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	**Programming and Computational Thinking (PCT-2)**	30
Unit-2	**Data Management**	20
Unit-3	**Society, Law and Ethics (SLE-1) - Cyber safety**	20
Unit - 4	Practical [Python Lab]	15
Unit - 5	Practical[SQL LAB]	15
	Total	100

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