

# COMPUTER SCIENCE

## CLASS-XII (Reduced Syllabus)

### 1. Prerequisites

Computer Science- Class XI

### 2. Learning Outcomes

- Understand the concept of function and recursion
- Learn How to create Python libraries
- Learn File handling
- Learn basic data structures List, Stack, Queue.
- Understand basic SQL programming
- Learn about cyber safety
- Have a clear understanding of cyber ethics and cybercrime. Understand the value of technology in societies, gender and disability issues, and the technology behind biometric ids.

### 3.

| Unit No  | Unit Name   | Marks      |
|----------|---|------------|
| Unit -1  | <b>Programming and Computational Thinking (PCT-2)</b> | <b>30</b>  |
| Unit-2   | <b>Data Management</b>                                | <b>20</b>  |
| Unit-3   | <b>Society, Law and Ethics (SLE-1) - Cyber safety</b> | <b>20</b>  |
| Unit - 4 | Practical [Python Lab]                                | <b>15</b>  |
| Unit - 5 | Practical[SQL LAB]                                    | <b>15</b>  |
| Total    |   | <b>100</b> |

#### **4.1. Unit-1: Programming and Computational Thinking (PCT-2)**

- Revision of the basics of Python
- Functions: scope, parameter passing, mutable/immutable properties of data objects, pass arrays to functions, return values, functions using libraries: mathematical, and string functions.
- File handling: open and close a file, read, write, and append to a file, standard input, output, and error streams, relative and absolute paths.
- Using Python libraries: create and import Python libraries
- Recursion: simple algorithms with recursion: factorial, Fibonacci numbers; recursion on arrays: binary search

#### **4.2. Unit 2: Data Management**

- Relational databases: idea of a database and the need for it, relations, keys, primary key, foreign key; use SQL commands to create a table, keys, foreign keys; insert/delete an entry, delete a table.
- SQL commands: select, project, and join; indexes, and a lot of in-class practice
- SQL commands: aggregation functions – having, group by, order by.

#### **4.3 Unit 3: Society, Law and Ethics (SLE-1) - Cyber safety**

- Cyber safety: safely browsing the web, identity protection, confidentiality, social networks, cyber trolls and bullying
- Appropriate usage of social networks: spread of rumours, and common social networking sites (Twitter, LinkedIn, and Facebook) and specific usage rules.
- Safely accessing web sites: adware, malware, viruses, Trojans
- Safely communicating data: secure connections, eavesdropping, phishing and identity verification.
- Technology and society: understanding of societal issues and cultural changes induced by technology.

#### **5.1. Unit-4: Python Lab**

- Recursively find the factorial of a natural number.
- Read a file line by line and print it.
- Remove all the lines that contain the character `a' in a file and write it to another file.
- Write a Python function  $\sin(x, n)$  to calculate the value of  $\sin(x)$  using its Taylor series expansion up to  $n$  terms. Compare the values of  $\sin(x)$  for different values of  $n$  with the correct value.

- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).
- Write a recursive code to find the sum of all elements of a list.
- Write a recursive code to compute the nth Fibonacci number.
- Write a Python program to implement a stack and queue using a list data-structure.
- Write a recursive Python program to test if a string is a palindrome or not.
- Write a Python program to plot the function  $y = x^2$  using the pyplot or matplotlib libraries.

## 5.2. Unit-5: SQL Lab

At least the following SQL commands should be covered during the labs: create, insert, delete, select, and join. The following are some representative assignments.

- Create a student table with the student id, name, and marks as attributes where the student id is the primary key.
- Insert the details of a new student in the above table.
- Delete the details of a particular student in the above table.
- Use the select command to get the details of the students with marks more than 80.
- Create a new table (name, date of birth) by joining two tables (student id, name) and (student id, date of birth).
- Create a new table (order ID, customer Name, and order Date) by joining two tables (order ID, customer ID, and order Date) and (customer ID, customer Name, contact Name, country).

### Reference Books:-

1. Computer Science with Python ( class xii) by Sumita Arora , Dhanpat Rai Publication
2. Textbook of Computer Science with Python for Class- XII (Two Colours) 1st Edition 2020  
by Bhasin, Harsh , New Age International (P) Ltd Publishers
3. Progress in Computer Science with Python ( class xii) by Sumita Arora , Dhanpat Rai  
Publication