2/4 B.Tech - FIRST SEMESTER

IT3L2 **OOPS THROUGH C++ LAB** **Credits: 2**

Internal assessment: 25 marks

Lab: 3 Periods/week **Semester end examination: 50 marks**

Objectives:
- To practice object-oriented concepts through C++.
- To provide practical knowledge on C++
- To demonstrate the use of inheritance, virtual functions, polymorphism and templates.
- To practice on exception handling and streams.

Outcomes:

Students will be able to
- Distinguish Object Oriented programming with declarative and procedural programming.
- Implement the concepts of inheritance, virtual functions and polymorphism.
- Implement the concepts of exception handling.
- Develop applications using tempalte programming.
- Develop programs with streams.

Exercise 1
a) Write a C++ program to print your personal details name, surname(single character), total marks, gender(M/F), result(P/F) by taking input from the user.
b) Write a C++ program to convert centigrade into Fahrenheit. Formula:C=(F-32)/1.8.
c) Write a C++ program that declares two integers, determines whether the first is a multiple of the second and print the result. (Hint: Use the remainder operator).

Exercise 2
a) Write a C++ program to convert decimal to binary.
b) Write a C++ program to print the accepted number and its reverse number.
c) Develop a simple calculator using if-else if and switch-case.
d) Write a C++ program to find the sum of individual digits of a positive integer.

Exercise 3
a) Create a class called 'Employee' that has 'Empnumber' and 'Empname' as data members and member functions getdata( ) to input data display() to output data. Write a main function to create an array of 'Employee' objects. Accept and print and accept the details of at least 6 employees.
b) Write a C++ program to create a simple banking system in which the initial balance and the rate of interest are read from the keyboard and these values are initialized using the constructor. The destructor member function is defined in this program to destroy the class object created using constructor member function. This program consists of following member functions:
    i. Constructor to initialize the balance and rate of interest
    ii. Deposit - To make deposit
    iii. Withdraw – To with draw an amount
    iv. Compound – To find compound interest
    v. getBalance – To know the balance amount
    vi. Menu – To display menu options
    vii. Destructor

Exercise 4

a) Write a C++ program to add two complex numbers by passing objects as parameters.
b) Write a C++ program to illustrate the usage of static data members.

Exercise 5

a) Write a C++ program to add two complex numbers using binary operator overloading.
b) Write a C++ program to add two complex numbers using unary operator overloading.
c) Write a C++ program to print a complex number using assignment operator overloading

Exercise 6

Write a C++ Program to implement
    i.Multilevel inheritance
    ii.Multiple inheritances
    iii.Hierarchical Inheritance
    iv.Hybrid inheritance through virtual base class

Exercise 7

a) Write a C++ program to display elements of an array using pointer. Display addresses of elements.
b) Write a C++ program to pass elements of an array to a function by using call by value.
c) Write a C++ program to pass elements of an array to a function by using call by reference.
d) Write a C++ program to initialize an array using functions.
e) Write a C++ program to display array elements and their addresses using pointers.

Exercise 8

Write a C++ programs to implement
    a) Run-time polymorphism
    b) Abstract class

Exercise 9

    a) Write a C++ program to display the contents of text file
    b) Write a C++ program by accepting two file names and produces a new file that contains that contains the contents of accepted files
    c) Write a C++ program that produces the sum of all the numbers in a file of white space separated integers.

Exercise 10

Write a C++ program to illustrate
    a) Class templates
    b) Class templates with multiple parameters
    c) Function templates

Exercise 11

a) Write a C++ program to declare string objects. Perform assignment and concatenation operations with the string objects.
b) Write a C++ program to compare two strings using standard function compare().
c) Write a C++ program to remove specified characters from the string.
d) Write a program to display the capacity of the string object. Use member function capacity().

Exercise 12

a. Write a C++ program to illustrate
    i. Division by zero
    ii. Array index out of bounds exception
b. Write a C++ Program to illustrate the concept of multiple catch block
c. Write a C++ Program to illustrate rethrowing an exception.

Reference Books:

1. Programming in C++, 2nd Edition Ashok N Kamthane, Pearson Education
2. C++ How to program, Dietel and Dietel, Prentice hal
3. C++ Complete Reference, 5th Edition, by Herbert schildt TMH