CS-10001   **Computer Networks**

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UNIT-I

Basics of Networking, Description of LAN, MAN, WAN and wireless Networks, OSI and TCP/IP models with description of Data Encapsulation & Peer to Peer communication, Mobile Adhoc networks, Data transmission in wired network, and wireless Network.

UNIT-II

LLC and MAC sub layer, MAC addressing, Framing Error control and flow control, Error Detection & Correction , Elementary data link protocols, Channel allocation problem – static and dynamic. Multiple Access protocol – ALOHA, CSMA/CD, CSMA/CA, Token bus, Token ring,

UNIT-III

Network layer addressing, Network-layer data gram, IP addressed classes. Subnetting – Sub network, Subnet mask. Routing algorithm – optimality Principle, Shortest path routing, Hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host – Concatenated Virtual circuits, tunneling, Fragmentation and DHCP. Routing Protocol – RIP, IGRP, OSPF and EIGRP.

UNIT-IV

Transport Layer Protocols :TCP & UDP. Three-way hand shakes open connection. Application layer design issues., Application layer protocols: TELNET, FTP, HTTP, SNMP.
Need of network security. Security policies, network security at various layers, Introduction to DoS and DDoS

Books

Computer Networks	Tanenbaum	PHI
Computer Networks and Their Protocols	Darix	DLA Labs
Comp. Communication & Networks	Freer	East-West-Press
Data Communication and Networking	Forouzen	Tata McGraw Hill

CS-10002	**Network Programming**	**L**	**T**	**P**	**C**
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Unit-1
Socket Programming: Creating sockets, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls – socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models, select & poll functions, socket implementation (client & server programs).

Unit-2
APIs & Winsock Programming: Windows socket API, window socket & blocking I/O model, blocking sockets, blocking functions, timeouts for blocking I/O, API overview, Different APIs & their programming technique, DLL & new API's, DLL issues, Java Beans.

Unit-3
Web Programming & Security: Java network programming, packages, RMI, Overview of Javascript, WAP architecture & WAP services, Web databases, Component technology, CGI programming, Firewall & security technique, Cryptography, Digital Signature.

Unit-4
Client/Server Programming: Client side programming: Creating sockets, Implementing generic network client, Parsing data using string Tokenizer, Retrieving file from an HTTP server, Retrieving web documents by using the URL class. Server side programming: Steps for creating server, Accepting connection from browsers, creating an HTTP server, adding multithreading to an HTTP server.

Books
1. Steven.W.R, UNIX Network Programming, PHI (VOL I& II)
2. Bobb Quinn and Dave Schutes, Window Socket Programming
3. Davis.R.: Windows Network Programming, Addison Wesley
4. Baner .P., PH New Jersey, NETWORK PROGRAMMING With Windows Socket
5. Ivan Stojmenovic (Editor), Handbook of Wireless Networks and Mobile Computing, Wiley, ISBN: 0-471-41902-8, February 2002
6. Core Java Volume I and II from Sun Micro Systems.
7. Huges, Java Networking, Hut Publication, Pune
8. Java 2: The Complete Reference 4/e; Herbert Schildt, TMH, Delhi.

CS-10006   **Data Communication and Network Security**

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Unit I

Introduction: Data communication and network security, Data representation, Components, Protocols and standards, Network Models, OSI model, TCP/IP model, Data and signals,. Transmission performance parameters, Multiplexing, FDM, TDM, WDM, Transmission media, guided and unguided, Circuit switching, Packet switching, Message switching, Error and correction, Hamming code

Unit II

Network Security : Issues- Impersonation, Security Services, Message Confidentiality, Message integrity, Message authentication, Message non-Repudiation, Digital Signature, IP Security, SSI/TLS, Virtual Private Networks and Firewalls.

Web Security: Web Servers Secure Electronic Mail, Enchance Eamil, Pretty Good Privacy**.**

Unit III

Cryptography : Security goals, Attacks, Type of Cryptography, Linear congruence, Chines Remainder Theorem, Symmetric Key Cryptography, Monoalphabetic Substitution Ciphers such as the Caesar Cipher, Cryptanalysis of Monoalphabetic Ciphers, Ployalphabetic Ciphers such as Vigenere, Vernam Cipher, Transposition Ciphers, Stream and block ciphers, Modern Ciphers, One time pad Cipehers, two dimensional ciphers, Asymmetric Key Cryptography, Encryption system, Merkle-Hellman and Knapscas, Rivlets-Shamir-Adlman(RSA) Encryption, DES Standard

Unit IV

Steganography and Watermarking : Type of Steganography, Attacks on Steganography, Characteristics of Steganography, LSB Substitution Techniques, Moderate Bit Substitution method, Modern Application of Steganography, Introduction of Watermaking

Books

Data communication and networking	Bebrouz A Forouzan	TMH
Cryptography and Network Security	Bebrouz A Forouzan	TMH
Principles of cryptography	William Stalling	Pearson Education
Cryptography and Network Security	Atul Kahate	TMH

CS-10005 **DIGITAL IMAGE PROCESSING**

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Unit-I
Digital Image Fundamentals

Scenes and images, different stages of image processing and analysis, components of image processing system, visual preliminaries, brightness adaptation and contrast, acuity and contour, texture and pattern discrimination, shape detection and recognition, colour perception, image formation, geometric and photometric models, digitization including sampling, quantization and digital image visual details.

