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**North Maharashtra University,  
Jalgaon**

**Syllabus for M.Sc.**

# **Information Technology**

w.e.f. July, 2001

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**  
**SYLLABUS FOR M.Sc. (Information Technology)**  
**(With Effect from July, 2001)**

**M.Sc. (Information Technology) Syllabus**

**Semester-I**

IT -101	Introduction to Information Technology
IT -102	Data Base Management Systems
IT -103	Object Oriented Analysis & Design.
IT -104	Data Structures Using STL
IT -105	Networking Computing - I
IT- Lab-I	Information Tech. Lab
IT- Lab-II	Data Structures Using STL Lab

**Semester-II**

IT -201	Data Warehousing & Data Mining
IT -202	Web Scripting Languages
IT -203	Internet Computing -I
IT -204	Windows Programming & VC++
IT -205	JAVA programming -I
IT- Lab-III	Web Scripting, Internet Computing
IT- Lab-IV	Windows Programming, VC++ & Java Programming

**Semester-III**

IT -301	C# Programming
IT -302	Internet Computing - II
IT -303	Software Engineering
IT -304	Component Architecture
IT -305	Network Computing - II
IT- Lab-V	Lab course on C # Programming & Internet Computing-II
IT- Lab-VI	Lab course on Network Computing-II & Component Architecture

**Semester-IV**

Industrial Training

**Course Code : IT-101**  
**Title : Introduction to Information Technology**

**I.T. CONCEPT: Understanding role of I.T.:**

Understanding the I.T. organization Revolution and Evolution of I.T. I.T. organizational functions, Functional Unit descriptions, describing the I.T. professional, I.T. infrastructure, External support considerations, Exhibits.

**Role of I.T.:**

Identifying Technology Group Rules, Common I.T. Roles, Identifying I.T. customers, Technical Strategic planning, Business Management and I.T. Interaction, Information Architecture, communication

**Techniques And Tools:**

Definition of Techniques And Tools, Consideration when using techniques, and Tools, Techniques And Nonstatistical Tools statistical tools, Periodical and newspapers.

## **ELECTRONIC DATA INTERCHANGE (EDI):**

What is EDI? EDI users and types of activities where does I.T fit in? What is needed to implement EDI? International considerations, In EDI for you?

## **INTERNET:**

Brief History Internet Fundamentals, how the Internet works, getting connected to the Internet, connecting with a commercial online and an Internet service installing the Internet, solving common connection problems. Upgrading the equipment 56K, ADSL, ISDN

## **WWW:**

Exploring the WWW, Internet Explorer 4.0, Netscape Navigator 4.0, Search Agents.

## **Communication Using Internet Mail And News:**

Internet Mail and Usenet New Group, Outlook express and other S/Ws used, Chat Rooms.

## **e- Business:**

Introduction B2B, B2C, C2B, C2C, Internet Bookshops Grocery Supplies S/W, Supplies & Support, Electronic Newspapers, Internet banking, virtual Action, Online share Dealing, Gambling on the Net, e-Diversity.

## **HTML:**

Brief history of HTML, HTML 4.0, Internationalization, Accessibility Tables, compound Documents, Style sheets scripting, Printing, Authoring documents with HTML 4.0 Separate Structure and presentation, Consider universal accessibility to the Web, Help user agents with incremental rendering, On SGML and HTML, Introduction to SGML. SGML constructs used in HTML, Elements Attributes, Character references, comments HTML DTD HTML documents Representation - character sets, character encoding and entities.

The Document Character encoding set, character encoding, Choosing an encoding, Notes on specific encoding, Specifying the character encoding character reference, Numeric character reference, Character entity references, Undisplayable character, Basic HTML data types-character data, colors, length, URIs, content types, etc.

The global structure of an HTML document - The HEAD and BODY of a document The title attribute, Meta data, Specifying meta data, The META element, Meta data profiles, The document body, The BODY element, Element identifiers: the id and class Attributes, Block-level and inline elements, Grouping elements: the DIV and SPAN elements, Headings: The H1, H2, H3, H4, H5, H6 elements. The ADDRESS elements.

Language Information and text direction: International consideration for text Text-Paragraphs, Lines and Phrases, Tables,

Links -- Hypertext and Media -- Independent Links

Object, Images, and Applets

Style Sheet - Adding style to HTML documents

Alignment, font style, and horizontal rules

Frames- Multi-view presentation of documents

Forms - User -- input Forms: Text Fields, Buttons, Menus, and More

Scripts - Animated Document and Smart Forms.

## **Privacy & Security Topics:**

Introduction, Known Information, Volunteered Information, Information collection, Software Complexity, Contributing Factors, Browsers, networks, Operating Systems, and Servers, Encryption Schemes, Basic Concepts, Prime Number, Private Key Cryptography, Public Key Cryptography, Hashing Algorithms, Secure Web Documents, Digital Signatures, Digital Signature Example, Pretty Good Privacy, Firewalls.

1. "Teach Yourself Internet in 24 Hours" SAMS Publ, ISBN 1576100510
2. Fundamentals of the Internet and the World Wide Web.  
Tata McGraw-Hill  
ISBN 0-07-042031-9 Raymond Greenlaw Ellen Hepp
3. Commercial Web site Development ISBN 1575211696
4. Launching a Business on the Web, Second Edition  
(Imprints: Que) (Publisher: Macmillan Computer Publishing)  
Authors David Cook, Deborah Selier, ISBN: 078970871x
5. How to become Web Master in 14 Days Sams Net James Mohler
6. E- Commerce, Strategy, Technologies & Applications.  
TATA McGraw-Hill ISBN 0-07-044532-x David Whiteley.

**Course Code : IT-102**

**Title : Database Management Systems**

**Basic concepts:**

Database & Database Users, Characteristics of the Database, Database Systems Concepts & Architecture, Data Models, Schemas & Instances, DBMS Architecture & Data Independence, Data Base languages & Interfaces, Data Modeling using the Entity-Relationship Approach.

**Relation Model, Languages & Systems**

**Relational Data Model & Relational Algebra**

Relational Model Concepts, Relational Model Constraints, Relational Algebra, SQL - A Relational Database Language, Date Definition in SQL, Specifying Constraints & Indexes in SQL, Specifying Constraints & Indexes in SQL, A relational Database Management Systems, ORACLE/INGRES

**Conventional Data Models & Systems**

Network Data Model Hierarchical Data Model

**Relational Data Base Design**

Integrity constraints, Function Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal forms based on primary keys, (1NF, 2NF, 3NF, & BCNF), Lossless join & Dependency preserving decomposition.

**Concurrency Control & Recovery Techniques**

Concurrency Control Techniques, Locking Techniques, Time stamp ordering, Granularity of Data items, Recovery Techniques, Recovery concepts, Database backup and recovery from catastrophic failures.

**Security and Integrity.**

**References**

- Date, C.J., "An Introduction to Database Systems", Narosa Publishing House, New Delhi.
- Desai, B., "An Introduction to Database Concepts", Galgotia Publications, New Delhi.
- Elmsari and Navathe, "fundamentals of Database Systems", Addison Wesley, New York.
- Ullman, J.D., "Principles of Database Systems", Galgotia Publications, New Delhi.

**Course Code : IT-103**

**Title : Object Oriented Analysis & Design**

Object modeling: Objects and classes. Links and associations. Generalization and inheritance. Grouping constructs. Aggregation. Generalization as extension and restriction. Multiple inheritance. Meta data, candidate keys. Dynamic modeling: Events and states nesting. Concurrency. Functional modeling: Data flow diagrams. Specifying operations.

Analysis: Object modeling. Dynamic modeling, functional modeling. Adding operations. Iteration.

System design: Subsystems. Concurrency. Allocation to processors and tasks. Management of data stores. Control implementation. Boundary condition. Architectural frameworks. Object design: Optimization, implementation of control. Adjustment of inheritance. Design of associations documentation. Comparison of methodologies. Implementation: Using a programming language, a database system. Programming styles, reusability, extensibility, robustness. Programming-in-the-large, case study.

#### References

- Booch, G., "Object oriented Analysis Analysis and Design" 2<sup>nd</sup> edition, Benjamin/Cummins Publishing Co., Redwood City, CA, U.S.A., 1994.  
Rebecca Wirfs-Brock, et al, "Designing Object Oriented Software", Prentice Hall of India, 1996  
Rumbaugh, J., Et al " Object Oriented Modelling and Design", Prentice Hall of India, New Delhi, 1991

Course Code : IT-104  
Title : Data Structures Using STL

#### Introduction

STL Class support illustrated through simple example of some interactive game like card Playing Algorithm, Introduction to order notations, Analyzing Execution Time, correctness.

#### The standard containers of STL:

The Random Access And Sequential Containers, vectors, strings, lists, Doubly-ended queues, Stacks And Queues, sets, priority queues and Maps, Detailed Discussion on each of the above standard containers.

#### Searching techniques:

Sequential, Binary and interpolation search.  
Elementary Sorting techniques: Bubble, insertion and selection sort,  
Advanced Sorting techniques: Heapsort, Mergesort and Quicksort.  
STL Algorithms: Mutating and Non-Mutating Algorithms, Sorting and searching algorithms.  
STL Iteration: Unidirectional, Bi-directional Mutating and Non-Mutating Iteration, STL function, Objects, STL Adapters, Introduction to other STL Containers like Map, Tables Graphs, Matrices Files  
Software Requirement: VisualC++ - 5.0 And Above

#### References

- Timothy Budd, Data Structures In C++ using the STL, Addison Wesley (1998)  
Alexander Stopanov, and David R. Musav, STL By Example.

Course Code : IT-105  
Title : Network Computing - I

#### Introduction to Computer Network:

Advantages Of networks, structure of communication Network, point-to-point and multidrop circuits, Data flow and physical circuits, network topologies, topologies and design goals, Hierarchical Topology. Horizontal topology (Bus) Star Topology. Ring Topology, Mesh Topology The Telephone Network, switched and nonswitched options, fundamentals of communication theory, channels speed and bit rate, Voice Communications and analog waveforms, Bandwidth and the frequency spectrum, connecting the digital and analog words, Digital signals, Modem, Asynchronous and Synchronous Transmission, Wide area and local

networks, connection oriented and connectionless networks, classification of communication protocols, Time division multiple access (TDMA), Time division Multiple (TDM), Carrier Sense(Collision) system, token passing, peer to peer priority systems, priority slot, carrier sense (Collision free) systems, Token Passing (priority systems).

**Layered protocols and the OSI Model:**

Goals of layered protocols, network design problems, communication between layers, Introduction to standard organizations, Layers of OSI, OSI Status.

**Polling/ Selection Protocols:**

Character and Bit Protocols, binary, synchronous control (B.Sc), HDLC options, HDLC frame format, code transparency and synchronization, HDLC transmission process, HDLC subsets, SDLC, Protocol conversion

**Local Area Network:**

WHY LANS?, Primary attributes of LAN, Broadband and Base band and base LAN's, IEEE LAN standards, Relationship of the 802 standards to the ISO/CCITT model, Connection options with LAN's LLC and MAC protocol data units, LAN topologies and protocols, CSMA/CD and IEEE 802.3 Token ring (Priority)token bus and IEEE 802.4, metropolitan area networks (MAN) ANSI fiber distributed data interface

**Switching and Routing in Networks:**

Message switching, packet switching, when and when not to use packet switching, packet routing, packet switching support to circuit switching networks.

**The X.25 Networks and supporting Protocols:**

Features of X.25, Layers of X.25, the physical layer, X.25 and the data link layer, companion standards to X.25, X.25 channel options flow control principles, other packet types, X.25 logical channel states, packet formats, internetworking, connectionless mode networks, the frame relay, X.25 stacks.

**References:**

Computer Networks, Tanenbaum

**Course Code : IT- Lab-I**  
**Title : Information Technology**

**Laboratory Assignments:**

- 1) Create a HTML Page(s) to demonstrate use of:
  1. Internal Links
  2. External Links
  3. Use of Images
  4. Various types of lists.
  
- 2) Create a HTML Page to demonstrate use of:
  1. Logical styles such as bold, italics, emphasis, address, pre-formatted text
  2. External Links.
  3. Character entity reference characters (any 2)
  4. Various types of lists.
  
- 3) Create HTML Page(s) to demonstrate use of linking using image map. The image map should contain at least 5 images.
  
- 4) Create a HTML page to demonstrate use of
  1. Animated Images & text
  2. Scrolling text
  3. Static backgroundParagraph and Divisions
  
- 5) Create a HTML page for calendar of the current month. The calendar should contain a Photograph at the beginning. Make use of appropriate colors for dates, advertisement(s) at the bottom.

6) Create HTML page that shows the year wise statement of sale & revenue, split in to quarterly sale for 5 products of your choice. Page should also contain the logo for the company.

7) Create a HTML page to demonstrate use of frames.

The page should contain appropriate number of frames to demonstrate followings:

Left pane should contain at least 3 shows the names of product. Which when selected should show the information about the products in the right pane. Try to make your pages as appealing and attractive as possible with the use of various formatting elements.

The top pane should contain advertisements the bottom pane should contain a running flash line.

8) Create a HTML page that contains a table with images ( at least 9). When clicked on a image it should display the description of the image in the new window. Table should be properly formatted. Images should have ToolTips.

9) Design and create a HTML form to signing up for e-mail service. Validate the contents.

Display the contents entered by the user

10) Design and create a HTML form to demonstrate use of various controls. Display the contents entered by the user.

11) Create a HTML page to demonstrate use of frames.

The page should contain appropriate number of frames to demonstrate followings:

Left pane should contain at least 3 shows the names of product. Which when selected should show the information about the products in the right pane. Try to make your pages as appealing and attractive as possible with the use of various formatting elements.

The top pane should contain advertisements the bottom pane should contain a running flash line.

**Course Code : IT- Lab-II**

**Title : Data Structures using STL**

#### **Laboratory Assignments:**

##### **Programming in C++:**

1. Write a C++ program that tells you how many bits are used to represent objects of data type char, short, int, long.
2. Write a hash Table class that stores and retriever records with a character string key, Provide public member function to insert, lookup, remove records from hash table. Hide the implementation details in the private parts of the class.
3. Design directed graph data type class.
4. Design two – way list whose implementation uses only a single link pointer, include in your design an iterator that can traverse the list in either direction.

##### **STL Practicals:**

1. Implementing containers class like Stack, Queue, List, Vectors, Maps, Multimaps, Sets, Multisets
2. Using STL Generic Algorithms.
3. Implementing Function Objects and Adapters.
4. Tree Traversal, Graph Implementations

**Course Code : IT- 201**  
**Title : Data Warehousing & Data Mining**

**Basics**

What is a decision support system?, Understanding operational versus analytical processing

What is a data warehouse?

**Introduction to data warehousing, What is data warehousing? Difference between data warehouse and Operational (OLTP) databases**

**Understanding terms and technology**

Analytical processing, Operational processing, Decision Support systems, Data warehouse

Environment for data access, Architecture, Technical infrastructures, Source and target, data, Levels of users, Classes of tools, Decision support system (DSS) applications

Data transformation, Data transformation tools, Middleware tools, Metadata, Star schema Hierarchies, Granularity, Database gateway, Decision Support development cycle

The decision support life cycle

Life cycles for system development, Issues affecting the decision support life cycle, The decision support life cycle, architect environment, phases of the decision support life cycle (DSLCC)

Designing the Database for a Data Warehouse

**TRANSACTION-PROCESSING DATABASES, DECISION SUPPORT DATABASES STAR SCHEMA DATABASE DESIGN, benefits of using a star Schema, Understanding Star Schema Design Facts and Dimensions, VARIETIES OF STAR SCHEMAS, How to Read the Diagrams, Simple Star schemas, Multiple Fact Tables, Outboard Tables, variations of a Star Schema, Multi-Star Schemas, A SALAD DRESSING EXAMPLE, Understanding the available Data, Browsing the dimension Tables, Using Tables Attributes, Creating Attributes Hierarchies, AGGREGATION, DENORMALIZATION, DATA Warehousing DATABASE DESIGN EXAMPLES, Reservation Database, Investment Database, Health insurance Database, Putting it All together**

**Developing and Deploying the Data Warehouse**

Initial Deployment, Initial Installation, Rollout Planning, Training and Orientation, Platform Upgrades and Maintenance, Infrastructure Block, Transport Block, End User Access and Usage, Data Management, Metadata Management, Data Warehouse Administration, Data Refreshment, Update/Replication, Source Synchronization, Disaster Recovery, Access Controls and Security, Managing Database Growth, Managing Database Performance

Data Warehouse Enhancement and Extension, Scope Management, Business User-Needs Addresses, Technology Considerations, Implementation Timeframe, Budget Allocation

Resource Allocation

**The Important of Metadata Management**

What is Metadata? Why is Metadata Important? Importance of Metadata during Warehousing the Development, Data Source Extraction, Data Refinement and Re-Engineering, Access and Usage's, Storing and managing the Metadata Persistently Data Warehouse Information Directories, State of the Practice in Information Directories Metadata Data Dictionaries and Repositories, State of the Practice in Data Directories Repositories, Metadata Standards, Consumerization of Metadata, Analytical Processing Business User View of Data, Multidimensional Analysis, On-line Analytical Processing (OLAP), Defining OLAP, OLAP Architecture, OLAP: Multidimensional versus Relational



Multidimensional and Relational Data Store, Multidimensional database server Versus Relational OLAP Server, Multidimensional Data Store and OLAP services Relational OLAP

OLAP: Technical Requirement and Considerations, The 12 Rules of OLAP, Evaluating OLAP Servers Tools, Data Mining, Data Mining Ingredients, Data Mining Users, Emergence of Data Mining Applications, Data Mining Technologies and Tools, Statistical Analysis, Using Statistical Analysis Tools, Features of Statistical Analysis Tools, Application of Statistical Analysis, Challenges in applying Statistical Analysis Techniques

Knowledge Discovery, General Structure of Knowledge Discovery Systems, Knowledge Discovery Technology, Business Usage of Knowledge Discovery Technology, Systems Architectures of Knowledge Discovery Tools, Challenges in applying Knowledge, Discovery Tools, Value of Knowledge Discovery, Other Data Mining Techniques and Tools

Visualization Systems, Geographical Information Systems, Fractal Analysis

### References

Building a Data warehouse for decision Support, Vindette poe, Prentice Hall PTR, ISBN: 0-13-371121-8

The official Client-Server guides to Data Warehousing, Harjinder Gill Prakash Rao, ISBN: 0-7897-0714-4

Course Code : IT- 202

Title : Web Scripting Languages

### Common Gateway Interface (cgi) scripting:

CGI overview, CGI Languages, CGI Methods: GET, POST, HEAD. Interface specification environment variables, command line, standard input, standard output. Server-specific, client-specific, and request, Specific environment variables, Types of responses, Headers.

### Introduction to Perl

Regular and associative arrays, regular expression, looping and conditional statements, file handling, subroutines, special variable , perl commands

CGI Libraries: CGIc 1.05, CGI-HTML 1.21.

The C++ CGI Class Libraries A HTML, Kelly Black's CGI C++ Classes., Perl Libraries: CGI-Lib., Designing CGI application, testing, and debugging., Server-side Includes (SSI) and Gateway, HTML Forms, and How to handle them, CGI Security, Searching and CGI, Imagemaps

Windows CGI: Win CGI Basics, Database back ending

### Introduction to JavaScript

Basic Declarations & expressions, JavaScript Operators, Object an Events, Arrays

### Functions of JavaScript

Time & Date, Math, Strings.

### Object of JavaScript

Window, document, area, image, history, form, fileUpload, link, anchor, applet, layer, location, button, reset, submit, checkbox, radio select, text textarea, password. James L Mohler, Teach yourself How to become a Web Master in 14 days. Techmedia Publishers, New Delhi (ISBN 81-87105-74-7) (Chapter-4) Keith Brophy, Timothy Korts, Teach yourself VB Script in 21 Days. Arman Danesh, Teach yourself JavaScript 1.1 in a week. (Second Edition) Sama (15 Nov.96) us\$40 ISBN 1575211955. Eric Hermann Teach yourself CGI programming with Per 1.5 in a week (2<sup>nd</sup> Edition) Sams (18 Dec. 1996) us\$40. ISBN 1575211963 E

Course Code : IT- 203  
Title : Internet Computing –I

Basics of Web Design, Marketing on Internet, Developing Effective Web Strategy, Domain Name issues (choosing, registration etc), Server issues: Discuss pros and cons of having own server with hiring server, virtual domain hosts, Laying foundations for the web site, Web Design process, Web site user requirements and interaction.

Web site organization, site types and architecture, navigation theory and practice, Use of graphics, Making site appealing, Search and Design, site maps, indexes, other Navigational and use Aids, Basics of Web Page Design: Page types, layouts, text and fonts, color, images and backgrounds. Making use of Mail delivery systems, online customer services, online payments.

History of HTML, DTD, CSS, HTML document representation, character encoding set, HTML elements, attributes, entity references (numeric, character)

Structure of HTML document, discuss all block level tags, text level tags, linking tags, images maps, tables, frames, forms, integration with CGI, integrating components in a HTML page.

Web mastering skills and Roles: Internet specialist, information design scientist, media designer, technical designer, technical manager etc., Web site security issues, web site evaluation procedures.

Introduction to XML, XML advantages, XML Implementations, XML approach to web designing, logical and physical structures of XML documents, XML prolog, DTD, elements, attributes, entities, linking in XML, Style sheets, XML processor, Morphing HTML into XML.

#### References:

1. Thomas A Powell, "The Complete Reference – Web Design", TMH.
2. Creating Commercial Web sites, ISBN 1575211696.
3. James L. Mohler, " Teach yourself How to become a Webmaster in 14 days", Samsnet, Techmedia
4. Richard Light, "Presenting XML", Sams, Macmillan Computer Publishing.  
*XML standards specification from w3.org should be used*

Web Sites:<http://www.htmlgoodies.com>

1. <http://www.webdeveloper.com>
2. <http://www.xml.com>
3. <http://www.w3.org>

Course Code : IT-204  
Title : Windows Programming & VC++

#### Readme.TXT

The programmers challenge, The Ground Rules, A brief history of Windows, A brief history of this book, Let's get started

#### Windows 95

The Windows difference, Your First windows Program, the Windows Programming Hurdles

#### Painting with Text

Painting and repainting, Introduction to GDI, Scroll Bars

#### Essential Graphics

CFM philosophy – Structure of GDI, The Device context, Drawing Lines, Drawing Filled areas, The Mapping Mode, Rectangles Regions and Clipping, Paths, Bits and Bits, The GDI Bitmap Object, Metafiles, Enhanced metafiles, Text and fonts

**The Keyboard**

Keyboard Basics, Keystroke messages, Enhancing Systems, Adding a keyboard interfaces character Messages, Looking at Keyboard Messages, The CoreT (Not the cursor), The Windows character set, Internationalization concerns.

**The Mouse**

The Mouse Basics, Client Area Mouse Messages, Non client Area Mouse Messages, Hit Testing in your Programs, Capturing the Mouse.

**The Timer**

Timer Basics, Using the Timer Three Methods, Using the Timer for a Clock, Windows standard Time, Animation

**Child Window Controls**

The Button class, Controls and colours, The static Class, The Scrollbar Class, The Edit Class, The List box Class

**Icons, Cursors, Bitmaps and Strings**

Compiling Resources Icons and Cursors, character Strings, User defined Resources

**Menus and Accelerators**

Menus, Using Bitmaps in Menus, Keyboard Accelerators,

**Dialog Boxes**

Modal Dialog boxes, Message boxes, Modeless dialog Boxes, The Common Dialog Boxes

**Memory Management and file I/O**

Memory Good, Bad and Ugly, Memory Allocation, File Input/Output

**Multitasking and Multithreading**

Modes of Multitasking, Windows 95 Multithreading, Thread Synchronization, Event Signaling, Thread Local Storage (TLS)

**Dynamic Link Libraries**

Library basics, A Simple DLL, Shared Memory in DLLs, Some Library Restrictions, Dynamic Linking Without Imports, Resource only Libraries.

**Windows, Visual C++ and application Frameworks Fundamentals.****Microsoft Windows and Visual C++ :**

Windows Programming Model, Visual C++ components.

**The Microsoft Foundation Class Library Application Framework:**

Use of Application Framework, Application Framework, MFC Library Message Mapping, Documents & Views

**The MFC Library view Class****Getting Started with AppWizard**

"Hello World", Single document Interface Vs. Multiple document Interface, The "Do-Nothing" Application, The Cex03 a View Class, Drawing inside the View Window - The Windows Graphics Device Interface, Preview of the Resource Editors, Win 32 Debug Target Vs. Win32 Release Target, Enabling the Diagnostic Macros, Understanding precompiled Headers, Two way to Run a Program

**Basic Event Handling, Mapping Modes and a Scrolling View**

Getting User Input-Message Map Function, Mapping Modes A Scrolling View Window, Other Windows Messages.

**The Graphics Device Interface, Colors and Fonts**

The Device context Classes, GDI Objects, Windows color Mapping, Fonts

**The Modal Dialog and Windows Common Controls.**

Modal Vs. Modeless Dialogs, Resources and Controls, Programming a Modal Dialog, The Dialog That Ate Cincinnati, Enhancing the Dialog program, Identifying Controls, CWnd Pointers & Controls IDS, Setting the Color for dialog Background and for controls, Painting inside the Dialog Window, Adding Dialog controls at Runtime, Other control Features, Windows Common Controls

**The Modeless Dialog and Windows common Dialogs**

Modeless Dialogs, CFormView Class, Windows Common Dialogs

- Using ActiveX Controls**
  - ActiveX Controls Vs. Ordinary Windows Controls, Installing ActiveX Controls
  - Calendar Control, ActiveX Control Container Programming, ActiveX Controls in HTML Files, Creating ActiveX Controls, Picture properties, enable Properties
- Internet Explorer 4 Common Controls**
- Win32 Memory Management**
  - Processes and Memory Space, Working of Virtual Memory, VirtualAlloc, Function, Windows Heap and GlobalAlloc Function Family, Small-Block Heap, the C++ new and delete Operators, and -heapmin, Memory - Mapped Files, Accessing Resources
- Bitmaps**
  - GDI Bitmaps and Device Independent Bitmaps
  - Using GDI bitmaps
  - Using Bitmaps to Screen Display
  - DIBS and Cdib Class
  - Putting Bitmaps on Pushbuttons
- The Document - View Architecture**
- Menus, Keyboards Accelerators, the Rich Edit Controls & Property Sheets**
  - Main Frame Window and Document Classes, Windows Menus, Keyboard Accelerators, Common Processing, Application Frameworks Built- In Items, MFC text Editing Options, Property Sheets, Cmenu Class, Creating Floating Pop-up Menus, Extended Command Processing.
- Toolbars and Status Bars**
  - Control bars and Application Framework, Toolbars, Tooltips, Locating the Main Frame Window, Status bar
- A Reusable Frame Window Base Class**
  - CPersistent Frame Class, CFrameWnd Class and Activate Frame Member Function, PreCreateWindow Member Function, Windows Registry, Position of Maximized Window, Control bars Status and Registry, Static data Member, Default Window Rectangle, Persistent Frames in MDI Applications
- Separating the Document From its View**
  - Document - View Interaction Function, View Application, Cformview Class, Cobject Class, View Interaction, Cdocument :: Delete Contents Function, Coblist collection Class
- Database Management**
  - Advantage of Database Management, SQL, ODBC Standard, MFC ODBC Classes - Crecordset and Cdatabase, The Student Registration Database, Filter and Sort Strings, Joining two Database Tables, Multiple Recordset, ODBC Multithreading, Bulk Row Fetches, Use of Recordset Without binding
- Database Management with Microsoft Data Access Objects**
  - DAO COM and the Microsoft jet Database Engine, DAO and VBA, DAO and MFC, Using DAO in ODBC mode, DAO Table - Type Recordsets, DAO Query Defs and Table Defs, DAO Multithreading, Displaying Database Rows in Scrolling Window, Programming Dynamic Recordset
- OLE Templates**
  - Basic OLE DB Architecture, Basic OLE DB Template Architecture, Creation of an OLE DB consumer, Using OLE DB consumer Code, Creating an OLE DB Provider
- TCP/IP, Winsock and Win/net**
  - To Com or Not to Com, Internet Primer, Build your own \$99 Intranet
  - Winsock, Building a Web Server and Client using Chttp Blocking Socket
  - Win/net, Building a Web Client with the MFC Win/net Classes, Asynchronous Moniker Files

Course Code : IT-205  
Title : JAVA Programming-I

**Introduction to JAVA:**

Programming Tool, JAVA and Internet, Comparison with C++, Power of Java, Advantages over other Languages.

**Java Language Structure:**

Comments, Data types, variable operators, strings, control flow statements, arrays and class methods.

**OOPS in JAVA:**

Objects and classes: Inheritance, Interfaces and inner classes.

**Graphics Programming:**

Creating a closeable Frame layout, Displaying Information in a Frame, Graphics Objects, Text and Fonts, colors, Drawing Shapes from Lines, Drawing Rectangles and Ovals, Filling shapes, Paint Mode, images.

**Event Handling:**

Basics of Event handling AWT Event Hierarchy, Semantic and low-level events in the AWT, Event handling summary, individual events, separating GUI and application code, multicasting advanced Event Handling.

**User interface Components with Swing:**

Model-View-Controller Design Pattern, Layout management, Text input, choice controls, Scroll bars, Menus, dialog boxes.

**Applets:**

Applet Basics, The applet HTML tags and attributes, pop-up windows in applets, multimedia, Applet context.

**Exception Handling:**

Dealing with errors, catching exceptions, JDB debugger.

**Streams and Files:**

Streams, complete stream zoo, ZIP file stream, putting streams to use, object streams, File management.

**Multi Threading:**

Basics of threading Thread properties, interrupting threads, selfish threads, thread groups, Synchronization, timers.

**Network programming in JAVA:**

Connecting to a server, implementing servers, sending E-mail, URL, connections, posting form data, Applet security, and Proxy servers.

**JDBC:**

Basic JDBC programming concepts, populating a Database, Executing queries, metadata, Result sets.

**Advanced Topics:**

Introduction to Beans, RMI.

**Text Books: -**

1. Core Java Vol I (Addison- Wesley)  
Sun Press  
ISBN - 981-405-861-0
2. Core Java Vol II (Addison- Wesley)  
Sun Press  
ISBN - 981-4058-50-5

**Reference**

1. Thinking in Java  
Bruce Eckel,  
Addison - Wesley  
ISBN- 9814035750
2. MWSS: Data Structures and Algorithms in Java  
(Imprint: Waite Group Press)  
(Publisher, Macmillan computer Publishing)  
Author: Robert Lafore ISBN: 1571690956

**Course Code : IT- Lab-III**  
**Title : Web Scripting & Internet Computing**

**Laboratory Assignments:**

**Web Scripting Languages**

1. Write perl code to return a Web page based on a browser.
2. Design forms that gather and send data from and to Web server.
3. Write a CGI program for managing pull-down menu data.
4. Write a CGI program for mailing environment variables.
5. Write a program that demonstrates file handling in perl.
6. Build a online Catalog using perl
7. A program that demonstrates use of existing CGI libraries.
8. Write a program that keeps track of Web page visitors.
9. Create an Html page explaining use different time/data functions/built in function of Java Script/VB Script.
10. Write a VB Script/Java Script Application that allows you to create a home page with the help of an interactive form.
11. Develop a server side scripting application using VB Script.
- 12.

**Internet Computing**

1. Understanding Front-page express 98
2. Create a simple form and accept the information form client browser and create an HTML page on fly and send it back to client browser.
3. Create a form using different controls.
4. Create a HTML that uses an ActiveX control on it. Manipulate the Control
5. HTML page with Simple Database connectivity, List the content of the database in a template file.
6. Create a complex web based Database application that allows you update database, gives reports, allows you to query, (Typically a attendance system for a company/class/result system/income tax calculation system any one)
7. Write a XML based application for Museum Information.
8. Develop a XML based application that demonstrated extensible styles and linking in XML.

**Course Code : IT- Lab-IV**  
**Title : Windows Programming, VC++ & Java Programming**

**Laboratory Assignments:**

**Windows Programming**

1. Write a Window program to demonstrate line drawing with right mouse button. The color of line should change with every new line.
2. Write a Window program that display a small rectangle with every left mouse click, double clicking on existing rectangle should erase the rectangle.
3. Write a Window program to display size of window and no. of left button clicks, no of right button clicks and no. of double clicks. This data should be displayed on two separate lines. Size should be updated when user resizes the window object.
4. Write a Window program to create filled rectangles and circles on alternate left click. New figure should not erase the previous one.

5. Write a Window program that draws a rectangle, circle and ellipse in the client area. If user clicks on either figure, a message box is displayed saying, " You have clicked on circle/rectangle/ellipse"
6. Write a Window program to create various brushes and change the background color to brushes on each left mouse click.
7. Write a Window program to display the characters entered by user from keyboard [Consider only alphabets and numbers only].
8. Write a Window program to create a window object. Drag the left mouse button & display rectangle for which dragged line is a diagonal. Also demonstrate mouse capturing.
9. Write a Window program to implement checkers program.
10. Write a Window program to create a window and display three scroll bars for red, blue and green color. Each having a range from 0 to 255. User can adjust the scroll box in each bar. Get the position of scroll box in each bar and make a color by combining three values and change the background color to the color set by user.
11. Implement a simple editing pad with the help of edit control.
12. Write a program that capture Home, Page Up, Page Down, End & all arrow keys as user presses these keys. Program should display appropriate message in the client window
13. Write a Window program to that contains an edit box; two buttons Viz Add, Remove and a list box. Whenever user enters a string in the edit box and presses the Add button data should be added to the list box and removes the data if i) it is present in the list ii) presses Remove button, at run time.
14. Write a Window program to create a window object with a following menu bar:
 

Cricket	Hockey	Foot Ball
- One Run	- Penalty Corner	- corner
- Four	- Penalty hit	- penalty kick
- Sixer	- Goal	- Goal
- Out		
15. When ever user selects a particular menu item an appropriate message should be displayed

VC++

#### Laboratory Assignments:

1. Create a SDI application, which invokes a dialog box from a menu option. The dialog box has three scroll bars called red scroll, blue scroll, green scroll and a multiline edit box. As the user scrolls through these scroll bars the background color of the edit box changes.
2. Create a SDI application that displays a dialog box with five fields: Name, age(spinner control), qualification it has four check boxes for MCA, M.Sc., M.Tech, Ph.D. Radio buttons for sex & drop down combo box for designation. System Analyst, Programmer and Project Leader. As the user fills in this information in the dialog box, display the data entered by the user in the client window. The dialog should be invoked through a menu option called 'Dialog' on main menu bar.

3. Implement a simple note pad that can save, open the text files. It also supports the find and Replace utility.
4. Create a SDI application that invokes a dialog box from a menu called "Dialog" The Dialog has a Track bar (slider control) and a progress bar control. As the user slides through the slider control the progress bar also sets its state accordingly. Display the value of current position set in track bar.
5. Create a SDI application that invokes a dialog box from a menu called "Dialog"

The Dialog has a Track bar (slider control) and a spinner control and a progress bar. Slider should slide as the spinner value is changed by the user and vice a versa. Progress bar's state also should be updated.

6. Create a SDI application with following menu options. Display the selected menu time in the client window s the user selects it. Menu-Item should have check marks on it when selected.

Cricket	Hockey	Foot Ball
- One Run	- Penalty Corner	- corner
- Four	- Penalty hit	- penalty kick
- Sixer	- Goal	- Goal
- Out	- Referee	- Referee
- Umpire		

7. Create a SDI application to create a dialog box. Put a list box & all types of combo boxes on that & demonstrate their use. The selected values should be displayed in the client area of the window.
8. Create a SDI application to create a dialog box with Multi Column List control & Display the student information in different columns. Student information: name, seat no, class, rank should be considered.
9. Create a SDI application with a splitter window, which splits in 2 horizontal panes. First pane is a data entry pane for entering movie name, actor, actress, and theatre. As the user enters this information and presses ok it should be displayed in the bottom pane. Define the underlying document class.
10. Design a SDI application for data entry of Insurance system. It has fields like name, age, daisies, policy no., amount, and maturity year. User should be able to navigate through the data entered using tool bar buttons 'Previous' and 'next'.

### Java Programming:

#### Laboratory Assignments:

- 1) Write a program to illustrate use of inner classes in java
- 2) Demonstrate use of inheritance.
- 3) Demonstrate use of Array.
- 4) Demonstrate use of String.
- 5) Implementation of stack & queue.
- 6) Program to implement Applet.
- 7) Program to illustrate multithreading.
- 8) Program to illustrate multicasting.
- 9) Write program to draw rectangle, oval, etc(graphics in java)
- 10) Write program to illustrate XOR mode.
- 11) Write program to illustrate Radio button test.
- 12) Write program to illustrate button test.
- 13) Write program to illustrate Text Area button test.
- 14) Write program to illustrate List test.
- 15) Write program to illustrate Dialog & combo Box test.
- 16) Write program to illustrate check Box test.
- 17) Write program to illustrate Keyboard event handling.
- 18) Write program to illustrate Mouse event handling.
- 19) Write program to implement simple client & server.



- 20) Write program to implement hash table, Map, linked list.
- 21) Write program to implement Layout management box and grid.
- 22) Write program to implement File handling:-
  - i. Simple text file.
  - ii. Primitive data types.
- 23) Program to illustrate data management using JDBC
- 24) Program to illustrate menu & sub menu.

**Course Code : IT-301**  
**Title : C# Programming**

#### **Overview of the Microsoft .NET Platform**

Introduction to the .NET Platform, Overview of the .NET Framework, Benefits of the .NET Framework, The .NET Framework Components, Languages in the .NET Framework

#### **Overview of C#**

Structure of a C# Program, Using the Console class of the System namespace to perform basic input/output operations, Recommended Practices Compiling, Running, and Debugging, Handling exceptions in a C# program.

#### **Value-Type Variables**

Common Type System, Naming Variables, Using Built-in Data Types, Creating User-Defined Data Types, Converting Data Types.

#### **Statements and Exceptions**

Introduction to Statements, Using Selection Statements, Using Iteration Statements, Using Jump Statements, Handling Basic Exceptions, Raising Exceptions

#### **Methods and Parameters**

Using Methods, Using Parameters, Using Overloaded Methods

#### **Arrays**

Overview of Arrays, Creating Arrays, Using Arrays

#### **Essentials of Object-Oriented Programming**

Classes and Objects, Using Encapsulation, C# and Object Orientation, Defining Object-Oriented Systems

#### **Reference-Type Variables**

Using Reference-Type Variables, Using Common Reference Types, The Object Hierarchy, Namespaces in the .NET Framework, Data Conversions

#### **Creating and Destroying Objects**

Using Constructors, Initializing Data, Objects and Memory, Using Destructors Destroying Objects

#### **Inheritance in C#**

Deriving Classes, Implementing Methods, Using Sealed Classes, Using Interfaces, Using Abstract Classes

#### **Aggregation, Namespaces, and Advanced Scope**

Using Internal Classes, Methods, and Data, Using Aggregation, Using Namespaces, Using Modules and Assemblies

#### **Operators and Events**

Introduction to Operators, Operator Overloading, Creating and Using Delegates, Defining and Using Events

#### **Properties and Indexers**

Using Properties, Using Indexers

#### **Attributes**

Overview of Attributes, Defining Custom Attributes, Retrieving Attribute Values

### Miscellaneous Topics

Unsafe Code and Security, C # and Data Handling, Interfacing with COM

### References

1. **The Complete Guide to C # Programming**, V.K. Jain, Dreamtech Press, 2001, ISBN: 81-7722-142-6.

Course Code : IT-302  
Title : Internet Computing-II

### Introduction

Internet fundamentals and web browsers Scripting Languages, Client-Side and Server-Side Scripting.

### Introduction to VBScript

Constants, Variables and Data types, Mathematical Operations, Processing Arrays and Collections, Looping and Decision Structures, Relational and Logical Operators, CASE Statement.

### VBScript Functions and Objects

Data Conversion Functions, Mathematical Functions, Data Formatting functions, Text Manipulation Functions, Date and Time Functions, Built in Objects.

### Introduction to ASP

What is ASP? , Comparison with HTML and VBscript, ASP and SSI Directives, #config, #echo, #exec, #lastmod, #filesize, #include etc , Modular ASP code.

### Web Applications

Objects, Properties, Methods and events, ASP Object Model , Study of Response, Request , Application , Session and Server Objects, Error Handling

### Scripting Objects

Dictionary, FileSystemObject and Collections, Displaying file and folder information, Opening files, TextStream Object.

### SQL and Databases

Review of Database Concepts, Creating a simple database using MS-Access, Data Access Basics, Querying Databases with SQL, SELECT Statement ,INSERT Statement ,UPDATE Statement ,DELETE Statement ,Data Source Name (DSN), Using ADO ,Connection Object ,Recordset Object ,Paging through Recordsets

### ASP Components

Creating Instance of a Component, Ad Rotator Component, Content Linking Component, Browser Capabilities Component

### ASP and E-Commerce

Using Browser Capabilities, Component Processing Cookies, Counting page hits

### Discussions on

#### Web Servers:

Personal Web Server, JWS, Apache. IIS etc

#### Net Applications:

Implementation details of Shopping Cart, Guest Book, Discussion Forum, on line Chat, on line results etc.

### References

1. **ASP 3 Programming Bible**, Eric A. Smith, IDG Books India, 2000, ISBN 81-265-0049-2,
2. **Beginning Active Server Pages 3.0**, David Buser etc., Wrox Press Ltd, 1999, ISBN 81-7366-149-9.

Course Code : IT-303  
Title : Software Engineering

#### **THE PRODUCT**

The Evolving Role of Software, Software, Software: A Crisis on the Horizon

Software Myths

#### **THE PROCESS**

Software Engineering: A Layered Technology, The Software Process, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component-Based Development  
The Formal Methods Model, Fourth Generation Techniques, Process Technology  
Product and Process

#### **PROJECT MANAGEMENT CONCEPTS**

The Management Spectrum, People, The Product, The Process, The Project, The WSHH Principle, Critical Practices

#### **SOFTWARE PROCESS AND PROJECT METRICS**

Measures, Metrics, and Indicators, Metrics in the Process and Project Domains  
Software Measurement, Reconciling Different Metrics Approaches, Metrics for Software Quality, Integrating Metrics within the Software Engineering Process  
Managing Variation: Statistical Quality Control, Metrics for Small Organizations  
Establishing a Software Metrics Program, SOFTWARE PROJECT PLANNING  
Observations on Estimating, Project Planning Objectives, Software Scope sources  
Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, The Make/Buy Decision, Automated Estimation Tools

#### **SOFTWARE QUALITY ASSURANCE**

Quality Concepts, The Quality Movement, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Statistical Software Quality Assurance, Software Reliability, Mistake Proofing for Software  
The ISO 9000 Quality Standards, The SQA Plan

#### **SOFTWARE CONFIGURATION MANAGEMENT**

Software Configuration Management, The SCM Process, Identification of Objects in the Software Configuration, Version Control, Change Control, Configuration Audit, Status Reporting, SCM Standards

#### **ANALYSIS CONCEPTS AND PRINCIPLES**

Requirements Analysis, Requirements Elicitation for Software, Analysis Principles, Software Prototyping, Specification, Specification Review

#### **ANALYSIS MODELING**

A brief History, The Elements of the Analysis Model, Data Modeling, Functional Modeling and Information Flow, Behavioral Modeling, The Mechanics of Structured Analysis, The Data Dictionary, Other Classical Analysis Methods

#### **DESIGN CONCEPTS AND PRINCIPLES**

Software Design and Software Engineering, The Design Process, Design Principles, Design Concepts, Effective Modular Design, Design Heuristics for Effective Modularity, The Design Model, Design Documentation

#### **ARCHITECTURAL DESIGN**

Software Architecture, Data Design, Architectural Styles, Analyzing Alternative Architectural Designs, Mapping Requirements into a Software Architecture, Transform Mapping, Transaction Mapping, Refining the Architectural Design

#### **USER INTERFACE DESIGN**

The Golden Rules, User Interface Design, Task Analysis and Modeling, Interface Design Activities, Implementation Tools, Design Evaluation

#### **COMPONENT-LEVEL DESIGN**

Structured Programming, Comparison of Design Notation

#### **SOFTWARE TESTING TECHNIQUES**

Software Testing Fundamentals, Test Case Design, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Testing for Specialized Environments, Architectures, and Applications

## **SOFTWARE TESTING STRATEGIES**

A Strategic Approach to Software Testing, Strategic Issues, Unit Testing, Integration Testing, Validation Testing, System Testing, The Art of Debugging

## **OBJECT-ORIENTED CONCEPTS AND PRINCIPLES**

The Object-Oriented Paradigm, Object-Oriented Concepts, Identifying the Elements of an Object Model, Management of Object-Oriented Software Projects, OBJECT-ORIENTED ANALYSIS, Object-Oriented Analysis, Domain Analysis, Generic Components of the OO Analysis Model, The OOA Process, The Object-Relationship Model, The Object-Behavior Model

## **OBJECT-ORIENTED DESIGN**

Design for Object-Oriented Systems, The System Design Process, The Object Design Process, Design Patterns, Object-Oriented Programming

## **OBJECT-ORIENTED TESTING**

Broadening the View of Testing, Testing OOA and OOD Models, Object-Oriented Testing Strategies, Test Case Design for OO Software, Testing Methods Applicable at the Class Level, Interclass Test Case Design

## **CLIENT/SERVER SOFTWARE ENGINEERING**

The Structure of Client/Server Systems, Software Engineering for c/s Systems, Analysis Models Issues, Design for c/s Systems, Testing Issues

## **WEB ENGINEERING**

The Attributes of Web-Based Applications, The WebE Process, A Framework for WebE, Formulating/Analyzing Web-Based Systems, Design for Web-Based Applications, Testing Web-Based Application, Management Issues

### **Reference:**

Software Engineering, a Practitioner's Approach, Roger S. Pressman, 5th Edition, McGraw Hill International Edition

**Course Code : IT-304**

**Title : Component Architecture**

**Component Architecture: Introduction**

**Component Object Model (COM) Introduction:**

COM as better C++, Software distribution, Dynamic Linking, Separating Interface from implementation, Run time polymorphism, Introduction to DCOM.

**Interfaces in COM/DCOM:**

Introduction to interfaces, Interface Definition Language (IDL), Interfaces and IDL, Using COM interface pointers, Optimizing query interface, Code sharing and reuse.

**Classes and Objects in COM/DCOM:**

Introduction, Classes and Servers, Optimizations, Classes and IDL, Class Emulation, Query interface types and properties, Object services and Dynamic Composition, Apartments, Cross apartments access, Life cycle management.

**Distributed COM:**

Fundamental programming architecture of DCOM; Parallel processing, Advantages of distributed computing.

Threading Models and Apartments: Apartments, Apartments interaction, Implementing multithreaded local components.

Facilities: Connection points and type information, connectable objects.

Remoting: DLL surrogates and Executable components.

**CORBA:**

Objectives, History of CORBA, OMG and CORBA, Overview of CORBA, CORBA components, Architectural features, Method Invocations: Static and Dynamic, ORB.

**CORBA Services:**

Services for object naming, object life cycle, Event, Transaction service features, concurrency control services, Persistent Object service and CORBA security service.

CORBA Facilities, CORBA Domains

### Enterprise Java Beans:

Introduction to distributed Computing: Mainframe-Transaction Monitors, Two-tier and Three-tier architecture, EJB's role in Middle-tier.

Java Beans and Enterprise Java Beans, Architecture of EJB, Session and Entity Java beans

Comparison of EJB, MTS and CORBA.

HTML, XML & XSL: Introduction, Limitations of HTML.

Java RMI, JDBC: Introduction only.

ASP: Introduction only.

### References:

1. Dale Rogerson, "Inside COM", Microsoft Press.
2. Guy Eden, Henry Eden, "DCOM", Microsoft Press.
3. Mowbrey, "Inside CORBA", Addison Wesley.
4. Mowbrey, Zahavi, "Essential CORBA", Addison Wesley.
5. John Siegle, "CORBA Fundamentals and Programming", John Wiley and Sons.
6. Orfali, "The essential Distributed Object Survival Guide".
7. Valesky, "Enterprise Java Beans", Addison Wesley.
8. Bruce Eickel, "Thinking in Java".
9. Naughton, Schildt, "The Complete Reference Java 2", TMH.
10. "Mastering ASP", BPB.

### Web sites

<http://www.mcdn.microsoft.com>

<http://java.sun.com>

<http://www.vcdj.com>

Course Code : IT-305

Title : Network Computing – II

Introduction & Overview of TCP/IP suite protocols, use of TCP/IP, Designing Applications for Distributed Environment, standard and nonstandard application protocols & examples of them, application protocols and software flexibility & services from the provider's perspective

### Client Server Model & Software Design

Introduction to client-server paradigm, its applications, advantages, general structure of a client-server application, motivation, terminology & concepts.

Concurrent Processing in Client-Server Software. Concurrency in Networks, concurrency in servers, terminology and concepts, examples, code execution, context switching and protocol software design, concurrency and asynchronous I/O

Program Interface to Protocols, loosely specified protocol, software interface, interface functionality, conceptual interface specification, system calls, two basic approaches to network communication, basic I/O functions in Unix and Windows, Using Unix with TCP/IP

Socket Interface, Berkeley Sockets, protocol interface specification, socket abstraction, endpoint specification, generic address structure, major system calls used with sockets (Unix & Windows), utility routines for integer conversion, using socket calls in a program, symbolic constants for socket call parameters

Algorithms and issues in client software design, learning algorithms instead of details, client architecture, identifying the location of a Server, parsing an address argument, looking up a domain name, well known port by name, port numbers and Network byte order, protocol by Name, TCP client algorithm, allocating socket, choosing local protocol port number, problems in choosing IP addresses, socket connection to server using TCP and UDP, interpreting response from the server, closing connection, partial close for UDP. Discuss the client software examples: for TCP as well as UDP both.

Algorithm and issues in Server Software design, conceptual server algorithm, concurrent Vs. Iterative Servers, Connection Oriented Vs. Connectionless access, connection oriented servers, failure, reliability and statelessness, optimizing stateless servers, request processing time, iterative server algorithms, iterative connection-oriented algorithm, binding sockets to well known ports in Unix/Windows, placing socket in passive mode, accepting connections and using them, Iterative connectionless server algorithm, reply address problem, forming reply address, concurrent server algorithms, master and slave processes, concurrent connectionless and connection oriented server algorithms, apparent concurrency using single process, When to use which type of server configuration, server deadlocks.

Iterative, Connectionless Server (UDP), Creating passive socket, process structure, time server example.

Iterative, connection-oriented servers (TCP), allocating passive TCP socket, DAYTIME service example, process structure, closing connections, connection termination and server vulnerability.

Concurrent, connection-oriented servers(TCP), design, concurrent ECHO example, Iterative Vs. Concurrent Implementations, process structure, Echo server example, cleaning up errant processes

Single-Process, concurrent servers(TCP)

Data driven processing in a server, Data driven processing with a single process, process structure of a single process server, example :Echo server

Multiprotocol Servers (TCP, UDP)

Concept introduction and justification for reducing number of servers, multi protocol design, process structure, and multi-protocol server example: DAYTIME server, concept of shared code, concurrent multi-protocol servers.

Multiservice Servers(TCP, UDP), concept introduction, consolidating servers, multiservice design for connection-oriented as well as connectionless servers, single process implementations of multiservice servers, invoking separate programs from multiservice server, multiservice an multiprotocol designs, example.

Concurrency in Clients, advantages and motivations for the concept, concurrent contact with multiple servers, implementations of concurrent clients, single process implementations, example, execution of concurrent client.

Remote Procedure Call Concept (RPC):

Introduction, Remote Procedure Call Model, Two Paradigms For Building Distributed Programs, A Conceptual Model For Conventional procedure Calls, An Extension Of the Procedural Model, Execution Of conventional Procedure Call And Return, The Procedural Model In Distributed Systems, Analogy Between client-Server And RPC, Distributed Computations As A Program, Sun Microsystems's Remote Procedure Call Definition, Reducing The Number Of Arguments, Identifying Remote Programs And Procedures, Accommodating Multiple Versions Of A Remote Program, Mutual Exclusion For Procedures In A Remote Program, Communication Semantics, At Least Once Semantics, RPC Retransmission, Mapping A Remote Program To A Protocol Port, Dynamic Port Mapping, RPC Retransmission, Mapping A Remote Program To A Protocol Port, Dynamic Port Mapping, RPC Port Mapper Algorithms, Sun RPC Message Format, Marshaling Arguments For A Remote Procedure, Authentication, An Example Of RPC Message Representation, An Example Of The UNIX Authentication Field.

Distributed Program Generation (Rpcgen concept):

Introduction, Using Remote Procedure Calls, Programming Mechanisms To Support RPC, Dividing A Program Into Local And Remote Procedures, Adding Code For RPC,

Stub Procedure, Multiple Remote Procedures And Dispatching, Name Of The Client-Side Stub Procedure, Using Rpcgen To Generate Distributed Programs, Rpcgen Output And Interface Procedures, Rpcgen Input And Output, Using Rpcgen To Build A Client And Server.

**Network File System Concepts (NFS):**  
Introduction, Remote File Access Vs. Transfer, Operations On Remote Files, File Access Among Heterogeneous computers, Stateless Servers, NFS And UNIX File Semantics, Review Of The UNIX File System, Files Under NFS, NFS File Types, NFS File Modes, NFS File attributes, NFS Client And Server, NFS Client Operation, NFS client And UNIX, NFS Mounts, File Handle, Handles Replace path Names, An NFS Client In UNIX, File Positioning With A Stateless Server, Operations On Directories, Reading A Directory Statelessly, Multiple Hierarchies In An NFS Server, The Mount Protocol  
**Network File System Protocol (NFS, Mount):**  
Introduction, Using RPC To Define A Protocol, Defining A protocol With Data Structures And Procedures, NFS Procedures semantics Of NFS Operations, The Mount Protocol, Procedure In The Mount Protocol, Semantics of Mount Operations, NFS And Mount Authentication.

**Course Code : IT- Lab-V**  
**Title : C # Programming & Internet Computing-II**

**Laboratory Assignments:**

**C # Programming**

- 1 Overview of Microsoft .NET Framework SDK Tools & Utilities
- 2 Develop a series of practicals that demonstrates the following in C#
- 3 Data types, statements and controls
4. Classes and Methods
- 5 Arrays, Strings, Attributes, Structs and Enum
- 6 Write a C# program to demonstrates the concept of exceptions and error handling
- 7 Write a C# program that demonstrates the concept of file handling
8. Write a Program in C# that demonstrates Data Handling.
- 9 Write a C# program that demonstrates interfacing with COM.
- 10 Write a C# program that implements a mailing facility.

**Note: Apart from the above practicals students are expected to carry out practicals as directed by the lab instructor**

**Internet Computing-II:**

- 1 Write a program in ASP to insert the data into the database table.
- 2 Write a program in JavaScript or VBScript to do the validations on the form.
- 3 Write a program in ASP to modify and Delete the data n the database table.
4. Write a simple chat program in ASP
5. Write a program in ASP to make the Add rotator component for the banner Advertisement.
6. Write a Program in Asp to Create Text file, to write and read the data using the text stream object
- 7 Write a program of paging in ASP
- 8 Write a Application in ASP to make Discussion form
- 9 Make the voting facility in ASP for the web site
10. Make the search program in ASP for the static pages
- 11 Make a guest Book & shopping cart in Asp.

**Course Code : IT- Lab-VI**  
**Title : Network Computing-II & Component Architecture**

**Laboratory Assignments:**

**Network Computing**

- 1) Write client & server programs so that client can print the host ID, local port, also client should indicate connection status.
- 2) Implement the client – server communication using TCP.
- 3) Implement the client – server communication using UDP.
- 4) Develop an ECHO server using TCP/UDP.
- 5) Write a program for ECHO server.
- 6) Write programs which will demonstrate the implementation of: -
  - Iterative Connectionless servers.
  - Iterative Connection oriented servers.
- 7) Write programs which will demonstrate the implementation of: -
  - Concurrent Connectionless servers.
  - Concurrent Connection oriented servers.
- 8) Write a server program, which will provide telnet services.
- 9) Demonstrate the file transfer-using FTP.
- 10) Develop the Chat client & Server application. A single server should accept the request of multiple clients for intercommunication of clients. Design your own protocols for message passing.
- 11) Develop a simple web server capable of accepting request from standard clients like IE, Netscape, and Opera etc.  
Use standard protocol HTTP 1.0 (Ref: - [www.w3c.org](http://www.w3c.org))

**Component Architecture**

**Laboratory Assignments:**

1. Build a COM Component in VC++ and client in VB.
2. Same as 1 only client in VJ++
3. Same as 1 only component is build in VB and client in VC++
4. Using Java socket programming APIs, write a simple echo server.
5. Assignment on Java Applet.
6. Accessing VB component using ASP (Active Server Pages).
7. Accessing a Database using JDBC.

**Sem-IV**

**Industrial Training**

