Core Python Course Syllabus (2.5 Months)

Week 1: Introduction to Python

- Overview of Python programming language
- Setting up Python environment
- Writing and running your first Python program
- Python syntax and basic data types (int, float, string, bool)
- Variables and naming conventions

Week 2: Control Structures

- Conditional statements (if, elif, else)
- Looping constructs (for, while)
- Break, continue, and pass statements
- Introduction to functions
- Writing and calling functions

Week 3: Data Structures

- Lists: creation, indexing, slicing, and methods
- Tuples: creation, indexing, slicing, and methods
- Dictionaries: creation, accessing, and methods
- Sets: creation and methods
- List comprehensions

Week 4: Functions and Modules

- Function arguments and return values
- Lambda functions
- Scope and lifetime of variables
- Introduction to modules and packages
- Importing and using standard libraries

Week 5: File Handling

- Reading from and writing to files
- Working with different file modes

- Handling file exceptions
- Working with CSV files
- Introduction to JSON data

Week 6: Error and Exception Handling

- Understanding errors and exceptions
- Try, except, else, and finally blocks
- Raising exceptions
- Creating custom exceptions
- Debugging techniques

Week 7: Object-Oriented Programming (OOP)

- Introduction to classes and objects
- Attributes and methods
- The __init__ method (constructor)
- Inheritance and polymorphism
- Encapsulation and data hiding

Week 8: Advanced Topics

- Decorators
- Iterators and generators
- Working with datetime module
- Regular expressions
- Introduction to web scraping (using BeautifulSoup)

Week 9: Working with Libraries

- NumPy for numerical computations
- Pandas for data manipulation and analysis
- Matplotlib for data visualization
- Introduction to virtual environments

Week 10: Introduction to Databases

- Overview of databases and SQL

- Connecting to databases with Python
- Performing CRUD operations
- Using SQLite with Python
- Introduction to ORM (Object-Relational Mapping) with SQLAlchemy

Week 11: Web Development Basics

- Introduction to web frameworks (Flask/Django)
- Setting up a simple web application
- Routing and views
- Template rendering
- Handling forms and user input

Week 12: Final Project and Review

- Review of all topics covered
- Guidance on final project
- Hands-on project development
- Debugging and testing the project
- Project presentation and feedback

Week 13: Advanced Topics and Course Wrap-Up

- Introduction to concurrency (threads and multiprocessing)
- Basic understanding of API (RESTful APIs)
- Best practices in Python programming
- Course recap and Q&A
- Additional resources for further learning

This syllabus provides a comprehensive overview of Core Python programming, gradually building from basic concepts to more advanced topics and practical applications.