Syllabus

of

Master of Science

(Computer Science)

(Two Years Post Graduate Course)
M.Sc. (Computer Science) - I  
SEMESTER - I  
PAPER-1: DISCRETE MATHEMATICAL STRUCTURE  
(1MSc1)  

Unit-I: (Fundamental and Mathematics Logic)  
**Fundamental:** Sets and Subsets, Operations on Sets, Sequence, Properties of Integer, Matrices.  
**Logic:** Proposition and Logical Operation Conditional Statements, Methods of Proof, Mathematical Induction,  
**Mathematics Logic:** Statements and Notation, Connectives ,Normal forms ,The Theory of Interface for The Statement Calculus ,Inference Theory of The Predicate Calculus,  

Unit-II: (Counting, Relation and Diagraph, Function)  
**Counting:** Permutation, Combination, Pigeonhole Principle, and Recurrence Relations.  
**Relational and Diagraphs:** Product Sets and Partitions, Relations and Digraphs, Paths in Relations and Digraphs Properties of Relations, Equivalence Relations, Computer Representation of Relations and Digraph, Manipulation of Relations, Transitive Closure.  
**Functions:** Definition and Introduction, Function for Computer Science, Permutation Functions,  

Unit-III: (Graph Theory, Boolean and Tree)  
**Graph Theory:** Basic Concept of Graph Theory, Euler Paths and Circuits, Hamiltonian Paths and Circuits. Other Relations and Structure- Partially ordered Sets, Lattices Finite.  
**Boolean:** Algebra, Functions of Boolean Algebras, Boolean Function as Boolean Polynomials.  
**Tree:** Introduction Undirected Tree, Minimal Spanning Trees.  

Unit-IV: (Semigroup and Groups)  
**Semigroups and Groups:** Binary Operations Revisited Semigroups, Products and Quotations of Groups. Introduction to Computability, Languages Finite State Machines, Semigroup, Machines and Language.  

Books:  

References:  
M.Sc. (Computer Science) - I  
SEMMESTER - I  
PAPER-2: ADVANCED JAVA  
(1MSc2)

Unit-I: (Introduction of Java with OOPs Concepts)

**Introduction of Java:** Java and Internet, Features of Java, Oops Concepts of Java, Data Types, Operators, Variables and Arrays **Classes:** Declaring Objects, Methods, Constructor, Overloading Constructor, Garbage Collection, Finalize() Method, Uses of Static and Final Variable, Command Line Argument, Uses of Packages.

**Exception Handling:** Uncaught Exception, Try -Catch Block, Multiple Catch, Nested Try, Throw, Throws, Finally, Built-in and User- Defined Exception.

**Multithreading:** Life Cycle, Thread Class and Runnable Interface, Type Priorities, Synchronization and Interthread Communication

Unit-II: (Classes and Package)

**Classes:** Wrapper Classes, **Applet:** Applet Class, Architecture, Life Cycle, Display Methods, HTML Applet Tag, And Passing Parameter to Applet. **AWT:** Working with Windows, Controls, Layout Manager, and Menus. Introduction of Swings and Event Handling. **Networking:** The Java.Net Package, Connection oriented Transmission, Stream Socket Class, Creating a Socket to a Remote Host on a Port (Creating TCP Client and Server)

Unit-III: (JDBC ODBC)

**Database Programming:** Design of JDBC, JDBC Configuration, Types of Drivers, Executing SQL Statements, Query Execution, Scrollable and Updatable Result Sets, Rowset,Metadata, Transactions

**Collections:** Introduction to The Collection Framework (Interfaces, Implementation and Algorithms), Interfaces, **Collection Classes:** Set, List, Queue and Map, **Set:** Hash set, Tree set, and Linked hash Set, Interfaces Such As Lists, Set, Vectors, Linked list, Comparator, Iterator, Hash, Tables.

Unit-IV: (JSP and Servlet)

**Servlet:** Introduction to Servlet(Http Servlet),Life Cycle of Servlet, Handling Get and Post Request(Http),Data Handling Using Servlet, Creating and Cookies, Session Tracking Using Http Servlet, **JSP:** Getting Familiar with JSP Server, First JSP, Adding Dynamic Contents Via Expressions Scriptlets, Mixing Scriptlets and HTML, Directives, Declaration, Tags and Session.