Unit-II
Image Enhancement and Restoration

Contrast intensification comprising of linear stretching, non-linear stretching, fuzzy property modification, histogram specification, modifying grey level co-occurrence matrix and local contrast stretching, smoothing including image' • averaging, mean filter, ordered statistic filter, edge-preserving smoothing and low pass filtering, image sharpening including high-pass filtering and homomorphic filtering, image restoration fundamentals, minimum mean square error restoration least square error restoration, constrained least square error restoration.

Unit III
Image Compression

Fundamentals of image compression, error criterion, lossy compression including transform compression, block truncation compression, vector quantization compression, lossless compression including Huffman coding method

Unit-IV Image
Segmentation and Edge Detection

Region extraction, pixel based approach including feature thresholding., optimum thresholding ahd threshold selection, methods, edge detection fundamentals, derivative operators including Roberts, 4-neighbour, Prewitt and Sobel operators, Canny edge detector, Laplacian edge detector and Laplacian of Gaussian edge detector.

Books

Digital Image Processing	Rafael C. Gonzalez	Pearson
Digital Image Processing & Analysis	Chanda & Majmudar	PHI
Computer Viosion and		
Image Processing	S Nagabhushana	New Age International

CS-10004 **OPTIMIZATION TECHNIQUES**

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UNIT-I

OPTIMIZATION PROBLEM: Definition, types, optimality criteria, single-variable optimization, exhaustive search, region elimination, fibonacci search and golden section search, cubic interpolation method, Newton-Raphson bisector and secant method.

UNIT-II

MULTIVARIABLE OPTIMIZATION ALGORITHMS: Direct search methods-evolutionary simplex, Hooke-Jeeves pattern search, Gradient Based Method- Steepest method, Newton conjugate gradient method.

UNIT-III

CONSTRAINED OPTIMIZATION: Kuhn Tucker condition, transformation methods, penalty function, method of multipliers, sensitivity analysis, interior point optimization.

UNIT-IV

NON-TRADITIONAL OPTIMIZATION: Genetic Algorithms for constrained optimization, simulated annealing, Multi Objectives Optimization Problems, weighting method, ε-constrained method, decision-making, min-max problem. Evolutionary Programming, Particle Swarm Optimization.

Books:

1.   Optimization Techniques, S S Rao.
2.   Optimization for Engineering Design Algorithms and Examples, Kalyanmoy Deb, PHI.
3.   Emerging Optimization Techniques in Producion Planning & Control by Godfrey G Onubolu, Imperial College Press.
4.   Multi Objective Optimization using Evolutionary Algorithms by Kalyanmoy Deb, Chichester, UK, Wiley.
5.   Non-Linear programming; Sequesntial Unconstrained Minimization Techniques by A V Fiacco and G P McComic, John Wiley & Sons, New York.
6.   Modern Optimization Techniques in Power Systems by Yong Hua Song, Kluwer Academic Publishers.
7.   Power System Optimization by D.P.Kothari, J.S. Dhillon, PHI

CS-10003   **WIRELESS SENSOR NETWORKS**

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UNIT-I

ADHOC WIRELESS

Mobile Adhoc Networks, Technologies for Adhoc Network, Issues in Adhoc wireless Networks, IEEE 802.11 Architecture and protocols. Protocol for ADHOC Wireless Networks
Issues and classification of MAC protocol, other MAC protocols, Dynamic Source Routing (DSR), On-demand Distance Vector (AODV) Routing Protocols, and Multicasting Routing issues

UNIT-II

TRANSPORT LAYER & SECURITY PROTOCOLS

Issues in designing transport layer protocols, TCP over Adhoc Wireless Networks, Network Security Attacks, and Key management..

UNIT-III
WIRELES SENSOR NETWORKS
Basic Sensor Network Architectural Elements, Applications of Sensor Networks, Comparison with Wireless Networks, Challenges and Hurdles. Architecture of Wireless Senser Networks (WSNs) Hardware components, Operating systems and execution environments, some examples of sensor nodes, Network Architecture, Sensor networks scenarios, Optimization goals and figures of merit, Design principles for WSNs.

UNIT-IV
COMMUNICATION PROTOCOLS

Physical Layer and Transceiver design considerations in WSNs, Fundamentals of (wireless) MAC protocol, Address and name management in wireless sensor networks, Localization and positioning

Routing protocols Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless, Routing Strategies in WSNs, Quality of Service (QoS) in wireless sensor networks, Coverage and deployment

References:

C Siva Ram Murty & BS Manoj	Adhoc Wireless Networks: Architectures & Protocols	2nd Ed, Pearson Education
Adleshein & Gupta	Fundamentals of Mobile and Pervasive Computing	TMH, 2005

Kazem Sohraby, Daniel Minoli, Taieb Znati, John Wiley & Sons

Wireless Sensor Networks Technology, Protocols, and applications

John Wiley & Sons.