Python Development

1. Introduction to Python & Programming

Building blocks of programming: variables, data types, operators.
Basic control flow: conditional statements, loops.
Writing simple functions.

2. Working with Data Structures

Lists, tuples, dictionaries: creating, accessing, iterating.
Mutability and object references.
Working with strings and sequences.

3. Functions & Modules

Writing functions with arguments and return values.
Importing and using modules, organizing code.
Recursive functions and problem-solving

4. Object-Oriented Programming

Designing classes and objects, modeling real-world entities.
Inheritance and polymorphism, building class hierarchies.
Exception handling and error prevention.

5. Data Analysis & Visualization

Reading and writing text files, handling CSV data.
Numerical data processing with NumPy arrays.
Creating basic data visualizations with Matplotlib.

6. Web Scraping & Automation

Downloading web content with requests library.
Parsing HTML with BeautifulSoup, data extraction.
Automating repetitive tasks with Selenium.

7. Concurrency & Threading

Understanding multitasking and concurrency concepts.
Working with threads and processes, handling I/O tasks.
Building asynchronous applications with asyncio.

8. Unit Testing & Code Quality

Importance of unit testing for reliable code.
Writing test cases with unittest framework.
Code linting and static analysis tools.

9. Context Managers & Exception Handling

Implementing context managers for resource management.
Advanced exception handling techniques.
Customizing error messages and error logging.

10. Decorators & Metaclasses

Creating and using decorators to extend functionality.
Understanding metaclasses and dynamic class creation.
Advanced customization of class behavior.

11. Functional Programming with Python

Implementing functional programming patterns in Python.
Higher-order functions, map, filter, reduce.
Immutability and functional data structures.

12. Advanced Iterators & Generators

Customizing iteration behavior with custom iterator classes.
Implementing generators for lazy evaluation and iterators.
Yielding values and efficient memory management.

13. Regular Expressions & Text Processing

Understanding regular expressions for pattern matching.
Searching and manipulating text with re module.
Parsing text formats and validation techniques.

14. Networking & Web APIs

Sending and receiving data over network sockets.
Interacting with web APIs using requests library.
Building basic client-server applications.

15. Database Access

Connecting to and querying relational databases.
Working with popular database frameworks like SQLAlchemy.
Persisting data and building data-driven applications.