

**MATHEMATICS PRACTICAL KNOWLEDGE/SKILL-1**  
**SEMESTER – IV**  
**24MATHCPS-1: Mathematics Skill-1**  
**Solution of Mathematical Problems Using Python**

**Practical Hours: 4 Hours/Week**

**Credits: 2**

**Total Practical Hours: 56 Hours**

**Max. Marks: 50**

**Course Learning Objectives:**

- Understand Mathematical Concepts Computationally.
- Learn to apply Python Programming to Solve Mathematical Problems.
- Analyse and Visualise Mathematical Results
- Understand the basic steps of solving a given problem

**Course Outcomes:** This course will enable the students to

- Verify and Validate Mathematical solutions
- Acquire the knowledge of Matrices through FOSS tools

**Part I:**

**Introduction to Python:**

Introduction to Features and Applications of Python, Python Versions, Installation of Python, Python IDEs, Simple Python Program. Comments, Indentation. Identifiers, Variables, Operators, Precedence and Association.

**Python Libraries:** Importing Libraries, installing new packages.

**Libraries overview** - NumPy, Pandas, Matplotlib.

**Built-in Data Type** - int, float, complex. Type Conversions

**Built-in Functions**- Console Input and Console Output.

Strings, Statements-if, else, elif, nested if, while loop, break, continue statements, for loop Statement

**Part II:**

**A. Basic Python Programs**

1. Add two numbers
2. Maximum of two numbers
3. Factorial of a number
4. Find simple interest
5. Find the area of a Rectangle
6. Find area of a circle

7. Print all Prime numbers in an Interval

## **B. Matrix Programs**

8. Adding and Subtracting Matrices
9. Multiplication of matrices
10. Transpose of a Matrix
11. Matrix creation of  $n \times n$
12. Get  $k^{\text{th}}$  column of matrix

## **References :**

1. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition,
2. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
3. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python
4. Advanced Core Python Programming, MeenuKohli, BPB Publications, 2021.
5. Core PYTHON Applications Programming, Wesley J. Chun, 3rd Edition, Prentice Hall, 2012.
6. Automate the Boring Stuff, Al Sweigart, No Starch Press, Inc, 2015.
7. <http://www.ibiblio.org/g2swap/byteofpython/read/>
8. <https://docs.python.org/3/tutorial/index.html>