# ■ Python Short Notes (With Examples)

## *1. Basics*

• Python is an interpreted, high-level, dynamically typed language.
• Variables are created when first assigned. Example: **x = 5**
• Data types: int, float, str, bool, list, tuple, set, dict.
• Input: **input("Enter name: ")**; Output: **print("Hello")**
• Comments start with #.

## *2. Operators*

• Arithmetic: +, -, *, /, %, **, //
• Comparison: ==, !=, >, <, >=, <=
• Logical: and, or, not
• Membership: in, not in
• Identity: is, is not

## *3. Strings*

• Strings are immutable sequences of characters.
• Access: **str[0]**, Slice: **str[1:4]**
• Common methods: **upper()**, **lower()**, **replace()**, **split()**
• f-strings: **f"Hello {name}"**

## *4. Conditional Statements*

• **if condition:**
  **print("True")**
**elif** condition:
  **print("Another")**
**else:**
  **print("False")**

## *5. Loops*

• **for i in range(5):** loops 0–4
• **while condition:** repeats until false
• **break** exits loop, **continue** skips iteration, **pass** does nothing.

## *6. Data Structures*

• List: mutable, ordered → **nums = [1,2,3]**
• Tuple: immutable → **t = (1,2)**
• Set: unique values → **s = {1,2,3}**
• Dict: key-value → **d = {'a':1, 'b':2}**
• List comprehension: **[x*x for x in range(5)]**

## *7. Functions*

• Define: **def add(a,b): return a+b**
• Lambda: **lambda x: x*x**
• Map/Filter: **map(func, list)**, **filter(cond, list)**
• Recursion: function calling itself.

### *8. File Handling*

• **with open('file.txt','r') as f:** auto-closes file
• **f.read()**, **f.write()**
• Modes: 'r', 'w', 'a', 'r+'

### *9. Exception Handling*

• **try:** risky code
**except Exception as e:** handle error
**else:** if no error
**finally:** always runs.

### *10. OOP (Object-Oriented Programming)*

• **class Car:**
**def __init__(self, name):**
**self.name = name**
**def drive(self):** print(self.name)
• Inheritance: **class ElectricCar(Car):**
• Encapsulation: using private variables (**__var**)

### *11. Modules & Packages*

• Import: **import math**, **from math import sqrt**
• Custom module: save file as **my_module.py**, then **import my_module**

### *12. Built-in Functions*

• **len()**, **range()**, **sorted()**, **enumerate()**, **zip()**
• **any()**, **all()**, **sum()**, **max()**, **min()**

### *13. Useful Libraries*

• **os**: file & directory operations
• **sys**: system-specific parameters
• **datetime**: date/time manipulation
• **json**: handle JSON data
• **requests**: for API calls
• **pandas**: data analysis basics