FOR

M. Tech. (COMPUTER NETWORKS & INFORMATION SECURITY)

I YEAR I SEMESTER

Code	Group	Subject	L	P	Credits
		Advanced Computer Networks	3	0	3
		Network Programming	3	0	3
		Distributed Computing	3	0	3
		Information Security – I	3	0	3
	Elective -I	Java &Web Technologies Software Architecture and Process Management Multimedia and Rich Internet Applications TCP/IP Protocol Suite	3	0	3
	Elective -II	Embedded Systems Data Warehousing and Mining Distributed Databases Speech Processing	3	0	3
	Lab	Network Programming Lab	0	3	2
		Seminar	-	-	2
		Total Credits (6 Theory + 1 Lab.)			22

I YEAR II SEMESTER

Code	Group	Subject	L	P	Credits
		Wireless Networks	3	0	3
		Mobile Computing	3	0	3
		Information Security - II	3	0	3
		Information Security, Management and Standards	3	0	3
	Elective -III	Distributed Systems Web Services Database Security Communication Protocol Engineering	3	0	3
	Elective -IV	Network Management and Performance Evaluation Information Retrieval Systems Wireless Security Adhoc and Sensor Networks	3	0	3
	Lab	Web Programming Lab	0	3	2
		Seminar	-	-	2
		Total Credits (6 Theory + 1 Lab.)			22

II YEAR - III Semester

Code	Group	Subject	L	P	Credits
		Comprehensive Viva	-	-	2
		Project Seminar	0	3	2
		Project work	-	-	18
		Total Credits			22

II YEAR - IV Semester

Code	Group	Subject	L	P	Credits
		Project work and Seminar	-	-	22
		Total Credits			22

M. Tech. (CN&IS) **I SEMESTER**

ADVANCED COMPUTER NETWORKS

UNIT I Review

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet - **Foundation of Networking Protocols:** 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **Networking Devices:** Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure.

UNIT II

The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization - **Routing and Internetworking:** Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer

UNIT III

Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **Multicasting Techniques and Protocols:** Basic Definitions and Techniques, Intradomain Multicast Protocols, Interdomain Multicast Protocols, Node-Level Multicast algorithms - **Transport and End-to-End Protocols:** Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **Application Layer:** Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, Building a Simple Web Server

UNIT IV

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Optical Networks and WDM Systems:** Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocation in Networks, Case Study: An All-Optical Switch

UNIT V

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony, VoIP Signaling Protocols, Real-Time Media Transport Protocols, Distributed Multimedia Networking, Stream Control Transmission Protocol - **Mobile A-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks – **Wireless Sensor**

Networks: Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W.Ross*, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007

REFERENCES:

1. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill, 2007
2. Guide to Networking Essentials, *Greg Tomsho,Ed Tittel, David Johnson,*Fifth Edition, Thomson.
3. An Engineering Approach to Computer Networking , *S.Keshav,* Pearson Education.
4. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet,* Pearson Education (CISCO Press)
5. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
6. The Internet and Its Protocols, A. Farrel, Elsevier.

M. Tech. (CN&IS) **I SEMESTER**

NETWORK PROGRAMMING

UNIT I

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed, awk,Basics of Perl - Scalars and their operations, assignment statements and simple I/O, control statements, arrays, hashes, references, functions, pattern matching, file I/O, example programs.Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT II

Linux Files- File Concept, File Structure, File System Layout, File types, kernel support for files, The standard I/O library (C), System calls, low level file access - usage of open, creat, read, write, close, lseek, stat family, umask, dup, dup2, fcntl.file and directory management - chmod, chown, links(soft links & hard links - unlink, link, symlink), mkdir, rmdir, chdir, getcwd, opendir, readdir, closedir,rewinddir, seekdir, telldir functions.Linux Process – Process concept, Kernel support for process, process attributes, process hierarchy, process creation, waiting for a process, process termination, Orphan process, zombie process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, system.Linux Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

UNIT III

Interprocess Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, Pipes, FIFOs, Introduction to three types of IPC(Linux)-Message queues, Semaphores and Shared memory.

Message Queues- Kernel support for messages, Linux APIs for messages, client/server example, Semaphores-Kernel support for semaphores, Linux APIs for semaphores, File locking with semaphores, Shared Memory- Kernel support for shared memory, Linux APIs for Shared memory, Semaphore and Shared memory example.

UNIT IV

Network IPC (Part-I)-Introduction to Unix Sockets, Socket descriptors, Addressing-Byte Ordering, Address formats, Socket system calls for Connection oriented-Communication-socket, bind, listen, accept, send, recv, Socket system calls for Connectionless-Communication-socket,connect,sendto,recvfrom,Example-Client,/ServerPrograms.,Out-of-Band Data. Network IPC (Part-II)-Windows Sockets, Socket Server functions, Socket Client

functions, Ex. A Socket-based client, A Socket-based server, Comparison of IPC methods.

UNIT V

Advanced Socket System calls, Socket options-setsockopt, getsockopt, fcntl, ioctl system calls.

Remote Procedure Calls-Introduction, RPC model, Transparency issues, Sun RPC-actual RPC implementation with the Sun RPC System, Transparency issues handling in Sun RPC.

TEXT BOOKS:

1. Unix system programming using C++, T.Chan, PHI / Pearson Education, rp-2008.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006.
3. Unix Network Programming, W.R.Stevens,PHI/Pearson.
4. Windows system Programming, J.M.Hart,Pearson.

REFERENCE BOOKS:

1. Windows Sockets Network Programming, Bob Quinn and D.Shute, Addison-Wesley.
2. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition,rp-2008.
3. Linux System Programming, Robert Love, O'Reilly, SPD, rp-2007.
4. Internetworking with TCP/IP, Vol.III, Douglas Comer, PHI.
5. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education, 2003.
6. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens & S.A.Rago, Pearson Education.
7. Learning Perl, R.L. Schwartz, T.Phoenix, B.D. Foy, O'Reilly, SPD.
8. Unix Programming, Kumar Saurabh, 1st Edition, Wiley India pvt Ltd.

M. Tech. (CN&IS) **I SEMESTER**

DISTRIBUTED COMPUTING

UNIT I

Introduction

The different forms of computing – Monolithic, Distributed, Parallel and cooperative computing, the meaning of Distributed computing, Examples of Distributed systems, the strengths and weaknesses of Distributed computing, operating system concepts relevant to distributed computing, the architecture of distributed applications.

