Unit-Wise Marks

Unit No.	Unit Name	Marks
1.	COMPUTER FUNDAMENTALS	10
2.	PROGRAMMING METHODOLOGY	12
3.	INTRODUCTION TO C++	14
4.	PROGRAMMING IN C++	34
	TOTAL	70

Unit 1 : Computer Fundamentals

(18 Theory + 6 Practical) Periods

Classification 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), Time sharing, Real Time and Distributed ; Commonly used operating systems : UNIX, LINUX, Windows, Solaris, BOSS (Bharat Operating System Solutions) ; Mobile OS – Android, Symbian IOS.

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

Open Source Concepts : Open Source Software, Freeware, Shareware, Propietary Software.

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 Forcasting System ;

Number System : Binary, Octal, Decimal, Hexadecimal and conversion between different 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, 128 bit processors ; Types – CISC Processors (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.

Unit 2 : Programming Methodology

(28 Theory + 10 Practical) Periods

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 : Understanding of the problem, Solution for 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 (modular approach), identification of arithmetic and logical operations required for solution, Control Structure : Conditional control and looping (finite and infinite) ;

Problem Solving : Introduction to Algorithms/Flowcharts.

Unit 3 : Introduction to C++

(44 Theory + 36 Practical) Periods

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, Compilation, Error Messages and execution. 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, long.

Operators and Expressions

Operators : Arithmetic operators (–, +, *, /, %), Assignment opetator (=) ; C++ shorthands (+=, –=, *=, /=, %=) ; Unary operator (–), Increment (++) and Decrement (– –) Operators, Relation operators (>, >=, <, <=, ==, !=), Logical operators (!, &&, ||), Conditional operator : <condition>?<if true>: <if false> ; Precedence of Operators ; Automatic type conversion in expressions, Type casting.

Unit 4 : Programming in C++

(50 Theory + 48 Practical) Periods

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.

Inbuilt Functions

Header File Categorization	Header File	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( ), strupr( ), strlwr( ) ;
Mathematical Functions	math.h	fabs( ), pow( ), sqrt( ), sin( ), cos( ), abs( )

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 to 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/initialisation 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 type :

Structures

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** preprocessor directive.

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	:	6 Marks
Documentation/Indentation	:	2 Marks
Output presentation	:	2 Marks

2. Project Work

06 + 4*

Problems using String, Number, Array and Structure 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. Hollywood/Hangman : A word Guessing game
3. Cows 'N Bulls : A word/number Guessing game
4. Random Number Guessing Game (High/Low)
5. A game to check whether a word does not use any of the forbidden letters
6. Cross 'N knots game : A regular tic-tac-toe game.

Or

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 2-4 students)

* Collaboration and Presentation of the project

3. Practical File

(5+1*) = 6

(*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 20 programs from the topics covered in class XI course.

- Programs on Control Structures
- Programs on String Manipulations
- Programs on Array Manipulations (1D & 2D)
- Programs on Structures

*1 mark is for innovating while developing programme.

4. Viva Voce

04

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

*1 mark is for innovating while developing programme.