

**Unit-1:Introduction** Overview of database Management System; Various views of data, data Models, Introduction to Database Languages. Advantages of DBMS over file processing systems, Responsibility of Database Administrator,

**Unit-2:** Introduction to Client/Server architecture, Three levels architecture of Database Systems, E-R Diagram (Entity Relationship), mapping Constraints, Keys, Reduction of E-R diagram into tables.

**Unit-3: File Organisation:** Sequential Files, index sequential files, direct files, Hashing, B-trees Index files.

**Unit-4:** Relational Model, Relational Algebra & various operations, Relational and Tuple calculus.

**Unit-5: Introduction to Query Languages :**QLB , QBE, Structured query language – with special reference of (SQL of ORACLE), integrity constraints, functional dependencies & NORMALISATION – (up to 4<sup>th</sup> Normal forms), BCNF (Boyce – code normal forms)

**Unit-6:** Introduction to Distributed Data processing, parallel Databases, data mining & data warehousing, network model & hierarchical model, Introduction to Concurrency control and Recovery systems.

**Text Books:**

- Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3<sup>rd</sup> edition, 1997, McGraw-Hill, International Edition.
- Introduction to Database Management system by Bipin Desai, 1991, Galgotia Pub.

**Reference Books:**

- Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3<sup>rd</sup> edition, 2000, Addison-Wesley, Low Priced Edition.
- An Introduction to Database Systems by C.J. Date, 7<sup>th</sup> edition, Addison-Wesley, Low Priced Edition, 2000.
- Database Management and Design by G.W. Hansen and J.V. Hansen, 2<sup>nd</sup> edition, 1999, Prentice-Hall of India, Eastern Economy Edition.
- Database Management Systems by A.K. Majumdar and P. Bhattacharyya, 5<sup>th</sup> edition, 1999, Tata McGraw-Hill Publishing.
- A Guide to the SQL Standard, Date, C. and Darwen,H. 3rd edition, Reading, MA: 1994, Addison-Wesley.
- Data Management & file Structure by Looms, 1989, PHI

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

**Unit-1: Introduction:** Syntactic and semantic rules of a Programming language, Characteristics of a good programming language, Programming language translators compiler & interpreters , Elementary data types – data objects, variable & constants, data types, Specification & implementation of elementary data types, Declarations ,type checking & type conversions , Assignment & initialization, Numeric data types, enumerations, Booleans & characters.

**Unit-2: Structured data objects :** Structured data objects & data types , specification & implementation of structured data types, Declaration & type checking of data structure ,vector & arrays, records Character strings, variable size data structures , Union, pointer & programmer defined data objects, sets, files.

**Unit-3 : Subprograms and Programmer Defined Data Types:** Evolution of data type concept ,abstraction, encapsulation & information hiding , Subprograms ,type definitions, abstract data types.

**Unit-4: Sequence Control:** Implicit & explicit sequence control ,sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return ,recursive subprograms, Exception & exception handlers, co routines, sequence control .

**Unit-5: Data Control:** Names & referencing environment, static & dynamic scope, block structure, Local data & local referencing environment, Shared data: dynamic & static scope. Parameter & parameter transmission schemes.

**Unit-6: Storage Management:** Major run time elements requiring storage ,programmer and system controlled storage management & phases , Static storage management , Stack based storage management, Heap storage management ,variable & fixed size elements.

**Unit-7: Programming Languages:** Introduction to procedural, non-procedural ,structured, functional and object oriented programming language, Comparison of C & C++ programming languages.

**Text Book:**

- Programming languages Design & implementation by T.W. .Pratt, 1996, Prentice Hall Pub.
- Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH,

**Reference Books:**

- Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia publications (Springer Verlag),
- Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.,
- Programming Languages – Principles and Pradigms Allen Tucker , Robert Noonan 2002, T.M.H.

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**Unit-1: Finite Automata and Regular Expressions:** Finite State Systems, Basic Definitions Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.

**Unit-2: Introduction to Machines:** Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Conversion of NFA to DFA by Arden's Method.