UNIT II

Distributed Computing Paradigms

Paradigms for Distributed Applications – Message Passing Paradigm, The Client-Server Paradigm (Java Socket API), The peer-to-peer Paradigm, **Message system (or MOM) Paradigm** – the point-to-point message model and the publish/subscribe message model, RPC model, **The Distributed Objects Paradigms** – RMI, ORB, the object space Paradigm, The Mobile Agent Paradigm, the Network Services Paradigm, The collaborative application (Groupware Paradigm), choosing a Paradigm for an application.

UNIT III

Distributed Objects Paradigm (RMI): Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, Java RMI API, A sample RMI Application, steps for building an RMI application, testing and debugging, comparison of RMI and socket API - **Distributed Object Paradigm(CORBA):** The basic Architecture, The CORBA object interface, Inter-ORB protocols, object servers and object clients, CORBA object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, object Adapters, Java IDL, An example CORBA application.

UNIT IV

Distributed Document-based Systems : WWW, Lotus Notes, comparison of WWW and Lotus Notes, **Distributed Coordination-based systems** – Introduction to coordination models, TIB, JINI, comparison of TIB and JINI - Software Agents, Agent Technology, Mobile Agents - **Distributed Multimedia Systems** : characteristics of multimedia data, QOS of service management, Resource Management, Stream Adaptation

UNIT V

Grid Computing: Definition of grid, grid types – computational grid, data grid, grid benefits and applications, drawbacks of grid computing, grid components, grid architecture and its relation to various Distributed Technologies - **Cluster Computing :** Parallel computing overview, cluster computing – Introduction, Cluster Architecture, parallel programming models and Paradigms, Applications of Clusters.

TEXT BOOKS:

1. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education.
2. Distributed Systems, Principles and Paradigms, A.S.Tanenbaum and M.V.Steen , Pearson Education.
3. Client/Server Programming with Java and CORBA, second edition, R.Orfali & Dan Harkey, John Wiley & sons.
4. Grid Computing, J.Joseph & C.Fellenstein, Pearson education.
5. High Performance Cluster Computing, Rajkumar Buyya, Pearson education.

REFERENCES:

1. A Networking Approach to Grid Computing, D.Minoli, Wiley & sons.
2. Grid Computing: A Practical Guide to Technology and Applications, A.Abbas, Firewall Media.
3. Java Network Programming, E.R.Harold, 2nd edition, O'Reilly, SPD.
4. Distributed Systems, Concepts and Design, 3rd edition, G.Coulouris, J.Dollimore and Tim Kindbirg, Pearson Education.
5. Java Programming with CORBA, 3rd edition, Brose, Vogel, Duddy, Wiley Dreamtech.

M. Tech. (CN&IS) **I SEMESTER**

INFORMATION SECURITY- I

UNIT I

Security Goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Mathematical Tools for Cryptography: Introduction to number theory, prime & relative numbers, modular arthimetic, Fermat's and Euler's theorems, testing for primality, Chinese remainder theorem, Discrete logarithms

UNIT II

Conventional Encryption Principles & Algorithms(DES, AES, RC4), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution,Public key cryptography principles, public key cryptography algorithms(RSA, RABIN, ELGAMAL, Diffie-Hellman, ECC), Key Distribution

UNIT III

Approaches of Message Authentication, Secure Hash Functions(SHA-512, WHIRLPOOL) and HMAC - **Digital Signatures:** Comparison, Process- Need for Keys, Signing the Digest, Services, Attacks on Digital Signatutres, Kerberos, X.509 Directory Authentication Service

UNIT IV

Network Management, Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3

OS Security, OS Security Functions, Separation, Memory Protection, Access Control, Trusted Operating System: MAC, DAC, Trusted path, Trusted Computing Base

UNIT V

Viruses and related threats, Anatomy of Virus, Virus Counter Measures - **Software Flaws:** Buffer Overflow, Incomplete Mediation, Race Conditions, Malware: Brain, Morris Worm, Code Red, Malware Detection - **Firewalls**, Design principles, Types of Firewalls, Firewall Architectures, Trusted Systems.

TEXT BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings, Pearson Education.
2. Information Security Principles & Practice, Mark Stamp, WILEY INDIA 2006.

REFERENCES:

1. Cryptography and network Security, Fourth edition, Stallings, PHI/Pearson
2. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.

M. Tech. (CN&IS) **I SEMESTER**

JAVA & WEB TECHNOLOGIES
(Elective –I)

Unit I:

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script, CSS

Unit II:

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

Review of Applets, Class, Event Handling, AWT Programming.

Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.

Unit III:

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API.

Web servers: Tomcat Server installation & Testing.

Introduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters.

Unit IV:

More on Servlets: The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC architecture. AJAX.

Unit V:

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

Database Access Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNIT 1, 2)
2. The complete Reference Java 2 Fifth Edition ,Patrick Naughton and Herbert Schildt., TMH (Chapters: 25) (UNIT 2,3)
3. Java Server Pages –Hans Bergsten, SPD O'Reilly (UNITs 3,4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly for chap 8.
5. Murach's beginning JAVA JDK 5, Murach, SPD
6. An Introduction to web Design and Programming –Wang-Thomson
7. Professional Java Server Programming,S.Allamaraju and othersApress(dreamtech).
8. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
9. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas
10. Beginning Web Programming-Jon Duckett WROX.
11. Java Server Pages, Pekowsky, Pearson.
12. Java Script,D.Flanagan,O'Reilly,SPD.

M. Tech. (CN&IS) **I SEMESTER**

SOFTWARE ARCHITECTURE AND PROCESS MANAGEMENT
ELCTIVE -I

UNIT I

Software Process Maturity: Software maturity Framework**,** The Principles of Software Process Change, Software Process Assessment, The Initial Process,

UNIT II

The Repeatable Process: Managing Software Organizations, The project plan, Software Configuration Management (Part-I) - **The Defined Process:** Software standards, Software inspections, software configuration management (Part-II), defining the software process.

UNIT III

The Managed Process: Data Gathering and analysis, managing software quality - **The Optimizing Process:** Defect prevention, automating the Software Process.

UNIT IV

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views **- Creating an Architecture -** Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture - **Analyzing Architectures -** Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

UNIT V

Moving from one system to many

Software Product Lines, Building systems from off the shelf components, Software architecture in future.

TEXT BOOKS:

1. Managing the Software Process by *Watts S. Humphrey*, published by Pearson Education.
2. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education,2003.

REFERENCES:

1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education,2000
2. Introduction to the Personal Software Process by *Watts S. Humphrey*, Published by Pearson Education.
3. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003
4. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR,2001
5. Software Design, David Budgen, second edition, Pearson education,2003

M. Tech. (CN&IS) **I SEMESTER**

MULTIMEDIA AND RICH INTERNET APPLICATIONS
ELECTIVE -I

Unit I.