**Books:**

**References:**
M.Sc. (Computer Science) - I
SEMESTER - I
PAPER-3: DIGITAL ELECTRONICS AND EMBEDDED SYSTEM
(1MSc3)

UNIT -I: Introduction
Number System and Codes – Introduction Number System, Binary Number System, Signed Binary Numbers, Binary Arithmetic’s, 1’s Compliment, 2’s Compliment.

UNIT -II: Combinational Logic & Flip-Flops

UNIT -III: Introduction to Embedded Systems

UNIT -IV: Real Time Operating Systems

Books :

Reference :
M.Sc. (Computer Science) - I
SEMESTER - I
PAPER-4: DATA WAREHOUSING AND SQL SERVER
(1MSc4)

Unit I: (Data Warehousing and OLAP)
Introduction to Data Warehousing: Characteristics of a Data Warehouse, Data Warehouse Architectural Strategies, Design Considerations, Data Content, Building a Data Warehouse, Metadata, Tools for Data Warehousing, Performance Considerations, Crucial Decisions in Designing a Data Warehouse, Different Case Studies. Various Technological Considerations: OLTP and OLAP Systems, Data Modeling, Categories of OLAP Tools, Managed Query Environment (MQE), OLAP Tools and The Internet.

Unit II: (Data Mart and Data Mining Tools)
Data Mart: Data Mart, Type of Data Mart, Loading a Data Mart, Metadata for a Data Mart, Data Model for a Data Mart, Software Component for a Data Mart, Tables in Data Mart, Security in Data Mart. Data Mining and Tools: Introduction, From Data Warehouse to Data Mining, Steps of Data Mining, Data Mining Algorithm, Database Segmentation, Predictive Modeling, Link Analysis, Tools for Data Mining.

Unit III: (SQL Server, Components and Queries)

Unit IV: (Data Integrity, User Security and Concurrency Control)

Books:

References:
M.Sc. (Computer Science) - I
SEMESTER - II
PAPER-1: THEORY OF COMPUTATION AND SYSTEM PROGRAMMING
(2MSc1)

Unit-I: (Finite Automation and Regular Expression)


Unit-II: (Push Down Automata and Turing Machine)


Turing Machine: Introduction, The Turing Machine Model, Computable Languages and Functions, Techniques Turing Machine Construction, Modification of Turing Machines, Church’s Hypothesis, Turing Machine As Enumerators, Restricted Turing Machine Equivalent to The Basic Model.

Chomsky: Regular Grammars, Unrestricted Grammars, Context Sensitive Languages, Relation between Classes of Languages.

Unit-III: (Introduction to Device Drivers)


Unit-IV: (Assembly and Machine Languages)


Loaders and Linkers: Loading Schemes, Linking, Relocation and Program Relocation.

Books:
3. John E. Hoperott and Jeffery D.Ullman, “Introduction to Automata Theory, Languages and Computation”.

References:
M.Sc. (Computer Science) - I
SEMESTER - II
PAPER-2: EVENT DRIVEN PROGRAMMING WITH VB.NET
(2MSc2)

Unit –I: (Introduction to.Net)
Introduction to .Net Framework, Basic Functionality of CLR, MSIL, About Platform
Independency, Language Interoperability, CTS and CLS, .Net Languages, Assemblies,
Garbage Collection, Architecture of GC and Application Domain

Unit - II: (Visual Studio.Net)
WPF Designer and Windows form Integration, Multi-Framework Targeting, Better Intelligent
Support, Refactoring and Enhancements, Visual Studio Split View, Debugging The .Net Source
Code
VB.Net Language: Features of VB.Net, Writing Programs in VB.Net, Compiling and Execution
from Command Prompt
Data Types, Expressions and Operators: Option Statements, Basic Element of Programming
(Data types, Variable, Constant, Control Flow Statement), Type Casting, Boxing and Unboxing,
Built-in Functions in VB.Net, Sub Programs and Working with Arrays

