
\*\*Week 8: Object-Oriented Programming (OOP) I: Classes and Objects\*\*  
\* Main Topic: Introduction to OOP concepts.  
\* Subtopics: Classes, objects, attributes, methods, constructors (`\_\_init\_\_`).  
\* Activity: In-class exercise creating simple classes.  
  
  
\*\*Week 9: OOP II: Inheritance and Polymorphism\*\*  
\* Main Topic: Inheritance and polymorphism.  
\* Subtopics: Inheritance, method overriding, polymorphism, abstract classes (brief introduction).  
\* Activity: Lab assignment involving inheritance and polymorphism.  
  
  
\*\*Week 10: Exception Handling\*\*  
\* Main Topic: Handling errors and exceptions.  
\* Subtopics: `try`, `except`, `finally` blocks; raising exceptions; custom exceptions.  
\* Activity: Quiz on OOP concepts and file handling.  
  
  
\*\*Week 11: Working with Strings\*\*  
\* Main Topic: Advanced string manipulation.  
\* Subtopics: String methods, regular expressions (basic introduction).  
\* Activity: Lab assignment involving string manipulation and regular expressions.  
  
  
\*\*Week 12: Working with Data: Introduction to NumPy\*\*  
\* Main Topic: Introduction to NumPy arrays.  
\* Subtopics: Creating arrays, array operations, slicing and indexing.  
\* Activity: In-class exercise using NumPy arrays.  
  
  
\*\*Week 13: Data Visualization with Matplotlib\*\*  
\* Main Topic: Creating plots and visualizations.  
\* Subtopics: Line plots, scatter plots, bar charts, histograms.  
\* Activity: Lab assignment creating visualizations with Matplotlib.  
  
  
\*\*Week 14: Project Work – Part 1\*\*  
\* Main Topic: Project planning and development.  
\* Subtopics: Project brainstorming, defining requirements, choosing appropriate libraries and tools.  
\* Activity: Project proposal submission.  
  
  
\*\*Week 15: Project Work – Part 2 & Presentation\*\*  
\* Main Topic: Project completion and presentation.  
\* Subtopics: Project testing, debugging, documentation, presentation preparation.  
\* Activity: Project presentations and final submission.

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