**UNIT 1: COMPUTER FUNDAMENTALS**

Evolution of computers; Basics of computer system and its operation: Functional Components and

their inter-connections; concept of Booting.

**Software Concepts:**

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

**System Software:** Operating System, Compiler, Interpreter and Assembler;

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), Real Time and Distributed; Commonly used operating systems: UNIX, LINUX,

Windows, Solaris, BOSS (Bharat Operating System Solutions); Mobile OS - Android, Symbian.

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

**Utility Software:** Anti Virus, File Management tools, Compression tools and Disk Management tools

(Disk Cleanup, Disk Defragmenter, Backup)

**Application software:** Office Tools - Word Processor, Presentation Tool, Spreadsheet Package,

Database Management System; Domain specific tools - School Management System, Inventory

Management System, Payroll System, Financial Accounting, Hotel Management, Reservation System

and Weather Forecasting System

**Number System:** Binary, Octal, Decimal, Hexadecimal and conversion amongst these number systems.

**Internal Storage encoding of Characters:** ASCII, ISCII (Indian scripts Standard Code for

Information Interchange), and UNICODE (for multilingual computing)

**Microprocessor:** Basic concepts, Clock speed (MHz, GHz), 16 bit, 32 bit, 64 bit processors,

128 bit processors; Types - CISC Processores (Complex Instruction set computing), RISC Processors

(Reduced Instruction set computing), and EPIC (Explicitly parallel Instruction computing).

**Memory Concepts:**

Units: Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte, Peta Byte, Exa Byte, Zetta Byte, Yotta Byte

**Primary Memory:** Cache, RAM, ROM

**Secondary Memory:** Fixed and Removable Storage - 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, Firewire.

**Note :** Exploring inside computer system in the computer lab class.

**UNIT 2: 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.

**Data Types, Variables and Constants:**

Concept of Data types; Built-in Data types: **char, int, float** and **double;** Constants: Integer Constants,

Character constants - \n, \t, \b), Floating Point Constants, String Constants; Access modifier: **const;**

Variables of built-in data types, Declaration/Initialisation of variables, Assignment statement; Type

modifier: **signed, unsigned, longOperator and Expressions :**

Operators: Arithmetic operators (-,+,\*,/,%), Unary operator (-), Increment (++) and Decrement (--)

Operators, Relation operator (>,>=,<,<=,= =,!=), Logical operators (!, &&,||), Conditional operator:

<condition>? <if true>:<if false>; Precedence of Operators; Automatic type conversion in expressions,

Type casting; C++ shorthands (+=, -=, \*=, /=, %=)

**UNIT 3: 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 Methodologies:** Understanding of the problem, Identifying minimum number of

inputs required for output, Writing code to optimizing execution time and memory storage, step by step

solution for the problem, breaking down solution into simple steps, Identification of arithmetic and

logical operations required for solution, Control Structure: Conditional control and looping (finite and

infinite)

**UNIT 4: PROGRAMMING IN C++**

**Flow of control:**

Conditional statements: **if-else**, Nested **if**, **switch..case..default**, use of conditional operator, Nested

**switch..case, break** statement (to be used in **switch..case only**); Loops: **while, do - while , for** andNested loops

**Inbuilt Functions**

**Header file Categorization Header Function**

**Standard input/output functions stdio.h gets ( ), puts ( )**

**Character Functions ctype.h isalnum ( ), isalpha ( ),**

**isdigit ( ), islower ( ),**

**isupper ( ), tolower ( ),**

**toupper ( )**

**String Functions string.h strcpy ( ), strcat ( ),**

**strlen ( ), strcmp ( ),**

**strcmpi ( ), strrev ( ),**

**strlen ( ), strupr ( ),**

**strlwr ( )**

**Mathematical Functions math.h fabs ( ), pow ( ), sgrt ( ),**

**sin ( ), cos ( ), abs ( )**

**Other Functions stdlib.h randomize ( ), random ( ),**

**itoa ( ), atoi ( )**

**User Defined Functions:**

**Introduction to user-defined function and its requirements.**

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.

Relating the Parameters and return type concepts in built-in functions.

**Structured Data Type:**

**Arrays:** Introductory to Array and its advantages.

One Dimensional 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:**

Introduction to user defined data types.

**Structure**

Defining a Structure (Keyword Structure), Declaring structure variables, Accessing structure elements,

Passing structure to 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

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

PRACTICALS

**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 : 5 Marks

Documentation/Indentation : 2 Marks

Output presentation : 3 Marks

**2 Project Work 06**

**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

**or**

Similar projects may be undertaken in other domains

(As mentioned in general guidelines for project, given at the end of the curriculum in a group of

2-4 students)

**3. Presentation based on research 02**

It will be a group presentation based on a detailed study of at least two technology inventions in

the field of information technology, which may include Inventor's name with country, out of box

contributions year of invention, characteristics, social impact and uses. A partial list of inventors

is in the Annexure.

(The project can be done in a group of 2-3 students)

**4 Practical File 06**

(a) Record of the configuration of computer system used by the student in the computer lab

(by exploring inside computer system in the first 2 lab classes).

(b) 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

**5 Viva Voce 06**

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