SYLLABUS

M.Sc. – I.T. 1st Year
<table>
<thead>
<tr>
<th>M.Sc.IT</th>
<th>1st Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper I</td>
<td>Computer Organization &amp; Architecture</td>
</tr>
<tr>
<td>Paper II</td>
<td>Data Communications and Computer Networking</td>
</tr>
<tr>
<td>Paper III</td>
<td>Programming in C and Data Structure</td>
</tr>
<tr>
<td>Paper IV</td>
<td>Object Oriented Programming in C++</td>
</tr>
<tr>
<td>Paper V</td>
<td>Advanced DBMS, Oracle</td>
</tr>
<tr>
<td>Paper VI</td>
<td>Visual Basic</td>
</tr>
<tr>
<td>Paper VII</td>
<td>Discrete Mathematics</td>
</tr>
</tbody>
</table>
M.Sc. IT – Ist Year
Paper - I
COMPUTER ORGANISATION & ARCHITECTURE

UNIT-I


Data Representation: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes.

UNIT-II

Register Transfer and Microoperations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit.

Basic Computer Organisation and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.

UNIT-III


Microprogrammed Control: Control Memory, Address Sequencing, Microprogram Example, Design of Control Unit.

UNIT-IV

Central Processing Unit: Introduction, General Register Organisation, Stack Organisation, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.


UNIT-V

Memory Organisation: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Paper-II
Data Communication and Computer Networking

UNIT-I

UNIT-II

UNIT-III

UNIT-IV


UNIT-V


Paper-III
Programming in C and Data Structure

UNIT-I
Introduction: Introduction to Algorithm, Abstract Data type and Data Structure, Analysis of Algorithm, Asymptotic of Notation, verification of algorithm.

Arrays: Introduction, ordered list & arrays, 2-dimensional array, Representation of polynomials, sparse, matrix representation, representation of multidimensional array.

UNIT-II
Linked Lists: Introduction, Implementation of linked list, Data type Structure using pointer data types, Doubly linked list, circular list, array representation of linked lists, Dynamic Memory Management, shared & recursive lists.

Stacks And Queues: Introduction, array representation, linked list representation of stacks and queues, application of stack, application of queue.
UNIT-III

**Strings:** Introduction, strings as an ADT, representation of string, string searching algorithms.

**Recursion:** Introduction, simple recursion and recursion free, divide and conquer, tower of Hanoi, permutation generation, removal of recursion.

UNIT-IV

**Trees:** Introduction, Definition, Binary Tree, Array representation, Binary Tree Traversal, properties of Binary Tree, Binary Search Tree.

**Advanced Trees:** Introduction, AVL Tree, insertion, deletion from an AVL Tree, B-Trees, Definition, Searching a B-tree, insertion deletion from B-Tree, priority queues, heaps, construction of Heaps.

UNIT-V

**Searching And Sorting:** Introduction, sequential search linear search, binary search, internal sorting, sorting methods, shuttle sort, straight insertion sort shell sort, simple selection sort, straight selection sort bubble sort, quick sort, merge sort, heap sort, hashing, hash function.

**Elementary Graphs:** Introduction, definition, representation, traversal of graphs, shortest path.

**Paper-IV**

**Object Oriented Programming in C++**

UNIT-I

**Principles of Object-Oriented Programming:** Software Crises, Software Evolution, A Look at Procedure-Oriented Programming, Object-Oriented Programming Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of OOP, Object-Oriented Languages, Applications of OOP

**Beginning With C"++:** What is C++ ?, Applications of C++ Simple C++ Program, More C++ Statements, An Example with Class, Structure of C++ Program, Creating the Source File, Compiling and Linking

**Tokens, Expressions and Control Structures:** Introduction, Tokens, Keywords, Identifiers and Constants, Basic Data Types, User-Defined Data Types, Derived Data Types, Symbolic Constants, Type Compatibility, Declaration of Variables, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operator, Expressions and Their Types, Special Assignment Expressions, Implicit Conversions, Operator Overloading, Operator Precedence, Control Structures.

UNIT-II

**Functions In C++:** Introduction, The Main Function, Function Prototyping, Call by Reference, Return by Reference, Inline Functions, Default Arguments, const Arguments, Function Overloading, Friend and Virtual Functions, Math Library Functions.

**Classes and Objects:** Introduction, C Structures Revisited, Specifying a Class. Defining Member Functions, AC++ Program with Class, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Objects as
UNIT-III

Constructors and Destructors: Introduction, Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructors, constructing Two-Dimensional Arrays, const Objects, Destructors.


