Madhya Pradesh Bhoj (Open) University
M. Sc. CS (Final Year)
Syllabus for the Session 2006-07

Data Communication and Computer Networks

Unit – I

Fundamentals of Data Communication : Analog Versus Digital, Fundamentals of Data Transmission Communication Modes Transmission System, Synchronous System, **Communication Channnels-Modems** : Classification of Modems Modem Based on Range Modems Based on Line Modems Based on Operation Mode Modems Based on Synchronization Modems Based on Modulation.

Data Transmission Protocol : Protocols An Overview of Networking The Role of Computer Networks in Development, **Transmission Media** : Introduction Transmission Concepts and Terms Master Sites Interconnection to Telephone.

Unit – II

Local Area Network : Local Area Network Baseband Versus Broadband LAN Hardware LAN Operating Systems.

Implementing LAN : Implementation of LAN Using Fiber-Optic Cables Implementation of LAN Using Wireless Technology Fast LANs Non-standard LANs.

Extending LAN : Transmission Concepts and Terms, Master sites, Interconnection to Telephone.

Unit – III

Data Transmission Network : Telephone Networks, Wan Technologies.

TCP/IP and the Internet : History of Internet, Internet2 Internet Services Standards for TCP/IP and the Internet RFCS and the TCP/IP Standardization Process.

Network Architectures and OSI, Network Architectures Layering the Communications Process The Need for Layered Solutions Open Systems Interconnection (OSI) Model. **Routing and Congestion Control :** Routing Concepts Routing in Wide Area Networks Hop-By-Hop versus Source Routing Congestion Control, Deadlocks. **Queueing Theory**: **Basic Design Techniques** : Basic Concepts, Queueing Model and Factors Traffic Theory Lost Call Rate.

Unit – IV

Wide Area Network : Introduction Network Using WAN and Network Services Communication Protocols Over WAN.

Transmission Control Protocol/Internet Protocol (TCP/IP) : LAN Protocol and OSI TCP/IP Protocol Data Transmission by TCP and Ethernet Data Encapsulation Data Routing TCP/IP Services and Application Protocols.

Data Link Layer Address : Physical Address. **Naming, Addressing, and Routing :** Network Layer Addresses Subnet Address Resolution Protocol (ARP) Domain Name System (DNS).

Unit – V

Broadband Network Local Loop Technologies Asymmetric Digital Subscriber Line (ADSL) High Bit-Rate Digital Subscriber Line (HDSL), Line Coding Techniques Wireless Local Loop (WLL). **Security** : Basic Requirements of Network Security, Security Levels Data Security Invalid Access/ Possibility of Eavesdropping Firewalls (Access Control) Encryption Security Against Remote Access. **Electronic Mail and other Internet Services :** Electronic Mail E-Mail Addresses Format of **A Mail Message** Some Important Features of E-Mail Services Available on The Internet, **Electronics Commerce and EDI**, Electronic Commerce Internet: A Tool for Electronic Commerce Electronic Data Interchange (EDI), Implementing EDI - Major Considerations User Characteristics and Electronic Commerce , Issues in Electronic Commerce.

MCS-13 Object Oriented Programming With C++

Unit – I

Object Oriented Paradigms and Metaphors : Basic Concepts of Object-oriented Programming Objects What is C++? A Simple C++ Program Initialization Input with C in Tokens Control Statements Decisions Nesting Type Conversion.

Data Types Operators and Expressions. Tokens Basic Data Types Constants User Defined Data Types Derived Data Types Declaration of Variables Operations and Expressions Operator and Function Overloading Manipulation of Strings Using Operators Polymorphism Streams.

Unit – II

Function in C++ : The Main Function Passing Arguments to Function Returning Values From Functions Overload Functions Inline Functions Default Arguments, **Class and Objects** The Concept of a Class, Classes Versus Objects.

Unit – III

Constructor and Destructor : Constructors, Destructors, Constructors of the String Class, String Class Assignment ,String Access Operators and Method.

Operator Overloading Type Casting

Unit – IV

Inheritance : Derived Class Relationships Superclass/Subclass Multiple Inheritence Constructors, Destructors, and Inheritance Hierarchical Inheritance Hybrid Inheritance Virtual Base Classes.

