

ANNA UNIVERSITY COIMBATORE

**FACULTY OF
ELECTRONICS & COMMUNICATION
ENGINEERING**

BOARD OF STUDIES -ECE

M.E. COMPUTER AND COMMUNICATION

CURRICULUM AND SYLLABI

I –IV SEMESTERS

REGULATIONS - 2007

ANNA UNIVERSITY COIMBATORE
M.E. COMPUTER AND COMMUNICATION
CURRICULUM 2007 - FULL TIME MODE

SEMESTER – I

Code No.	Course Title	L	T	P	M
Theory					
07CP101	Applied Mathematics	3	1	0	100
07CP102	Advanced Digital Signal Processing	3	0	0	100
07CP103	Modern Digital Communication Techniques	3	0	0	100
07CP104	Data communication Networks	3	1	0	100
07CP105	Object Oriented Software Development	3	0	0	100
07CP106	System Programming and Operating System	3	0	0	100
Practical					
07CP107	Computer and Communication Lab I	0	0	4	100
Total		18	2	4	-

SEMESTER – II

Code No.	Course Title	L	T	P	M
Theory					
0 7CP201	High Speed Networks	3	1	0	100
0 7CP202	Optical Fiber Communication	3	0	0	100
0 7CP203	Computer Architecture and Parallel Computing	3	0	0	100
0 7CP2XX	Elective I	3	1	0	100
0 7CP2XX	Elective II	3	0	0	100
0 7CP2XX	Elective III	3	0	0	100
Practical					
0 7CP204	Computer and Communication Lab II	0	0	4	100
Total		18	2	4	-

SEMESTER – III

Code No.	Course Title	L	T	P	M
Theory					
0 7CP3XX	Elective IV	3	0	0	100
0 7CP3XX	Elective V	3	0	0	100
0 7CP3XX	Elective VI	3	0	0	100
Practical					
0 7CP301	Project Work (Phase I)	0	0	12	200
Total		9	0	12	-

SEMESTER – IV

Code No.	Course Title	L	T	P	M
0 7CP401	Project Work (Phase II)	0	0	24	400
Total		0	0	24	-

LIST OF ELECTIVES
M.E. COMMUNICATION AND COMMUNICATION
SEMESTER II

Code No.	Course Title	L	T	P	M
0 7CP11	High Speed, Switching Architecture	3	0	0	100
0 7CP12	Multimedia Databases	3	0	0	100
0 7CP13	Mobile and Personal Communications	3	0	0	100
0 7CP14	Advanced Database System	3	0	0	100
0 7CP15	Advance Java Technology	3	0	0	100
0 7CP16	Genetic Algorithms and Applications	3	0	0	100
0 7CP17	Digital Image Processing	3	0	0	100
0 7CP18	Neural Networks and Applications	3	0	0	100
0 7CP19	Network Routing Algorithms	3	0	0	100

LIST OF ELECTIVES
M.E. COMMUNICATION AND COMMUNICATION
SEMESTER III

Code No.	Course Title	L	T	P	M
0 7CP20	Simulation of Communication Systems and Networks	3	0	0	100
0 7CP21	Communication Network Security	3	0	0	100
07CP22	Wireless Communication Networks	3	0	0	100
0 7CP23	Network Management	3	0	0	100
0 7CP24	Internet Programming	3	0	0	100
0 7CP25	E-Commerce Technology	3	0	0	100
0 7CP26	Real Time Embedded Systems	3	0	0	100
0 7CP27	Multimedia Compression techniques	3	0	0	100
0 7CP28	Network System Design Using Network Processor	3	0	0	100
0 7CP29	Wireless Sensor Networks	3	0	0	100
	Special Electives	3	0	0	100

SEMESTER I

07CP101 APPLIED MATHEMATICS

3 1 0 100

UNIT I

LINEAR ALGEBRAIC EQUATION AND EIGEN VALUE PROBLEMS

9+3

System of equations- Solution by Gauss Elimination, Gauss-Jordan and LU decomposition method- Jacobi, Gauss-Seidal iteration method- Eigen values of a matrix by Jacobi and Power method.

UNIT II

WAVE EQUATION

9+3

Solution of initial and boundary value problems- Characteristics- D'Alembert's Solution - Significance of characteristic curves - Laplace transform solutions for displacement in a long string - a long string under its weight - a bar with prescribed force on one end- free vibrations of a string.

UNIT III

SPECIAL FUNCTIONS

9+3

Bessel's equation - Bessel Functions- Legendre's equation - Legendre polynomials -Rodrigue's formula - Recurrence relations- generating functions and orthogonal property for Bessel functions - Legendre polynomials.

UNIT IV

RANDOM VARIABLES

9+3

One dimensional Random Variable - Moments and MGF – Binomial, Poisson, Geometrical, Normal Distributions- Two dimensional Random Variables – Marginal and Conditional Distributions – Covariance and Correlation Coefficient - Functions of Two dimensional random variable

UNIT V

QUEUEING THEORY

9+3

Single and Multiple server Markovian queueing models - Steady state system size probabilities – Little's formula - Priority queues - M/G/1 queueing system – P.K. formula.

$$L + T = 45 + 15 = 60$$

REFERENCES:

1. Sankara Rao.K. "Introduction to Partial Differential Equation ", PHI, 1995.
2. Taha. H.A., "Operations Research- An Introduction " 6th Edition, PHI, 1997.
3. Jain M.K. Iyengar, S.R.K. & Jain R.K., "International Methods for Scientific and Engineering Computation", New Age International (P) Ltd, Publishers 2003..
4. Kanpur J.N. & Saxena. H.C. "Mathematical Statistics", S.Chand & Co.,New Delhi, 2003.
5. Greweal B.S. "Higher Engineering Mathematics", Khanna Publishers, 2005.

07CP102 ADVANCED DIGITAL SIGNAL PROCESSING

3 1 0 100

[Review of discrete-time signals and systems- DFT and FFT, Z-Transform, Digital Filters is recommended]

UNIT I

9

DISCRETE RANDOM SIGNAL PROCESSING

Discrete Random Processes- Ensemble averages, stationary processes, Autocorrelation and Auto covariance matrices. Parseval's Theorem, Wiener-Khintchine Relation- Power Spectral Density- Periodogram, Spectral Factorization, Filtering random processes. Low Pass Filtering of White Noise. Parameter estimation: Bias and consistency.

UNIT II
SPECTRUM ESTIMATION

9

Estimation of spectra from finite duration signals, Non-Parametric Methods-Correlation Method , Periodogram Estimator, Performance Analysis of Estimators -Unbiased, Consistent Estimators- Modified periodogram, Bartlett and Welch methods, Blackman –Tukey method. Parametric Methods - AR, MA, ARMA model based spectral estimation. Parameter Estimation -Yule-Walker equations, solutions using Durbin’s algorithm

UNIT III
LINEAR ESTIMATION AND PREDICTION

9

Linear prediction- Forward and backward predictions, Solutions of the Normal equations- Levinson-Durbin algorithms. Least mean squared error criterion -Wiener filter for filtering and prediction , FIR Wiener filter and Wiener IIR filters ,Discrete Kalman filter

UNIT IV
ADAPTIVE FILTERS

9

FIR adaptive filters -adaptive filter based on steepest descent method-Widrow-Hoff LMS adaptive algorithm, Normalized LMS. Adaptive channel equalization-Adaptive echo cancellation-Adaptive noise cancellation- Adaptive recursive filters (IIR). RLS adaptive filters-Exponentially weighted RLS-sliding window RLS.

UNIT V
MULTIRATE DIGITAL SIGNAL PROCESSING

9

Mathematical description of change of sampling rate - Interpolation and Decimation , Decimation by an integer factor - Interpolation by an integer factor, Sampling rate conversion by a rational factor, Filter implementation for sampling rate conversion- Direct form FIR structures, Polyphase filter structures, time-variant structures. Multistage implementation of multirate system. Application to sub band coding - Wavelet transform and filter bank implementation of wavelet expansion of signals.

L-45 T-15 Total-60

REFERENCES:

1. Monson H.Hayes, Statistical Digital Signal Processing and Modeling, John Wiley and Sons, Inc.,Singapore, 2002.
2. John G.Proakis, Dimitris G.Manolakis, Digital Signal Processing Pearson Education, 2002.
3. John G.Proakis et.al., 'Algorithms for Statistical Signal Processing', Pearson Education, 2002.
4. Dimitris G.Manolakis et.al., 'Statistical and adaptive signal Processing', McGraw Hill, Newyork,2000.
5. Rafael C. Gonzalez, Richard E.Woods, 'Digital Image Processing', Pearson Education, Inc., Second Edition, 2004.(For Wavelet Transform Topic)

07CP103 MODERN DIGITAL COMMUNICATION TECHNIQUES 3 0 0 100

UNIT I
COHERENT AND NON-COHERENT COMMUNICATION:

9

Coherent receivers – Optimum receivers in WGN – IQ modulation & demodulation – Noncoherent receivers in random phase channels; M-FSK receivers – Rayleigh and Rician channels – Partially coherent receives – DPSK; M-PSK; M-DPSK,-BER Performance Analysis.

UNIT II
BANDLIMITED CHANNELS AND DIGITAL MODULATIONS:

9

Eye pattern; demodulation in the presence of ISI and AWGN; Equalization techniques – IQ modulations; QPSK; QAM; QBOM; -BER Performance Analysis. – Continuous phase modulation; CPM; CPFSK; MSK,OFDM.

UNIT III**9****BLOCK CODED DIGITAL COMMUNICATION:**

Architecture and performance – Binary block codes; Orthogonal; Biorthogonal; Transorthogonal – Shannon's channel coding theorem; Channel capacity; Matched filter; Concepts of Spread spectrum communication – Coded BPSK and DPSK demodulators – Linear block codes; Hamming; Golay; Cyclic; BCH ; Reed – Solomon codes..

UNIT IV**9****CONVOLUTIONAL CODED DIGITAL COMMUNICATION:**

Representation of codes using Polynomial, State diagram, Tree diagram, and Trellis diagram – Decoding techniques using Maximum likelihood, Viterbi algorithm, Sequential and Threshold methods – Error probability performance for BPSK and Viterbi algorithm, Turbo Coding.

UNIT V**9****SPREAD SPECTRUM SIGNALS FOR DIGITAL COMMUNICATION**

Model of spread Spectrum Digital Communication System-Direct Sequence Spread Spectrum Signals, Error rate performance of the coder, Generation of PN Sequences- Frequency-Hopped Spread Spectrum Signals, Performance of FH Spread Spectrum Signals in an AWGN Channel- Synchronization of Spread Spectrum Systems.

Total: 45**REFERENCES:**

1. M.K.Simon, S.M.Hinedi and W.C.Lindsey, Digital communication techniques; Signalling and detection, Prentice Hall India, New Delhi. 1995.
2. Simon Haykin, Digital communications, John Wiley and sons, 1998
3. Wayne Tomasi, Advanced electronic communication systems, 4th Edition Pearson Education Asia, 1998
4. B.P.Lathi Modern digital and analog communication systems, 3rd Edition, Oxford University press 1998.
5. John G. Proakis, Digital Communications, 4th Edition, McGraw-Hill, New york , 2001

07CP104 DATA COMMUNICATION NETWORKS**3 0 0 100****UNIT I****9****DATA COMMUNICATION FUNDAMETNALS AND OSI REFERENCE MODEL**

Overview of Data Communication and Networking – Analog / Digital signals and transmission, Simplex / Half and Full duplex and Synchronous / Asynchronous communication – Multiplexing – Transmission Media – Circuit switching and Telephone network – DSL, ADSL and Cable Modem – Network Configuration, Concepts of layering , ISO's OSI reference model – Physical Layer Standards – RS 232C, RS 449, RS 422A / 423A, X.21 and V.24.

UNIT II**9****DATA LINK LAYER**

Error detection and correction – Data link control and protocols – Flow and Error control – Sliding window protocol – ARQ schemes – HDLC protocol – Point to Point Protocol – Multiple Access Techniques – Random Access, Controlled Access – Logical Link Control (LLC) and Medium Access Sub-layer functions – LAN standards – IEEE 802.3(CSMA/CD) – Fast Ethernet – Giga Bit Ethernet, IEEE 802.4 (Token Bus), IEEE 802.5 (Token Ring), IEEE 802.11 (Wireless LAN).

**UNIT III
NETWORK LAYER**

9

Network layer - Services - Virtual circuits and Data-grams – Inter-networking – Addressing – Routing – Link state and Distance Vector Routing - Congestion control algorithms - Network Layer Protocols – ARP, RARP, IPv4, ICMP, IPv6 and ICMPv6 – Uni-cast Routing - RIP, OSPF, BGP and Multicast Routing – IGMP, DVMRP, MOSPF, CBT, PIM.

**UNIT IV
TRANSPORT LAYER**

9

Transport layer - Services – Processes to Processes Delivery – Transmission Control Protocol (TCP) - User Datagram Protocol – Data Traffic – Congestion Control and Quality of Service – Techniques to improve QOS – Integrated Services – Differentiated Services.

**UNIT V
SESSION, PRESENTATION AND APPLICATION LAYERS**

9

Session layer Design Issues, services - Presentation layer Design Issues – Network security – Cryptography, Message Security, Digital Signature, User Authentication, Key Management, Security Protocols in Internet – Application layer Design Issues – DNS, E-mail (SMTP), FTP, HTTP, WWW, Virtual Terminal Protocol.

Total: 45

REFERENCES :

1. Forouzan : Data Communications and Networking, TMH, 3rd Edition, 2004.
2. William Stallings, Data and Computer Communications, Eighth Edition, Printice Hall of India Private Limited, 2007
3. Brijendra Singh : Data Communication and Computer Networks, PHI, 2004.
4. Michael A. Gallo, William A. Hancock : Computer Communication and Networking Technologies, Thomson Asia, 2003.
5. S. Tanenbaum : Computer Networks, 4th Edition, Pearson Education Asia Inc., 2004.
6. Leon-Garcia, Widjaja : Communication Networks, Fundamental Concepts and Key Architecture, TMH, 2nd Edition, 2004.
7. Gerd E. Keiser : Local Area Networks, TMH, 2nd Edition, 2002

07CP105 OBJECT ORIENTED SOFTWARE DEVELOPMENT

3 0 0 100

**UNIT I
FUNDAMENTALS**

9

Object–Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types — Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call–by–Reference – Assertions – Standard template library.

**UNIT II
IMPLEMENTING ADTS AND ENCAPSULATION**

9

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

**UNIT III
POLYMORPHISM**

9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – List – List Iterators.

UNIT IV **9**
TEMPLATES

Template Class – Function Templates – Class Templates – Parameterizing – STL – Algorithms – Function Adaptors.

UNIT V **9**
INHERITANCE

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run–Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

TOTAL : 45

REFERENCES

1. Ira Pohl, “Object–Oriented Programming Using C++”, Pearson Education, Second Edition, 2003.
2. Stanley B.Lippman, Josee Lajoie, “C++ Primer”, Pearson Education, Third Edition, 2004.
3. Kamthane,” Object Oriented Programming with ANSI and Turbo C++”, Person Education, 2002.
4. Bhave , “ Object Oriented Programming With C++”, Pearson Education , 2004.

07CP106 SYSTEMS PROGRAMMING AND OPERATING SYSTEMS **3 0 0**
100

UNIT I **9**

Language processors: Introduction, Language processing Activities, Fundamentals of language Processing - Data Structures, Search data structures, Allocation data structures, scanning and parsing.

UNIT II **9**

Assemblers: Elements of assembly language programming, simple assembly scheme, pass structure of Assemblers, Design of two pass Assemblers.

Macros and Macro Processor: Macro definition and call, Macro expansion, nested Macro calls, Advanced Macro facilities, Design of a Macro preprocessor

UNIT III **9**

Compilers and Interpreters: Aspects of Compilation, Memory allocation, Compilation of expressions, Compilation of control structures, Code optimization, Interpreters

Linkers: Relocation and Linking concept, design of a Linker, Self Relocating Programs

UNIT IV **9**

Introduction to OS: Types of OS, I/O Structure, Storage structure, Network Structure, System calls.

Process Management: Process concept, Multithreading models, CPU Scheduling criteria, algorithms, Multiple processor Scheduling, Real Time Scheduling, Algorithm Evaluation, Critical Section problem, Synchronization hardware, Semaphores, Monitors, Classical Problems of Synchronization. Deadlock characterization, Prevention, Avoidance, Detection and Recovery.

UNIT V **9**

Storage Management: Swapping, Memory Allocation – Contiguous and noncontiguous- Paging, Segmentation, Virtual Memory, demand paging, Page replacement, Allocation of frames, Thrashing, File concept, Access methods, File system structure.

I/O Systems- I/O hardware, Disk - Structure, Scheduling, Disk Management and swap space management.

Total: 45

REFERENCES

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

L-45 T-15 Total-60

REFERENCES

1. William Stallings, “High Speed Networks and Internet”, Second Edition, Pearson Education, 2002.
2. Warland, Pravin Varaiya, “High Performance Communication Networks”, Second Edition, Jean Harcourt Asia Pvt. Ltd., 2001.
3. Irvan Pepelnjk, Jim Guichard, Jeff Aparcar, “MPLS and VPN Architecture”, Cisco Press, Volume 1 and 2, 2003.

07CP202 OPTICAL FIBER COMMUNICATION

3 0 0 100

UNIT I

9

OPTICAL FIBERS

Geometrical description – wave propagation- Dispersion in single mode (SM) and multimode (MM) fibers – Limitations due to dispersion – Fiber Losses – Non liner optical effects.

UNIT II

9

OPTICAL AMPLIFIERS

Concepts- Semiconductor optical Amplifier – Raman and Brillouin amplifier – Fiber amplifiers – Erbium doped amplifiers – System applications

UNIT III

9

DISPERSION MANAGEMENT

Need- Precompensation schemes – Postcompensation techniques – Dispersion compensating fibers – Optical filters – Fiber Bragg gratings- Optical Phase Conjugation – Long Haul lightwave systems – High capacity systems.

UNIT IV

9

MULTICHANNEL SYSTEMS

WDM lightwave systems- WDM components – System performance issues – Time Division Multiplexing (TDM) - Sub carrier multiplexing – Code Division Multiplexing, DWDM.

UNIT V

9

COHERENT LIGHTWAVE SYSTEMS

Concepts – Modulation formats – Demodulation formats – Bit Error Rate (BER) – Sensitivity degradation – System performance.

TOTAL: 45

REFERENCES:

1. G.P. Agrawal, “Fiber optic communication systems”, 3rd Ed, John Wiley & Sons, New York, 2002.
2. H. Franz & V.K.Jain, “Optical Communication Systems”, Narosa Publications, New Delhi, 1995.
3. G. Keiser, “Optical fiber communication systems”, McGraw-Hill, 3rd Edition, New York, 2000.
4. H. Franz & V.K. Jain, “Optical communication, Components and Systems, Narosa Publications, New Delhi, 2002.
5. Selvarajan, S. Kar and T. Srinivas, Optical fiber Communication – Principle and Systems, Tata McGraw-Hill, 2002.

07CP203

COMPUTER ARCHITECTURE AND PARALLEL COMPUTING

3 1 0 100

UNIT I	9
INTRODUCTION	
Introduction – parallel processing terminology- The sieve of Erasthenes – PRAM algorithms – Model for Parallel Computation –PRAM Algorithms –reducing the number of processors	
UNIT II	9
PARALLEL PROCESSOR TYPES	
Processor array, multiprocessors, multi computer – Processors organization- processor arrays – multi processors – multi computers- Flynn’s taxonomy – speed up, scaled speed up and parallelizability – parallel programming languages- programming parallel process – sequent C- n cube – C–C-LINDA. – A notation for expressing parallel algorithms	
UNIT III	9
LOAD BALANCING AND SCHEDULING	
Mapping and scheduling - mapping data to processors- arrays and multi computers – dynamic load balancing on multi computers – static scheduling on UMA multiprocessors- deadlock –elementary parallel algorithms – classifying MIMD algorithms reduction – Broad cast – prefix sums	
UNIT IV	9
SORTING	
Matrix multiplication –sequential algorithms- algorithms for processor array – algorithms for multi computer – for multiprocessor – sorting –enumeration sort – odd –even transposition sort –Bitonic Merge – quick sort –based algorithms –random read and random write	
UNIT V	9
SEARCHING	
Dictionary operation – complexity of parallel search – searching on multiprocessors- combinatorial search –divide and conquer – TSP –parallel branch and Bound algorithms – alpha beta search –parallel alpha beta search	

Total:45

References:

1. Michael J Quinn “**Parallel Computing, Theory and Practice**” , Second Edition, Tata McGraw Hill Publishing Co. Ltd, New Delhi
2. Michael J Quinn “**Designing Efficient Algorithms for Parallel Computers**” , First Edition, Tata McGraw Hill Publishing Co. Ltd, New Delhi
3. Kai Hwang, Faye J Briggs “**Computer Architecture and Parallel Processing**”, McGraw Hill International Edition, 1989
4. V Rajaraman, C Sivarama Murthy, “Parallel Computers – Architecture and Programming”, Prentice Hall of India 2000.

07CP204 COMPUTER AND COMMUNICATION LAB II 0 0 4 100

1. Simulation and implementation of congestion control algorithm in ATM Network. (using free ATM network simulator software)
2. Simulation of ATM Switches.
3. DC characteristics of PIN PD and APD.
4. P-I characteristics of LED and LASER.
5. Optical link simulation using simulator packages.
6. Web design with HTML.
7. Web design with JAVA
8. Performance evaluation of CDMA Systems
9. Simulation of IEEE 802.11 MAC protocol

**LIST OF ELECTIVES:
SEMESTER II**

07CP11 HIGH SPEED SWITCHING ARCHITECTURE 3 0 0 100

UNIT I 9
HIGH SPEED NETWORK

LAN and WAN network evolution through ISDN to BISDN - Transfer mode and control of BISDN - SDH multiplexing structure - ATM standard; ATM adaptation layers.

UNIT II 9
LAN SWITCHING TECHNOLOGY

Switching concepts; Switch forwarding techniques; switch path control - LAN switching; cut through forwarding; store and forward - virtual LANs.

UNIT III 9
ATM SWITCHING ARCHITECTURE

Switch models - Blocking networks – basic and enhanced banyan networks - sorting networks – merge sorting - rearrangeable networks - full and partial connection networks - nonblocking networks – recursive network – construction and comparison of non-blocking network - switches with deflection routing – shuffle switch - tandem banyan.

UNIT IV 9
QUEUES IN ATM SWITCHES

Internal queuing – Input, output and shared queuing - multiple queuing networks –combined input, output and shared queuing – performance analysis of queued switches.

UNIT V 9
IP SWITCHING

Addressing mode - IP switching types-flow driven and topology driven solutions - IP Over ATM address and next hop resolution – multicasting - IPv6 over ATM.

Total: 45

REFERENCES:

- 1.Achille Patavina, Switching Theory: Architectures and performance in Broadband ATM Networks. John Wiley & Sons Ltd., New York.1998.
- 2.Christopher Y Metz, Switching protocols & Architectures. McGraw Hill, New York.1998.
- 3.Ranier Handel, Manfred N Huber, Stefan Schrodder. ATM Networks-concepts, protocols, applications, 3rd Edition, Adisson Wesley, New York,1999.
- 4.John A.Chiong: Internetworking ATM for the internet and enterprise networks. McGraw Hill, New York, 1998.

07CP12 MULTIMEDIA DATABASES

3 0 0 100

UNIT I 9
INTRODUCTION

Overview of Database Management – Threshold Architecture – Informal look at the Relational Model – SQL.

UNIT II **9**
NORMAL FORM

Functional Dependencies – Basic Definition and Some Examples – 1NF, 2NF, 3NF, BCNF – Multivalued Dependencies – Definition and Examples – 4NF – Join Dependencies : Definitions and Examples – 5NF.

UNIT III **9**
OODB AND ADVANCED DATA STRUCTURES

Introduction to OODBMS – K-D trees – Point Quad Trees – R-trees

UNIT IV **9**
IMAGE AND TEXT DATABASES

Similarity Based Retrieved – Representing Image DBs with Relation – Representing Image DBs with R-Trees – Stop Lists – Words Term and Frequency Tables – Latent Semantic Indexing – TV Trees.

UNIT V **9**
VIDEO AND AUDIO DATABASES

Organizing content of a Single Video – Querying content of Video Libraries – General Model of Audio Data – Indexing Audio Data.

TOTAL : 45

REFERENCES

1. Elmasri and Navathe, Fundamentals of Database System, 3rd Edition, Pearson Education, 2002.
2. V. S. Subramanian, “Principles of Multimedia Database System”, Morgan Kaufmann Publishers, Inc, 1998.
3. C. J. Date, “An Introduction to Database Systems”, Seventh Edition, Pearson Education, 2000.
4. S. Khoshafian and A. B. Bakor, “Multimedia and Imaging Databases”, Morgan Kaufmann, 1996.

07CP13 MOBILE AND PERSONAL COMMUNICATIONS **3 0 0 100**

UNIT I **9**
INTRODUCTION TO MOBILE AND PERSONAL COMMUNICATION

History of wireless communications, Mobile and Personal communications: Cell phone generations, cellular networks, The mobile radio environment, Cellular concept and frequency reuse, Multiple access technologies for cellular systems, Channel assignment and hand off, Mobile radio interference.

UNIT II **9**
PROPAGATION ISSUES

Prediction of propagation loss-Prediction over flat terrain, Point-point prediction, Calculation of fading and methods of reducing fading- Amplitude fading, Selective fading, Diversity schemes, combining techniques.

UNIT III **9**
ANTENNA SYSTEMS

Design parameters at the Base station- Antenna locations, spacing, heights, configurations, Design parameters at the Mobile unit- Directional antennas and diversity schemes, Antenna connections and locations.

UNIT IV **9**
PERSONAL COMMUNICATION SYSTEMS (PCS)

The concept of PCS/PCN, Function , Evolution of personal Communications, Requirements of PCS,PCS environment, Differences between PCS and Cellular systems, IS-136(TDMA)PCS, IS-95 CDMA PCS, Data Communication with PCS, PCS standards, PCS economics

UNIT V **9**
UNIVERSAL PERSONAL TELECOMMUNICATION (UPT)

UPT: Concept and service aspects, Functional Architecture, Numbering, Routing and Billing aspects, Access security requirements for UPT Digital Cellular Mobile Systems- GSM, IS-136, PDC, IS-95, IMT-2000: Third generation Mobile Communication Systems, W-CDMA, CDMA-2000, EDGE

REFERENCES

1. William C.Y.Lee, "Mobile Communications Design Fundamentals", second edition, John Wiley & sons, 1993.
2. RajPandya, "Mobile and Personal Communication systems and services", PHI, New Delhi, 2003.
3. Blake, "Wireless Communication Technology", Thomson Asia Pte, Ltd, Singapore, 2001.
4. Bud Bates, "Wireless networked telecommunications- Concepts, Technology and Implementation", McGraw-Hill International Editions, 1995.
5. Jack.M.Holtzman, David J. Goodman (Er.s), " Wireless and Mobile Communications", Allied Publishers Limited, 1996.
6. Andy Dorman, "The Essential Guide to Wireless Communications applications", Pearson Education Asia, 2001.
7. Jon W Mark , Weihua Zhuang,"Wireless communication and Networking",Prentice Hall India 2003

07CP14 ADVANCED DATABASE SYSTEM **3 0 0 100**

UNIT I **9**
DATABASES

Conventional Databases, Distributed Databases and Relational Databases – Architecture – Fragmentation – Query Processing – Transaction Processing – Concurrency Control – Recovery.

UNIT II **9**
OBJECT ORIENTED DATABASES

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks - Recovery.

UNIT III **9**
EMERGING SYSTEMS

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases.

UNIT IV **9**
DATABASE DESIGN ISSUES

ER Model - Normalization - Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues – Design of Temporal Databases – Spatial Databases.

UNIT V **9**
CURRENT ISSUES

Rules - Knowledge Bases - Active and Deductive Databases - Parallel databases – Multimedia Databases – Image Databases – Text Database

TOTAL : 45

REFERENCES

1. Elisa Bertino, Barbara Catania, Gian Piero Zarri, "Intelligent Database Systems", Addison-Wesley, 2001.

2. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, R.T.Snodgrass, V.S.Subrahmanian, "Advanced Database Systems", Morgan Kaufman, 1997.
3. Gary W.Hason, James V.Hanson, "Database Management and Design", Prentice Hall of India Private Ltd, 1999.
4. N.Tamer Ozsu, Patrick Valduriez, "Principles of Distributed Database Systems", Prentice Hal International Inc., 1999.
5. C.S.R Prabhu, "Object-Oriented Database Systems", Prentice Hall of India, 1998.
6. Abdullah Uz Tansel et al, "Temporal Databases: Theory, Design and principles", Benjamin Cummings Publishers, 1993.
7. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition 2004.
8. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fourth Edition, McGraw Hill, 2002.
9. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Pearson Education, 2004.

07CP15 ADVANCED JAVA TECHNOLOGY

3 0 0 100

UNIT I

9

JAVA FUNDAMENTALS

Java Virtual Machine – Reflection – I/O Streaming – Filter And Pipe Streams – Byte Codes – Byte Code Interpretation – Dynamic Reflexive Classes – Threading – Java Native Interfaces – GUI Applications.

UNIT II

9

NETWORK PROGRAMMING IN JAVA

Stream Customization – Sockets – Secure Sockets – Custom Sockets – UDP Datagrams – Multicast Sockets – URL Classes – Reading Data From The Server – Writing Data – Configuring The Connection – Reading The Header – Content Handlers – Telnet Application – Java Messaging Services.

UNIT III

9

DISTRIBUTED COMPUTING IN JAVA

Remote Method Invocation – Activation Models – RMI Custom Sockets – Object Serialization – Call Back Model – RMI – IIOP Implementation – CORBA – IDL Technology – Naming Services – CORBA Programming Models – JAR File Creation.

UNIT IV

9

MULTI – TIER APPLICATION DEVELOPMENT

Server Side Programming – Servlets – Session Management – Cookies – HTTP Communication – JDBC – Multimedia Data Handling – Java Media Framework – Enterprise Applications.

UNIT V

9

MOBILE APPLICATION DEVELOPMENT

Mobile Information Device Profile – Deployment Of Mobile Objects – Foundation Profile – RMI Profile For Mobile Devices – Development Of Midlets – Mobile Networking Applications.

TOTAL : 45

REFERENCES

1. Elliotte Rusty Harold, "Java Network Programming", O'Reilly Publishers, 2000.
2. Cay S.Horstmann, Gary Cornell, "Core Java, Volume 1 And 2", 5th Edition, Pearson Education Publishers, 2003.
3. Topley, "J2ME In A Nutshell", O'Reilly Publishers, 2002.
4. Hunt, "Guide to J2EE Enterprise Java", Springer Publications, 2004.
5. Ed Roman, "Enterprise Java Beans", Wiley Publishers, 1998.
6. Avstin, "Advance Programming For The Java2 Platform" 'Pearson Education, 2001.

07CP16 GENETIC ALGORITHM AND ITS APPLICATIONS

3 0 0 100

UNIT I	9
Fundamentals of genetic algorithm: A brief history of evolutionary computation-biological terminology-search space -encoding, reproduction-elements of genetic algorithm-genetic modeling-comparison of GA and traditional search methods.	
UNIT II	9
Genetic technology: steady state algorithm - fitness scaling - inversion. Genetic programming - Genetic Algorithm in problem solving	
UNIT III	9
Genetic Algorithm in engineering and optimization-natural evolution –Simulated annealing and Tabu search .Genetic Algorithm in scientific models and theoretical foundations.	
UNIT IV	9
Implementing a Genetic Algorithm – computer implementation - low level operator and knowledge based techniques in Genetic Algorithm.	
UNIT V	9
Applications of Genetic based machine learning-Genetic Algorithm and parallel processors, composite laminates, constraint optimization, multilevel optimization, real life problem.	

TOTAL : 45

REFERENCES

1. Melanie Mitchell, 'An introduction to Genetic Algorithm', Prentice-Hall of India, New Delhi, Edition: 2004
2. David.E.Golberg, 'Genetic algorithms in search, optimization and machine learning', Addison-Wesley-1999
3. S.Rajasekaran and G.A Vijayalakshmi Pai,'Neural Networks, Fuzzy logic and Genetic Algorithms, Synthesis and Applications', Prentice Hall of India, New Delhi-2003.
4. Nils.J.Nilsson,'Artificial Intelligence- A new synthesis', Morgan Kauffmann Publishers Inc, San Francisco,California,1998.

07CP17 DIGITAL IMAGE PROCESSING 3 0 0 100

UNIT I	9
DIGITAL IMAGE FUNDAMENTALS:	

Elements of digital image processing systems, Elements of visual perception, psycho visual model, brightness, contrast, hue, saturation, mach band effect, Color image fundamentals -RGB,HSI models, Image acquisition and sampling, Quantization, Image file formats, Two-dimensional convolution, correlation, and frequency responses.

UNIT II	9
IMAGE TRANSFORMS:	

1D DFT, 2D transforms – DFT, DCT, Discrete Sine, Walsh, Hadamard, Slant, Haar, KLT, SVD, Radon, and Wavelet Transform.

UNIT III	9
IMAGE ENHANCEMENT AND RESTORATION:	

Histogram modification and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic filters, Homomorphic filtering, Color image enhancement. Image Restoration – degradation model, Unconstrained and Constrained

restoration, Inverse filtering, Wiener filtering, Geometric transformations – spatial transformations, Gray-Level interpolation,

UNIT IV

9

IMAGE SEGMENTATION AND RECOGNITION:

Edge detection. Image segmentation by region growing, region splitting and merging, edge linking, Morphological operators: dilation, erosion, opening, and closing. Image Recognition – Patterns and pattern classes, matching by minimum distance classifier, Statistical Classifier. Matching by correlation, Neural network application for image recognition.

UNIT V

9

IMAGE COMPRESSION:

Need for image compression, Huffman, Run Length Encoding, Arithmetic coding, Vector Quantization, Block Truncation Coding. Transform Coding – DCT and Wavelet. Image compression standards.

Total: 45

REFERENCES:

1. Rafael C. Gonzalez, Richard E.Woods, ‘Digital Image Processing’, Pearson Education, Inc., Second Edition, 2004.
2. Anil K. Jain, ‘Fundamentals of Digital Image Processing’, Prentice Hall of India, 2002.
3. David Salomon : Data Compression – The Complete Reference, Springer Verlag New York Inc., 2nd Edition, 2001
4. Rafael C. Gonzalez, Richard E.Woods, Steven Eddins, ‘ Digital Image Processing using MATLAB’, Pearson Education, Inc., 2004.
5. William K.Pratt, ‘ Digital Image Processing’, John Wiley, NewYork, 2002.
6. Milman Sonka, Vaclav Hlavac, Roger Boyle, ‘Image Processing, Analysis, and Machine Vision’, Brooks/Cole, Vikas Publishing House, II ed., 1999.
7. Sid Ahmed, M.A., ‘Image Processing Theory, Algorithms and Architectures’, McGrawHill, 1995.
8. Lim, J.S., ‘Two Dimensional Signal and Image Processing’, Prentice-Hall, New Jersey, 1990.

07CP18 NEURAL NETWORKS AND APPLICATIONS

3 0 0 100

UNIT I

9

BASIC LEARNING ALGORITHMS:

Biological Neuron – Artificial Neural Model - Types of activation functions – Architecture: Feedforward and Feedback – Learning Process: Error Correction Learning –Memory Based Learning – Hebbian Learning – Competitive Learning - Boltzman Learning – Supervised and Unsupervised Learning – Learning Tasks: Pattern Space – Weight Space – Pattern Association – Pattern Recognition – Function Approximation – Control – Filtering - Beamforming – Memory – Adaptation - Statistical Learning Theory – Single Layer Perceptron – Perceptron Learning Algorithm – Perceptron Convergence Theorem – Least Mean Square Learning Algorithm – Multilayer Perceptron – Back Propagation Algorithm – XOR problem – Limitations of Back Propagation Algorithm.

UNIT II

9

RADIAL-BASIS FUNCTION NETWORKS AND SUPPORT VECTOR MACHINES:

RADIAL BASIS FUNCTION NETWORKS:

Exact Interpolator – Regularization Theory – Generalized Radial Basis Function Networks - Learning in Radial Basis Function Networks - Applications: XOR Problem – Image Classification.

SUPPORT VECTOR MACHINES:

Optimal Hyperplane for Linearly Separable Patterns and Nonseparable Patterns – Support Vector Machine for Pattern Recognition – XOR Problem - ϵ -insensitive Loss Function – Support Vector Machines for Nonlinear Regression

UNIT III

9

ATTRACTOR NEURAL NETWORKS:

Associative Learning – Attractor Neural Network Associative Memory – Linear Associative Memory – Hopfield Network – Content Addressable Memory – Strange Attractors and Chaos - Error Performance of Hopfield Networks - Applications of Hopfield Networks – Simulated Annealing – Boltzmann Machine – Bidirectional Associative Memory – BAM Stability Analysis – Error Correction in BAMs - Memory Annihilation of Structured Maps in BAMS – Continuous BAMs – Adaptive BAMs – Applications

UNIT IV

9

ADAPTIVE RESONANCE THEORY:

Noise-Saturation Dilemma - Solving Noise-Saturation Dilemma – Recurrent On-center –Off-surround Networks – Building Blocks of Adaptive Resonance – Substrate of Resonance Structural Details of Resonance Model – Adaptive Resonance Theory – Applications

UNIT V

9

SELF ORGANISING MAPS:

Self-organizing Map – Maximal Eigenvector Filtering – Sanger’s Rule – Generalized Learning Law – Competitive Learning - Vector Quantization – Mexican Hat Networks - Self-organizing Feature Maps – Applications

Total: 45

REFERENCES:

1. Satish Kumar, “Neural Networks: A Classroom Approach”, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2004.
2. Simon Haykin, “Neural Networks: A Comprehensive Foundation”, 2ed., Addison Wesley Longman (Singapore) Private Limited, Delhi, 2001.
3. Martin T.Hagan, Howard B. Demuth, and Mark Beale, “Neural Network Design”, Thomson Learning, New Delhi, 2003.
4. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques, Pearson Education (Singapore) Private Limited, Delhi, 2003.
5. S. Rajasekaran, G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, Synthesis and Applications, Prentice –Hall of India, New Delhi,2003.

07CP19 NETWORK ROUTING ALGORITHMS

3 0 0 100

UNIT I

9

CIRCUIT SWITCHING NETWORKS

AT & T’s Dynamic Routing Network, Routing in Telephone Network-Dynamic Non Hierarchical Routing-Trunk Status Map Routing-Real Time Network Routing, Dynamic Alternative Routing-Distributed Adaptive Dynamic Routing-Optimized Dynamic Routing

UNIT II

9

PACKET SWITCHING NETWORKS

Distance vector Routing, Link State Routing, Inter domain Routing-Classless Interdomain routing (CIDR), Interior Gateway routing protocols (IGRP) - Routing Information Protocol (RIP), Open Shortest Path First

(OSPF), Exterior Gateway Routing Protocol (EGRP) - Border Gateway Protocol (BGP), Apple Talk Routing and SNA Routing

**UNIT III
HIGH SPEED NETWORKS**

9

Routing in optical networks-The optical layer, Node Designs, Network design and operation, Optical layer cost tradeoffs, Routing and wavelength assignment, Architectural variations, Routing in ATM networks-ATM address structure, ATM Routing, PNNI protocol, PNNI signaling protocol, Routing in the PLANET network and Deflection Routing.

**UNIT IV
MOBILE NETWORKS**

9

Routing in Cellular Mobile Radio Communication networks-Mobile Network Architecture, Mobility management in cellular systems, Connectionless Data service for cellular systems, Mobility and Routing in Cellular Digital Packet Data (CDPD) network, Packet Radio Routing-DARPA packet radio network, Routing algorithms for small, medium and large sized packet radio networks.

**UNIT V
MOBILE AD-HOC NETWORKS (Manet)**

9

Internet based mobile ad-hoc networking, communication strategies, routing algorithms – Table-driven routing - Destination Sequenced Distance Vector (DSDV), Source initiated on-demand routing- Dynamic Source Routing (DSR), Ad-hoc On- demand Distance Vector (AODV), Hierarchical based routing- Cluster head Gateway Switch Routing (CGSR) and Temporally-Ordered Routing Algorithm (TORA), Quality of Service.

TOTAL : 45

REFERENCES

1. M. Steen strub, "Routing in Communication networks", Prentice Hall International, NewYork, 1995.
2. "Internetworking Technologies Handbook", Fourth Edition, Inc. Cisco Systems, ILSG Cisco Systems, 2003.
3. William Stallings, "ISDN and Broadband ISDN with Frame Relay and ATM", PHI, New Delhi, 2004.
4. Behrouz A Forouzan, "Data Communications and Networking (3/e), TMH, 2004
5. William Stallings, "High Speed Networks TCP/IP and ATM Design Principles", Prentice Hall International, New York, 1998.
6. Mohammad Ilyas, "The Handbook of Ad hoc Wireless Networks" CRC Press, 2002.
7. Vijay K.Garg, "Wireless Network Evolution: 2G to 3G", Pearson Education, New Delhi, India, 2003.
8. Rajiv Ramaswami and Kumar N.Sivarajan, "Optical Networks",Morgan Kaufmann Publishers,1998.
9. Sumit Kaseria and Pankaj sethi, "ATM Networks", Tata McGraw-Hill Publishing Company limited, New Delhi,2001.
10. IEEE Journal on Selected Areas in Communications, Special issue on Wireless Ad-hoc Networks, Vol. 17, No.8, 1999.
11. Scott. M. Corson, Joseph P. Macker, Gregory H. Cirincione, IEEE Internet Computing Vol.3, No. 4, July – August 1999.
12. Alder M.Scheideler.Ch. Annual ACM Symposium on Parallel Algorithms and Architectures, ACM, NewYork 1998.
13. http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/
14. www.moment.cs.ucsb.edu

**LIST OF ELECTIVES
SEMESTER III**

UNIT I 9
MODELLING OF COMMUNICATION SYSTEM
 Model of speech and picture signals, Pseudo noise sequences, Non-linear sequences, Analog channel model, Noise and fading, Digital channel model-Gilbert model of bursty channels, HF, Troposcatter and satellite channels, Switched telephone channels, Analog and Digital communication system models, Light wave system models.

UNIT II 9
SIMULATION OF RANDOM VARIABLES AND RANDOM PROCESS
 Univariate and multivariate models, Transformation of random variables, Bounds and approximation, Random process models-Markov and ARMA Sequences, Sampling rate for simulation, Computer generation and testing of random numbers

UNIT III 9
ESTIMATION OF PERFORMANCE MEASURES
 Quality of an estimator, estimator for SNR, Probability density functions of analog communication system, BER of digital communication systems, Monte Carlo method and Importance of sampling method, estimation of power spectral density

UNIT IV 9
COMMUNICATION NETWORKS
 Queuing models, M/M/I and M/M/I/N queues, Little formula, Burke's theorem ,M/G/I queue, Embedded Markov chain analysis of TDM systems, Polling, Random access systems

UNIT V 9
NETWORK OF QUEUES
 Queues in tandem, store and forward communication networks, capacity allocation, Congestion and flow chart, Routing model, Network layout and Reliability

TOTAL : 45

REFERENCES

1. M.C.Jeruchim, Philip Balaban and K.Sam Shanmugan, "Simulation of communication systems", Springer, 2nd Edition, 2002.
2. A.M.Law and W.David Kelton, "Simulation Modelling and analysis", 3rd Edition, Mc Graw Hill Inc., 1999.
3. J.F.Hayes, "Modeling and Analysis of Computer Communication networks (Applications of Communication Theory)", Plenum Press, 1984.
4. Jerry Banks and John S.Carson and Barry L. Nelson, "Discrete-Event System Simulation", 4th Edition, Prentice Hall Inc., 2004.

07CP21 COMMUNICATION NETWORK SECURITY 3 0 0 100

UNIT I 9
SYMMETRIC CIPHERS
 Introduction – Services, Mechanisms and Attacks, OSI security Architecture, Model for network Security; Classical Encryption Techniques- Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Product ciphers , Data Encryption Standard- Block Cipher Principles, Strength of DES, Differential and Linear Crypt Analysis, Block Cipher Design Principles, BlockCipher Modes of Operation, Stegnography;

UNIT II 9
ADVANCED ENCRYPTION STANDARD AND STREAM CIPHERS
 Evaluation Criteria for AES, AES Cipher; Contemporary Symmetric Ciphers- Triple DES, Blowfish, RC5- Characteristics of Advanced Symmetric Block Ciphers, Stream ciphers based on LFSRs, RC4 Stream Cipher; Random Number Generation. Traffic Confidentiality, Key Distribution,

UNIT III 9

PUBLIC-KEY ENCRYPTION AND HASH FUNCTIONS

Public Key Cryptography and Key Management- RSA Algorithm and other public key cryptosystems-, Diffie-Hellman Key Exchange, Elliptic Curve arithmetic, Elliptic Curve Cryptography; Message Authentication and Hash Functions- Authentication Requirements, - MD5 Message Digest Algorithm; Secure Hash Algorithm, RIPEMD 160, HMAC; Digital Signatures and Authentication Protocols- Digital Signature Standards.

UNIT IV 9 **NETWORK SECURITY PRACTICE**

Authentication Applications- Kerberos, X.509 Authentication Service; Electronic Mail Security- Pretty Good Privacy, S/MIME; IP Security- overview and Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations; Web Security- Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

UNIT V 9 **SYSTEM SECURITY**

Intruders- Intruder Detection, Password Management; Malicious Software- Virus and Related Threats, Virus Counter Measures; Firewalls- Firewall Design Principles, Trusted Systems.

TOTAL : 45

REFERENCES

1. William Stallings, "Cryptography and Network Security", 3rd Edition. Prentice Hall of India, New Delhi, 2004
2. William Stallings, "Network Security Essentials", 2nd Edition. Prentice Hall of India, New Delhi, 2004
3. Charlie Kaufman, "Network Security: Private Communication in Public World", 2nd Edition. Prentice Hall of India, New Delhi ,2004

07CP22 WIRELESS COMMUNICATION NETWORKS 3 0 0 100

UNIT I 9 **WIRELESS MEDIUM:**

Air Interface Design – Radio propagation mechanism – Pathloss modeling and Signal Coverage – Effect of Multipath and Doppler – Channel Measurement and Modelling – Simulation of Radio Channel.

UNIT II 9 **WIRELESS MEDIUM ACCESS:**

Fixed Assignment Access for Voice Networks – Random Access for Data Networks – Integration of Voice and Data Traffic.

UNIT III 9 **WIRELESS NETWORK OPERATION:**

Wireless Network Topologies – Cellular Topology – Cell fundamentals – Signal to Interference Ratio – Capacity Expansion – Mobility Management – Resources and Power Management – Security in Wireless Networks.

UNIT IV 9 **WIRELESS WAN:**

GSM and TDMA Technology – Mobile Environment – Communication in the Infrastructure – CDMA Technology – IS95 – IMT2000 – Mobile Data Networks – CDPD Networks – GPRS – Mobile Application Protocol.

UNIT V 9 **WIRELESS LANS AND HIPERLANS:**

Introduction to wireless LANs – IEEE 802.11 – WPAN IEEE 802.15 – Mobile AdHoc Networks(MANET)- Principle and operation - Wireless Home Networking – Concepts of Bluetooth Technology – Wireless Geolocation.

Total: 45

REFERENCES:

1. Kaveth Pahlavan, K.Prasanth Krishnamurthy, “Principles of Wireless Networks”, Pearson Education Asia, 2002
2. Leon Garcia, Widjaja, “Communication Networks”, Tata McGraw Hill, New Delhi, 2000.
3. William Stallings, “Wireless Communications and Networks”, Second Edition Prentice Hall, India 2007
4. Jon W Mark , Weihua Zhuang, ”Wireless communication and Networking”, Prentice Hall India 2003

07CP23 NETWORK MANAGEMENT

3 0 0 100

UNIT I

9

FUNDAMENTALS OF COMPUTER NETWORK TECHNOLOGY

Network Topology, LAN, Network node components- Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN-Transmission Technology, Communications protocols and standards

UNIT II

9

OSI NETWORK MANAGEMENT

OSI Network management model-Organizational model-Information model, communication model. Abstract Syntax Notation - Encoding structure, Macros Functional model CMIP/CMIS

UNIT III

9

INTERNET MANAGEMENT(SNMP)

SNMP-Organizational model-System Overview, The information model, communication model-Functional model, SNMP proxy server, Management information, protocol remote monitoring

UNIT IV

9

BROADBAND NETWORK MANAGEMENT

Broadband networks and services, ATM Technology-VP, VC, ATM Packet, Integrated service, ATM LAN emulation, Virtual LAN. ATM Network Management-ATM Network reference model, integrated local management Interface. ATM Management Information base, Role of SNMD and ATM Management, M1, M2, M3, M4 Interface. ATM Digital Exchange Interface Management

UNIT V

9

NETWORK MANAGEMENT APPLICATIONS

Configuration management, Fault management, performance management, Event Correlation Techniques security Management, Accounting management, Report Management, Policy Based Management Service Level Management

TOTAL : 45

REFERENCES

1. Mani Subramanian, " Network Management Principles and practice ", Addison Wesley New York, 2000.
2. Salah Aaidarous, Thomas Plevayk, " Telecommunications Network Management Technologies and Implementations ", eastern Economy Edition IEEE press, New Delhi, 1998.
3. Lakshmi G. Raman, " Fundamentals of Telecommunication Network Management ", Eastern Economy Edition IEEE Press, New Delhi, 1999.

07CP24 INTERNET PROGRAMMING

3 0 0 100

**UNIT I
INTRODUCTION**

9

Introduction to the Internet and World Wide Web - World Wide Web Consortium (W3C) - History of the Internet - History of the World Wide Web - History of SGML -XML Introduction to HyperText Markup Language - Editing HTML - Common Elements – Headers - Linking - Images - Unordered Lists - Nested and Ordered Lists - HTML Tables-Basic HTML Forms

**UNIT II
DYNAMIC HTML**

9

Dynamic HTML Object Model and Collections, Event Model, Filters and Transitions, Data Binding with Tabular Data Control, Dynamic HTML-Structured Graphics ActiveX Controls, Dynamic HTML-Path, Sequencer and Sprite ActiveX Controls.

**UNIT III
JAVASCRIPT**

9

JavaScript, Introduction to Scripting, Control Statements, Functions, Arrays, Objects.

**UNIT IV
XML**

9

Creating Markup with XML -Parsers and Well-formed XML Documents -Parsing an XML Document with msxml - Document Type Definition (DTD) - Document Type Declaration - Element Type Declarations - Attribute Declarations - Document Object Model - DOM Implementations - -- DOM Components - path - XSL: Extensible Stylesheet Language Transformations (XSLT)

**UNIT V
PERL, CGI AND PHP**

9

Perl - String Processing and Regular Expressions - Form Processing and Business Logic - Server-Side Includes - Verifying a Username and Password - Using DBI to Connect to a Database -PHP - Form Processing and Business Logic --Connecting to a Database - Dynamic Content in PHP

TOTAL : 45

REFERENCES

1. Deitel H M , Deitel P J and Goldberg A B, Internet & World Wide Web How to Program, Prentice Hall of India -3rd Edition -2007
2. Deitel & Deitel XML How to Program, Pearson Education,2001
3. Negrino and Smith Javascript for the World Wide Web, 5th Edition, Peachpit Press 2003.
4. Deitel & Deitel Perl How to Program, Pearson Education, 2001
5. Benoit Marchal, XML by Example, 2nd Edition, Que/Sams 2002.

07CP25 E-COMMERCE TECHNOLOGY

3 0 0 100

**UNIT I
INTRODUCTION**

9

Infrastructure for Electronic Commerce - Networks - Packet Switched Networks - TCP/IP Internet protocol - Domain name Services - Web Service Protocols - Internet applications - Utility programs - Markup Languages - Web Clients and Servers - Intranets and Extranets - Virtual private Network.

**UNIT II
CORE TECHNOLOGY**

9

Electronic Commerce Models - Shopping Cart Technology - Data Mining - Intelligent Agents – Internet Marketing - XML and E-Commerce

**UNIT III
ELECTRONIC PAYMENT SYSTEMS**

9

Real world Payment Systems - Electronic Funds Transfer - Digital Payment -Internet Payment Systems – Micro Payments - Credit Card Transactions - Case Studies.

UNIT IV **9**
SECURITY

Threats to Network Security - Public Key Cryptography - Secured Sockets Layer - Secure Electronic Transaction - Network Security Solutions - Firewalls.

UNIT V **9**
INTER/INTRA ORGANIZATIONS ELECTRONIC COMMERCE

EDI - EDI application in business - legal, Security and Privacy issues - EDI and Electronic commerce - Standards - Internal Information Systems - Macro forces - Internal commerce - Workflow Automation and Coordination - Customization and Internal commerce - Supply chain Management.

TOTAL : 45

REFERENCES

1. Ravi Kalakota and Andrew B Whinston , Frontiers of Electronic commerce, Addison Wesley, 1996
2. Pete Loshin, Paul A Murphy , Electronic Commerce, 2nd Edition , Jaico Publishers,1996.
3. Joseph P T , S J,E-Commerce - An Indian Perspective, second edition, Prentice Hall of India.2006.
4. David Whiteley, e - Commerce : Strategy, Technologies and Applications - McGraw Hill,2000

07CP26 REAL TIME AND EMBEDDED SYSTEMS **3 0 0 100**

UNIT I **9**
INTRODUCTION

Introduction to Embedded systems – Classification of Embedded Systems – Processors in the system – Memories - Power Source and Managing the Power Dissipation and Consumption, Real Time Clock, Watchdog - Timer Reset, Input, Output and I/O Ports, IO Buses and Interfaces, ADC and DAC. Linking and Interfacing Buses, Units of the Embedded System Hardware. Exemplary Embedded Systems, Embedded System-On-Chip (SOC) and VLSI Circuit.

UNIT II **9**
RTOS

RTOS Programming tools – MicroC/OS-II - RTOS System Level Functions, Task Service Functions, Time Delay Functions, Memory Allocation, Semaphore, Mailbox and Queue Functions.

UNIT III **9**

REAL TIME SYSTEMS

Coding for an Automatic Chocolate Vending Machine – Adaptive Cruise Control System – Smart Card.

UNIT IV **9**
REAL TIME SPECIFICATIONS

Design techniques – Real-time kernels – Inter-task communication and synchronization – Real –time memory management

UNIT V **9**
MULTI-PROCESSING SYSTEMS

Multiprocessing Systems - Hardware/Software integration- Real time Applications

REFERENCES:

1. Raj Kamal, 'Embedded Systems Architecture, Programming and Design', Tata Mc-Graw-Hill,2003.
2. Phillip A.Laplante, " Real –Time Systems Design and Analysis, An Engineer's Handbook', Prentice-Hall of India,2002.
3. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real Time Systems: Design to networking with C/C++", Prentice- Hall, International, 1999.
4. Grehan Moore and Cyliax, "Real Time Programming: A guide to 32 Bit Embedded Development Reading: Addison- Wisley-Longman, 1998.
5. Haeth, Steve, "Embedded systems Design", Newnes, 1997.

07CP27 MULTIMEDIA COMPRESSION TECHNIQUES**3 0 0 100****UNIT I****9****INTRODUCTION**

Special features of Multimedia – Graphics and Image Data Representations – Fundamental Concepts in Video and Digital Audio – Storage requirements for multimedia applications -Need for Compression - Taxonomy of compression techniques – Overview of source coding, source models, scalar and vector quantization theory – Evaluation techniques – Error analysis and methodologies

UNIT II**9****TEXT COMPRESSION**

Compaction techniques – Huffmann coding – Adaptive Huffmann Coding – Arithmetic coding – Dictionary techniques – LZW family algorithms.

UNIT III**9****AUDIO COMPRESSION**

Audio compression techniques - μ - Law and A- Law companding. Frequency domain and filtering – Basic sub-band coding – Application to speech coding – G.722 – Application to audio coding – MPEG audio, progressive encoding for audio – Silence compression, speech compression techniques – Formant and CELP Vocoders

UNIT IV**9****IMAGE COMPRESSION**

Predictive techniques – DM, PCM, DPCM: Optimal Predictors and Optimal Quantization– Transform Coding – JPEG Standard – Sub-band coding algorithms: Design of Filter banks – Wavelet based compression: Implementation using filters – EZW, SPIHT coders – JPEG 2000 standards.

UNIT V**9****VIDEO COMPRESSION**

Video compression techniques and standards – MPEG Video Coding I: MPEG – 1 and 2 – MPEG Video Coding II: MPEG – 4 and 7 – Motion estimation and compensation techniques – H.261 Standard.

Total: 45**REFERENCES:**

1. Khalid Sayood : Introduction to Data Compression, Morgan Kauffman Harcourt India, 2nd Edition, 2000.
2. David Salomon : Data Compression – The Complete Reference, Springer Verlag New York Inc., 2nd Edition, 2001.
3. Yun Q.Shi, Huifang Sun : Image and Video Compression for Multimedia Engineering - Fundamentals, Algorithms & Standards, CRC press, 2003.
4. Peter Symes : Digital Video Compression, McGraw Hill Pub., 2004.
5. Mark Nelson : Data compression, BPB Publishers, New Delhi,1998.
6. Mark S.Drew, Ze-Nian Li : Fundamentals of Multimedia, PHI, 1st Edition, 2003.
7. Watkinson,J : Compression in Video and Audio, Focal press,London.1995.

07CP28 NETWORK SYSTEM DESIGN USING NETWORK PROCESOR 3 0 0 100

UNIT I 9

INTRODUCTION - PROTOCOLS AND PACKET FORMATS: Network systems and the Internet, Applications, packet processing, protocols and layering, layer 1 and 2, layer 3, layer 4, protocol port numbers and de-multiplexing, Encapsulation and transmission.

UNIT II 9

PACKET PROCESSING: Introduction, packet buffer allocation, packet buffer size and copying, protocol layering and copying, Heterogeneity and network byte order, IP datagram fragmentation and reassembly, IP forwarding algorithm,

UNIT III 9

TCP ALGORITHM:

TCP connection recognition algorithm, TCP splicing algorithm, Functions – Address lookup and packet forwarding, error detection and correction, Fragmentation, segmentation and reassembly, frame and protocol de-multiplexing, packet classification, queuing and packet discard, Scheduling and timing, Authentication and privacy, traffic measurement and policing , traffic shaping, timer management.

UNIT IV 9

NETWORK PROCESSORS: Introduction, motivation for embedded processors, RISC Vs CISC, need for custom silicon, definition of NP, flexibility through programmability, instruction set, scalability with parallelism and pipelining, cause and benefits of NP, NP functionality, packet processing functions, Ingress and Egress processing, Parallel and distributed architecture, architectural roles of NP, NP architectures – Introduction, architectural variety, primary architectural characteristics, Architecture, packet flow and clock rates, software architecture, assigning functionality to the process hierarchy, issues in scaling an NP.

UNIT V 9

IXP2XXX: Introduction, IXP2xxx Architecture, Micro engines, Programming Models, Packet processing in a single thread, Advanced programming, Applications: Switches, Routers, Firewall, and Active Networks.

Total:45

REFERENCES:

1. Douglas E.Comer, “Network Systems Design using Network Processors”, Intel IXP version,, Pearson Education. March 2003
2. Erik J. Johnson and Aaron Kunze, “IXP 2400/2800 Programming”, Intel Press, April 2003
3. Uday R. Naik and Prashant R. Chandra, “ Designing High Performance Networking Applications – Essential Insights for Developers of IXP2XXX Network Processor Based Systems”, Intel Press, November 2004
4. Donald F. Hooper, “ Using IXP2400/2800 Development Tools – A Hands on Approach to Network Processor Software Design”, Intel Press, August 2004
5. Patrick Crowley, Peter Z. Onufryk, Mark A. Franklin, Haldun Hadimioglu, “Network Processors 2002: Design Principles and Practices”, Vol 1, Morgan Kaufmann Publications, September 2002.
6. Mark A. Franklin, Patrick Crowley, Haldun Hadimioglu, Peter Z. Onufryk “Network Processor Design: Issues and Practices”, Vol 2, Academic Press, December 2003.
7. Panos C. Lekkas, “Network Processors: Architectures, Protocols and Platforms (Telecom Engineering)”, McGraw Hill, July 2003

07CP29 WIRELESS SENSOR NETWORKS 3 0 0 100

UNIT I 9

INTRODUCTION

Over view of sensor networks- Constraints and challenges – Advantages of sensor networks- Applications- Collaborative processing – Key definitions in sensor networks – Tracking scenario – Problem formulation – Distributed representation and interference of states – Tracking multiple objects – sensor models- Performance comparison and metrics.

UNIT II **9**
NETWORKING SENSORS

Key assumption - Medium access control – S-MAC protocol – IEEE 802.15.4 standard and ZigBee - General Issues - Geographic, Energy – Aware Routing - Attribute based routing.

UNIT III **9**
INFRASTRUCTURE ESTABLISHMENT

Topology control – Clustering -Time Synchronization – Localization – Task driven sensing – Role of sensor nodes – Information based tasking - Routing and aggregation.

UNIT IV **9**
SENSOR NETWORK DATABASE

Sensor Database Challenges – Querying the physical environment – Interfaces – In-network aggregation – Data centric storage – Data indices and range queries – Distributed Hierarchical aggregation – Temporal data.

UNIT V **9**
SENSOR NETWORK PLATFORMS AND TOOLS

Sensor Node Hardware – Sensor network programming challenges – Node level software platforms – Operating system TinyOS – Node level simulators – State centric programming – Applications and future directions.

Total: 45

REFERENCE:

1. Feng Zhao, Leonidas Guibas, “Wireless sensor networks an information processing approach”, Morgan kaufmann publishers, 2004