Introduction to Multimedia

Internet and Multimedia communications,Multimedia Networks,Multimedia Applications,Multimedia Information representation- Digitization Principles,Text,Images,Audio and Video,Compression Methods-Basic Coding Methods – Run Length coding, Huffman coding, Arithmetic coding, Discrete Cosine Transform, Differential PCM, Motion Compensated Prediction, Video Compression – JPEG, H.261, MPEG-1 Video,MPEG 2 and 3 Video, H.263, Wavelet and Fractal Image Compression, Audio Compression.

Unit II.

Multimedia Applications in Networks.

Introduction, Application Level Framing,Audio/Video Conferencing-Session Directories,Audio/Video Conferencing,Adaptive Applications,Reciever Hetrogenity,Real Time Application with Resource Reservation ,Video Server, Applications requiring reliable multicast – White Board , Network Text Editor for Shared Text Editing, Multi Talk, Multicast file transfer,MultiMedia Applications on the World Wide Web – Multicast Web Page Sharing, Audio/Video Streams in the www, Interactive Multiplayer Games.

Unit III

Web 2.0

What is web 2.0, Search,Content Networks,User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

Unit IV

Rich Internet Applications(RIAs) with Adobe Flash and Flex

Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

Adobe Flex 2- Introduction, Flex Platform Overview, Creating a Simple User Interface, Accessing XML data from your application, Interacting with Server Side Applications, Costumizing your User Interface, Creating Charts and Graphs, Connection Independent RIAs on the desktop -Adobe Integrated Runtime(AIR), Flex 3 Beta.

Unit V

Ajax- Enabled Rich Internet Application

Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

TEXT BOOKS:

1. Multimedia Communications: Protocols and Applications , Franklin F Kuo, J.Joaquin Garcia , Wolf gang Effelsberg,Prentice Hall Publications.
2. Multimedia Communications : Applications, Networks, Protocols and Standards , Fred Halsall,Addison Wesley Publications.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel,Deitel Developer Series,Pearson education.

REFERENCE BOOKS:

1. Professional Adobe Flex 2 , Rich Tretola , Simon barber and Renaun Erickson,Wrox,Wiley India Edition.
2. Multimedia Information Networking , Nalin K Sharda,PHI Learning.
3. Multimedia Computing, Communications & Applications , Ralf Steinmetz and Klara Nahrstedt,Pearson Education.
4. Multimedia Communication Systems: techniques, standards and networks, K.R.Rao,Bojkovic and Milovanovic.,PHI Learning.
5. Programming Flex 3,C.Kazoun and J.Lott,SPD.
6. Dojo,J.E.Harmon,Pearson Education.
7. Adobe Flex 3:Training from the Source,Tapper&others,Pearson Education.
8. Principles of Multimedia,R.Parekh,TMH.
9. Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

M. Tech. (CN&IS) **I SEMESTER**

TCP/IP PROTOCOL SUITE
ELECTIVE -I

UNIT - I

Introduction to TCP/IP, The OSI Model and TCP/IP Protocol Suites, Underlying Technologies; IP Addressing, Sub netting and Super netting, CIDR, Delivery and Routing of IP Packets

UNIT - II

Internet Protocol (IP), ARP and RARP, Internet Control Message Protocol (ICMP), Internet Group Management Protocol (IGMP)

UNIT - III

User Datagram Protocol (UDP), Transmission Control Protocol (TCP) ; Routing Protocols (RIP, OSPF, HELLO and BGP)

UNIT - IV

Application Layer and Client-Server Model, BOOTP and DHCP; Domain Name System (DNS), Telnet and Rlogin

UNIT - V

File Transfer Protocol (FTP), Trivial File Transfer Protocol (SMTP), Simple Network Management Protocol (SNMP), Hyper Text Transfer Protocol (HTTP)

TEXT BOOKS:

1. "Internetworking with TCP/IP, Principles, Protocols and Architectures", Vol. I, Douglas E.Comer, Fourth Edition, PHI.
2. "TCP/IP Protocol Suite", Forouzan BA, TMH (2000)

REFERENCES:

1. TCP/IP Unleashed, Pearson Education.

M. Tech. (CN&IS) **I SEMESTER**

EMBEDDED SYSTEMS
ELECTIVE –II

UNIT I

Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices in a System, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems

UNIT II

8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization - **Devices and Communication Buses for Devices Network:** Serial and parallel Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols

UNIT III

Embedded Programming Concepts: Software programming in Assembly language and High Level Language, Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ & JAVA

UNIT IV

Real – Time Operating Systems: OS Services, Process and Memory Management, Real – Time Operating Systems, Basic Design Using an RTOS, Task Scheduling Models, Interrupt Latency, Response of Task as Performance Metrics - **RTOS Programming:** Basic functions and Types of RTOSES, RTOS VxWorks, Windows CE

UNIT V

Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-Design - **Testing, Simulation and Debugging Techniques and Tools:** Testing on Host Machine, Simulators, Laboratory Tools

TEXT BOOKS:

1. Embedded Systems, Raj Kamal, Second Edition TMH.

REFERENCES:

1. Embedded/Real-Time Systems, Dr.K.V.K.K.Prasad, dreamTech press
2. The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Pearson.
3. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. Micro Controllers, Ajay V Deshmukhi, TMH.
6. Microcontrollers, Raj kamal, Pearson Education.
7. Introduction to Embedded Systems,Shibu K.V,TMH.

M. Tech. (CN&IS) **I SEMESTER**

DATA WAREHOUSING AND MINING

ELECTIVE -II

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining

Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

UNIT III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining - **Classification and Prediction:** Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

UNIT IV

Cluster Analysis Introduction : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis - Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multirelational Data Mining:

UNIT V

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web. - **Applications and Trends in Data**

Mining: Data Mining Applications, Data Mining System Products and Research Prototypes, Additional Themes on Data Mining and Social Impacts of Data Mining.

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, 2nd Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

REFERENCES:

1. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
2. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
3. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
4. Building the Data Warehouse By William H Inmon, John Wiley & Sons Inc, 2005.
5. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education
6. Data Mining Techniques – Arun K Pujari, University Press.

M. Tech. (CN&IS) **I SEMESTER**

DISTRIBUTED DATABASES
ELECTIVE -II

UNIT I

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Distributed Database Design

UNIT II

Translation of Global Queries to Fragment Queries, Equivalence transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries

UNIT III

The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions

Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT IV

Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT V

Architectural Issues, Alternative Client/Server Architectures, Cache Consistency, Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution, Transaction Management, Transaction Management in Object DBMSs, Transactions as Objects

Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues Transaction Management Transaction and Computation Model, Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation and Interoperability, Object Management Architecture CORBA and Database interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability, PUSH-Based Technologies

TEXT BOOKS:

1. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti,TMH.
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.

