



## PROGRAMMING LAB

**Programming Lab** focuses on providing basic principles of C, C++, Java and Python programming languages along with the practical exposures like designing flowcharts, algorithms, how to debug programs etc

### Computational Resources:

**System** : Hewllet Packard (HP) Pro Desk 600 SFF

**System Count:** 69

#### **System Configuration:**

- i) HP LED 24" Monitor
- ii) Intel Core i7 9700CPU 3.00 GHZ 8 core
- iii) RAM 16 GB
- iv) HDD 1 TB



### Softwares and Utility available:

- i) Microsoft Visual C++
- ii) Python-3.10.4
- iii) Turbo C
- iv) Mysql5.5
- v) Open office 4.1
- vi) Anaconda3-2018
- vii) Code Block
- viii) Wire shark
- ix) JDK 6u17
- x) R-Studio



## PROGRAMMING LAB



### LAB Ethics:

- Be on time for your assigned lab session.
- Make Proper entry in log register before taking your assigned system.
- Perform practical's as explained by the facilitator individually, ask for guidance from the facilitator when stuck.
- Aim to finish, at least one practical in a session
- After completion, shut down your systems properly.
- Collect your extensible if any like flash drive, mobiles, notebook, pen extra before you leave your station.
- Arrange the stools and chairs properly before you leave your assigned station and the lab.

**In Charge:**  
**Dr Ranjeet kumar Singh**

**Physical In Charge:**  
**Mr. Sanjay Aroliya**



## PROGRAMMING LAB

### Course Outcomes- Introduction to Computer Programming LAB

CO1 Define the fundamentals of computer system.

CO2 Outline the various components of computer system.

CO3 Design, implement, test and debug the computer programs using programming language.

CO4 Analyze the usage of various system & application softwares to manage computer system and data.

CO5 Develop the ability to design computer programs to solve real world problems.

CO6 Elaborate the working of Internet.



## PROGRAMMING LAB

### List of Programs for Introduction to Computer Programming LAB

1. Write a program to find area of circle, square and rectangle.
2. Write a program to calculate simple interest.
3. Write a program to find ASCII code for a character entered by a user.
4. Write a program to check whether a number entered by user is even or odd.
5. Write a program to find the largest among three numbers entered by user.
6. Write a program to check whether a year entered by a user is Leap year or not.
7. Write a program which will calculate the roots of a quadratic equation entered by user.
8. Write a program in to create a calculator which is able to perform +, -, \*, / using a switch case.
9. Write a program which generates a multiplicative table of a number entered by user.
10. Write a program which calculates sum of N natural numbers.
11. Write a program to find factors of a number entered by user.
12. Write a program which will display the reverse a number entered by user.
13. Write a program to generate Fibonacci series.
14. Write a program to check whether a three digit number entered by user is an Armstrong number or not?
15. Write a program to check whether a number entered by user is Prime or not.
16. Write a program to generate prime numbers between 1 to n (where 'n' is an integer entered by user).
17. Write a program to search an element in an Array.
18. Write a program to sort the elements of an Array in ascending order using Bubble sort.
19. Write a program to find addition of two matrices.
20. Write a program to find factorial of number using a recursive function.
21. Write a program to add two complex numbers (use structure variable to store a complex number).



## PROGRAMMING LAB

### Skill Based Mini Projects- Introduction to Computer Programming LAB

1. Design a program to implement Tic tac toe game
2. Design a program to implement basic operation of Leave Management System
3. Generate a Student report card system using a C/C++ program.
4. Design a program which can generate a Calendar for any year.
5. Design a program which demonstrates the operations performed by an ATM Machine.
6. Design a program to create a Number System Conversion system.
7. Design a program to implement basic operation of Department Store Management System
8. Design a program to implement basic operation of Library Management System
9. Design a program to implement basic operation of Bus Reservation System
10. Design a program to implement Periodic Table.
11. Design a program to implement Digital clock



## PROGRAMMING LAB

### Course Outcomes- Object Oriented Programming & Methodology

After completion of this course, the students would be able to:

- CO1 . tell the concepts of classes & objects and their significance in real world.
- CO2. explain the benefits of object oriented design.
- CO3. build C++ classes using appropriate encapsulation and design principles.
- CO4. analyze the utilization of inheritance and polymorphism in the solution of problems.
- CO5. choose appropriate object orient programming concepts for solving real world problems.
- CO6. develop solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.