**Unit-3: Properties of Regular Sets:** The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm.

**Unit-4: Grammars:** Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

**Unit-5: Pushdown Automata:** Introduction to Pushdown Machines, Application of Pushdown Machines

**Unit-6: Turing Machines:** Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., PCP Problem.

**Unit-7: Chomsky Hierarchies:** Chomsky hierarchies of grammars, Unrestricted grammars, Context sensitive languages, Relation between languages of classes.

**Unit-8: Computability:** Basic concepts, Primitive Recursive Functions.

**Text Book:**

- Introduction to automata theory, language & computations- Hopcroft & O.D.Ullman, R Mothwani, 2001, AW

**Reference Books:**

- Theory of Computer Sc.(Automata, Languages and computation):K.L.P.Mishra & N.Chandrasekaran, 2000, PHI.
- Introduction to formal Languages & Automata-Peter Linz, 2001, Narosa Publ..
- Fundamentals of the Theory of Computation- Principles and Practice by RamondGreenlaw and H. James Hoover, 1998, Harcourt India Pvt. Ltd..
- Elements of theory of Computation by H.R. Lewis & C.H. Papaditriou, 1998, PHI.
- Introduction to languages and the Theory of Computation by John C. Martin 2003, T.M.H.

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

**Unit-1:** Introduction to C++, C++ Standard Library, Basics of a Typical C++ Environment, Pre-processors Directives, Illustrative Simple C++ Programs. Header Files and Namespaces, library files.

**Unit-2: Object Oriented Concepts :** Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable (public, protected, private, package), Other Modifiers, Polymorphism: Overloading,, Inheritance, Overriding Methods, Abstract Classes, Reusability, Class's Behaviors.

**Unit-3: Classes and Data Abstraction:** Introduction, Structure Definitions, Accessing Members of Structures, Class Scope and Accessing Class Members, Separating Interface from Implementation, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors, Using Default Arguments With Constructors, Using Destructors, Classes : Const(Constant) Object And Const Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using This Pointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Container Classes And Integrators, Proxy Classes, Function overloading.

**Unit-4: Operator Overloading:** Introduction, Fundamentals of Operator Overloading, Restrictions On Operators Overloading, Operator Functions as Class Members vs. as Friend Functions, Overloading, <<, >> Overloading Unary Operators, Overloading Binary Operators.

**Unit-5: Inheritance:** Introduction, Inheritance: Base Classes And Derived Classes, Protected Members, Casting Base- Class Pointers to Derived- Class Pointers, Using Member Functions, Overriding Base – Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived –Class Object To Base- Class Object Conversion, Composition Vs. Inheritance.

**Unit-6: Virtual Functions and Polymorphism:** Introduction to Virtual Functions, Abstract Base Classes And Concrete Classes, Polymorphism, New Classes And Dynamic Binding, Virtual Destructors, Polymorphism, Dynamic Binding.

**Unit-7: Files and I/O Streams:** Files and Streams, Creating a Sequential Access File, Reading Data From A Sequential Access File, Updating Sequential Access Files, Random Access Files, Creating A Random Access File, Writing Data Randomly To a Random Access File, Reading Data Sequentially from a Random Access File. Stream Input/Output Classes and Objects, Stream Output, Stream Input, Unformatted I/O (with read and write), Stream Manipulators, Stream Format States, Stream Error States.

**Unit-8: Templates & Exception Handling:** Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends, Templates and Static Members.

Introduction, Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception, Catching an Exception, Rethrowing an Exception, Exception specifications, Processing Unexpected Exceptions, Stack Unwinding, Constructors, Destructors and Exception Handling, Exceptions and Inheritance.

#### **Text Books:**

- C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
- Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.
- Programming with C++ By D Ravichandran, 2003, T.M.H

#### **Reference books:**

- Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill
- Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,
- The Complete Reference in C++ By Herbert Schildt, 2002, TMH.