M. Tech. (CN&IS) **I SEMESTER**

SPEECH PROCESSING
ELECTIVE -II

UNIT I
INTRODUCTION

Production of speech, sound perception, speech Analysis, speech coding, speech Enhancement, speech Synthesis, speech and speaker Recognition. Signals and Linear Systems: Simple signal, Filtering and convolution, Frequency Analysis : Fourier Transform, spectra and Correlation, Laplace Transform: Poles and Zeros, Discrete –Time Signal and Systems: Sampling, Frequency Transforms of Discrete-Time Signals, Decimation and Interpolation Filter: Band pass Filter, Digital Filters, Difference Equations and Interpolation

UNIT II

SPEECH PRODUCTION AND ACOUSTIC PHONETICS:Anatomy and Physiology of the speech Organs: the Lungs and the Thorax, Larynx and Vocal Folds(cords), Vocal Tract, Articulatory phonetics: Manner of Atriculatory, Structure of the Syllable, Voicing, Place of the Articulation, Phonemes in Other Language, Articulatory Models, Acoustic Phonetics : Spectrograms, Vowels, Diphthongs, glides and Liquids, Nasals, Fricatives, stops (Plosives), Variants of Normal Speech - **SPEECH ANALYSIS:** Introduction, Short-Time speech Analysis: Windowing, Spectra of Windows: Wide-and Narrow –Band Spectrograms, Time-domain Parameters: Signal Analysis in the Time Domain, Short –Time Average Energy and Magnitude, Short –Time Average Zero-Crossing Rate (ZCR), short-Time Autocorrelation Function , Frequency–Domain (Spectral) Parameters: Filter–Bank Analysis, Short-Time Fourier Transform Analysis, Spectral Displays, Formant Estimation and Tracking

UNIT III

LINEAR PREDICTIVE CODING (LPC) ANALYSIS: Basic Principles of LPC, Least –Squares Autocorrelation Method, Least –Squares Covariance Method, Computation Considerations, Spectral Estimation Via LPC, Updating the LPC Model Sample by Sample, Window Considerations - **Cepstral Analysis:** Mathematical details of Cepstral analysis, Applications for the spectrum, Mel-Scale Cepstrum, F0 Pitch estimation:Time domain F0 estimation methods, short-time Spectral methods

UNIT IV

Introduction to speech recognition: Variability in speech signals, segmenting speech into smaller units, Performance evaluation, Database for speech recognition, pattern recognition methods, pre-processing, parametric representation: parameters used in speech recognition, feature extraction, Evaluation of similarity of speech patterns: frame-based distance measures - HMM based Speech recognition: HMM representation, Balm-Welch re-estimation training, testing, Viterbi algorithm, speech segmentation, making ASR decisions

UNIT V

Speaker recognition: Introduction, Verification Vs. Recognition, Recognition techniques: Model evaluation, text dependence, statical Vs. dynamic features, stochastic models, vector quantization, similarity and distance measures, cepstral analysis, Features that distinguish the speakers: measures of the effectiveness of features, techniques to choose features, spectral features, prosodic features

TEXT BOOKS:

1. Speech Communication Douglas O' Shaughnessy, Universities Press.

REFERENCES:

1. Fundamentals of Speech Recognition, Lawrence Rabiner, Biing-Hwang Juang, Pearson Edn.
2. Speech and Language processing, Daniel Jurafsky, James H. Martin, Pearson Edn.

M. Tech. (CN&IS) **I SEMESTER**

NETWORK PROGRAMMING LAB

LIST OF SAMPLE PROBLEMS/EXPERIMENTS

*1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

*2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

*3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

*4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

**5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

*6. Write a shell script that accepts any number of arguments and prints them in the reverse order.

*7. Write a shell script that determines the period for which a specified user is working on the system.

*8. Write a shell script to list all of the directory files in a directory.

*9. Write an interactive file-handling shell program- Let it offer the user the choice of copying, removing or linking files. Once the user has made a choice, have the program ask him for the necessary information such as the file name, new name and so on.

*10. Write a shell script to find factorial of a given integer.

*11. Write a shell script to find the G.C.D. of two integers.

*12. Write a shell script to generate a multiplication table.

*13. Write a shell script that copies multiple files to a directory.

*14. Write a shell script that counts the number of lines and words present in a given file. *15.Write a shell script that displays the list of all files in the given directory.

*16. Write a shell script (small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two division options: one returns the quotient and the other returns reminder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add (-a), subtract (-s), multiply (-m), quotient (-c) and reminder (-r).

**17. Write a shell script to reverse the rows and columns of a matrix.

**18. Write a sed command that deletes the first character in each line in a file.

**19. Write sed command that deletes the character before the last character in each line a file.

**20. Write a sed command that swaps the first and second words in each line of a file.

**21. Write an awk script that reads a file of which each line has 5 fields – ID, NAME, MARKS1, MARKS2, MARKS3 and finds out the average for each student. Print out the average marks with appropriate messages.

**22. Write an awk script to find the factorial of a user supplied number.

**23. ls –l command produces long listing of files. Write an awk script 1)to print the selected fields (Ex:size and name of the files) from the file listing. 2) to print the size of all files and number of files.

**24. Write an awk script to count the number of lines in a file that do not contain vowels.

**25. Write an awk script to find the number of characters, words and lines in a file.

**26. Write a c program that makes a copy of a file using
a. standard I/O b. system calls.

*27. Write a C program that counts the number of blanks in a text file
a. Using standard I/O b. Using system calls

**28. Implement in C the following Unix commands using system calls
a. cat b. ls c. mv

***29. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.
a. File type.
b. Number of links.
c. Time of last access.
d. Read, Write and Execute permissions.

**30. Write a c program to emulate the Unix ls –l command.

*31. Write a c program that creates a directory, puts a file into it, and then removes it.

*32. Write a c program that searches for a file in a directory and reports whether the file is present in the directory or not.

***33.** Write a c program to list for every file in a directory, its inode number and file name.

**34. Write a c program that creates a file containing hole which is occupying some space but having nothing.

*35. Write a c program that demonstrates redirection of standard output to a file.Ex: ls > f1.

*36. Write a c program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

*37. Write a c program to create a Zombie process.

*38. Write a c program that illustrates how an orphan is created.

**39. Write a c program that creates a child process to execute a command. The command to be executed is passed on the command line.

**40. Write a c program that accepts two small numbers as arguments and then sums the two numbers in a child process. The sum should be returned by child to the parent as its exit status and the parent should print the sum.

