1. Petrology - 10 marks
2. Structural Geology - 6marks
3. Economic Geology (Ore Minerals) - 5 marks
4. Field Report - 3 marks
5. Viva Voce - 3 marks
6. Laboratory Records - 3 marks

Detailed Syllabus for Practical:

1. Petrology

Megascopic Identification of Rocks as mentioned in Theory.

2. Structural Geology

Study of Geological Maps and drawing of sections of Simple Maps.

3. Economic Geology

Megascopic Identification of the following Economic Minerals:- Haematite, Pyrite, Magnetite,
Pyrolusite, Psilomelane, Chalcopyrite, Bauxite, Chromite, Magnesite, Coal, Graphite.

4. Field Training:

1. Use of Clinometer Compass
2. Study of Structure and rock types, Mineral assemblages during the course of field training.
3. Preparation of Field Report and it is to be submitted at the time of Practical Examination.

5. Viva Voce

Oral questions to be answered by the students.

6. Laboratory records

The Laboratory Records are to be examined by the examiner at the time of Practical Examination

COMPUTER SCIENCE SYLLABUS
COMPUTER SCIENCE
CLASS +2 1ST YEAR (THEORY) C++

Duration: 3 hours Total Marks: 70

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

UNIT-1: COMPUTER FUNDAMENTALS

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

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, and Proprietary software

Dark Application Software: Office Tools - Word Processor, Presentation Tool, Spreadsheet Package,

Dark DatabaseManagement 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 between different number systems.

I**nternal 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 Methodologies: 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; 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, StringConstants; Access modifier: const; Variables of built-in-data types, Declaration/ Initialization of variables,Assignment statement, Type modifier: signed, unsigned, long

Operator and Expressions: Operators: Arithmetic operators (-,+,*,/,%), Assignment operator (=), **C++** shorthands (+=, -=,*=,/=,%=) Unary operators (-), Increment (++) and Decrement + (-)Operators, Relation operator (>,>=,<=,=,!=), Logical operators (!,&&,II), Conditional Operator: <condition>?<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, 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 File**	**Function**
Standard input/output functions	stdio.h	gets ( ), puts ( )
Character Functions	ctype.h	isalnum ( ), isalpha ( ), isdigit ( ), islower ( ), isupper ( ), tolower ( ), toupper( )
String Function	string.h	strcpy ( ), strcat ( ), strlen ( ), strcmp ( ), strcmpi ( ), strev ( ), strupur ( ), strlwr ( )
Mathematical Functions	math.h	fabs ( ), pow ( ), sqrt ( ), sin ( ), cos ( ), abs ( )
Other Functions	stdlib.h	randomize ( ), random ( )

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: Introduction to Array and its advantages.

One Dimensional Array: Declaration/initialization 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/initialization of a two-dimensional array, inputting array elements,accessing array elements, manipulation of Array elements (sum of row element, column elements, diagonalelements, 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, arrayof structure, 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.

CLASS +2 1ST YEAR (PRACTICAL) – C++

Duration: 3 hours Total Marks: 30

1. Programming in C++ 12 Marks

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

Logic : 7 Marks

Documentation : 2 Marks

Output presentation : 3 Marks

2. One logical problem to be solved through flow charts. 04

3. Project Work 08

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

Memory game: A number guessing game with application of 2 dimensional arrays containing randomly generated numbers in pairs hidden inside boxes.

Hollywood/Hangman: A word Guessing game

Cows 'N Bulls: A word/number Guessing game

Random Number Guessing Game (High\Low)

A game to check whether a word does not use any of the forbidden letters

Cross„N knots game: A regular tic-tac -toe game, or

Similar projects may be or 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)

4. Practical File 3+1*

(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 +2 1st yr 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 programmes.

6. Viva Voce **02 Marks**

Viva will be asked from the syllabus covered in class +2 1st yr and the project developed by the student(s).*1 mark is for innovating while developing programme.

CLASS +2 2NDYEAR (THEORY) - C++

Duration : 3 hours Total Marks: 70

Unit No.	Name	Marks
1.	OBJECT ORIENTED PROGRAMMING IN C++	30
2.	DATA STRUCTURE	14
3.	DATABASE MANAGEMENT SYSTEM AND SQL	8
4.	BOOLEAN ALGEBRA	8
5.	COMMUNICATION TECHNOLOGIES	10
	Total	**70**

Unit 1: Object Oriented Programming in C++ (50 Theory + 40 Practical) Periods

Object Oriented Programming: Concept of Object Oriented Programming - Data hiding, Data encapsulation,Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies,

