

21GEN02	PROGRAMMING FOR PROBLEM SOLVING	L	T	P	C
		3	0	0	0
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• To understand the basics of algorithmic problem solving.</li> <li>• To learn how to solve problems using Python conditionals and loops.</li> <li>• To define Python functions and use function calls to solve problems.</li> <li>• To use Python data structures – lists, tuples, and dictionaries to represent complex data.</li> <li>• To do input/output with files in Python.</li> </ul>					
<b>UNIT I</b>	<b>INTRODUCTION TO COMPUTING AND PYTHON</b>	<b>9 Hours</b>			
Fundamentals of Computing - Computing Devices - Identification of Computational Problems Pseudocodes and Flowcharts - Instructions – Algorithms – Building Blocks of Algorithms - Introduction to Python: Features of Python, History and Future of Python - Working with Python Interactive and script mode - Identifiers and Keywords, Comments, Indentation and Multi-lining					
<b>UNIT II</b>	<b>DATA TYPES AND EXPRESSION</b>	<b>9 Hours</b>			
Data types - Built-in data types – Operators - Boolean Values - Operator Precedence – Expression - Function Call and Returning Values - Parameter Passing - Local and Global Scope – Recursive Functions					
<b>UNIT III</b>	<b>DECISION &amp; CONTROL FLOW</b>	<b>9 Hours</b>			
Selection/Conditional Branching Statements: if, if-else, nested if, if-elif-else statement(s), Basic Loop Structures - Iterative Statements – while and for loop, Nested loops, break and continue statement, pass Statement, else Statement used with loops - Strings: Introduction, Indexing & Traversing - Concatenating, Appending - Multiplying, Formatting - Slicing, Comparing, Iterating - Basic Built-In String Functions					
<b>UNIT IV</b>	<b>FUNCTIONS &amp; LISTS</b>	<b>9 Hours</b>			
Functions: Communicating with functions - Variable Scope and lifetime - Return statement - Types of arguments - Lambda functions - Recursive functions - Lists: list operations & list slices - list methods, list loop and mutability - Aliasing, cloning lists and list parameters					
<b>UNIT V</b>	<b>DICTIONARIES AND MODULES</b>	<b>9 Hours</b>			
Dictionary: Creating, Accessing, Adding Items, Modifying, Deleting - Sorting, Looping & Nested Dictionaries Built-in Dictionary Function - Finding Key and Value in a Dictionary - Modules – Module Loading and Execution – Packages - Python Standard Libraries					

### **Course Outcomes:**

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems.
- Develop and execute simple Python programs.
- Write simple Python programs using conditionals and looping for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries etc.
- Read and write data from/to files in Python programs.

### **Text Books**

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., 2018.

### **Reference Books**

1. Introduction to Computer Science using Python: A Computational Problem-Solving Focus Charles Dierbach Wiley India Edition 2013
2. Introduction to Programming in Python: An Inter-disciplinary Approach Robert Sedgewick, Kevin Wayne, Robert Dondero Pearson India Education Services Pvt. Ltd 2016
3. Fundamentals of Python: First Programs Kenneth A. Lambert CENGAGE Learning 2012