**41. Write a c program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls –l | sort

***42. Write c programs that illustrate communication between two unrelated processes using named pipe.

**43. Write a c program in which a parent writes a message to a pipe and the child reads the message.

*44. Write a c program that illustrates suspending and resuming processes using signals.

*45. Write a c program that displays the real time of a day every 60 seconds, 10 times.

**46. Write a c program that runs a command that is input by the user and prints the exit status if the command completes in 5 seconds. If it doesn't, then the parent uses kill to send a SIGTERM signal to kill the child process.

***47. Write a C program that illustrates file-locking using semaphores.

***48. Write a C program that implements a producer-consumer system with two processes.(Using semaphores).

**49. Write client and server programs (using C) for

a. Interaction between server and client processes using Unix Domain Sockets.

b. Interaction between server and client processes using Internet Domain Sockets.

**50. Write a c program (sender.c)

a. to create a message queue with read and write permissions.

b. to write 3 messages to it with different priority numbers.

*51. Write a c program (receiver.c) that receives the messages (from the above message queue as specified in 63.a) and displays them.

**52. Write c program that illustrates two processes communicating via shared memory.

***53. Design TCP iterative Client and server application to reverse the given input sentence

***54. Design TCP iterative Client and server application to reverse the given input sentence

***55. Design TCP client and server application to transfer file

***56. Design a TCP concurrent server to convert a given text into upper case using multiplexing system call "select"

***57. Design a TCP concurrent server to echo given set of sentences using poll functions

***58. Design UDP Client and server application to reverse the given input sentence

***59. Design UDP Client server to transfer a file

***60. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.

***61. Design a RPC application to add and subtract a given pair of integers

TEXT BOOKS:

1. Advance Unix Programming Richard Stevens, Second Edition Pearson Education
2. Advance Unix Programming, N.B. Venkateswarlu, BS Publication.
3. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Thomson.
4. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
5. Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.

* Simple

** Moderate

*** Complex

M. Tech. (CN&IS) **II SEMESTER**

WIRELESS NETWORKS

UNIT I

OVERVIEW OF WIRELESS NETWORKS: Introduction, Different generations of wireless networks - **CHARACTERISTICS OF THE WIRELESS MEDIUM**: Introduction, radio propagation mechanisms, path-loss modeling and signal coverage, effects of multi path and Doppler, channel measurement and modeling techniques.

UNIT II

PHYSICAL LAYER ALTERNATIVES FOR WIRELESS NETWORKS: Introduction, applied wireless transmission techniques, short distance base band transmission, UWB pulse transmission, Carrier Modulated transmission, Broadband modems for higher speeds, Spread Spectrum transmissions, High-speed Modems for Spread spectrum technology, Diversity and Smart Receiving Techniques, Comparison of modulation schemes, Coding techniques for wireless communications - **WIRELESS MEDIUM ACCESS ALTERNATIVES:** Introduction, fixed-assignment access for Voice-Oriented networks, Random access for Data-Oriented Networks, Integration of Voice and Data Traffic

UNIT III

NETWORK PLANNING: Introduction, wireless network topologies, Cellular Topology, Cell Fundamentals, Signal-to-interference ratio calculation, capacity Expansion Techniques, network planning for CDMA systems - **WIRELESS NETWORK OPERATION:** Introduction, mobility management, radio resources and power management, security in wireless networks

UNIT IV

WIRELESS APPLICATION PROTOCOL

Design and Principles of Operation, WAP Architecture & Components, WAE Overview, WAE Model, WTA Architecture, WTA Framework Components, WSP Specification, WTP Specification, WTLS Specification, WDP Specification

UNIT V

BLUETOOTH : Design and Principles of Operation, Transmitter Characteristics, Bluetooth Security, Link Manager Protocol, Logical Link Control and Adaptation Layer Protocol, Alternatives to Bluetooth - **WIRELESS LANs:** Benefits of WLANs, Design and principles of Operation, WLAN Configurations, Microcells and Roaming, Types of WLANS, IEEE802.11, IEEE802.11a, IEEE802.11b

TEXT BOOKS:

1. Kaveh Pahlavan and Prashant Krishnamurthy," Principles of Wireless Networks-a Unified approach", Pearson , 2004
2. Gary S.Rogers et al, "An Introduction to Wireless Technology", Pearson, 2007

REFERENCES:

1. William Stallings,"Wireless communications and Networks", Pearson education, 2005, ISBN 81-7808-560-7
2. Jim Geier, "Wireless Networks first-step", Pearson, 2005.
3. Sumit Kasera et al, "2.5G Mobile Networks: GPRS and EDGE", TMH, 2008.
4. Matthew S.Gast, "802.11 Wireless Networks", O'Reilly, Second Edition, 2006.
5. Theodore s. Rappaport,"Wireless Communications –principles and practice", second edition, PHI, 2002
6. C.S.R.Prabhu et al, "Bluetooth Technology and its Applications with Java and J2ME", PHI, 2007.

M. Tech. (CN&IS) **II SEMESTER**

MOBILE COMPUTING

UNIT I

INTRODUCTION TO MOBILE COMPUTING: Introduction to Mobile Computing, Mobile Computing Functions, Devices, Applications and Services. **Mobile Computing Architecture:** Architecture for Mobile Computing, Three-Tier Architecture – Presentation Tier, Application Tier, Data Tier, Design Considerations for Mobile Computing: Client Context Manager, Context Aware Systems

UNIT II

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM): GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security - **GENERAL PACKET RADIO SERVICE(GPRS):** GPRS: GPRS and Packet Data Network, GPRS Network Architecture & Operations, Applications and Limitations of GPRS - **WAP:** WAP Architecture, Wireless Markup Language(WML), WML Script

UNIT III

MOBILE NETWORK LAYER: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP), Mobile Ad-hoc networks: Routing, destination Sequence Distance Vector, Dynamic Source Routing - **MOBILE TRANSPORT LAYER:** Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT VI:

BROADCAST SYSTEMS

Overview, Cyclical repetition of data, Digital audio broadcasting: Multimedia object transfer protocol, Digital video broadcasting: DVB data broadcasting, DVB for high-speed internet access, Convergence of broadcasting and mobile communications.

UNIT V

EMERGING TECHNOLOGIES: Introduction, Bluetooth, Radio Frequency Identification(RFID), Wireless Broadband(WiMax), IPv6, J2ME - **SECURITY ISSUES IN MOBILE COMPUTING :** Introduction, information Security, Security Models, Security Frameworks for Mobile Environment

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Pearson Education, Second Edition, 2008.
2. Asoke K Talukder, et al, “Mobile Computing”, Tata McGraw Hill, 2008.

