

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M.TECH (COMPUTER NETWORKS AND INFORMATION SECURITY)**  
**COURSE STRUCTURE AND SYLLABUS**

**I YEAR I SEMESTER**

<b>Code</b>	<b>Group</b>	<b>Subject</b>	<b>L</b>	<b>P</b>	<b>Credit</b>
		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

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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 Ad-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.

# **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**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**

NetworkIPC (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..NetworkIPC (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,iocctl 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, 4<sup>th</sup> 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, 3<sup>rd</sup> Edition, Graham Glass, King Ables, Pearson Education, 2003.
6. Advanced Programming in the Unix environment, 2<sup>nd</sup> 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, 1<sup>st</sup> Edition, Wiley India pvt Ltd.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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, 2<sup>nd</sup> edition, O'Reilly, SPD.
4. Distributed Systems, Concepts and Design, 3<sup>rd</sup> edition, G.Coulouris, J.Dollimore and Tim Kindbirg, Pearson Education.
5. Java Programming with CORBA, 3<sup>rd</sup> edition, Brose, Vogel, Duddy, Wiley Dreamtech.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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 arithmetic, 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 Signatures, 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.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech. (CN&IS)

I SEMESTER

## 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, JDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API.  
Web servers: Tomcat Server installation & Testing.  
Introduction to Servlets: Lifecycle of a Servlet, JSDK The Servlet API, The javax.servelet Package, Reading Servlet 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 Servlet. 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 Data 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 2<sup>nd</sup> 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 Programmng-Bai/Ekedaw-Thomas
10. Beginning Web Programming-Jon Duckett WROX.
11. Java Server Pages, Pekowsky, Pearson.
12. Java Script,D.Flanagan,O’Reilly,SPD.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**M. Tech. (CN&IS) I SEMESTER**

**SOFTWARE ARCHITECTURE AND PROCESS MANAGEMENT**  
**ELECTIVE -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

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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, Receiver Heterogeneity, 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, Customizing 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 , Wolfgang 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.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**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.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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, 2<sup>nd</sup> 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.

# **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**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.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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.

## **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**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 remainder. 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 remainder (-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, Ellie Quigley, Pearson Education.

- \* Simple
- \*\* Moderate
- \*\*\* Complex