OPTIONAL SUBJECT - COMPUTER APPLICATION/SCIENCE

1. **Computer Organization and Architecture**

Von Neumann Architecture, Number representation and Computer arithmetic, Logic design of Digital Systems, Fundamental and advanced concepts of Logic Designs, Boolean Algebra & functions, Designing and synthesis of combinational and Sequential circuits, minimization techniques, Memory and CPU organization, DMA, I/O Interface, basic architecture of Indian super computer ‘PARAM’.

2. **Computer Programming**

Algorithms and Flowcharts: Problem analysis, algorithms, data assignments, flowcharts, stepwise refining, sequencing, alternation and Looping, programming languages.

C language: Representation of integers, real, characters, data types, constants, variable, arithmetic expression, assignments, conditional statement, control statements, simple I/O. Arrays, functions and procedures, parameter passing, Pointers.

3. **Object Oriented Programming Language**

Objects and Classes, Data encapsulation, Abstraction, Polymorphism, Inheritance, Access specifier, Abstract Data Types. Friend function, Operator overloading, nested class, Interfaces and Packages, Standard Java packages, Creating & using a package, adding a class to a package. Exception handling, multithreading, Applet Vs Application.

4. **Data Structures & Algorithms**

Stacks & queues, their array implementations, recursion stacks and recursive procedures. Linked list, Trees, Binary search tress, Tree and graph traversal, Spanning trees, Shortest paths, Hashing, Sorting, Searching , Merging, introduction to algorithm analysis for time and space.
5. **Computer Networks**


6. **Operating Systems**


7. **Data Base Management Systems**

Basic database concepts, Entity Relationship modelling, Relational data model and algebra, RDBMS; Database design, functional dependencies and normal forms (1NF, 2NF, 3NF, 4NF & BCNF), Structured query languages (SQL), File Structure (Sequential files, indexing), Transaction and Concurrency Control, Security, Privacy and authentication aspects in database.

8. **Web Technology**

Introduction to HTML, Tags and Attributes, Text Styles and Text Arrangements, Color and Background of Web Pages, Lists and their Types, Attributes of Image Tag. Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, concept of navigation, Different Section of a Page and Graphics, Footnote and e-Mailing, Creating Table, Frame, Form and Style Sheet. Dynamic HTML, Document Object Model, Features of DHTML, CSSP (Cascading Style Sheet Positioning) and JSSS (JavaScript assisted Style Sheet) , Front Page Basics , Web Terminologies, FTP, HTTP and WPP, Features, Front Page Views, Relating Front Page to DHTML.

9. **Software Engineering**

Software development Life Cycle and different SWDLC models, Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, planning and managing the project, Risk analysis, design, coding, testing, implementation, maintenance, Software verification and validation, CASE tools.
10.  **Numerical Methods**


**Note :- Pattern of Question Paper**

1. Objective type paper
2. Maximum Marks : 200
3. Number of Questions : 120
4. Duration of Paper : Three Hours
5. All questions carry equal marks.
6. There will be Negative Marking.