Core Paper - 2 : Semester –II

CC-2 Programming with Python

BLOCK – I

Unit-1: Introduction to Python - Features &Flavors, Byte Code, & Virtual Machine of Python, Frozen Binaries, Memory Management, Garbage, Collection in Python, Comparing python with C and Java, Installing Python for Windows, Installing numpy, Setting the Path, First Python Program, Executing a Program, Getting Help, Getting Documentation Help, Reopening the Python Program in IDLE.

Unit-2: Data types in Python - Comments, Doc strings, Variables, Built-in data types, bool Data type, Sequences, Sets, Literals, Determining the Data type of a Variable, out Characters, User-defined Data types, Constants, Identifiers and Reserved words, Naming Conventions. Operators in Python - Arithmetic Operators, Assignment Operators, Unary Minus Operator, Relational Operators, Logical Operators, Boolean Operators, Bitwise Operators, Membership Operators, Identity Operators, Operator Precedence and Associability, Mathematical Functions. Input and Output: Output statements, Input Statements, Command Line Arguments

Unit-3: Control Statements: Control Statements, The if Statement, A Word on Indentation, The if … else Statement, The if … elif … else Statement, The while Loop, The for Loop, Infinite Loops, Nested Loops, The else Suite, The break Statement, The continue Statement, The pass Statement, The assert Statement, The return Statement.

BLOCK-II

Unit-4: Arrays in Python - Array, Advantages of Arrays, Creating an Array, Importing the Array Module, Indexing, Slicing, Processing the Arrays, Types of Arrays, Working with Arrays using numpy, Creating Arrays using array(), linspace, logspace, arange(), zeros() and ones() Functions, Mathematical Operations on Arrays, Comparing Arrays, Aliasing the Arrays, Viewing and Copying Arrays, Slicing and Indexing in numpy Arrays, Dimensions of Arrays, Attributes of an Array, The reshape() Method, The flatten() Method, Working with Multi-dimensional Arrays, Indexing in Multi-dimensional Arrays, Slicing the Multi-dimensional Arrays, Matrices in numpy, Getting Diagonal Elements of a Matrix, Finding Maximum and Minimum Elements, Finding Sum and Average of Elements, Products of Elements, Sorting the Matrix, Transpose of a Matrix, Matrix Addition and Multiplication, Random Numbers.

Unit-5: Strings and Characters - Creating Length, Indexing, Slicing, Repeating,the Strings, Concatenation, Checking Membership, Comparing Strings, Removing Spaces from a String, Finding Sub Strings, Counting Substrings in a String, Strings are Immutable, Replacing a String with another String, Splitting and Joining Strings, Changing Case of a String, Checking Starting and Ending of a String, String Testing Methods, Formatting the Strings, Working with Characters, Sorting Strings, Searching in the Strings, Finding Number of Characters and Words, Inserting Sub String into a String.

Unit-6 Functions - Difference between a Function and a Method, Defining a Function, Calling a Function, Returning, Results from a Function, Returning Multiple Values from a Function, Functions are First Class Objects, Pass by Object Reference, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default, Arguments, Variable Length Arguments, Local and Global Variables, The Global Keyword, Passing a Group of Elements to a Function, Recursive Functions, Anonymous Functions or Lambdas, Function Decorators, Generators, Structured Programming, Creating our Own Modules in Python, The Special Variable name,

BLOCK-III

Unit-7: Lists - List, Creating Lists using range() Function, Updating the Elements of a List, Concatenation of Two Lists, Repetition of Lists, Membership in Lists, Aliasing and Cloning Lists, methods to Process Lists, Finding Biggest and Smallest Elements in a List, Sorting the List

Elements, Number of Occurrences of an Element in the List, Finding Common Elements in Two Lists, Storing Different Types of Data in a List, Nested Lists, Nested Lists as Matrices, List Comprehensions,

Unit-8: Tuples, - Creating Tuples, Accessing the Tuple Elements, Basic Operations on Tuples, Functions to Process Tuples, Nested Tuples, Inserting Elements in a Tuple, Modifying Elements of a Tuple, Deleting Elements from a Tuple.

Unit-9 : Dictionaries: Operations on Dictionaries, Dictionary Methods, Using for Loop with Dictionaries, Sorting the Elements of a Dictionary using Lambdas, Converting Lists into Dictionary, Converting Strings into Dictionary, Passing Dictionaries to Functions, Ordered Dictionaries.,

BLOCK-IV

Unit-10 : Object oriented concepts – definition and concept of objects, Classes, interface, encapsulation, abstraction, inheritance,polymorphism. Pyhton– simple class, determining methods, constructor, member variables, calling methods, adding inheritance, class variables, class methods and static methods, properties, interfaces, new style classes, Doc string for classes, private memeners

Unit-11: Graphic User Interfaces with python – buttons and callbacks, canvas as widget, co-ordinate sequences, more widgets, packing widgets, menus and callables, binding, debugging

Unit-12 Files – Persistance, reading and writing, format operator, file names and paths, catching exceptions, databases, pickling, pipes, writing modules, debugging

Practicals

1. Python Program to Calculate the Average of Numbers in a Given List
2. Python Program to Exchange the Values of Two Numbers Without Using a Temporary Variable
3. Python Program to Read a Member n and Compute n+nn+nnn
4. Python Program to Check Whether a Number is Positive or Negative
5. Python Program to Take in the Marks of 5 Subjects and Display the Grade
6. Python Program to Read the Contents of a File
7. Python Program to Append the Contents of One File to Another File
8. Python Program to Copy the Contents of One File into Another
9. Python Program to Count the Number of Blank Spaces in a Text File
10. Python Program to Append, Delete and Display Elements of a List Using Classes
11. Python Program to Create a Class which Performs Basic Calculator Operations
12. Python Program to Create a Class and Get All Possible Subsets from a Set of Distinct Integers