What Are Pointers? C++ Memory Map Free Store Pointers and Arrays Reserving Dynamic Memory Freeing Dynamic Memory Polymorphism Virtual Functions Pure Virtual Functions Early vs. Late Binding.

Unit – V

Input-Output in C++ : Old Vs. Modern C++I/O C++ Streams Creating Inserters Creating Extractors Creating Manipulator Functions.

File Handling in C++ Classes for File Stream Operations Opening and Closing A File Manipulations of File Pointers Random Access Command-Line Arguments. Standard Library Objects The Container Classes Theory of Operation Vectors Lists Maps Algorithms The String Class.

Software Engineering

Unit – I

Introduction to Software and Software Engineering: The Origin of Software Engineering, Characteristics of Software Engineering, Software Crisis, **Software Engineering: Models** : Life Cycle Model, Spiral Model, Models of the Software Process

Unit- II

Software Engineering Methodologies: Software Process, Software Metrics, **Configuration Management Issues** : Organizing the Process.

Unit – III

Software Requirement Analysis and Specification : Requirements Definition, Nonfunctional Requirements Definition, Formal Specification, Algebraic Specification, Model-based Specification, Z Schemas, Specification using Functions, Specification using Sequences, Validation, The Prototyping Process, Prototyping Techniques

Unit- IV

Principles of Software Project Management : Principles of Software Project Management, Principles or Laws of Project Management, Software Project and Personnel Planning, Cost Estimation of Building a System, Software Metrics, The Project Plan, Resource Tracking and Stimulation Example, Quality Assurance Planning, Risk Analysis

Unit - V

Software Design : Top-down Design, Systems Design, Design Decomposition, Software Design Quality, Design Description Languages, User Interface Design, User Interface Design Objectives, Function-oriented Design, Data-flow Diagrams, Structure Charts, Data Dictionaries, Deriving Structure Charts, Design Example, Concurrent Systems Design, Object-oriented Design, Inappropriate Object-oriented Design, Design Quality Assurance, Design Reviews, Design Quality Metrics, User Interface Evaluation, Verification and Validation, The Output Interface.

Optional Group I

Internet and Web Programming

UNIT - I

Introduction to Internet, Beginning of internet, Timeline of internet, How internet works, Components of internet - client/server, modem, cable, modem, backbone, router, IP addresses, address classes, dns names, subnet, udp, & TCP, ports, firewall Connecting to internet, Who owns the internet, Facilities available over internet - email, www, ftp, telnet, usenet, blog, rss, faq, caht, rfc IPv6, Virtual private network Mode of connectivity with internet, uses of internet.

UNIT - II

Introduction to www, what is www, Introduction to website, website structure, Uniform resource locator, home page Browser, uses of web site, Web site hosting, Registration process of domain name languages of web.

UNIT - III

HTML-Creating HTML Documents, Title and Headings, Paragraphs Linking to other Documents Relative Links versus Absolute Pathnames Links to Specific Sections in Documents Unnumbered Lists Numbered Lists Definition Lists Nested Lists Preformatted Text Text Tags Animated GIF Images Image Alignment Using an Image as Hypertext Link Embedding sound and video Frames.

UNIT - IV

JavaScript Introduction JavaScript Basics What We Can Do with JavaScript Embedding JavaScript in HTML Functions Using the JavaScript Console Using JavaScript Objects Window Methods Handling Events Using the Status Bar Validating Form Input Using Windows and Frames Creating a Frame Using JavaScript URLs javascript examples(programs).

UNIT - V

Active Server Pages (ASP) Introduction to ASP technologies Asp objects ActiveX components Vbscript Vbscript functions Working with databases HTTP status codes error codes Example of asp programms.

