PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY, KANURU, VIJAYAWADA
(AUTONOMOUS)

DEPARTMENT OF CIVIL ENGINEERING
I YEAR / II SEMESTER

CE2L3 - COMPUTER PROGRAMMING LAB

Objectives:
- To make the student learn a programming language.
- To teach the student to write programs in C solve the problems

Recommended Systems/Software Requirements:
- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week I: INTRODUCTION TO WINDOWS ENVIRONMENT
a) How to open Borland C Editor **b)** Creating directories **c)** Writing a C Program
d) Compiling a C Program **e)** Executing a C program

Week 2: BASIC I/ O & DATA TYPES
a) Write a program that calculates the area of a square after obtaining from the user the length of its sides.

>   Input: Square length
>   Output: Area of a square
>   Formula: Area = length * length

b) Write a program that calculates the volume of a sphere after obtaining from the user the radius.

>   Input: Sphere Radius
>   Output: Volume of Sphere
>   Formula: volume= $(4/3)*pi*radius^3$

c) Write a program that reads a temperature value in degrees centigrade and then converts and displays the equivalent temperature in Fahrenheit. The conversion formula is:

>   degrees_in_Fahrenheit = (degrees_in_Centigrade * 9.0 / 5.0) + 32.0

(You should declare your variables as float)

Week 3: OPERATORS & ARITHMETIC EXPRESSIONS -1
a) Write a program that calculates the area & perimeter of a rectangle, where the values for width and length are given by the users.
b) Write a C program to calculate the following Sum:

>   Sum=$1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

c) The total distance traveled by vehicle in 't' seconds is given by distance $= ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance traveled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

Week 4: OPERATORS & ARITHMETIC EXPRESSIONS -II
a) Write a program that converts the number of minutes to hours and minutes. For example, if the number in minutes is 185, the output will be :
        185 minutes is equal to 3 hours and 5 minutes.
b) Consider the following mathematical expressions (with assumed initial values of a, b, c and x to be 6, 7, 8 and 9 respectively):
        x = a + b++ * ++c – 6
        x = ++x * b++ + 2 * x % ++b
        x = c++ - --b * b++ / a
Run the program containing the expressions and confirm that the answers obtained are in line with the operators precedence rules studied in class.
Week 5: SELECTION CONTROL STRUCTURES - I
a) Write a multiple alternative if statement to display a message indicating the educational Level of a student based on his/her number of years of school. Use the table below. Print a message to indicate invalid data as well.

NumberofYears	EducationalLevel
0	None
1–5	Elementary
6–8	MiddleSchool
9–12	HighSchool
Morethan12	College

b) Write a program to find the largest number among three numbers
c) Write a program to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables.
Week 6: SELECTION CONTROL STRUCTURES - II
a) Design a program to calculate the car parking fee based on the rates:

- first 2 hours,Rs.1/ -perhour,

- the following hours is Rs.2/- perhour.

    Forexample, parking fee of 4 hours is(Rs1x 2)+(Rs.2 x 2)=Rs.6
b) Write a program that will do task according to user's selection based on the table below.For example if the user enter 1, the user will be asked to enter an input to calculate the area of a circle. You may want to add a menu to help the user to understand your program.

Selection	Inputs	Formula	Output
1	Radius	Pi * radius * radius	Area of Circle
2	Width, length	Width * length	Area of Rectangle
3	Length	Length * length	Area of square
4	Length	$((3 * \sqrt{3}) / 2) *$ length *length	Area of Hexagon
5	Height, base	½ * height * base	Area of Triangle

Week 7: REPETITION AND LOOP STRUCTURES – I
a) Write a program to print multiplication table of given number in given range.
b) Write a program to find the factorial of a given number

Week 8: REPETITION AND LOOP STRUCTURES – II
a) Display the following formats
```
 *                        *
* *                     *     *
* * *                 *     *     *
* * * *             *     *     *     *
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b) Write a program to display the fibonacci series in given range.
c) Write a C program to find wheather a given number is prime or not.
Week 9 : FUNCTIONS – I
a) Write a function multiply that accept 2 integers and returns the multiplication of those two   integers.
b) Modify question 1. Create 4 more functions for addition, subtraction, division and modulus. Make sure your program contains menu and will keep on looping until the user   enter a specific value to end it. You might want to use switch for the menu.
Week 10: FUNCTIONS – II & RECURSION
a) Write a program to find H.C.F and L.C.M of two numbers using recursion
b) Write a function to swap two numbers.
Week 11: Arrays – I
a) Write a program to store 10 numbers in a array . Display 10 numbers in following format A[0] =   NUM1
        A[1] =   NUM2 ……..
 b) Write a program that reads a list of n   floating point numbers and stores them in a one -dimensional, floating -point array. Then calculate their average and compute the deviation of each numerical quantity about the average, using the formula
        $d = x_i – avg$

 Week 12 : ARRAYS – II & STRINGS
a) Write a program to display the addition of two matrices
b) Write a program that will count the number of alphabets, digits and punctuations in a sentence given by the user. (Hint: Use isalpha(), isdigit(), ispunct() and a repetition structure.)
        Example:
                Enter your sentence: my tel no is 12345678.
                Your sentence contains:
                Alphabets: 9
                Digits: 8
                Punctuations: 1

Week 13: STRUCTURES
a) Write a program to declare a structure with following fields
        StudentName   ------ character array
         StudentId   ------- int
          Year   ------ int
          Semester   ------ int
Create a instance of student structure and Read student details and display them.
b) Write a program to Add, Subtract, Multiplication , Division of two complex numbers(Use functions)

Week 14: POINTERS
a) Write a program to swap two numbers using pointers (Call by reference & Call by reference)
b) Write user-defined functions which perform the tasks of strlen().

Week 15: **FILES**

Assume that in the current directory there is a file named "ee105_students.txt" that contains information related to the students registered to a module (e.g. EE105). In the file on the first line there is the number of students registered for the module. Information related to one student at a time is stored on each of the following lines of the file. The lines are separated by '\n'. This information is recorded in the following format:

student_id name surname lab_grade exam_grade

In consequence the potential content of the file may look as follows:
e.g.: content of the file "ee105_students.txt": 3
      53123456 Sean Murphy 70 66
      53234567 Eimear McCoy 60 62
      53345678 Lynn Swan 80 68

a) Read the information from the file and store it in five arrays that could be denoted respectively: Ids, Names, Surnames, Labs, Exams b) Print on the screen the information read from the file using vertical bars between items (e.g. '|')
e.g.
53123456	Sean Murphy	70	66
53234567	Eimear McCoy	60	62
53345678	Lynn Swan	80	68
hint: Use formatted printout to maintain the alignment (e.g. "%10s", "%8d")

Text Books:
1. Problem Solving and Program Design in C, Jeri R. Hanly, Ellot B. Koffman, 5th Edition, Pearson.
2. Programming in C, P.Dey & M. Ghosh, Oxford Univ.Press.