Servers; Web Hosting.

**Unit III: Database Management**

Database Concepts: Introduction to database concepts and its need.

Relational data model: Concept of domain, relation, tuple, attribute, degree, cardinality, key, primary key, candidate key, alternate key and foreign key;

Structured Query Language:

General Concepts: Advantages of using SQL, Data Definition Language and Data Manipulation Language;

Data Types: number / decimal, character / varchar / varchar2, date;

SQL commands **covered in class XI (2019-20)**

SELECT, DISTINCT, FROM, WHERE, IN, BETWEEN, LIKE, NULL / IS NULL, ORDER BY,GROUP BY, HAVING;

SQL functions: SUM ( ), AVG ( ), COUNT ( ), MAX ( ) and MIN ( );

Joins: equi-join and natural join

Interface of Python with an SQL database
- Connecting SQL with Python
- Creating Database connectivity Applications
- Performing Insert, Update, Delete queries
- Display data by using fetchone(),fetchall(),rowcount

## 4. Practical

| S. No. | Area | Marks (Total=30) |
|--------|------|------------------|
| 1 | **Lab Test:** <br> 1. Python program (60% logic + 20% documentation + 20% code quality) <br> 2. Small Python program that sends a SQL query to a database and displays the result. A stub program can be provided. | **7** <br><br> **5** |
| 2 | **Report file:** Minimum 20 Python programs. Out of this at least 4 programs should send SQL commands to a database and retrieve the result | **7** |
| 3 | **Project** (that uses the concepts that have been learnt in Class 11 and 12) | **8** |
| 4 | **Viva voce** | **3** |

**5. Suggested Practical List:**

**Python Programming**

- Read a text file line by line and display each word separated by a #.
- Read a text file and display the number of vowels/ consonants/ uppercase/ lowercase characters in the file.
- Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
- Create a binary file with roll number, name and marks. Input a roll number and update the marks.
- Remove all the lines that contain the character `a' in a file and write it to another file.
- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).
- Write a Python program to implement a stack and queue using a list data-structure.
- Take a sample of ten phishing e-mails (or any text file) and find most commonly occurring word(s)

**Database Management**

- Create a student table and insert data. Implement the following SQL commands on the student table:
  ALTER table to add new attributes / modify data type / drop attribute
  UPDATE table to modify data
  ORDER By to display data in ascending / descending order
  DELETE to remove tuple(s)
  GROUP BY and find the min, max, sum, count and average
- Similar exercise may be framed for other cases.
- Integrate SQL with Python by importing the MySQL module.

## 6. Project

The aim of the class project is to create something that is tangible and useful using Python / Python and SQL connectivity. This should be done in groups of two to three students and should be started by students at least 6 months before the submission deadline. The aim here is to find a real world problem that is worthwhile to solve.

Students are encouraged to visit local businesses and ask them about the problems that they are facing. For example, if a business is finding it hard to create invoices for filing GST claims, then students can do a project that takes the raw data (list of transactions), groups the transactions by category, accounts for the GST tax rates, and creates invoices in the appropriate format. Students can be extremely creative here. They can use a wide variety of Python libraries to create user friendly applications such as games, software for their school, software for their disabled fellow students, and mobile applications, Of course to do some of these projects, some additional learning is required; this should be encouraged. Students should know how to teach themselves.

The students should be sensitized to avoid plagiarism and violations of copyright issues while working on projects. Teachers should take necessary measures for this.