62	B.Sc(H) Computer Science	VI	DSC18: Cloud Computing	DSC18: Cloud Computing
63	Generic Elective	VII	N.A.	GE7d: Cloud Computing
64	Discipline Specific Elective	VIII	N.A.	DSE8e: Cloud Computing

Note: N.A. in the fourth column in the above table indicates a newly proposed course.

Syllabus

DSC01: OBJECT ORIENTED PROGRAMMING USING PYTHON

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Object Oriented Programming using Python	4	3	0	1	Class XII pass	Nil

Course Objectives:

This course introduces programming to a novice. Python is used for problem solving. The course also introduces the concept of object- oriented programming.

Learning Outcomes:

On successful completion of the course, students will be able to:

• Develop, document, and debug modular Python programs.

• Handle files.

• Apply suitable programming constructs and built-in data structures to solve a problem.

• Use classes and objects in application programs

Syllabus

Theory

Unit 1 Introduction to Programming: Problem solving strategies; Structure of a Python program; Syntax and semantics; Executing simple programs in Python.

Unit 2 Creating Python Programs: Identifiers and keywords; Literals, numbers, and strings; Operators; Expressions; Input/output statements; Defining functions; Control structures (conditional statements, loop control statements, break, continue and pass, exit function), default arguments.

Unit 3 Built-in data structures: Mutable and immutable objects; Strings, built-in functions for string, string traversal, string operators and operations; Lists creation, traversal, slicing and splitting operations, passing list to a function; Tuples, sets, dictionaries and their operations.

Unit 4 Object Oriented Programming: Introduction to classes, objects and methods; Standard libraries.

Unit 5 File and exception handling: File handling through libraries; Errors and exception handling.

Practical **(30 hours)**

List of Practicals

1. Write a program to find the roots of a quadratic equation
2. Write a program to accept a number 'n' and
   a. Check if 'n' is prime
   b. Generate all prime numbers till 'n'
   c. Generate first 'n' prime numbers This program may be done using functions
3. Write a program to create a pyramid of the character '*' and a reverse pyramid
4. Write a program that accepts a character and performs the following:
   a. print whether the character is a letter or numeric digit or a special character.
   b. if the character is a letter, print whether the letter is uppercase or lowercase
   c. if the character is a numeric digit, prints its name in text (e.g., if input is 9, output is NINE)
5. Write a program to perform the following operations on a string

a. Find the frequency of a character in a string.
b. Replace a character by another character in a string.
c. Remove the first occurrence of a character from a string.
d. Remove all occurrences of a character from a string.

6. Write a program to swap the first n characters of two strings.
7. Write a function that accepts two strings and returns the indices of all the occurrences of the second string in the first string as a list. If the second string is not present in the first string then it should return -1.
8. Write a program to create a list of the cubes of only the even integers appearing in the input list (may have elements of other types also) using the following:

    a. 'for' loop
    b. list comprehension

9. Write a program to read a file and
    a. Print the total number of characters, words and lines in the file.
    b. Calculate the frequency of each character in the file. Use a variable of dictionary type to maintain the count.
    c. Print the words in reverse order.
    d. Copy even lines of the file to a file named ‘File1’ and odd lines to another file named ‘File2’.
10. Write a program to define a class Point with coordinates x and y as attributes. Create relevant methods and print the objects. Also define a method distance to calculate the distance between any two point objects.
11. Write a function that prints a dictionary where the keys are numbers between 1 and 5 and the values are cubes of the keys.
12. Consider a tuple t1=(1, 2, 5, 7, 9, 2, 4, 6, 8, 10). Write a program to perform following operations:
    a. Print half the values of the tuple in one line and the other half in the next line.
    b. Print another tuple whose values are even numbers in the given tuple.
    c. Concatenate a tuple t2=(11,13,15) with t1.
    d. Return maximum and minimum value from this tuple
13. Write a program to accept a name from a user. Raise and handle appropriate exception(s) if the text entered by the user contains digits and/or special characters.

Essential Readings

- Taneja, S., Kumar, N. Python Programming- A modular Approach, 1st edition, Pearson Education India, 2018.

- Balaguruswamy E. Introduction to Computing and Problem Solving using Python, 2nd edition, McGraw Hill Education, 2018.

Suggestive Readings

- Brown, Martin C. Python: The Complete Reference, 2nd edition, McGraw Hill Education, 2018.
- Guttag, J.V. Introduction to computation and programming using Python, 2nd edition, MIT Press, 2016.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DSC-A1/GE1a: PROGRAMMING USING PYTHON

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Programming using Python	4	3	0	1	Class XII pass	Nil

Course Objectives

This course is designed to introduce programming concepts using Python to students. The course aims to develop structured as well as object-oriented programming skills using Python. The course also aims to achieve competence amongst its students to develop correct and efficient Python programs to solve problems spanning multiple disciplines.

Learning Outcomes

On successful completion of this course, a student will be able to: