

Code: BCA- 3007T (For Theory) BCA-3007P (For Practical)	SEC-IV	Python Programming	2L+T:4P	4 Credits (30 hours of theory and 60 hours of practical)
Max Marks; Theory: 100 (Int: 25; Ext: 75); Practical: 100				
<p>Course Outcomes: Upon completion of the course, students will be able to</p> <p>CO1: Develop modular Python programs.</p> <p>CO2: Apply suitable Python programming constructs, built-in data structures using Python libraries to solve a problem.</p> <p>CO3: Understand basic Data visualization and File handling in Python.</p> <p>Course Outcomes after Lab Programs</p> <p>CO1: Learn Basics constructs of programming in Python.</p> <p>CO2: Learn functions in python.</p> <p>CO3: Learn file handling, exception handling and tkinter widgets and graphics.</p>				
Unit	Topics		Proposed Lecture	
I	<p>Introduction History and Application Areas of Python; Structure of Python Program; Identifiers and Keywords; Operators and Precedence; Basic Data Types and Type Conversion Statements and Expressions; Input/Output Statements.</p> <p>Strings: Creating and Storing Strings, Built-In Functions for Strings; String Operators, String Slicing and Joining; Formatting Strings.</p> <p>Control Flow Statements: Conditional Flow Statements; Loop Control Statements; Nested Control Flow; Continue and Break Statements, Continue, Pass and Exit.</p>		10	
II	<p>Functions: Built-In Functions, Function Definition and Call; Scope and Lifetime of Variables, Default Parameters, Command Line Arguments; Lambda Functions; Assert Statement; Importing User Defined Module;</p> <p>Mutable and Immutable Objects: Lists, Tuples and Dictionaries; Commonly Used Functions on Lists, Tuples and Dictionaries. Passing Lists, Tuples and Dictionaries as Arguments to Functions. Using Math and NumPy Module for List of Integers and Arrays. Python Classes/Object, Python Inheritance, Python Polymorphism, Python Regx,</p>		10	
III	<p>Files: Types of Files; Creating, Reading and Writing on Text and Binary Files; The Pickle Module, Reading and Writing CSV Files. Reading and Writing of CSV and JSON Files.</p> <p>Exception Handling: Try-Except-Else-Finally Block, Raise Statement, Hierarchy of Exceptions, Adding Exceptions.</p>		10	

	Python Tkinter, Widgets, Geometry Manager, GUI Application. Data Visualization: Plotting Various 2D and 3D Graphics; Histogram; Pi Charts; Sine and Cosine Curves.	
Lab Programs:	<ol style="list-style-type: none"> 1. Write a program to find whether a number is a prime number. 2. Write a program to print m raise to power n, where m and n are read from the user. 3. Write a program having a parameterized function that returns True or False depending on whether the parameter passed is even or odd. 4. Write a program to print the summation of the following series up to n terms: 1-2+3-4+5-6+7 5. Write a menu driven program to perform the following operations on strings using string built in functions. <ol style="list-style-type: none"> 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 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 7. Using NumPy module write menu driven program to do following <ol style="list-style-type: none"> a. Create an array filled with 1's. b. Find maximum and minimum values from an array c. Dot product of 2 arrays. d. Re shape a 1-D array to 2-D array. 8. Write a function that takes a sentence as input from the user and calculates the frequency of each letter. Use a variable of dictionary type to maintain the count. 9. Consider a tuple t1=(1,2,5,7,9,2,4,6,8,10). Write a program to perform following operations: <ol style="list-style-type: none"> a. Print contents of t1 in 2 separate lines such that half values come on one line and other half in the next line. b. Print all even values of t1 as another tuple t2. c. Concatenate a tuple t2=(11,13,15) with t1. d. Return maximum and minimum value from t1. 10. Write a function that reads a file file1 and copies only alternative lines to another file file2. Alternative lines copied should be the odd numbered lines. 11. Write a Python program to handle a Zero Division Error exception when dividing a number by zero. 12. Write a program that reads a list of integers from the user and throws an exception if any numbers are duplicates. 13. Write a program that makes use of a function to display sine, cosine, polynomial, and exponential curves. 14. Take as input in the months and profits made by a company ABC over a year. Represent this data using a line plot. Generated line plot must include X axis label name = Month Number and Y axis label name = Total Profit. 	
Text Books:	<ol style="list-style-type: none"> 1. Taneja, Sheetal, and Naveen Kumar. <i>Python Programming: A Modular Approach with Graphics, Database, Mobile and Web Applications</i>. Pearson, 2017. 2. Venkatesh, Nagaraju Y. <i>Introduction to Python Programming</i>. Khanna Publishing House, 2021. 3. Python Programming Using Problem Solving Approach-ReemaThareja, Oxford University Press latest edition 	
Reference Books:	<ol style="list-style-type: none"> 1. Downey, Allen. <i>Think Python</i>. 2nd ed., O'Reilly, 2015. 2. Dowling, Bob. <i>An Introduction to Python for Absolute Beginners</i>. Cambridge University Press, 2015. 3. Guttag, John. <i>Introduction to Computation and Programming Using Python</i>. 2nd ed., PHI India, 2016. 4. Python Programming- A Modern Approach Vamshi Khurana, Pearson, 2010 	