REFERENCES:

1. Gary S.Rogers, et al, "An Introduction to Wireless Technology", Pearson Education, 2007.
2. Frank Adelstein et al, "Fundamentals of Mobile and Pervasive Computing", TMH, 2005.
3. Yi-Bang Lin, et al, 'Wireless and Mobile Network Architectures", Wiley-INDIA, 2008.
4. Dharma prakash Agarwal et al, "introduction to Wireless and Mobile Systems", Thomson, Second Edition, 2007.
5. Ivan Stojmenovic , "Handbook of Wireless Networks and Mobile Computing", Wiley, 2007.
6. Raj Kamal, "Mobile Computing", Oxford University Press, 2009

M. Tech. (CN&IS) **II SEMESTER**

INFORMATION SECURITY – II

UNIT I

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management - **Email Security:** Pretty Good Privacy (PGP) and S/MIME - **Web Security:** Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

UNIT II

Security in Wireless Networks and Devices: Introduction, Cellular Wireless Communication Network Infrastructure: Development of Cellular Technology, Limited and Fixed Wireless Communication Networks, Wireless LAN(WLAN) or Wireless Fidelity(Wi-Fi): WLAN Technology, WAP, Standards for Wireless Networks: The IEEE 802.11, Security in Wireless Networks: WLANs Security Concerns, Best Practices for Wi-Fi Security Problems, Hope on the Horizon for WEP - **Mobile Security:** Introduction, GSM, UMTS, Mobile IPv6 Security.

UNIT III

Computer and Network Forensics : Definition, Computer Forensics: History of Computer Forensics, Elements of Computer Forensics, Investigative Procedures, Analysis of Evidence, Network Forensics: Intrusion Analysis, Damage Assessment, Forensics Tools: Computer Forensic Tools, Network Forensic Tools - **Hostile Scripts:** Introduction, Introduction to Common Gateway Interface(CGI), CGI Scripts in a Three-Way Handshake, Server-CGI Interface, CGI Script Security Issues, Web Script Security Issues, Dealing with the Script Security Problems, Scripting Languages: Server-Side Scripting Languages, Client-Side Scripting Languages.

UNIT IV

Access Control, Authorization & Authentication

Access Control: Definitions, Access Rights: Techniques and Technologies, Access Control Systems: Physical Access Control, Access Cards, Electronic Surveillance, Biometrics, Event Monitoring - **Authorization:** Authorization Mechanisms, Types of Authorization Systems: Centralized, Decentralized, Implicit, Explicit, Authorization Priniciples: Least Privileges, Separation of Duties - **Authentication:** Definitions, Multiple factors and Effectiveness of Authentication, Authentication Elements, Types of Authentication, Authentication Methods

UNIT V

System Intrusion Detection and Prevention

Definition, Intrusion Detection: The System Intrusion Process, The Dangers of System Intrusions, Intrusion Detection Systems(IDSs): Anomaly Detection, Misuse Detection, Types of IDS: Network-Based IDS, Host-Based IDS, Hybrid IDS, Intrusion Prevention Systems(IPS): Network-Based IPS, Host-Based IPS, Intrusion Detection Tools.

TEXT BOOKS:

1. Computer Network Security, Joseph Migga Kizza, Springerlink.
2. Cryptography and Network Security, Third edition, Stallings, PHI/Pearson

REFERENCES:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, K.S.Gupta et al, TMH 2005.
2. Computer Security, Dieter Gollmann, Second Edition, Wiley India
3. The Handbook of Data & Networks Security, Buchanan W.J., Springer
4. Computer Evidence:Collection & Preservation, Christopher L.T.Brown, Firewall Media
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH

M. Tech. (CN&IS) **II SEMESTER**

INFORMATION SECURITY, MANAGEMENT & STANDARDS

UNIT I

Security Risk Assessment and Management: Introduction to Security Risk Management. Reactive and proactive approaches to risk management. Risk assessment, quantitative and qualitative approaches and asset classification – **Security Assurance Approaches:** Introduction to OCTAVE and COBIT approaches.

UNIT II

Security Management of IT Systems: Network security management. Firewalls, IDS and IPS configuration management. Web and wireless security management. General server configuration guidelines and maintenance.

UNIT III

Information Security Management

Information classification. Access control models, role-based and lattice models. Mandatory and discretionary access controls. Linux and Windows case studies. Technical controls, for authentication and confidentiality. Password management and key management for users. Case study: Kerberos.

UNIT IV

Key Management in Organizations: Public-key Infrastructure. PKI Applications, secure email case study(S/MIME or PGP). Issues in public-key certificate issue and lifecycle management - **Management of IT Security Infrastructure:** Computer security log management, malware handling and vulnerability management programs. Specifying and enforcing security policies.

UNIT V

Auditing and Business continuity Planning: Introduction to information security audit and principles of audit. Business continuity planning and disaster recovery. Case study: 9/11 tragedy. Backup and recovery techniques for applications and storage. Computer forensics: techniques and tools. Audit Tools: NESSUS and NMAP. **Information Security Standards and Compliance:** Overview of ISO 17799 Standard. Legal and Ethical issues.

TEXT BOOKS:

1. Slay, J. and Koronios, A. (2006) IT Security and Risk Management, Wiley
2. Incident Response and Computer Forensics. Chris Prosise and Kevin Mandia. McGraw-Hill (2003).
3. Nina Godbole, Information Systems Security-Security Management, Metrics, Frameworks and Best Practices, Wiley, 2009
4. Information Security Policies, Procedures, and Standards: Guidelines for Effective Information Security Management (Paperback) AUERBACH; 1 edition

REFERENCES:

