

7. COMPUTER SCIENCE

Class XI (Theory)

Duration: 3 hours

Total Marks: 70

Unit No.	Unit Name	Marks
1.	COMPUTER FUNDAMENTALS	10
2.	PROGRAMMING METHODOLOGY	10
3.	INTRODUCTION TO C++	15
4	PROGRAMMING IN C++	35
Total		70

UNIT 1: COMPUTER FUNDAMENTALS

Evolution of computers; Basics of computer and its operation: Functional Components and their interconnections, concept of Booting.

Software Concepts:

Types of Software - System Software, Utility Software and Application Software;

System Software: Operating System, Compilers, Interpreters and Assembler;

Utility Software : Anti Virus, File Management tools, Compression tools and Disk Management tools (Disk Cleanup, Disk Defragmenter, Backup);

Application Software as a tool: Word Processor, Presentation tools, Spreadsheet Package, Database Management System; Business software (for example: School Management System, Inventory Management System, Payroll System, Financial Accounting, Hotel Management, and Reservation System);

Operating System : Need for operating system, Functions of Operating System (Processor Management, Memory Management, File Management and Device Management), Types of operating system – Interactive (GUI based), Time Sharing, Real Time and Distributed; Commonly used operating systems:

LINUX, Windows, BhartiOO, Solaris, UNIX;

Illustration and practice of the following tasks using any one of the above Operating Systems:

- Opening / Closing Windows
- Creating / Moving / Deleting Files / Folders
- Renaming Files / Folders
- Switching between Tasks

Number System : Binary, Octal, Decimal, Hexadecimal and conversion between two different number systems;

Internal Storage encoding of Characters: ASCII, ISCII (Indian scripts Standard Code for Information Interchange), and UNICODE;

Microprocessor : Basic concepts, Clock speed (MHz, GHz), 16 bit, 32 bit, 64 bit processors; Types – CISC, RISC;

Memory Concepts :

Units : Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte, Peta Byte

Primary Memory : Cache, RAM, ROM,

Secondary Memory : Hard Disk Drive, CD / DVD Drive, Pen Drive, Blue Ray Disk;

Input Output Ports / Connections: Serial, Parallel and Universal Serial Bus, PS-2 Port, Infrared port, Bluetooth.

UNIT 2: PROGRAMMING METHODOLOGY

General Concepts; Modular approach; Clarity and Simplicity of Expressions, Use of proper Names for identifiers, Comments, Indentation; Documentation and Program Maintenance; Running and Debugging programs, Syntax Errors, Run-Time Errors, Logical Errors; Problem Solving Methodology and Techniques: Understanding of the problem, Identifying minimum number of inputs required for output, Step by step solution for the problem, breaking down solution into simple steps, Identification of arithmetic and logical operations required for solution, Using Control Structure: Conditional control and looping (finite and infinite);

UNIT 3: INTRODUCTION TO C++

Getting Started:

C++ character set, C++ Tokens (Identifiers, Keywords, Constants, Operators), Structure of a C++ Program (include files, main function); Header files – iostream.h, iomanip.h; **cout**, **cin**; Use of I/O operators (<< and >>), Use of endl and setw(), Cascading of I/O operators, Error Messages; Use of editor, basic commands of editor, compilation, linking and execution; standard input/output operations from C language: gets(), puts() of stdio.h header file;

Data Types, Variables and Constants:

Concept of Data types; Built-in Data types: **char**, **int**, **float** and **double**; Constants: Integer Constants, Character Constants (Backslash character constants - \n, \t), Floating Point Constants, String Constants; Access modifier: **const**; Variables of built-in data types, Declaration/Initialisation of variables, Assignment statement; Type modifier: signed, unsigned, long;

Operators and Expressions:

Operators: Arithmetic operators (-,+,*,/,%), Unary operator (-), Increment and Decrement Operators (—,++), Relational operators (>,>=,<,<=,==,!=), Logical operators (!, &&, ||), Conditional operator: <condition>?<if true>:<else>; Precedence of Operators; Expressions; Automatic type conversion in expressions, Type casting; C++ shorthand's (+=, -=, *=, /=, %=);

UNIT 4: PROGRAMMING IN C++

Flow of control:

Conditional statements: **if-else**, Nested **if**, **switch..case..default**, Nested **switch..case**, break statement (to be used in switch..case only); Loops: **while**, **do - while** , **for** and Nested loops;

String Functions:

Header File: string.h

Function: **isalnum(), isalpha(), isdigit(), islower(), isupper(), tolower(), toupper();**

Character Functions:

Header File: ctype.h

Functions: **isalnum(), isalpha(), isdigit(), islower(), isupper(), tolower(), toupper(), strcpy(), strcat(), strlen(), strcmp(), strcmpi();**

Mathematical Functions:

Header File-math.h, stdlib.h;

Functions: **fabs(), log(), log10(), pow(), sqrt(), sin(), cos(), abs(),**

Other Functions:

Header File- stdlib.h;

Functions: **randomize(), random();**

User Defined Functions:

Defining a function; function prototype, Invoking/calling a function, passing arguments to function, specifying argument data types, default argument, constant argument, call by value, call by reference, returning values from a function, calling functions with arrays, scope rules of functions and variables; local and global variables;

Structured Data Type: Array

Declaration/initialisation of One-dimensional array, Inputting array elements, Accessing array elements, Manipulation of Array elements (sum of elements, product of elements, average of elements, linear search, finding maximum/minimum value); Declaration/Initialization of a String, string manipulations (counting vowels/consonants/digits/ special characters, case conversion, reversing a string, reversing each word of a string);

Two-dimensional Array :

Declaration/initialisation of a two-dimensional array, inputting array elements Accessing array elements, Manipulation of Array elements (sum of row element, column elements, diagonal elements, finding maximum/minimum values);

User-defined Data Types

Need for User defined data type:

Defining a symbol name using typedef keyword and defining a macro using #define directive;

Structures:

Defining a Structure, Declaring structure variables, Accessing structure elements, Passing structure of Functions as value and reference argument/parameter, Function returning structure, Array of structures, passing an array of structure as an argument/ a parameter to a function.

Class XI (Practical)

Duration: 3 hours

Total Marks: 30

1. Programming in C++ **10**

One programming problem in C++ to be developed and tested in Computer during the examination. Marks are allotted on the basis of following:

Logic : 05 Marks

Documentation/Indentation : 02 Marks

Output presentation : 03 Marks

2. Project Work **10**

Problems related to String, Number and Array manipulation; General Guidelines : Initial Requirement, developing an interface for user (it is advised to use text based interface screen), developing logic for playing the game and developing logic for scoring points

1. Memory Game : A number guessing game with application of 2 dimensional arrays containing randomly generated numbers in pairs hidden inside boxes.
2. Cross 'N Knots Game : A regular tic-tac-toe game
3. Hollywood/Hangman: A word Guessing game
4. Cows 'N Bulls : A word/number Guessing game

Similar projects may be undertaken in other domains (As mentioned in general guidelines for projects, given at the end of the curriculum in a group of 1-2 students)

3. Practical File **05**

Must have minimum 15 programs from the topics covered in class XI course.

- 5 Programs on Control structures
- 4 Programs on Array Manipulations
- 4 Programs on String Manipulations
- 2 Programs on structure manipulations

4. Viva Voce **05**

Viva will be asked from syllabus covered in class XI and the project developed by student.