

**PROGRAMMING FOR PROBLEM SOLVING LABORATORY
(ONLY FOR CIVIL)**

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		CIA	SEE	Total
ACSB02	Foundation	-	-	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36			Total Classes: 36			

LIST OF EXPERIMENTS

Week-1	OPERATORS AND EVALUATION OF EXPRESSIONS										
<p>a. Write a Python program to check whether a number is even or odd.</p> <p>b. Write a Python program to perform the swap of two variables using temporary variable.</p> <p>c. Write a Python program to evaluate the arithmetic expression $((a + b / c * d - e) * (f - g))$. Read the values a, b, c, d, e, f, g from the standard input device.</p> <p>d. Write a Python program to find the sum of individual digits of a given positive integer.</p> <p>e. Write a Python program to read the values of x and y and print the results of the following expressions in one line:</p> <p style="margin-left: 20px;">i. $(x + y) / (x - y)$</p> <p style="margin-left: 20px;">ii. $(x + y)(x - y)$</p>											
Week-2	CONTROL STRUCTURES										
<p>a. A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a Python program to generate the first n terms of the sequence.</p> <p>b. Write a Python program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.</p> <p>c. A character is entered through keyboard. Write a Python program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-elif-else. The following table shows the range of ASCII values for various characters.</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Characters</th> <th style="text-align: center;">ASCII values</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A – Z</td> <td style="text-align: center;">65 – 90</td> </tr> <tr> <td style="text-align: center;">a – z</td> <td style="text-align: center;">97 – 122</td> </tr> <tr> <td style="text-align: center;">0 – 9</td> <td style="text-align: center;">48 – 57</td> </tr> <tr> <td style="text-align: center;">Special symbols</td> <td style="text-align: center;">0 – 47, 58 – 64, 91 – 96, 123 – 127</td> </tr> </tbody> </table> <p>d. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Write a Python program to determine how much profit or loss incurred in percentage.</p> <p>e. Write a Python program to check whether a given number is palindrome or not.</p>		Characters	ASCII values	A – Z	65 – 90	a – z	97 – 122	0 – 9	48 – 57	Special symbols	0 – 47, 58 – 64, 91 – 96, 123 – 127
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Week-3	CONTROL STRUCTURES
<p>a. Write a Python program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, **, //, % and use if-elif-else statement).</p> <p>b. Write a Python program to calculate the following sin series: $\text{Sin } x = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$</p> <p>c. Write a Python program to find the roots of a quadratic equation.</p> <p>d. Write a Python program to generate all Armstrong numbers from 1 to n.</p> <p>e. Write a Python program to print Floyd's triangle.</p> <pre> 1 2 3 4 5 6 7 8 9 10 </pre>	
Week-4	LIST
<p>a. Write a Python program to interchange first and last elements in a list.</p> <p>b. Write a Python program to swap two elements in a list.</p> <p>c. Write a Python programs to perform slicing operations on a given list.</p> <p>d. Write a Python programs to perform different built in functions on list.</p>	
Week-5	LIST
<p>a. Write a Python program to find largest number in a list.</p> <p>b. Write a Python program to print even numbers in a list.</p> <p>c. Write a Python program to find sum of elements in list.</p> <p>d. Write a Python to find maximum and minimum element's position in a list.</p>	
Week-6	TUPLES
<p>a. Write a Python to count tuples occurrence in list of tuples.</p> <p>b. Write a Python to convert string tuples to list tuples.</p> <p>c. Write a Python to find the tuples containing the given element from a list of tuples.</p> <p>d. Write a Python to min and max value in list of tuples.</p> <p>e. Write a Python to add of tuples</p>	
Week-7	DICTIONARY
<p>a. Write a Python program to initialize list with empty dictionaries.</p> <p>b. Write a Python program to find the sum of all items in a dictionary.</p> <p>c. Write a Python program to merge two dictionaries.</p>	
Week-8	ARRAYS
<p>a. Write a Python program to find the largest and smallest integer in a list.</p> <p>b. Write a Python program to perform the following:</p> <ol style="list-style-type: none"> i. Addition of two matrices ii. Multiplication of two matrices <p>c. Write a Python program to count and display positive, negative, odd and even numbers in an array.</p> <p>d. Write a Python program to find the frequency of a particular number in a list of integers.</p>	

Week-9	STRINGS
<ul style="list-style-type: none"> a. Write a Python program to find: <ul style="list-style-type: none"> i. Length of a string without using len() function. ii. Number of words in a string. b. Write a Python program to determine if the given string is a palindrome or not. c. Write a Python program to find a string within a sentence and replace it with another string. d. Write a Python program to read a line of text and counts all occurrence of a particular word. 	
Week-10	FUNCTIONS
<ul style="list-style-type: none"> a. Write a Python programs that use both recursive and non-recursive functions <ul style="list-style-type: none"> i. Find the factorial of a given integer. ii. Find the greatest common divisor of two given integers. b. Write a Python programs that use both recursive and non-recursive functions <ul style="list-style-type: none"> i. Print Fibonacci series. ii. Solve towers of Hanoi problem. c. Write a Python program to print the transpose of a given matrix using function. d. Write a Python program to generate pascal triangle using recursion. 	
Week-11	FUNCTIONS
<ul style="list-style-type: none"> a. Write a Python program to check whether given year is leap year or not. b. Write a Python program to find largest of three numbers. c. Write a Python program to convert binary to decimal number. d. Write a Python program that uses a function to reverse a given string. 	
Week-12	OBJECT ORIENTED PROGRAMMING
<ul style="list-style-type: none"> a. Write a Python program to define Student class and create an object to it. Also, we will call the method and display the student's details. b. Write a Python program to understand instance variables. c. Write a Python program to create a static method that counts the number of instances created for a class. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Dr. R Nageswa Rao, "Core Python Programming" Dreamtech Press, 2nd Edition, 2018. 2. Reema Thareja, "Python programming: Using Problem Solving Approach, Oxford HED, 1st Edition, 2019. 	
Web References:	
<ol style="list-style-type: none"> 1. http://www.geeksforgeeks.org/Python-programming-language 2. http://www.geeksforgeeks.org/c 3. http://www.Pythonprogramming.com/tutorial/Python 4. http://www.w3school 	

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 60 STUDENTS:

HARDWARE:

Desktop systems: 60 nos

Printers: 02

SOFTWARE:

System Software: Windows 10.

Application Software: MS Office.

Programming Languages: Python programming