UNIT-IV

Inheritance: Extending Classes: Introduction, Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Member Classes: Nesting of Classes

Pointers, Virtual Functions and Polymorphism: Introduction, Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

Managing Console I/O Operations: Introduction, C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, Managing Output with manipulators

UNIT-V


Paper-V

Advanced DBMS ORACLE

UNIT-I


Relational Databases: Background, Basic Structure, Set Operations, Aggregate Functions, Null Values, Nested Subqueries, Views, Complex Queries, Modifications of the Database, Jointed Relations, Data-Definition Language, Embedded SQL, Other SQL Features
UNIT-II

Other Relational Languages: Query-by-Example, Datalog, User Interfaces and Tools

Integrity and Security: Domain Constraints, Referential Integrity, Assertions, Triggers, Security and Authorization, Authorization in SQL, Encryption and Authentication

Relational-Database Design: First Normal Form, Pitfalls in Relational-Database Design, Functional Dependencies, Decomposition, Desirable Properties of Decomposition, Boyce-Codd Normal Form, Third Normal Form, Fourth Normal Form, More Normal Forms, Overall Database Design Process

Object-Based Databases: Object-oriented Databases: Need for Complex Data Types, The Object-Oriented Data Model, Object-Oriented Languages, Persistent Programming Languages, Persistent C++ System, Persistent Java Systems

UNIT-III

Object-Relational Databases: Nested Relations, Complex Types, Inheritance, Reference Types, Querying with Complex Types, Functions and Procedures, Object-Oriented versus, Object-Relational


Data Storage and Querying: Storage and File Structure, Overview of Physical Storage Media, Magnetic Disks, RAID, Tertiary Storage, Storage Access, File Organization, Organization of Records in Files, Data-Dictionary Storage, Storage for Object-Oriented Databases.

UNIT-IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Index Definition in SQL, Multiple-key Access

Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions


Transaction Management: Transactions, Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Transaction Definition in SQL, Testing of Serializability

UNIT-V

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocol, Validation-Based Protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations, Weak Levels of Consistency, Concurrency in Index Structures


Database System Architecture:

Database System Architectures: Centralized and Client-Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types
Distributed Databases: Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, Directory System


**Paper-VI**

**Visual Basic**

**UNIT-I**

Getting Started with Visual Basic 6: Visual Basic Development Overview Designing and building the User, Interface, Writing Code That Responds to Events, Creating and Calling Other Procedures as Needed, Testing and Debugging, Converting to Runtime Version, Preparing a Distributable Set of Files, Creating Your First Visual Basic program, A simple Project, Creating the Project, Adding Controls to the Form, setting Control Properties, Writing Event-Driven Code, Testing and Debugging the Sample Application, Converting Sample Application to Runtime

**Understanding Visual Basic Projects:** Using Different Types of Projects, Understanding the Project Explorer Window, Working with Multiple Projects, Setting Project Options,

**Visual Basic Code Basics:** Understanding Visual Basic Procedures, Using the Visual Basic Editor, Using Keyboard and Mouse, Understanding Editor Options, Controlling Program Flow

**UNIT-II**

**Using Visual Basic Variables:** Taking a Look at an Example, Understanding Visual Basic Data, Declaring Variables, Comparing Implicit and Explicit, Providing Names for your, Using a Naming Convention, Understanding Variable Scope and, Converting Between Data Types, Working with Arrays, Understanding the Variant Data, Passing Variables to Procedures, Using Constants, User-Defined Data Types

**Designing the User Interface:** Understanding the Visual Basic, Form, Getting the Look and Feel of Windows, Creating your First Form, Adding New Forms, Understanding form Properties, form Appearance Properties, Form Control Properties, Form size and Positioning Properties, More Form Properties, Other Form Properties, Referencing Form Properties, Setting Properties in Code, Positioning the Form with Methods, Using Form Drawing Methods, Showing and Hiding Forms, Loading Forms, Unloading Forms, Understanding Form Events, Form Maintenance Events, Form Mouse Events, Form Keyboard Events, Making the Most Built-In Dialog Boxes, Understanding MDI Applications, Wrapping up Forms

**UNIT-III**

**Putting Your Forms to Work with Controls:** Getting to Know the Toolbox, Getting to Know the Visual Basic Tools, Customizing the Toolbox, adding Controls to Forms, Using the Alignment Grid, Multiselecting Controls, Form Layout Functions, Control Properties, Displaying a Check Box, Providing Mutually Exclusive, Using the Frame Control, Entering Text, Drawing Shapes and Displaying Pictures, Selecting Files, Colors, Fonts, Printers, and Help, Generating Timed Events, Passing a Control as an Argument, Determining the Type
of Control, Using the Controls Collection, Setting Tab Order, Binding Controls, Dragging and Dropping, Handling Keyboard Events, Handling Mouse Events