Unit -III: (Object oriented Programming with VB.Net)
Principles of OOP, Data Encapsulation, Data Abstraction, Properties, Method Overloading,
Constructors, Inheritance, Overloading and Overriding, Shadowing, Abstract Classes and Sealed
Class, Polymorphism, Delegate- Unicast and Multicast, Events, Collections, Directories, Strings,
String Builders, Attributes, Namespaces and Generics
Windows Applications: Introduction to System.Windows.forms.Dll, Basic Controls and Event
Driven Programming, Programming with Advanced Controls. Windows Control Library
Error Handling: Structured Error Handling, Error Categories, Debug and Trace Classes, Code
Optimization, Testing Phases and Strategies

Unit - IV: (Data Access with ADO.Net)
Introduction to Access Libraries DAO,RDO,ADO, Limitation of ADO, ADO.Net Objects and
Usage, ADO.Net Managed Providers, Data Reader, Data Adapter and Dataset, Data Relation and
Dataset, Data Binding, Connected and Disconnected Environments, Connection Pooling,
ADO.Net Exceptions, Using Stored Procedures, N-Tier Database Application, ADO.Net and
XML. File Stream, Windows Services, Crystal Reports

Books:
1) David I. Schneider, “an Introduction to Programming Using Visual Basic .Net”, PHI,
   ISBN-81-203-2159-6
3) Mastering Crystal Report, BPB.

References:
   049511-4
2) Anne Prince and Doug Lowe, “March’s VB.Net Database Programming with ADO.Net”.
3) Crystal Report – The Complete References, TMH
Unit-I: (Data Communication)

Unit-II: Data Communication Networking

Unit-III: (Communication Architecture)

Unit-IV: (Digital Network)

Book:

Reference:
M.Sc. (Computer Science) - I  
SEMESTER - II  
PAPER-4: (ELECTIVE-I): PATTERN RECOGNITION  
(2MSc4.1)

Unit-I: (Introduction to Pattern Recognition, Bayesian Decision Theory)

Introduction to Pattern Recognition, Bayesian Decision Theory: Classifiers, Discriminates, Functions, Decision Surfaces, Normal Density and Discriminates Functions, Discrete Features

Unit-II: (Maximum Likelihood and Bayesian Estimation)


Unit-III: (Non-Parametric)


Unit-IV: (Multilayer Neural Network)

Multilayer Neural Network: Feed forward Classification, Back Propagation Algorithm, Error Surface Stochastic Data: Stochastic Search, Boltzmann Learning, Evolutionary Method and Genetic Programming. Metric Methods for Pattern Classification: Decision Trees, Classification and Regression Trees (Cart) and Other Tree Methods, String Recognition and Rule Based Method. Unsupervised Learning and Clustering : Mixture Densities and Identifiability, Maximum Likelihood Estimation, Application Normal Mixture, Unsupervised Bayesian Learning, Data Description and Clustering, Hierarchical Clustering, Graph Theory Method, Problem of Validity, Component Analysis

Books:


References:

M.Sc. (Computer Science) - I
SEMESTER - II
PAPER-4: (ELECTIVE-I): SCRIPTING LANGUAGE AND INFORMATION RETRIEVAL
(2MSc4.2)

Unit- I: (HTML and Linking)
HTML - Introduction to HTML, Creating HTML Documents, Creating Web Pages with HTML
Inline Images: Images Size Attributes, Inline Images, Alternate Text Images, Images a
Hyperlink Frames and Tables: Table Row and Columns, Creating Simple Tables, Spanning Row and Columns with HTML Tables, Spanning Rows and Columns, Table Alignment Properties. Forms: Field Types, How to Build a form, Connectivity with oracle or Access.

Unit-III: (VB Script)
Introduction VB Script: Evolution of Scripting Language, Introduction to VB Script, Features of VB Script, Data Types in VB Script, Elements of VB Script: Identifiers, Operators, Control Statements, Control Structure,
Functions: Variant Function, Math Function, formatting Function, String Manipulation Function, Type Conversion Methods Supported by VB Script, Arrays in VB Script, Regular Expression

Unit-II: (Java Script)

Unit-IV: (Information Retrieval)

Books:

References:
Unit-I: (Mobile Communications)

Unit-II: (Wireless Medium Access Control and CDMA Based Communication)

Unit-III: (Databases)

Unit-IV: (Mobile Devices Server and Management)

Books:

References: