7IT41   **COMPUTER NETWORKS & INTERNET**

UNIT-I:

Introduction: The use of computer networks, networks for companies, network for people, social issues. Network hardware. LAN's, MAN's, WAN's, wireless networks, internetworks, network software, protocol hierarchies, design issues for layers, interfaces and services, connectionless oriented and connectionless services, service primitives, relationship of services to protocols, the **OSI** reference model, TCP/IP reference model, comparison of OSI and TCP/IP reference model, critique of **OSI** model & protocols, critique of **TCP/IP** reference model. Example networks - novel! Netware, ARPANET, **NSFNET,** the internet, **SMDS, X.25** network, frame relay, network standardization - who's who in the telecommunication world, who's who in international standards world, who's who in the internet standards world.

UNIT-II:

Physical Layer - The theoretical basis for data communication-Fourier analysis, bandwidth-limited signals, maximum data rate of a channel, transmission media-magnetic media, twisted pair coaxial cable, fiber optics. Wireless transmission, microwave transmission, infrared and millimeter waves, light wave transmission. Telephone system structure, politics of telephones, local loop, trunks and multiplexing, switching, narrowband ISDN - services, architecture, interface, perspective on N-ISDN, broadband ISDN & ATM-virtual circuits versus circuit switching, transmission in ATM networks, ATM switches.

UNIT-Ill

Data Link Layer - design issues - services provided to the network Layer, framing, error control, flow control, error correcting & detecting codes, elementary data link protocols, simplex stop and wait simplex protocol for noisy channel, sliding window protocols-one bit protocol, go back protocol, selective repeat protocol. The medium access sub layer - static and dynamic channel allocation in LANs and MANs, Multiple access protocols - ALOHA. CSI\IA, collision free protocols, limited contention protocols, wavelength division multiple access protocols, wireless LAN protocols, IEEE Standards 802 for LAN and MANs-802.3 & Ethernet, token bus. token ring, comparison 802.6, 802.2.

UNIT-IV

The Network Layer - Design issues, services provided to the transport layer, internal organization, comparison of virtual circuit and datagram subnets, routing algorithms. Optimality principle, shortest path routing, flooding, flow-based routing, distance vector routing, link state routing, hierarchical routing, broadcast **&** multicast routing, congestion control algorithms, general principles prevention policies, traffic shaping. flow specifications, congestion control in virtual circuit subnets. choke packets, load shedding, jitter control, congestion control for multicasting. Internetworking - how networks differ, concatenated Virtual circuits, connectionless Internetworking tunneling. internetwork routing, fragmentation, firewalls, the Network layer in the internet - IP protocol, IP address. subnets, internet control protocols, OSPF. BGP, internet, Multicasting.

UNIT IV

Transport and Application Layer - services provided to the upper layer, Quality of Service, transport service primitives, elements of transport protocols, addressing, establishing a connection, releasing a connection, flow control & buffering, multiplexing, crash recovery, network security - traditional cryptography, fundamental principles, secret-key algorithms, public key algorithms, authentication protocols, digital signatures, social issues.

TEXTBOOKS::

1.Computer Networks Third Edition by Andrew Tanenbaum (PHI Pub.)

REFERENCE BOOKS:

1.Data. & Computer Communication, 5th Ed., by William Stallings (PHI Pub.)
2.Data & Network Communications by Michael A. Miller
3.Computer Networks & E-Commerce by Parag Diwan (Pentagaon Pub.)

UNIT-I

Discrete time signals and systems, linearity, time variance, casuality, stability properties of LTI casual system, response of LTI systems to various inputs, convolution, sampling theorem.

UNIT-Il

Frequency domain description of signals & system. fourier transform of discrete time signals, properties of DFT, DFTS of typical discrete time signals.

UNIT-Ill

The Z-transform, properties. ROCs relation with fourier transform. system function, inverse Z transform, solution of difference equation using unilateral Z-transform,

UNIT-IV

Digital filter design techniques design of FIR filters based on windows, design of IIR digital filters from analog filters.

UNIT-V

Introduction to FFT algorithms decimation in time - FFT algorithms, decimation in frequency FFT algorithms. DCT.

TEXT BOOKS:

1.Digital Signal Processing: Alen V.Oppenheim . W.Schaffer (PHI Pub
2.Digital Signal Processing: Proskies and Morialkies (PHI Pub.)

REFERENCE BOOKS:

1.Theory and Application of Signal Processing by Rabiner & Gold (PHI Pub.)
2.Digital Filter Design and Analysis by Andreas Antoniou (TMH Pub.)

PRACTICALS based on above syllabus using **MATLAB** and **TMS C320 C50**.

UNIT-I:
Introduction: attacks, services, mechanisms, security attacks, security services, a model for internet work security, encryption model, steganography, classical encryption techniques, modern techniques - simplified DES, block cipher principles, data encryption standard, strength of DES, differential & linear cryptanalysis, block cipher design principles, block cipher modes of operation, Algorithm - triple DES, international data encryption algorithm, blowfish, RCS, CAST, RC2, characteristics of advanced symmetric block ciphers.

UNIT-II:
Confidentiality using conventional encryption: placement of encryption function, traffic confidentiality, key distribution, random number generation. Public key cryptography: principles, RSA algorithm, key management, diffie-heliman key exchange, elliptic curve remainder theorem, discrete logarithms.

UNIT-III:
Message Authentication & hash functions: Authentication requirements, functions, codes, hash functions, security of hash function & MACs. Hash & Mac algorithms: MD5 message digest algorithm, secure hash algorithm (SHA- I), RJPEMD- 160, HMAC digital signatures & authentication protocols: digital signatures, authentication protocols, digital signature standard.

UNIT-IV:
Networks security practice: authentication applications - kerberos. X.509 directory authentication service, kerberos encryption techniques, E-mail security: pretty Good privacy, S/MIME, data compression using ZIP Radix-64 conversion. PGP random number generation, IP security: overview, architecture, authentication header, encapsulating security payload, combining security associations, key management.

UNIT-V:
Web security: requirements, secure sockets layer & transport layer security, secure electronic transaction, networks management security: basic concepts of SNMP, SNMPvI community facility, SNMPv3.
System Security: Intruders, viruses and worms - intruders, viruses & related threats, Firewalls:
design principles, trusted systems.

TEXTBOOKS::
Cryptography and networks security principles & practice 2/c by William Stalings (Pearson Education prentice Hall).

2. Networks security Essentials Applications & standards by William Stalings (Pearson Education, LPF).

REFERENCE BOOKS::

1. Cryptography in C and C++ by Michael Welschenbach (A press IDG Books India).
2. Introduction to Data Compression 2/c by Khalid Sayood (Morgan kaufmann/Harcourt India).

UNIT-I

Definitions, characteristics and limitations of O.R., phases of O.R., modelling in O.R., tool techniques of O.R., linear programming, formulation, solution of L.P.P., graphical method, simplex method, duality in L.P.P.

UNIT-II

Allocation models - Assignment models multiple optima, - prohibited assignment, transportation model, prohibited and preferred routes, degeneracy.

UNIT-III

Network analysis: Basic concept of network diagram, network construction, CPM, PERT, floats
in network analysis, cost analysis of project.

UNIT-IV

Queuing theory: Queuing process, components of queuing system, M/M/I(OO/FIFO) model, simulation, Monte Carlo simulation, concept and application in various areas such as queuing system, network.

UNIT-V

Maintenance and Replacement Problems: Models for routine maintenance and preventive maintenance decision, replacement models that deteriorate with time and those fail completely.

TEXT BOOKS::

1.Problems in Operation Research by P.K. Gupta & Man Mohan (Khanna Pub.)
2.Mathematical Models in Operation Research by .1K. Sharma (Macmillan Pub.)

REFERENCE BOOKS::

1 introduction to Operation Research by Hiller & Liberman (Holden Day Inc., Sanfransico)
2.Operations Research by Kantiswaroop & Gupta (S.Chand Pub.)
3.Principles of Operation Research by Wagner (PHI Pub.)
4.Operations Research by Dr. B.S. God & S.K. Mittal (Pragati Prakashan)

UNIT-I:

Switching algebra theorems, simplification of boolean functions using karnaugh maps, of combinational logic circuits, fault detection and location in two level circuits, clock concept in fllpflops, shift registers.

UNIT-II:

Introduction to CMOS circuit, MOS Transistorv theory, CMOS processing technology, circuit characterization and performance estimation, CMOS circuit and logic design.

UNIT-III:
Design of synchronous sequential machines using Mealy and Moore principles, minimization of state machines and their standard for ms FPGA, PLA, PLA, PLG.

UNIT-IV:

Introductory concepts of VHDL and Verilog language, HDL based programs for decoder, encoder, multiplexer, counters, flipfiops, and finite state machines

UNIT-V:

Architecture of 8 bit and 16-bit processors namely 8085. 8086 Concepts of increasing the speed of processor, architecture of other advanced processors, memory management, memory controllers. Introductory concepts of USB AND PCI buses.

TEXT BOOKS

1.Principles of CMOS VLSI Design by Weste and Eshraghian (Addison-Wesley Pub.)

REFERENCE BOOKS:

1.Digital logic and Computer Design by Morris Mano (PHI Pub.)
2.A VHDL Primer by Dr. Bhasker (Addison-Welsey Longman Pub.)
3.Verilog by Palnitkar.
4.VHDL by Nawabi (McGraw Hill Pub.)
5.VHDL by Perry.
6.Microprocessors Architecture Programming and Application with 8080/8085 by R.S.
   Gaonkar (Wiley Eastern Pub.)
7.Microporcessors and Digital Systems by DV. Hall (TMH Pub.)

FUZZY SYSTEM AND NEURAL NETWORKS

UNIT-I:

Basics of Artificial Neural Networks, characteristics of neural networks, historical development of neural network principles, model of neuron, basic learning laws. Learning in ANN: -supervised learning, unsupervised learning, reinforced learning, competitive learning, the delta rule, gradient descent rule, Hebbian learning, Parameters of ANN. ANN Topologies- Modeling ANNs, ANN learning & program, learning algorithms.
Discrimination ability - Learning separable ANNs, multilinear ANNs, and nonlinear separable ANNs.

UNIT-II:

McCulloch-Pitts model, Perceptron - Original perceptron, perceptron learning procedure, logic operations with simple layer perceptron, delta learning algorithms. ADALINE, MADALINE models, Winner-Takes-All Learning algorithm, Backpropogation learning algorithm — mathematical analysis, application, and criticism.

UNIT-III:

Hopfield model - Mathematical analysis, Hopfield learning algorithm, discrete time Hopfield net, and competitive learning model. Simulated annealing, Boltzman machine.

UNIT-IV:

Fuzzy logic - Prepositional logic, membership function, fuzzy logic, fuzzy rule generation, defuzzification of fuzzy logic, time dependent fuzzy logic. Temporal Fuzzy Logic (TFL) - Time invariant membership function, time variant membership function, intervals, semilarge intervals, internal operators, temporal fuzzy logic syntax, defuzzification of temporal fuzzy logic.

UNIT-V:

Fuzzy Neural networks (FANN) - Fuzzy neural example, Neuro fuzzy control — traditional control, neural control, fuzzy control, fuzzy neural control, applications.

TEXTBOOKS:

1.Understanding Neural Networks and Fuzzy Logic, Basic concepts and applications.
   by Stamatios V Kartalopoulos (PHI Pub.)
2.Fuzzy Sets uncertainty and information by George Klir (PHI Pub.)
3.Neural Networks and Fuzzy system by B.Kosko (PHI Pub.)

REFERENCE BOOKS:

1.Neural Networks, algorithms, application and programming techniques by J.P.Freeman & David M.Skapura
   (Pearson Education Pub.)
2.Fuzzy neural control, principles, algorithms and applications by Junhong Nie and Derek Linkens (PHI Pub.)'

UNIT-I

Multimedia - definitions, CD-ROM and the multimedia highway. uses of multimedia, introduction to making multimedia, the stages of project, requirements to make good multimedia, multimedia skills and training, the multimedia tea, training opportunities in multimedia.

UNIT-Il:

Multimedia hardware, macintosh and windows production platforms, hardware peripherals, connections, memory and storage devices, input devices output hardware, communication devices, media software, basic tools, making instant multimedia authoring tools.

UNIT-Ill:

Multimedia building blocks - text, sound. images, animation, video.

UNIT-IV:

Assembleing and delivering a project, planning and costing. designing and producing, content and talent, delivering. CD-ROM technology. DVD Tech.

UNIT-V:

Multimedia and Internet - History. web servers, web browsers, VRML, working on the web text, animation, images and sound for the web, multimedia applications, media communication, media consumption, media entertainment and multimedia games.

TEXT BOOKS::

1.Multimedia Making Work, by Tay Vaughan (TMH), 3rd Ed.

REFERENCE BOOKS:

1.Multimedia systems design by K. Andleigh, K. Thakkrar (PHi Pub.).
2.Multimedia: Computing, Communications & Applications
   by Raif Stein Metz and Kiara Nahrstedt.
3.Advanced Multimedia Programming by Steve Rimmer (McGraw Hill Pub
4.Multimedia Literacy by Fred T. Hofstetter (McGraw Hill Pub.)

7IT45/3　　　　　DIGITAL IMAGE PROCESSING

UNIT-I

Monochrome image representation and processing system(block diagram), Basic relationship between pixels, neighbors of pixel, connectivity, labeling of connected components, Relation equivalent and transitive closure**,** distance measure, arithmetic and logical operation, application of image processing.

UNIT-II:

Image Enhancement: Point operation, histogram modeling, spatial operation, transform operation, multi-spectral image enhancement, color image processing and enhancement, DFT, DCT**.**

UNIT-III:

Image Compression: Compression fundamentals, error free compression, variable length coding, bit plane coding, run line coding, entropy coding, loss less predictive coding. Huffman's coding, lossy compression, lossy predictive coding, transform coding.

UNIT-IV:

Image Restoration Degradation model diagonatization of circulant and block circulant matrices, algebraic approach to restoration, inverse filtering, Weiner filtering restoration, interactive restoration, restoration in spatial domain, coordinate transformation and geometric correction.

UNIT-V:

Image segmentation and representation: Detection of discontinuities, point detection, line detection, edge detection, image thresholding, role of illumination, global thresholding, region oriented segmentation, basic formulation, region growing by pixel aggregation, region splitting and merging, image representation, chain codes.

TEXT BOOKS:

1. Digital Image Processing by R.C. Gonzalez, R.E.Woods (Addision Wesley Pub.)

2**.**Fundamentals of Digital Image Processing by AK. Jain (PHI Pub.)

REFERENCE:

1.Fundamentals of Electronics Image Processing by AR. Weeks.

7IT45/4   CAD/CAM

UNIT-I

Introduction CAD/CAM define, product cycle & CAD/CAM automation & CAD/CAM. Fundamentals of CAD design process, Application of the computer for design, creating and manufacturing data base benefits of CAD.

UNIT-Il

Hardware in CAD design workstation, the graphics terminal, operator, input devices plotter & other output devices, CPU secondary storage. Computer graphics software and database, the software confirmation of a graphics system, function of a graphics package constructing the geometry, transformation database structure.

UNIT-III

Conventional numerical control, fundamental of CAM, NC concepts basic components of NC systems. The NC procedure NC coordinate systems, NC motion control systems application of NC economics of NC.

UNIT-IV

NC part programming the punched tape in NC tape coding and format manual part programming computer assisted part programming. Art language NC programming with interactive voice NV programming.

UNIT-V

Computer control NC problem with conventional NV, CNC, DNC, combined DNC systems, adaptive control machine systems, production planning and control.

TEXT BOOK:

1.CAD/CAM by P. Grover, Emory W. Zimmers Jr. (McGraw Hill Pub.)

REFERENCE BOOK:

1.CAD/CAM Theory& practice by I. Zeid (TMH Pub.)
2.Computer Aided Design: Software and Analytical Tools by Rajiv S. Krishnamurthy CS.
  (Narosa Pub.)
3.CAD/CAM by P. Radhakrishnamurthy and Subramanyam (Wiley Eastern Pub.)