

I B. Tech. – II Semester
(19BT10531) PROGRAMMING FOR PROBLEM SOLVING LAB
 (Common to ECE, EEE & EIE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	2	1

PRE-REQUISITES: A course on Basic Mathematics

COURSE DESCRIPTION: The course is designed to provide hands on practice on Scratch programming and python programming for problem solving.

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

- CO1. Develop scripts using Scratch tool to simulate simple problems.
- CO2. Apply Python Constructs and Modules to develop solutions for real-life problems.
- CO3. Function effectively as an individual and in team to foster knowledge and creativity.
- CO4. Write and present a substantial technical report/ document effectively.

PRACTICAL EXERCISES:

- 1)
 - a) Design a script in Scratch to simulate Airplane for take-off and land.
 - b) Design a script in Scratch to make a sprite to ask the user to enter two different numbers and an arithmetic operator and then calculate and display the result.
- 2)
 - a) Design a script in Scratch to calculate factorial of a given number.
 - b) Design a script in Scratch to simulate Maze game. (Hint: To get Maze images refer <http://inventwithScratch.com/downloads/>)
- 3)
 - a) Write a python script to read two integer numbers and perform arithmetic operations.
 - b) Write a python script to evaluate following expressions by considering necessary inputs.
 - i) $ax^2 + bx + c$ ii) $ax^5 + bx^3 + c$ iii) $(ax + b) / (ax - b)$ iv) $x - a / b + c$

- 4) a) Write a python script to convert given decimal number into octal, hexa decimal and binary.
- b) Write a python script to read four integer values separated with commas and display the sum of those four numbers.
- c) Write a python script to print "SVEC" with prefix of ten spaces by using format().
- 5) a) Write a python script to calculate electricity bill based on following slab rates.

<u>Consumption units</u>	<u>Rate (in Rupees/Unit)</u>
0-100	4
101-150	4.6
151-200	5.2
201-300	6.3
Above 300	8

(Hint: To get Consumption units take current Meter reading, old meter reading from the user as input)

- b) Print the following pattern using python script.

```

          1
        1   2   1
      1   2   3   2   1
    1   2   3   4   3   2   1
  1   2   3   4   5   4   3   2   1

```

- 6) a) Write a python script to read *N* student details like name, roll number, branch and age. Sort the student details based on their names and display.
- b) Write a python script to delete duplicate strings from a list of strings. (Insertion order should maintain after deleting duplicate string).
- c) Write a python script to read *N* number of student details into nested list and convert that as a nested dictionary.

- 7) a) Design a function that can perform sum of two or three or four numbers.
- b) Write a python script to implement towers of Hanoi problem.
- c) Write a Python function prime square (l) that takes a nonempty list of integers and returns True if the elements of l alternate between perfect squares and prime numbers, and returns False otherwise. Note that the alternating sequence of squares and primes may begin with a square or with a prime. Here are some examples to show how your function should work.

```
>>>primesquare([4])
```

```
True
```

```
>>>primesquare([4,5,16,101,64])
```

```
True
```

```
>>>primesquare([5,16,101,36,27])
```

```
False
```

- 8) a) Write a python script to perform arithmetic operations on numpyarrays.
- b) Write a python script to perform following matrix operations using numpy.
- i) Dot product ii) Matrix product iii) Determinant iv) Inverse
- 9) a) Write a python script to Create Pandas data frame using list of lists.
- b) Write a python script to load data from a CSV file into a Pandas Data Frame and perform basic operations on it.
- 10) a) Draw a Scatter Plot by considering an appropriate data set.
- b) Draw histograms by considering an appropriate data set.
- 11) **Mini Project-1**
- 12) **Mini Project-2**

TEXT BOOK:

1. R. Nageswara Rao, *Core Python Programming*, 2nd edition, Dreamtech Press, 2018.