Week 1: Introduction to Python

- Overview of Python and its features
- Installing and setting up Python
- Understanding the Python IDE and the Python shell
- Basic programming concepts: variables, data types, operators, and expressions
- Writing and running your first Python program

Week 2: Working with Control Structures

- Understanding control structures in Python
- Conditional statements: if, else, elif
- Looping constructs: for and while loops
- Using break and continue statements
- Nested loops and loop control statements

Week 3: Data Types and Data Structures

- Built-in data types in Python: numbers, strings, lists, tuples, and dictionaries
- Creating and using lists, tuples, and dictionaries
- List comprehension and generator expressions
- Understanding mutable and immutable objects
- Working with sets and frozensets

Week 4: Functions and Modules

- Understanding functions in Python
- Creating and using functions with parameters and return values
- Variable scope and global/local variables
- Built-in modules in Python
- Creating and using your own modules

Week 5: File Handling and Exceptions

- Reading and writing files in Python
- Understanding file modes and file handling methods
- Exception handling in Python
- Using try/except/finally statements
- Raising and handling custom exceptions

Week 6: Regular Expressions

- Introduction to regular expressions in Python
- Understanding the syntax of regular expressions
- Using regular expressions for string manipulation and pattern matching
- The re module and its functions

Week 7: Object-Oriented Programming in Python

- Introduction to object-oriented programming (OOP)
- Creating classes and objects in Python
- Understanding inheritance and polymorphism
- Overriding methods and operators
- Class and instance variables

Week 8: GUI Programming with Tkinter

- Overview of GUI programming in Python
- Introduction to Tkinter and its widgets
- Creating GUI applications with Tkinter
- Event-driven programming with Tkinter

Week 9: Database Programming with Python

- Introduction to database programming in Python
- Connecting to databases with Python
- Using SQL statements in Python
- SQLite, MySQL, and PostgreSQL databases
- ORM (Object-Relational Mapping) with SQLAlchemy

Week 10: Web Development with Flask

- Introduction to web development with Flask
- Setting up a Flask project
- Flask routes and templates
- Using forms and validators with Flask
- Flask extensions and deployment

Week 11: Data Analysis with NumPy and Pandas

- Overview of NumPy and Pandas libraries
- Creating and manipulating arrays with NumPy
- Data wrangling with Pandas: reading, cleaning, and transforming data
- Aggregating and summarizing data with Pandas

Week 12: Data Visualization with Matplotlib and Seaborn

- Introduction to data visualization
- Understanding Matplotlib and Seaborn libraries
- Creating plots, charts, and graphs with Matplotlib and Seaborn
- Customizing plots and adding annotations

Week 13: Machine Learning with Scikit-Learn

- Introduction to machine learning
- Overview of Scikit-Learn library
- Data preprocessing for machine learning
- Supervised and unsupervised learning algorithms

Week 14: Web Scraping with BeautifulSoup and Requests

- Introduction to web scraping
- Understanding the BeautifulSoup and Requests libraries
- Parsing HTML and XML documents
- Extracting data from websites and APIs

Week 15: Advanced Topics in Object-Oriented Programming

- Understanding design patterns and their implementation in Python
- Working with decorators and context managers
- Creating and implementing abstract classes and interfaces
- Inheritance vs. composition

Week 16: Network Programming with Python

- Introduction to network programming
- Understanding sockets and protocols
- Building client-server applications with Python
- Working with HTTP and websockets

Week 17: Concurrency and Parallelism

- Introduction to concurrency and parallelism
- Understanding the Global Interpreter Lock (GIL)
- Creating and managing threads and processes
- Asynchronous programming with asyncio

Week 18: Testing and Debugging

- Understanding unit testing and test-driven development (TDD)
- Using the unittest module for testing
- Debugging techniques and tools
- Using profiling and code analysis tools

Week 19: Data Science and Big Data

- Overview of data science and big data
- Working with distributed data processing systems (e.g., Apache Spark)
- Applying machine learning algorithms to big data
- Data visualization and storytelling with big data

Week 20: Web Development with Django

- Introduction to Django web framework
- Setting up a Django project
- Creating views, templates, and models with Django
- Using Django ORM for database access
- Building RESTful APIs with Django REST framework.