

First Course Handout

Course name

Python Mastery - From Novice to Ninja

Instructor details

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Objectives

1. **Provide In-Depth Knowledge of Python Programming:** Equip students with a thorough understanding of Python, covering core concepts and advanced techniques essential for modern development.
2. **Hands-On Experience Across Modern Python Development:** Ensure students gain practical experience with a wide array of Python applications, including Data Structures, System Design, Parallel Programming, Web Development, Data Processing, Data Visualization, IoTs, DevOps, and IT Automation.
3. **Foundation for Advanced Projects:** Lay a strong foundation that empowers students to confidently embark on advanced Python projects, leveraging the comprehensive skills and knowledge acquired throughout the course.

Materials

<https://github.com/suvambasak/Python-Mastery.git>

Content

1. **Module 1** – Python programming foundation
 - a. Concept of interpreted language
 - b. Variables
 - c. Control Flow
 - d. Loops
 - e. Functions
 - f. Data Structures
 - i. List
 - ii. Stack
 - iii. Queue

- iv. Tuple
 - v. Sets
 - vi. Dictionaries
- g. Errors and exceptions
- 2. **Module 2** – Object oriented approach
 - a. Classe objects
 - b. Inheritance
 - c. Object oriented design
- 3. **Module 3** – Python modules/packages
 - a. Standard modules
 - b. Packages
 - c. External module/packages
- 4. **Module 4** – File handling
 - a. Reading and writing files
 - b. Handling text files
 - c. Handling JSON files
 - d. Handling CSV files
- 5. **Module 5** – Data visualization
 - a. 2D Visualization
 - b. 3D Visualization
 - c. Interactive data visualization
- 6. **Module 6** – Parallel programming
 - a. Thread-based parallelism
 - b. Synchronization
 - c. Process-based parallelism
 - d. Asynchronous I/O
- 7. **Module 7** – Graphical user interface (GUI)
 - a. Text and images
 - b. Buttons and click events
 - c. User inputs and text box
 - d. Layout organization
 - e. Building interactive applications
- 8. **Module 8** – Web technology and networking
 - a. CURD operation on a webpage
 - b. CURD operation with REST APIs
 - c. User authentication
 - d. Data streaming
- 9. **Module 9** – Scientific computing

- a. Optimization
- b. Interpolation
- c. Calculus
- d. Fourier Transforms
- e. Linear Algebra
- f. Statistics

10. Module 10 – IT automation

- a. Automated testing and debugging
- b. Manage files and resources
- c. Manage servers/cloud instances
- d. Use automation for day-to-day tasks

11. Module 11 – Python for IoTs/Hardwares

- a. Raspberry Pi 4
- b. Infrared Proximity Sensor
- c. RC522 SPI S50 RFID reader
- d. HC-SRO4 Ultrasonic Distance Sensor