**Mastering Menus and Toolbars:** Understanding menus, Using the Menu Editor, Menu Arrays, Applying Menu Conventions, Using Pop-up Menus, Configuring Menus at Runtime, Understanding Toolbars, Finding the Perfect Icons, adding Toolbars to Your Application, Customizing the Toolbar, Configuring the Toolbar at Runtime, Handling Toolbar Events, Running the Menu and Toolbar Demo Program

**UNIT-IV**

**Using the Visual Basic Debugging Tools:** Finding Errors, Using the Module Options, Traditional Debugging Techniques, Using the Visual Basic Debugging Tools, Using the Debug Toolbar, Suspending Execution with Breakpoints, Stepping Through Code, Controlling Program Flow, Getting to Know the Debugging Windows, Using the Call Stack

**Handling Runtime Errors:** Recognizing Runtime Errors, Trapping Errors in Visual Basic Applications, using the Err Object, Using the Err Number Property Displaying More Helpful Information, Knowing Which Errors to Trap, Using the resume Statement, Using on Error Go To, Handling Errors Locally, Logging Errors

**Reading and Writing Text Files:** Understanding Text Files, Downloading the Data, Reviewing Database Terminology, Looking at Text File Formats, Understanding Data Access, Methods, Opening Text Files, Reading Fixed-Width Text Files, Taking a Closer Look at File Operations, Deleting Files, Outputting Fixed-Width Data to a File, Looking at Other File Operations, Deleting Files, Listing the Contents of a Folder, Detecting the End of a File, Copying a File, Determining the size of a Closed File, Determining the Size of an Open File, Getting a File’s Attributes, Setting a File’s Attributes

**UNIT-V**

**Mastering the Visual Basic Data Control:** Introducing the Data Control, Using the Data Control, Understanding the Data Control Properties, Knowing the Current Record, Using Data-Bound Controls, Manipulating the Data Control at Runtime, Programmed Access Using Events, navigating the Data Control in Code

**Creating Queries in Visual Basic:** Defining SQL, Using the SELECT Statement, Accessing Multiple Tables, Adding Calculated Fields, Specifying the Filter Criteria, Aggregating the Data, Grouping the Data, Using SQL Statements with the Data Control.
UNIT-I

Relations: Introduction, Product Sets, Relations, Pictorial Representations of Relations, Composition of Relations, Types of Relations, Closure Properties, Equivalence Relations, Partial Ordering Relations, n-ary Relations.


UNIT-II


UNIT-III
Graph Theory: Introduction, Data Structures, Graphs and Multigraphs, Subgraphs, Isomorphic and Homeomorphic Graphs, Paths, Connectivity, The Bridges of Konigsberg, Traversable Multigraphs, Labeled and Weighted Graphs, Complete, Regular and Bipartite Graphs, Tree Graphs, Planar Graphs, Graph Colorings, Representing Graphs in Computer Memory, Graph Algorithms.


UNIT-IV
Properties of the integers: Introduction, Order and Inequqlities, Absolute value, Mathematical Induction, Division Algorithm, Divisibility, Primes, Greatest Common Divisor,
Euclidean Algorithm, Fundamental Theorem of Arithmetic, Congruence Relation, Congruence Equation.


**UNIT-V**

**Languages, Grammars, Machines** : Introduction, Alphabet, Words, Free Semigroup, Languages, Regular Expressions, Regular Languages, Finite State Automata, Grammars, Finite State Machines, Godel Numbers, Turing Machines, Computable, Functions.

**Ordered sets and Lattices** : Introduction, Ordered sets, Hasse Diagrams of Partially Ordered Sets, Consistent Enumeration, Supremum and Infimum, Isomorphic (Similar) Ordered Sets, Well-ordered Sets, Lattices, Bounded Lattices, Distributive Lattices, Complements, Complemented Lattices.

**Boolean Algebra** : Introduction, Basic Definitions, Duality, Basic Theorems, Boolean Algebras as Lattices, Representation Theorem, Sum-of-Products Form for Sets, Sum-of-Products, Form for Boolean Algebras, Minimal Boolean Expressions, Prime Implicants, Logic Gates and Circuits, Truth Tables, Boolean Functions, Karnaugh Maps.

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