

RAMAKRISHNA MISSION VIDYAMANDIRA

NEP Syllabus B.Sc. Computer Science

Semester-I

Course Code: 1CMSVAC1

Credit: 2

Course Type: Value Added Course

Course Outcome:

- i) Able to understand built-in data types, operators, conditions and loops and can handle the branching statements and loops to solve the numerical problems.
- ii) Able to use arrays and data structures.
- iii) Able to understand and develop the functions and modules.
- iv) Able to understand and implement vectors, matrices and can plot 2D matrix and functions.
- v) Able to handle files and implement error handling.

1CMSVAC1 : Introduction to Python

Credit: 2

Marks: 50

Introduction to Python: Installing Python, IDLE. Variables, numbers and the assignment operator, the binding of names to objects and aliasing. Keywords and their significance. Input Output function. Evaluation of arithmetic expressions. Edit and execute a Script file. [6 L]

Basic Programming Techniques:

Conditionals and Iterators: Conditionals: If, elif, and else statements. Nested conditionals. Containment checking in containers using the in keyword.

Looping constructs: while and for loops. Flow control using break, continue, and pass. Nested loops. Combining branching statements and Loops. [7 L]

Different Data types:

Strings: definition, declaration, and immutability, string constants, declaration, and the equivalence of single and double quotes. Multi-line strings. Raw strings. String formatting using the format function and the % operator. f-strings in Python 3.6+. Built-in functions: count, find, replace, upper, lower, strip.

Lists: definition, declaration, and mutability. Nested lists. Indexing and slicing: same as strings. List comprehensions. The split and join methods. Built-in list functions – append, extend, count, find, index.

Tuples: definition, declaration, and immutability; Packing and unpacking lists and tuples. The + and * operators on strings, lists, and tuples. Indexing and slicing strings, lists, and tuples.

Sets and Dictionaries: definition, declaration and some useful operations related to those. Concept of keys and values. Immutability requirement for keys. Iterating over the keys and key, value pairs of a dictionary. Dictionary inversions. Nested structure formation with the help of different structures and their applications. [12 L]

Concept of functions and Modules:

User-defined Functions and Recursion: function definition, function signature, positional, default, and keyword arguments. Basic idea and implementation of recursion.

Concept of Modules and their implementation . [6 L]

Plotting:

Basics of Python packages like numpy and matplotlib. Creating and indexing Numpy arrays. Simple operations with Vectors and Matrices. Plotting vectors, arrays, functions, Subplots. [8 L]

File Handling and Exception Handling:

File handling: open and close methods, the different read and write modes. Using the with, open approach to files. read, readline, readlines functions.

Exception handling: the popular errors- NameError, ValueError, SyntaxError, KeyError, AttributeError and their cause and effects. Using try-except blocks for graceful handling of exceptions. [6 L]

Recommended Books:

1. Introduction to Computation and Programming Using Python: With Application to Understanding Data by John V Guttag, 2nd Edition, MIT.
2. Learn Python3 the Hard Way by Zed Shaw, Addison Wesley.