1. Microsoft Security Risk Management Guide (Chapters 2 and 4). (Unit 1)
2. Risk Management Guide for Information Technology Systems (Unit 1)
   http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf
3. OCTAVE approach (Unit 1)
   http://www.cert.org/octave/pubs.html
4. COBIT (Unit 2)
   http://www.isaca.org/
5. Network Security Testing Guidelines(Unit 2)
   http://csrc.nist.gov/publications/nistpubs/800-42/NIST-SP800-42.pdf
6. Guide to Firewalls and Policies (Unit 2)
   http://csrc.nist.gov/publications/nistpubs/800-41/sp800-41.pdf
7. Wireless security management guidelines (Unit 2)
   http://csrc.nist.gov/publications/nistpubs/800-97/SP800-97.pdf
8. Guide lines for Securing Web Servers (Unit 2)
   http://csrc.nist.gov/publications/nistpubs/800-44/sp800-44.pdf
9. Authentication and Confidentiality (Unit 3)
   http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter16.html
   http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter17.html
10. Information and Information Systems Classification With Respect to Security categories. (Unit 3)
    http://csrc.nist.gov/publications/nistpubs/800-60/SP800-60V1-final.pdf
    http://csrc.nist.gov/publications/nistpubs/800-60/SP800-60V2-final.pdf
    http://csrc.nist.gov/publications/nistpubs/800-60/proposedErrata-changes-SP800-60_Vol2.pdf
11. Applied Cryptography by Bruce Schneier (3rd Edition) for Public-Key Infrastructure (Unit 4)
12. Guide to Computer Log Management (Unit 4)
    http://csrc.nist.gov/publications/nistpubs/800-92/SP800-92.pdf
13. Guide to Malware handling and prevention (Unit 4)
    http://csrc.nist.gov/publications/nistpubs/800-83/SP800-83.pdf
14. Guide lines for Patch and Vulnerability Management Program (Unit 4)
    http://csrc.nist.gov/publications/nistpubs/800-40-Ver2/SP800-40v2.pdf
15. Guide to Forensic Techniques (Unit 5)
    http://csrc.nist.gov/publications/nistpubs/800-86/SP800-86.pdf
16. Audit Trails (Unit 5)
    http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter18.html
17. Security-Self Assessment Guide from NIST (Unit5)
    http://csrc.nist.gov/publications/nistpubs/800-26/sp800-26.pdf

M. Tech. (CN&IS) **II SEMESTER**

DISTRIBUTED SYSTEMS
ELECTIVE III

UNIT I

Characterization of Distributed Systems. Design Issues, User Requirement, Network Technologies and Protocols, IPC, Client-Server Communication, Group Communication, IPC in UNIX - Remote Procedure Calling, Design issues, Implementation, Asynchronous RPC

UNIT II

Distributed OS, Its kernel, Processes and Threads, Naming and Protection, Communication and Invocation, Virtual Memory, File Service components, Design issues, Interfaces, implementation techniques, SUN network file systems

UNIT III

SNS – a name service model, its design issues, Synchronizing physical clocks, Logical time and logical clocks, Distributed coordination. Replication and its architectural model, Consistency and request ordering, Conversation between a client and a server, Transactions, Nested Transactions - Concurrency control, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

UNIT IV

Distributed Transactions and Nested Transactions, Atomic commit protocols, Concurrency control in distributed transactions, distributed Deadlocks, Transactions with replicated data, Transaction recovery, Fault tolerance, Hierarchical and group masking of faults - **Cryptography**, Authentication and key distribution, Logics of Authentication, Digital signatures.

UNIT V

Distributed shared memory, Design and Implementation issues, Sequential consistency and ivy, Release consistency and Munin, Overview of Distributed Operating systems Mach, Chorus.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Third Edition, Pearson Education.

REFERENCES:

1 Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
2. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.

M. Tech. (CN&IS) **II SEMESTER**

WEB SERVICES
ELECTIVE III

UNIT I

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

UNIT II

Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services - **Web Services Architecture** – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services, developing web services enabled applications.

UNIT III

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding , SOAP message exchange models, SOAP communication and messaging, SOAP security - **Developing Web Services using SOAP** – Building SOAP Web Services, developing SOAP Web Services using Java, limitations of SOAP.

UNIT IV

Describing Web Services – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL - **Discovering Web Services** – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

UNIT V

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET and J2EE. **Web Services Security** – XML security frame work, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

TEXT BOOKS:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

REFERENCES:

1. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
2. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.

M. Tech. (CN&IS) **II SEMESTER**

DATABASE SECURITY
ELECTIVE III

UNIT I

Introduction

Introduction to Databases Security Problems in Databases Security Controls Conclusions

UNIT II

Security Models – 1: Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases - **Security Models – 2:**Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

UNIT III

Security Mechanisms: Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria - **Security Software Design**: Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

UNIT IV

Statistical Database Protection & **Intrusion Detection Systems:** Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

UNIT V

Models For The Protection Of New Generation Database Systems –1: Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases **Models For The Protection Of New Generation Database Systems –2:** A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

TEXT BOOKS:

1. Database Security by Castano *Pearson Edition (*1/e)
2. Database Security and Auditing: Protecting Data Integrity and Accessibility 1st Edition, Hassan Afyouni, THOMOS Edition

M. Tech. (CN&IS) **II SEMESTER**

COMMUNICATION PROTOCOL ENGINEERING
ELECTIVE III

UNIT I
Introduction.
Network Reference Model.

UNIT II
Protocol Specification.
SDL: A Protocol Specification Language.

UNIT III
Protocol Verification/Validation.
Protocol Conformance Testing.

UNIT IV
Protocol Performance Testing.
Protocol Synthesis.

UNIT V
Protocol Implementation.

TEXT BOOKS:

1. Communication Protocol Engineering, VENKATARAM PALLAPA, Manvi S. Sunilkumar , PHI edition
2. Communication Protocol Engineering, Miroslav Popvoic

M. Tech. (CN&IS) **II SEMESTER**

NETWORK MANAGEMENT AND PERFORMANCE EVALUATION
ELECTIVE IV

UNIT I

Introduction to Network Management: Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management. Network Management System Platform, Current Status and future of Network Management

UNIT II

SNMP v1 Network Management: Organization and Information Models: The History of SNMP Management The SNMP Mode, The Organization Model, System Overview, The Information Model. The SNMP Communication Model, Functional model - **SNMP Management: SNMP v2:** Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMP v1

UNIT III

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial network management Systems, System Management, and Enterprise Management Solutions - **Web-Based Management:** NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, **WBEM:** Windows Management Instrumentation. Java management Extensions, Management of a Storage Area Network: Future Directions

UNIT IV

Performance Modeling and Estimation: Overview of Probability and Stochastic Processes – Probability, Random Variables Stochastic Processes, Queuing Analysis - How Queues Behave - A Simple Example Why Queuing Analysis. Queuing Models, Single-Server Queues. Multi server Queues, Examples, Queues with Priorities, Networks of Queues, Other Queuing Models. Estimating Model Parameters - **Modeling and Estimation of Self-Similar Traffic:** Self-Similar Traffic - Self-Similarity, Self-Similar Data Traffic, Examples of Self-Similar Data Traffic, Performance Implications of Self-Similarity. Modeling and Estimation of Self-Similar Data Traffic

UNIT V

Quality of Service in IP Networks: Exterior Routing Protocols and Multicast - Path-Vector Protocols: BGP and IDRP. Multicasting, Integrated and Differentiated Services - Integrated Services Architecture (ISA), Queuing Discipline, Random Early Detection. Differentiated Services, Protocols for QOS Support - Resource Reservation: RSVP. Multi protocol Label Switching, Real-Time Transport Protocol (RTP)

TEXT BOOKS:

1. Mani Subramanian, "Network Management, Principles and Practice", Pearson Education, 2000, rp2007.
2. William Stallings, "High-Speed Networks and Internets: Performance and Quality of Service – 2ed", Prentice Hall/Pearson Education, 2002.