Programming in Java

Unit – I

The Genesis of Java, Introduction and Creation, Applets and Applications, Security, Bytecodes, Java Buzzwords, Simple, Multi-threaded, Architecture Neutral, Java and Java Script, New in JDK, **An Overview of Java**, What is an Object, Features of Object Oriented Programming, The First Simple Programme, Compiling. **Data Types, Variables and Arrays,** Data Types in Java, Literals, Characters, Variable Declaration, Symbolic Constants, Type Casting, Arrays, Vectors, Array Declaration Syntax, **Operating in Java**, Arithmetic Operators, Basic Assignment Operators, Relational Operators, Boolean Logical Operators, Ternary Operator, Operator Precedence, **Control Statements**, Java's Selection Statements, Switch, Nested Switch, Iteration Constructs, Continue, Return.

Unit - II

Class an Introduction, What is a Class, What are Methods, **Methods and Classes in Details**, Methods Overloading, Constructor Overloading, Objects as Parameters, Returning objects, Recursion, Access Control/ Visibility, Understanding Static, Final, Nested and Inner Classes, The String Class, Command Line Arguments, **Inheritance,** Inheritance Basic, Member Access and Inheritance, Super Class Variable and Sub Class Object, Using Super to Call Superclass Constructors, Another Use of Super, Multilevel hierarchy, Calling Constructor, Overriding Methods, Abstract Classes Method, Final and Inheritance, Object Class, **Interfaces and Packages**, Defining Interface, What is a Package, Classpath Variable, access Protection, Important Packages, **Exception Handling**, Fundamentals of Exception Handling, Types of Exceptions, Uncaught Exceptions, Try and Catch Keywords, Throw, Throws and Finally, Nested Try Statements, Java Built in Exceptions, User Defined Exceptions.

Unit – III

Multithreaded Programming, The Java Thread Model, Priorities, Synchronization, Messaging, Thread Class and Runnable Interface, Creation of Threads, Creating Multiple Threads, Synchronization and Deadlock, Suspending, Resuming and Stopping Threads, **Applets and Input Output,** Input/Output Basics, Streams (Byte and Character), Reading From and writing to Console, Reading and Writing Files, Printwriter Class, Fundamentals Of Applets, Transient and Volatile Modifier, Strictfp, Native Methods, Problems with Native Methods, **Handling Strings**, String Length, Operations on Strings, Extract Character Methods, String Comparison Methods, Searching and Modifying, Data Conversion and Value of () Methods, Changing Case of Characters, String Buffer, **Exploring Java. Lang,** Wrapper Classes and Simple Type Wrappers, Void, Abstract Process Class, Runtime Class and Memory Management, Other Programme Execution, System Class, Environment Properties, Using Clone () and Clonable () Interface, Class and Class loader, Math Class, Thread, Thread Group and Runnable Interface, Throwable Class, Security Manager, The java. lang. ref and java. lang. reflect packages, **Java..Util-The Utility Classes**, The Enumeration Interface, Vector, Stack, Dictionary, Hash table, Properties, Using Store () and Load (), String Tokenizer, Bit set Class, Date and Date Comparison, Time Zones, Random Class, Observe

Unit – IV

Input Output Classes, File in Java, Directory, File Name Filter Interface, Creating Directory, The Stream Classes, Input Stream and Output Stream, File input Stream and File Output Stream, Byte Array Input Stream and Byte Array Output Stream, Filtered Byte Stream, Buffered ByteStream, Print Stream, Random Access File, Stream Tokenizer, Stream Benefits, **Networking**, Basic of Networking, Proxy Server, Domain Naming Services, Networking Classes and Interfaces, InetAddress Class, TCP/IP Sockets, Datagram Packet, Networth, **Applet Class**, Applet Basics, Applet Life Cycle, A Simple Banner Applet, Handling Events, getDocumentBase(), getCodeBase(), showDocumentBase(), Audio Clip and Applet Stub interface, **AWT: Windows, Graphics and Text**, AWT Classes, Window Fundamentals, Working With Frame Windows, Frame Window in An Applet, Event Handling in a Frame Window, A Window Program, Displaying Information While Working with Graphics and Color, Working With Fonts, Managing Text Output Using Font metrics, Exploring Text and Graphics, **AWT: Controls, Layouts and Menus**, Control Fundamentals, Layouts, Menus, Dialog Class, Other Controls.