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## **CSE-208 E**

## **Internet Fundamentals**

**Unit-1: Electronic Mail:** Introduction, advantages and disadvantages, Userids, Pass words, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Mime types, Newsgroups, mailing lists, chat rooms.

**Unit-2 : The Internet:** Introduction to networks and internet, history, Working of Internet, Internet Congestion, internet culture, business culture on internet. Collaborative computing & the internet. Modes of Connecting to Internet, Internet Service Providers(ISPs), Internet address, standard address, domain name, DNS, IP.v6.Modems and time continuum, communications software; internet tools.

**Unit-3 : World Wide Web :** Introduction, Miscellaneous Web Browser details, searching the www: Directories search engines and meta search engines, search fundamentals, search strategies, working of the search engines, Telnet and FTP.  
Introduction to Browser, Coast-to-coast surfing, hypertext markup language, Web page installation, Web page setup, Basics of HTML & formatting and hyperlink creation.  
Using FrontPage Express, Plug-ins.

**Unit-4: Languages:** Basic and advanced HTML, java script language, Client and Server Side Programming in java script. Forms and data in java script, XML basics.

**Unit-5 : Servers :** Introduction to Web Servers: PWS, IIS, Apache; Microsoft Personal Web Server. Accessing & using these servers.

**Unit-6: Privacy and security topics:** Introduction, Software Complexity, Encryption schemes, Secure Web document, Digital Signatures, Firewalls.

### **Text Book:**

- Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp – 2001, TMH
- Internet & World Wide Programming, Deitel,Deitel & Nieto, 2000, Pearson Education

### **Reference Books:**

- Complete idiots guide to java script,. Aron Weiss, QUE, 1997
- Network firewalls, Kironjeet syan –New Rider Pub.
- [www.secinf.com](http://www.secinf.com)
- [www.hackers.com](http://www.hackers.com)
- Alfred Glkossbrenner-Internet 101 Computing MGH, 1996

**Note:** Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

**Unit-1: Basic Principles:** Boolean algebra and Logic gates, Combinational logic blocks(Adders, Multiplexers, Encoders, de-coder), Sequential logic blocks(Latches, Flip-Flops, Registers, Counters)

**Unit-2: General System Architecture:** Store program control concept, Flynn's classification of computers (SISD, MISD, MIMD); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS.

**Unit-3: Instruction Set Architecture:** Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086 ; simulation using MSAM.

**Unit-4: Basic non pipelined CPU Architecture:** CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage); microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining.

**Unit-5: Memory Hierarchy & I/O Techniques:** The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations).

**Unit-6: Introduction to Parallelism:** Goals of parallelism (Exploitation of concurrency, throughput enhancement); Amdahl's law; Instruction level parallelism (pipelining, super scaling – basic features); Processor level parallelism (Multiprocessor systems overview).

**Unit-7: Computer Organization [80x86]:** Instruction codes, computer register, computer instructions, timing and control, instruction cycle, type of instructions, memory reference, register reference. I/O reference, Basics of Logic Design, accumulator logic, Control memory, address sequencing, micro-instruction formats, micro-program sequencer, Stack Organization, Instruction Formats, Types of interrupts; Memory Hierarchy.

**Text Books:**

- Computer Organization and Design, 2<sup>nd</sup> Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
- Computer Architecture and Organization, 3<sup>rd</sup> Edi, by John P. Hayes, 1998, TMH.

**Reference Books:**

- Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall Upper Saddle River, New Jersey
- Computer Organization, 5<sup>th</sup> Edi, by Carl Hamacher, Zvonko Vranesic,2002, Safwat Zaky.
- Structured Computer Organisation by A.S. Tanenbaum, 4<sup>th</sup> edition, Prentice-Hall of India, 1999, Eastern Economic Edition.
- Computer Organisation & Architecture: Designing for performance by W. Stallings, 4<sup>th</sup> edition, 1996, Prentice-Hall International edition.
- Computer System Architecture by M. Mano, 2001, Prentice-Hall.
- Computer Architecture- Nicholas Carter, 2002, T.M.H.