Implementation of Object Oriented Programming concepts in C++: Definition of a class, Member of aclass - Data Members and Member Functions (methods), Using Private and Public visibility modes, default visibility mode (private); Member function definition: inside class definition and outside class definition using scope resolution operator (::); Declaration of objects as instances of a class; accessing members from object (s), Objects as functionarguments-pass by value and pass by reference;

Constructor and Destructor: Constructor: special characteristics, declaration and definition of a constructor,default constructor, overloaded constructors, copy constructor, constructor with default arguments;

Destructor: Special Characteristics, declaration and definition of destructor;

Inheritance (Extending Classes): Concept of Inheritances, Base Class, Derived classes, protected visibility mode; Single level inheritance, Multilevel inheritance and Multiple inheritance, Privately derived, publicly derived and Protectedly derived class, accessibility of members from objects and within derived class (es);

Data File Handling: Need for a data file, Types of data files - Text file and Binary file;
Text File: Basic file operations on text file: Creating/Writing text into file, Reading and Manipulation of text from an already existing text File (accessing sequentially).
Binary File: Creation of file, Writing data into file, Searching for required data from file, Appending data to a file, Insertion of data in sorted file, Deletion of data from file, Modification of data in a file;Implementation of above mentioned data file handling in C++; Components of C++ to be used with file handling:
Header file: fstream.h; ifstream, ofstream, classes; Opening a text file in in, out, and app modes;Using cascading operators (»«) for writing text to the file and reading text from the file; open (), get (), read ()put (), write(), getline() and close() functions; Detecting end-of-file(with or without using eof() function),tellg(), tellp(), seekg().seekp();
Pointers:
Introduction to Pointer, Declaration and Initialization of Pointer; Dynamic memory allocation/ deallocation operators: new, delete; Pointers and Arrays: Array of Pointers, Pointer to an array (1 dimensional array),Function returning a pointer, Reference variables and use of alias; Function call by reference. Pointer to structure: De-reference/Deference operator:"*, ->; self referencial structure;
UNIT 2: DATA STRUCTURES (42 Theory + 36 Practical) Periods
Introduction to data structure- array, stack queues primitive and non-primitive data structure, linear and nonlinear structure, static and dynamic data structure.
Arrays:
One and two Dimensional arrays: Sequential allocation and address calculation;One dimensional array: Traversal, Searching (Linear, Binary Search), Insertion of an element in an array,deletion of an element from an array, Sorting (Insertion, Selection, Bubble)Two-dimensional arrays: Traversal Finding sum/difference of two NxM arrays containing numeric values, Interchanging Row and Column elements in a two dimensional array;
Stack (Array and Linked implementation of Stack):
Introduction to stack (LIFO_Last in First out Operations) Operations on stack (PUSH and POP) and its Implementation in C++, Converting expressions from INFIX to POSTFIX notation and evaluation of Postfix expression;
Queue: (Array and Linked Implementation)
Introduction to Queue (FIFO - First in First out operations)
Operations on Queue (Insert and Delete and its Implementation in C++, circular queue using array.
UNIT 3: DATABASE MANAGEMENT SYSTEMA AND SQL
Data base Concepts: Introduction to data base concepts and its need.
Relational data model: Concept of domain, tuple, relation, key, primary key, alternate key, candidate key;
Relational algebra : Selection, Projection, Union and Cartesian product;

Structured Query Language:

General Concepts: Advantages of using SQL, Data Definition Language and Data Manipulation Language;

Data Types: NUMBER/DECIMAL, CHARACTER/VARCHAR/VARCHAR2, DATE;

SQL COMMANDS: CREATE TABLE, DROP TABLE, ALTER TABLE, UPDATE ...SET.....INSERT, DELETE;

SELECT, DISTINCT, FROM, WHERE, IN, BETWEEN, GROUP BY, HAVING, ORDER BY;

SQL functions: SUM ( ), AVG ( ), COUNT ( ), MAX ( ) AND MIN ( ); Obtaining results (SELECT query) from 2 tables using equi-join, Cartesian product and Union

Note: Implementation of the above mentioned commands could be done on any SQL supported software on one or two tables.

UNIT 4: BOOLEAN ALGEBRA

Role of Logical Operations in Computing.

Binary-valued Quantities, Boolean Variable, Boolean Constant and Boolean Operators: AND, OR, NOT;

Truth Tables; Closure Property, Commutative Law, Associative Law, Identity law, Inverse Law, Principle of Duality, Idempotent Law, Distributive Law, Absorption Law, Involution Law, DeMorgan"s Law and their applications; Obtaining Sum of Product (SOP) and Product of Sum (POS) form the Truth Table, Reducing Boolean Expression (SOP and POS) to its minimal form, Use of Karnaugh Map for minimization of Boolean expressions (up to 4 variables);

Application of Boolean Logic: Digital electronic circuit design using basic Logic Gates (NOT, AND, OR,NAND, NOR)

Use of Boolean operators (NOT, AND, OR) in SQL SELECT statements Use of Boolean operators (AND,OR) in search engine queries.