## PROGRAMMING LAB

### List of Experiments - Object Oriented Programming & Methodology

1. Write a program to swap two integers without using third variable. The swapping must be done in a function of a particular class.
2. Write a program that uses a class where the member functions are defined outside a class.
3. Design a class to represent a bank account. Which includes account number, name of the depositor, type of the account, balance amount in the account. Define Methods, to assign initial values, to Deposit an amount, to Withdraw amount after checking balance, to display name and balance.
4. Write a program to find the greater of two given numbers in two different classes using friend function.
5. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.
6. Create two classes: Polar and Cartesian, to represent Polar and Cartesian coordinates of a point. Demonstrate how to convert Polar coordinates to Cartesian coordinates by writing the conversion code in source class.
7. Write a program to demonstrate anomaly caused in Multi-path Inheritance. Also, write a program to overcome the anomaly.
8. Create an abstract class Shape which has a field  $PI=3.14$  as final and it has an abstract method Volume. Make two sub-classes 'Cone' and 'Sphere' from this class and they should print their volume.
9. Create a class called LIST with two pure virtual function store() and retrieve(). To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
10. Write a program to demonstrate working of various file handling operations in C++.



## PROGRAMMING LAB

### Skill Based Mini Projects- Object Oriented Programming & Methodology

1. 'Movie World' Shop has a huge collection of movies (in the form of DVDs). You are required to make software using OOPS paradigm that manages the rental operations of movies.
2. Question Bank computerizes the MCQ based exams. It takes input from a file having questions and their answers and presents randomly before the exam takers. Use OOPS concepts to implement the question bank system.
3. Design an OOPS to implement the basic operations of Leave Management System.
4. An Inventory System computerizes the Stock, Sale and Purchase of goods. Design an OOPS to implement it.
5. An electricity board charges the following rates to domestic users to discourage large consumption of energy: For the first 100 units - 60P per unit For next 200 units - 80P per unit Beyond 300 units - 90P per unit All users are charged a minimum of Rs.50.00. If the total amount is more than Rs.300.00 then an additional surcharge of 15% is added. Design an OOPS system to register users to the system, maintain his/her record and display monthly bills.
6. Library Systems is aimed to computerize the library management operations, e.g. Registering a Student, Issuing a book, Handling Books Return, etc. Design an OOPS system to implement the same.
7. Design an OOPS to implement a Personal Diary Management System.





## PROGRAMMING LAB

### Course Outcomes - Java Programming

After completion of this course, the students would be able to:

- CO1. Define the fundamentals, features, packages and functionalities of java programming.
- CO2. Explain exceptional handling, thread, multithreading, database connectivity and networking concepts.
- CO3. Outline the block diagram of control statements.
- CO4. Construct programs using concepts of java.
- CO5. Analyze and compare the existing programs for improvement.
- CO4. Create java programs/ project for real problems.



## PROGRAMMING LAB

### List of Experiments - Java Programming

- 1) Write a Java program to determine maximum from given 100 numbers.
- 2) Write a Java program to calculate the factorial of a given numbers.
- 3) Java program to check whether a given character is alphabet or not.
- 4) Java program to find sum of all digits.
- 5) Write a Java program to add two binary numbers.
- 6) Write a Java program for switch statement.
- 7) Write a Java program to print perfect numbers
- 8) Write a Java program to convert a decimal number to binary number.
- 9) Write a Java program for Parameterized Constructor.
- 10) Write a Java program using while loop, do while loop, "for" loop.
- 11) Write a Java program to check whether number is Armstrong or not.
- 12) Write a Java program for Hierarchical Inheritance.
- 13) Write a Java program for abstract class and for interface.
- 14) Write a Java program to declare, initialize and display the contents of an array of 5 integer values. Also show in Java how the length of array can be found.
- 15) Write a program to accept a string and count total capital and small letters in string.
- 16) Write a Java program to print following output: 0,1,1,2,3....(20 such items)
- 17) Write a Java program for method overloading and for method overriding.
- 18) Write a Java program to design a class Student that has three data member name ; Roll no; Marks in five subject and member function to assign streams on the basis of table given below



## PROGRAMMING LAB

### Course Outcomes - Python Programming

After completion of this course, the students would be able to:

- CO1. Tell the use of various built-in data structures used in python.
- CO2. Outline the working of file handling operations, normal functions and lambda functions in python.
- CO3. Apply the concepts of object oriented programming in python.
- CO4. Analyze the data and visualize it using python's matplotlib.
- CO5. Rule out various important characteristics of data using scikit-learn package.
- CO6. Create efficient algorithms in python to solve real world problems



## PROGRAMMING LAB

### List of Experiments - Python Programming

1. Python program to take input from user and display "Hello MITS Gwalior".
2. Python program to do arithmetic operations.
3. Python program to find area of rectangle, circle and triangle.
4. Python program to check number is even or odd, prime not prime.
5. Python program find factorial of a number.
6. Python program to check year is leap year or not.
7. Python Program to implement the operation on List, Tuple, Set and Dictionary.
8. Python Program to handle the exception and file handling operation.
9. Python Program to create and use of user defined function.
10. Python Program to solve a problem using Lambda function
11. Python Program for creating an object with and without inheritance.



## PROGRAMMING LAB

### SKILL BASED MINI-PROJECTS

Implement the below mentioned models using python programming and related libraries:

- Health Insurance Cost Prediction model.
- Salary Prediction model.
- Loan Amount Prediction model.
- Crop Yield Prediction Model.
- Stock Prediction Model.