B.E BIOTECHNOLOGY
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
SEMESTER - III

PYTHON PROGRAMMING

Course Code	18BT36	CIE Marks	40
Teaching Hours/Week (L:T:P)	(3:1:0)	SEE Marks	60
Credits	03	Exam Hours	03

Course objectives:

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures – lists, tuples, dictionaries.

Module-1

ALGORITHMIC PROBLEM SOLVING
Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, and guess an integer number in a range, Towers of Hanoi

Revised Bloom's Taxonomy Level	**L1, L2**

Module-2

DATA, EXPRESSIONS,
Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments

Revised Bloom's Taxonomy Level	**L1, L2**

Module-3

STATEMENTS, CONTROL FLOW
Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points. Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Strings: string slices, immutability, string functions and methods, string module

Revised Bloom's Taxonomy Level	**L1, L2**

Module-4

FUNCTIONS, LISTS
Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search. Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters

Revised Bloom's Taxonomy Level	**L1, L2, L3**

Module-5

TUPLES, DICTIONARIES
Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

Revised Bloom's Taxonomy Level	**L1, L2, L3**

Course outcomes:

At the end of the course the student will be able to:

- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Sl No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbook/s				
1	Think Python: How to Think Like a Computer Scientist	Allen B. Downey	Shroff O'Reilly Publishers	2nd edition 2016
2	An Introduction to Python – Revised and updated for Python 3.2	Guido van Rossum and Fred L. Drake Jr	Network Theory Ltd.,	2011
Reference Books				
3	Introduction to Computer Science using Python: A Computational Problem-Solving Focus	Charles Dierbach	Wiley India Edition	2013
4	Introduction to Programming in Python: An Inter-disciplinary Approach	Robert Sedgewick, Kevin Wayne, Robert Dondero	Pearson India Education Services Pvt. Ltd	2016
5	Fundamentals of Python: First Programs	Kenneth A. Lambert	CENGAGE Learning	2012