UNIT 5: NETWORKING AND OPEN SOURCE SOFTWARE

Evolution of Networking: ARPANET, Internet, Interspace Different ways of sending data across the network with reference to switching techniques (Circuit and Packet switching).

Data Communication terminologies: Concept of Channel, Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps, Kbps, Mbps, Gbps, Tbps).

Transmission media: Twisted pair cable, coaxial cable, optical fiber, infrared, radio link, microwave link and satellite link.

Network devices: Modem, RJ45 connector, Ethernet Card, Router, Switch, Gateway, wifi card.

Network Topologies and types: Bus, Star, Tree, PAN, LAN, WAN, MAN.

Network Protocol: TCP/IP, File Transfer Protocol (FTP), PPP, SMTP, POP3 Remote Login (Talent), and Internet Wireless/Mobile Communication protocol such as GSM, CDMA, GPRS, and WLL.

Mobile Telecommunication Technologies : 1G, 2G, 3G and 4G Electronic mail protocols such as SMTP, POP3 Protocols for Chat and Video Conferencing VOIPWireless technologies

such as Wi-Fi and WiMax

Network Security Concepts:

Threats and prevention from Viruses, Worms, Trojan horse, Spams

Use of Cookies, protection using Firewall.

India IT Act, Cyber Law, Cyber Crimes, IPR issues, hacking.

Introduction To Web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup Language (XML); Hyper Text Transfer Protocol (HTTP); Domain Names; URL; Website, Web browser>. Web Servers;Web Hosting, Web Scripting - Client side (VB Script, Java Script, PHP) and Server side (ASP, JSP, PHP), web 2.0 (for social networking)

CLASS, +2 2ND YEAR (PRACTICAL) - C++

Duration: 3 hours Total Marks : 30

1. Programming in C++

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

Logic : 7 Marks

Documentation/Indentation : 2 Marks

Output presentation : 3 Marks

Notes: The types of problem to be given will be of application type from the following topics

Arrays (One dimensional and two dimensional)

Class(es) and objects

Stack using arrays and or linked implementation

Queue using arrays (circular) and or linked implementation

Binary File operations (Creation, Displaying, Searching and modification)

Text File operations (Creation, Displaying and modification)

2. SQL Commands **05**

Five Query questions based on a particular Table / Relation to be tested practically on Computer during the examination. The command along with the result must be written in the answer sheet.

3. A digital circuit diagram (after reduction using k-map) to be given during the examination .The question must be written in the answer sheet. 02

4. Project Work 05

The project has to be developed in C++ language with Object Oriented Technology and also shouid have use of Data files. (The project is required to be developed in a group of 2-4 students)

Presentation on the computer

Project report (Listing, Sample, Outputs, Documentations)

Viva

*1 mark is for innovation while writing programme

5. Practical File 03+01*

Must have minimum 20 programs from the following topics

Arrays (One dimensional and two dimensional, sorting, searching, merging, deletion" & insertion of elements)
Class(es) and objects
Stacks using arrays and linked implementation
Queue using arrays & linked implementation (circular aslo).
File (Binary and Text) operations (Creation, Updation, Query)
Any computational Based problems
15 SQL commands along with the output based on any table/relation:

6. Viva Voce

Viva will be asked from syllabus covered in class +2 2nd year and the project developed by student.

Guidelines for Projects (Class +2 1st and 2nd year)

1. Preamble

1.1 The academic course in Computer Science includes on Project in each year. The Purpose behind this is to consolidate the concepts and practices imparted during the course and to serve as a record of competence.

1.2 A group of 2-3 students as team may be allowed to work on one project.

2. Project content

2.1 Project for class +2 1st year can be selected from the topics mentioned in the syllabus or domains on the similar lines.

2.2 Project for class +2 2nd year should ensure the coverage of following areas of curriculum:

a) Flow of control
b) Data Structure
c) Object Oriented Programming C++
d) Data File Handling

Theme of the project can be
Any subsystem of a System Software or Tool
Any Scientific or a fairly complex algorithmic situation
School Management, Banking, Library Information System, Hotel or Hospital Management System, Transport query system
Quizzes / Games;
Tutor, Computer Aided Learning Systems

2.3 It is suggested to prepare a bilingual (English and other Indian language) user manual part of project file.

2.4 The aim of the project is to highlight the abilities of algorithmic formulation, modular programming, optimized code preparation , systematic documentation and other associated aspects of software Development.