REFERENCES:

1. Benoit Claise and Ralf Wolter, "Network Management: Accounting and Performance Strategies", Pearson Education, 2007, rp2008.
2. J. Richard Burke, " Network Management – Concepts and Practice: A Hands-on Approach", PHI, 2004, rp2008.
3. Stephen B. Morris, "Network Management, MIBs and MPLS", Pearson Education, 2003, rp2008.
4. Anurag Kumar, D.Manjunath and Joy Kuri, "Communication Networking: An Analytical Approach", Elsevier, 2004.
5. Engineering Internet Qos, Sanjay Jha and Mahbub Hassan, Artech House, 2002
6. Thomas G. Robertazzi, "Conputer Networks and Systems – Queuing Theory and Performance Evaluation – 3ed", Springer, 2000, rp2002.
7. Gary N. Higginbottom, "Performance Evaluation of Communication Networks", Artech House, 1998.

M. Tech. (CN&IS) **II SEMESTER**

INFORMATION RETRIEVAL SYSTEMS
ELECTIVE IV

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, **Information Retrieval System Capabilities** - Search, Browse, Miscellaneous.

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure - **Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT III

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters - **User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext - **Information Visualization**: Introduction, Cognition and perception, Information visualization technologies.

UNIT IV

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. **Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT V

Multimedia Information Retrieval – Models and Languages – Data Modeling, Query Languages, Indexing and Searching - **Libraries and Bibliographical Systems –** Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.
2. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.

REFERENCES:

1. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.
3. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

M. Tech. (CN&IS) **II SEMESTER**

WIRELESS SECURITY
ELECTIVE IV

UNIT I

Traditional Security Issues: Integrity, Confidentiality, Nonrepudiation, Availability, Mobile and Wireless Security Issues: detectability, Resource Depletion/Exhaustion, physical Intercept Problems, Theft of Service, War Driving/Walking/Chalking, Mobility, Problems in Adhoc Networks: Routing, Prekeying, Reconfiguring, Hostile Environment Additional Issues: Commerce – liability, Fear, Uncertainty, Doubt, Fraud, Big Bucks at Stake

UNIT II

Approaches to Security; Limit the Signal, Wire Integrity and Tapping, Physical Limitation, Encryption, Public and Private key Encryption, Computational and Data Overhead, Integrity Codes, Checksum, Hash, MAC, Payload vs Header, Traffic Analysis – **IPSec**: Authentication Header(AH), Encapsulating Security Payload(ESP), Other Security-Related Mechanisms, Authentication Protocols, AAA, Special Hardware

UNIT III

Security in Wireless Personal Area Networks: Basic Idea, Bluetooth (Specifications, Network Terms, Security Mechanisms), Bluetooth Security Modes, Bluetooth Security Mechanisms, Initialization Key, Unit Key, Combination Key, Master Key, Encryption, Authentication, Limitations and Problems - **Security in Wireless Local Area Networks**: Wireless Alphabet Soup, Wired Equivalent Privacy (WEP) – goals, data frame, encryption, decryption, authentication, flaws, fixes

UNIT IV

Wi-Fi Protected Access (WPA), IEEE 802.11i, Encryption Protocols, Access Control via 802.1x, Fixes and "Best Practices", Anything is Better than Nothing, Know Thine Enemy, Use Whatever Wireless Security Mechanisms are Present, End – To – End VPN, Firewall Protection -

Broadband Wireless Access, IEEE 802.16, IEEE 802.16 Security, Key Management, Security Associations, Keying Material Lifetime, Subscriber Station(SS) Authorization, Encryption, problems and limitations

UNIT V

Security in Wide Area Networks, basic idea, CDMA, GSM, GSM Authentication, GSM Encryption, Problems with GSM Security, Session Life, Weak Encryption Algorithm, Encryption Between Mobile Host and Base Station Only, Limits to the Secret Key

TEXT BOOKS:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, K.S.Gupta et al, TMH 2005.

REFERENCES:

1. Wireless Security Models, Threats and Solutions, Randall k. Nichols, Panos C. Lekkas, TMH, 2006.
2. 802.11 Security, Bruce Potter & Bob Fleck, SPD O'REILLY 2005.
3. Guide to Wireless Network Security, Springer.

M. Tech. (CN&IS) **II SEMESTER**

ADHOC AND SENSOR NETWORKS
ELECTIVE IV

UNIT I

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs - **Routing in MANETs:** Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, Other routing algorithms.

UNIT II

Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting - **TCP over Ad Hoc:** TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT III

Basics of Wireless, Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT IV

Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots - **Security:** Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT V

Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms - **Operating System:** TinyOS - **Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal*, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

M. Tech. (CN&IS) **II SEMESTER**

WEB PROGRAMMMING LAB

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com The website should consist the following pages.
   - Home page
   - Registration and user Login
   - User Profile Page
   - Books catalog
   - Shopping Cart
   - Payment By credit card
   - Order Conformation
2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Bean Assignments
   a. Create a JavaBean which gives the exchange value of INR(Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
   b. Create a simple Bean with a label - which is the *count* of number of clicks. Than create a BeanInfo class such that only the "*count*" property is visible in the Property Window.
   c. Create two Beans-a)KeyPad .b)DisplayPad .After that integrate the two Beans to make it work as a Calculator.
   d. Create two Beans Traffic Light(Implemented as a Label with only three background colours-Red,Green,Yellow) and Automobile(Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.

Light Transition	Automobile State
Red ---> Yellow	Ready
Yellow ---> Green	Move
Green --> Red	Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using Servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

7. Implement the "Hello World!" program using JSP Struts Framework.

TEXT BOOKS:

1. Java Server Programming for Professionals, 2nd Edition, Bayross and others, O'reilly,SPD.
2. JDBC, Servlets, and JSP ,Black Book, K. Santosh Kumar, dreamtech.
3. Core Web Programming, 2nd Edition, Volume 1, M.Hall and L.Brown, PHPTR.
4. Core Web Programming, 2nd Edition, Volume 2, M.Hall and L.Brown, PHPTR.
5. Core Java, Volume 1, Horstman and Cornell, 8th Edition, Pearson Education.
6. Core Java, Volume 2, Horstman and Cornell, 8th Edition, Pearson Education.
7. Java Programming: Advanced Topics, 3rd Edition, J.Wiggles worth and P.McMillan,Thomson.