

**I B. Tech. – II Semester**  
(19BT10501) **PROGRAMMING FOR PROBLEM SOLVING**  
(Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	3	1	-	4

**PRE-REQUISITES:** A course on Basic Mathematics

**COURSE DESCRIPTION:** Introduction to problem solving approach, Introduction to Python programming, control structures, sequences, sets, Dictionaries, Implementation of Data structures using Python, Modular programming, file handling, Data representation and Visualization.

**COURSE OUTCOMES:** After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge on Python constructs to solve basic problems.

CO2. Develop and use Python modules to provide solutions to problems.

**DETAILED SYLLABUS:**

**UNIT-I: INTRODUCTION TO PROBLEM SOLVING AND PYTHON PROGRAMMING**

**(10 Periods)**

**Problem Solving Aspect:** top-down design, implementation of algorithms, building blocks of flow charts, program verification and efficiency of algorithms.

**Python Programming:** tokens, literals, identifiers, keywords, special symbols and operators; fundamental data types, expressions, type conversions, handling Input and output in Python.

**UNIT-II: CONTROL STRUCTURES**

**(8 Periods)**

**Selection Statements:** if statement, if-else statement, if-elif-else statement, nested-if statement.

**Iterative Statements:** while loop, for loop, break statement, continue statement, pass and else statements used with loops.

### **UNIT-III: SEQUENCES, SETS, DICTIONARIES AND DATA STRUCTURES**

**(9 Periods)**

**Sequences: Lists and operations** - creating, inserting elements, updating elements, deleting elements, searching and sorting, list comprehensions, nested lists; **tuples** - creating, searching and sorting, nested tuples; **strings** - Initializing a string and string operations, string handling methods, string formatting; **sets** - set creation and operations; **dictionaries** - operations on dictionaries, dictionary methods, sorting elements using lambdas.

**Data structures: Stacks** - push, pop, peek and display operations on stack, applications of stack; **Queues** – enqueue, dequeue and display operations on queue, applications of queues.

### **UNIT-IV: MODULAR PROGRAMMING AND FILE HANDLING**

**(10 Periods)**

**Modular Programming:** need for functions, function definition, function call, variable scope and lifetime, return statement, positional arguments, keyword arguments, default arguments and variable-length arguments, recursive functions; Modules - math, NumPy, date and time.

**File Handling:** types of files, opening and closing files, reading and writing data.

### **UNIT-V: DATA REPRESENTATION AND VISUALIZATION**

**(8 Periods)**

Pandas: creating data frame, reading data from CSV files, indexing and selecting data, dealing with rows and columns; Visualization - bar plots, histogram, Scatter Plot.

**Total Periods: 45**

#### **TEXT BOOKS:**

1. R. Nageswara Rao, *Core Python Programming*, 2<sup>nd</sup> edition, Dreamtech Press, 2018.
2. R. G. Dromey, *How to solve it by Computer*, Pearson, 2006.

#### **REFERENCE BOOKS:**

1. Reema Thareja, *Python Programming using Problem Solving Approach*, 1<sup>st</sup> edition, Oxford University Press, 2017.
2. Charles Dierbach, *Introduction to Computer Science using Python: A Computational Problem-Solving Focus*, Wiley India, 2016.