

25MAMT302	PYTHON PROGRAMMING ESSENTIALS	Category	L	T	P	R	Credit	Year of Introduction
		VAC	4	0	0	0	4	2025

Preamble: This course provides a comprehensive introduction to Python programming, covering fundamental programming constructs, data structures, object-oriented concepts, file handling, and essential Python libraries. The course emphasizes both theoretical understanding and hands-on implementation to develop problem-solving skills and real-world application development capabilities.

Prerequisite: Nil

Course Outcomes: After the completion of the course, the student will be able to:

CO	Course Outcomes	Knowledge Level
CO1	Apply programming fundamentals such as control structures, functions, and data structures to develop Python applications.	K3 Apply
CO2	Implement data structures and functions to solve computational problems.	K3 Apply
CO3	Apply object-oriented concepts to develop modular Python applications.	K3 Apply
CO4	Apply file handling techniques and Python libraries to develop real-world applications.	K3 Apply

Mapping of course outcomes with program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	1	-	-	-	-	-	1	2	1
CO2	3	3	2	1	1	-	-	-	-	-	1	2	1
CO3	3	3	3	1	1	-	-	-	-	-	1	2	1
CO4	2	3	3	2	1	-	-	-	-	-	1	2	1
Avg	2.8	2.8	2.3	1.3	1.0	-	-	-	-	-	1	2.0	1.0

Mapping of course outcomes with Knowledge and Attitude Profile (WK)

	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*	*	*		*	
CO2	*	*	*	*	*	*		*	
CO3	*	*	*	*	*	*		*	
CO4	*	*	*	*	*	*		*	

Wks Mapped with the course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*	*		*	

Mark Distribution:

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	40	60	2.5 hrs

Continuous Internal Evaluation Pattern:

Attendance	: 5 marks
Continuous Assessment Test	: 20 marks
Continuous Assessment Assignment	: 15 marks

SYLLABUS

Module 1 (15 Hrs)

Introduction to Programming and Python. Features of Python, Installation and IDEs. Python Syntax and Structure. Variables, Data Types (int, float, string, Boolean). Operators and Expressions. Input and Output Statements. Control Statements: Conditional Statements (if, elif, else), Looping Statements (for, while), Break, Continue, Pass.

Module 2 (13 Hrs)

Strings and String Operations. Lists and List Methods. Tuples and Sets. Dictionaries and Dictionary Operations. Functions: Function Definition and Calling, Parameters and Return Values, Default and Keyword Arguments, Recursive Functions, Lambda Functions.

Module 3 (15 Hrs)

Introduction to OOP Concepts, Classes and Objects, Constructors and Destructors, Instance and Class Variables, Methods and Types of Methods, Inheritance, Polymorphism, Encapsulation, Exception Handling, Modules and Packages.

Module 4 (13 Hrs)

File Handling (Read, Write, Append). Working with CSV and JSON Files. Introduction to Python Libraries. Basic GUI using Tkinter (Introduction). Introduction to NumPy and Pandas. Mini Project Development.

Text Books:

1. Matthes, E. (2023). *Python crash course: A hands-on, project-based introduction to programming* (3rd ed.). No Starch Press.
2. Lutz, M. (2013). *Learning Python* (5th ed.). O'Reilly Media.
3. Sweigart, A. (2019). *Automate the boring stuff with Python* (2nd ed.). No Starch Press.

Reference Books:

4. Beazley, D. M., & Jones, B. K. (2013). *Python cookbook* (3rd ed.). O'Reilly Media.
5. Ramalho, L. (2022). *Fluent Python* (2nd ed.). O'Reilly Media.
6. McKinney, W. (2022). *Python for data analysis* (3rd ed.). O'Reilly Media.

END SEMESTER EXAMINATION – MODEL QUESTION PAPER

Course Code	25MAMT302
Course Name	PYTHON PROGRAMMING ESSENTIALS
Max. Marks: 60	Duration: 2.5 Hours

Part A (Answer all questions. Each question carries 3 marks)				
Qn No.	Question	Marks	CO	BL
1.	Explain the features of Python and its advantages over other programming languages.	3	CO1	L2
2.	Write a Python program to find the factorial of a number using recursive functions.	3	CO1	L3
3.	Explain Python list methods with examples.	3	CO2	L2
4.	Write a Python program using lambda functions and dictionaries to count word frequency in a string.	3	CO2	L3
5.	Explain the concept of inheritance in Python with an example.	3	CO3	L2
6.	Describe exception handling in Python with try, except, else, and finally blocks.	3	CO3	L2
7.	Write a Python program to read and write data to a CSV file.	3	CO4	L3
8.	Explain the use of NumPy arrays with basic operations.	3	CO4	L2

Part B (Answer any one full question from each Module. Each carry 9 marks)				
Qn No.	Question	Marks	CO	BL
Module I				
9.a	Explain Python data types, operators, and expressions with examples. Describe conditional and looping statements.	5	CO1	L2
9.b	Write a Python program implementing control statements (if-elif-else, for, while, break, continue, pass) to solve a given problem.	4	CO1	L3
OR				
10	Explain functions in Python: definition, calling, parameters, return values, default/keyword arguments, recursive functions, and lambda functions with examples.	9	CO1	L2

Module II				
11.a	Explain Python strings and string operations with examples. Describe tuples and sets with their methods.	5	CO2	L2
11.b	Write a Python program using dictionaries to implement a phonebook application with add, search, and delete operations.	4	CO2	L3
OR				
12	Explain Python lists and list methods in detail. Write a Python program to implement a student grade management system using lists and functions.	9	CO2	L3
Module III				
13	Explain OOP concepts in Python: classes, objects, constructors, destructors, instance/class variables, inheritance, polymorphism, and encapsulation with examples.	9	CO3	L2
OR				
14.a	Explain different types of methods in Python: instance methods, class methods, and static methods with examples.	5	CO3	L2
14.b	Describe modules and packages in Python. Write a Python program using exception handling.	4	CO3	L3
Module IV				
15.a	Explain file handling in Python: read, write, and append operations. Describe working with CSV and JSON files.	5	CO4	L2
15.b	Explain the Pandas library with DataFrame operations and demonstrate its use with an example dataset.	4	CO4	L3
OR				
16	Develop a mini project in Python demonstrating file handling, Python libraries (NumPy/Pandas), and GUI using Tkinter. Describe the design and implementation.	9	CO4	L3

