

## Course Outline

### Python Fundamentals for AI



#### Session 1: Hello Python & First Code

Topics :

- Hello Python
- Writing your first Python program
- Python as a calculator
- Arithmetic operations and order of operations

Learning Outcomes :

- Run Python in Google Colab and VS Code
- Create and execute .py and .ipynb files
- Perform basic calculations using Python

#### Session 2: Variables & Data Types

Topics :

- Variables and variable assignment
- int float str bool
- Calculations using variables
- Operations with different data types
- Type conversion
- Basic string concatenation

Learning Outcomes :

- Understand Python's core data types
- Use variables in expressions and calculations
- Convert between data types and format output



## Session 3: Python Strings & String Methods

Topics :

- String indexing and slicing
- Common string methods
- lower upper split replace strip format

Learning Outcomes :

- Manipulate text data effectively
- Clean and reformat raw strings
- Apply string operations for preprocessing tasks

## Session 4: Lists: Creation Indexing and Slicing

Topics :

- Creating lists
- Lists with multiple data types
- Nested lists
- Indexing and slicing
- Accessing elements in list of lists

Learning Outcomes :

- Work with lists and nested structures
- Retrieve and manipulate list elements
- Understand indexing rules and slicing behavior





## Session 5: Manipulating Lists & List Methods

Topics :

- Modifying list elements
- append extend insert
- pop remove delete
- List behavior and inner workings

Learning Outcomes :

- Modify lists dynamically
- Use list methods for data organization
- Understand how lists change in memory

## Session 6: Functions Methods & Importing Packages

Topics :

- Defining functions
- Arguments positional keyword default
- Return values
- Docstrings and help
- Functions vs methods
- Importing packages
- Different import styles

Learning Outcomes :

- Write reusable functions
- Understand methods attached to objects
- Import and use Python standard libraries





## Session 7: Files Exceptions & Debugging

Topics :

- Reading and writing files
- Using with open
- Working with text and CSV-style files
- Exceptions and error handling
- Understanding tracebacks

Learning Outcomes :

- Read and write external files safely
- Handle runtime errors using exceptions
- Debug common Python errors

## Session 8: Introduction to NumPy & Basic Data Exploration

Topics :

- NumPy arrays
- Creating 1D and 2D arrays
- Indexing and subsetting
- Vectorized arithmetic
- Basic statistics mean median
- Comparison with Python lists

Learning Outcomes :

- Use NumPy arrays for numerical data
- Perform fast mathematical operations
- Compute basic statistics efficiently
- Understand why NumPy is essential for AI workflows



## Session 9: Mini Project Sprint & GitHub Publish

Focus :

- End-to-end Python mini project
- Applying variables lists functions files and NumPy
- Git and GitHub fundamentals

Deliverables:

- Complete Python project
- GitHub repository
- README documentation
- Short demo or output screenshots



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