Unit - V

Images, **File Formats, Image Fundamentals, Image Observer, Mediatracker,** JDBC, **JDBC Introduction of Class and Methods, Register Driver, Establish a Session, Execute a Query, Result Set, Closing the Session,** Swings, **JAPPLET,** Java Beans, **What is a Java Bean? Advantages of Java Beans, Application Builder Tools, The Bean Developer Kit (BDK), JAR Files, Introspection, Developing a Simple Bean, Using Bound Properties, Using The Bean Info Interface, Constrained Properties, Persistence, Customisers,** The Basic Servlet API, **The Get Method, The POST Method, Mime Content Types,** Java and Corba Connectivity, **The Compatibility Problem, An Overview of IDI And Iiop, A Working COBRA System, CORBA Servers, CORBA Clients, A Simple CORBA Service, Legacy Applications and Corba**

.NET

Curriculum for Visual Studio.Net(VB.Net and C#)

Unit1.Overview of the Microsoft .NET Framework

- The .NET Framework
- The Common Language Runtime (CLR)
- The .NET Framework Class Library
- Introduction to C# and VB.Net and Console Applications, Windows Applications, Windows Controls,Asp.Net Projects, Web Controls, Web Services, Net Components
- Overview Of the VS.Net IDE
- Visual Studio.Net and its main features. Creating Projects, Writing Code, and Compiling code, Debugging Code, Other Vs.Net Features.

Lab 1:

Exercise 1.1:Some Objective question related to CLR.
Exercise 1.2:Definition of key words
Exercise 1.3: Benefits Of .Net
Exercise 1.4 :Creation Of Simple Application

Unit 2.Object-Oriented Programming in Visual Studio.NET

- Introduction to Data Types
- Using Variables, Variable Scope
- Converting Data Types, Creating and Using Structures
- Storing Data in Arrays
- Understanding Classes, Working with Classes, Using Shared Members
- Inheritance, Polymorphism, abstraction, encapsulation, instantiation, initialization, constructors, and destructors. Namespaces in .Net.
- Types Of Errors, Use Of Exceptions in .Net framework.

Lab 2:

Exercise 2.1: Using Examples explanation Of About Concepts
Exercise 2.2: Use of Method Overloading, Method Overriding
Exercise 2.3:Use Of Try Catch Block.
Exercise 2.4: Use of Throw
Exercise 2.5: Use Of Arrays, Structures

Unit3.Tour Of Visual Studio .NET

- What are Visual Studio .NET Projects and Solutions?

- Buttons, CheckBoxes, ListBox Control, Panel, Group Boxes, Link Buttons, Splitter Control and more controls, Restricting User Input, Validating Field Data, Validating Form Data
- Creation of menu and integration of Forms.

Lab 3

Exercise 3.1: Creation of Form Using simple messages
Exercise 3.2: Use of Controls in real time Application.
Exercise 3.3: Simple assignments using Controls
Exercise 3.4: Restrict the type of data that can be entered in a field
Exercise 3.5: Test user input at the field level to determine if it is valid, and display messages to help the user correct invalid data

Unit 4. ADO.NET , ADO.NET objects and Crystal Reports

- Connections, DataAdapters, Commands, DataSets, DataViews.
- Binding to Controls, and Problems for accessing Data From SqlServer or access using Connected and Disconnected Record Sets.
- Accessing Data Through Crystal Report.
- Accessing Filtered Data Through Crystal Report.

Lab 4

Exercise 4.1:Creation of Database.
Exercise 4.2:Use of database Through Connected and disconnected Mode.
Exercise 4.3: Use of Crystal Report For Interacting with existing Database.

Unit 5. ASP.NET

- Introduction to Asp.Net, Web forms
- Difference Between Web Controls and HTML controls.
- Binding Data To Control, Use of Data-grid.
- Types of Validation controls. Required Field Validator, Custom Validator, Compare Validator, Range Validator
- Web Services

Lab 5:

Exercise 5.1: Creation of Simple Forms using Web Controls
Exercise 5.2:Use of Web controls and Html controls in application
Exercise 5.3: Assignment using Validator controls
Exercise 5. 4:Validating user input with required field Validator
Exercise 5.5: Creation Of Web Service