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Python

Data Analysis & ML with Python

45 days (3 hours / day)

Day 1

1. **Introduction to Python**
    - What is Python
    - The application areas of Python
    - Download and install Python
    - Execute Python program from command prompt and using IDLE
    - Save programs with .py extension and execute it from prompt

2. **Python Basics**
    - Data types and variables
    - Operators and operator precedence
    - Data type conversions
    - Command line argument
    - Data input
    - Comments

3. **Python Flow Control**
    - If statement
    - If.. elif.. else statement

Day 2

- While loop
- For loop
- Break & continue
- Else clause

Day 3,4

4. **Introduction to Python IDE – PyCharm**

5. **Python Sequences**
    - Range
    - String
    - List
    - Tuple
    - Dictionary
    - Set

6. **Shallow and deep copy**

Day 5,6, 7

7. **Functions and modules**
    - What is function
    - Define a function
    - Pass arguments
    - Arguments with default values
    - Arbitrary arguments

- Local and global variables
- Return a value from function
- Return multiple values
- Documentation Strings

8. Python built in functions

- Mathematical functions
- Random number functions
- Mathematical constants

9. Recursive functions

Day 8, 9

10. Python Modules

- What is module?
- Import module using import statement
- Namespaces and scoping
- Dir(), globals(), locals() and reload()

11. File Handling

- Reading
- Writing
- File manipulations
- Directories

Day 10

12. Exception Handling

- What is exceptions
- Python built-in exceptions
- Try
- Except
- Finally
- Raise exceptions
- User defined exception
- Assertions

Day 11

13. Python classes and objects

- Class definition
- Creating objects
- Constructors
- Accessing attributes
- Build-in class attributes
- Destructors
- Inheritance
- Overriding
- Overloading
- Data hiding

Day 12

14. Regular Expressions

- Match()
- Search()
- Search and replace
- Modifiers
- Patterns
- Character classes
- Repetitions

Day 13

15. Multithreading

- What is a thread?
- What is multithreading?
- Create and start a new thread
- The Threading module
- Thread synchronization

Day 14

16. Date and Time in Python

- The DateTime module
- Time tuple
- The Time module
- Date object
- The Calendar module

Day 15,16,17,18

17. Database programming

- With SQLite
  - ➢ Installing SQLite browser
  - ➢ Creating database
  - ➢ CRUD operations
- With MySQL
  - ➢ MySql datatypes
  - ➢ CRUD operations
  - ➢ Subquery
  - ➢ Join
  - ➢ Aggregate functions
  - ➢ Procedures

Day 19, 20

18. Python GUI Programming with Tkinter

- Widgets
- Geometry managers / layout managers
- Variable classes
- Events and binds

Day 21

- Evaluation Test

Day 22

19. Packages

- Creating packages
- Installing packages using PIP

20. Functional Programming

- Iterators
- Generators
- The lambda construct
- Comprehensions
- Map, reduce and filter

Day 23 - 25

Basic Project

Day 26 - 28

21. Introduction to web programming

- Web server
- Web client
- HTML
- CSS
- Java script

- jQuery
- AJAX

Day 29 – 33

22. Python Web framework – Django

- Installation
- Configuration
- Urls and Views
- App creation
- Admin interface
- Model
- Template integration
- Form Processing
- Database connection
- Sessions
- Image/files uploading
- Testing in Django

Day 34 - 37

- Project using Django

Day 38

- Evaluation Test

Day 39, 40 **Introduction to Python Data Analysis and Machine Learning**

- What is data analysis?
- What is machine learning?
- Examples
- Python modules used for analysis and machine learning
- What is data visualization?
- Modules used for visualization

Additional 5 Days for Hackathons / Assignments