AFFILIATED INSTITUTIONS ANNA UNIVERSITY ,CHENNAI REGULATIONS - 2009 CURRICULUM and SYLLABI – II TO IV SEMESTERS M.E. COMPUTER NETWORKING AND ENGINEERING

		022012.1.1				
SL.	COURSE					
NO	CODE	COURSE TITLE	L	Т	Ρ	С
THEC	RY					
1	CS 9251	Mobile Computing	3	0	0	3
2	MP 9221	Wireless Sensor Networks	3	0	0	3
3	NW 9323	Wireless Networks	3	0	0	3
4	CP9212	High Performance Computer Networks	3	0	0	3
5	E2	Elective II	3	0	0	3
6	E3	Elective III	3	0	0	3
PRAC	TICAL					
7	NE9227	Wireless Network Lab	0	0	4	2
		TOTAL	18	0	4	20

SEMESTER II

SEMESTER III

SL.	COURSE					
NO	CODE	COURSE TITLE	L	Т	Ρ	С
THEO	RY					
1	E4	Elective IV	3	0	0	3
2	E5	Elective V	3	0	0	3
3	E6	Elective VI	3	0	0	3
PRAC	TICAL					
4	NW9331	Project Work (Phase I)	0	0	12	6
		TOTAL	9	0	12	15

SEMESTER IV

SL. NO	COURSE CODE	COURSE TITLE		L	Т	Р	С
PRACT	ICAL						
1	NW9341	Project Work (Phase II)		0	0	24	12
		TO	TAL	0	0	24	12

TOTAL NO. OF CREDITS TO BE EARNED FOR THE AWARD OF DEGREE = 68

LIST OF ELECTIVES

M.E. COMPUTER NETWORKING AND ENGINEERING

SL. NO	COURS E CODE	COURSE TITLE	L	т	Р	С
1	NW9001	Advanced Networks	3	0	0	3
2	NE9251	Reliability Engineering	3	0	0	3
3	AP9252	Neural Networks and Its Applications	3	0	0	3
4	NE9253	Real-Time Embedded Systems	3	0	0	3
5	NE9254	Software Engineering Methodologies	3	0	0	3
6	CS9225	Web Technology	3	0	0	3
7	CP9253	High Speed Switching Architecture	3	0	0	3
8	NE9256	Genetic Algorithms and Applications	3	0	0	3
9	CU9224	Satellite Communication	3	0	0	3
10	NE9257	Multimedia Compression Technologies	3	0	0	3
11	NE9258	Advanced Algorithms	3	0	0	3
12	NE9259	Telecommunication and Switching Techniques	3	0	0	3
13	NE9260	Storage Area Networks	3	0	0	3
14	NE9261	Enterprise Networks	3	0	0	3
15	NE9262	Optical Communication Systems and Networking	3	0	0	3
16	NE9263	Distributed Computing	3	0	0	3
17	CS9256	Multimedia Systems	3	0	0	3
18	CS9266	Agent Based Intelligent Systems	3	0	0	3
19	NE9266	Simulation of Communication Systems and	3	0	0	3
		Networks_				
20	NW9003	Network Processor	3	0	0	3
21	CS9254	Soft Computing	3	0	0	3
22	NW9004	Cryptography & Network Security	3	0	0	3
23		Special Elective				

CS9251	MOBILE COMPUTING	LT P C 3 0 0 3
UNIT 1 Introduction – Antennas – Si – SDMA – FDI	WIRELESS COMMUNICATION FUNDAMENTALS Wireless transmission – Frequencies for radio transmission – Si ignal Propagation – Multiplexing – Modulations – Spread spectrum MA – TDMA – CDMA – Cellular Wireless Networks.	9 – MAC
UNIT II GSM – Syste Allocation – Re	TELECOMMUNICATION SYSTEMS Fm Architecture – Protocols – Connection Establishment – Free outing – Handover – Security – GPRS.	11 aquency
UNIT III Wireless LAN Network – Blu	WIRELESS NETWORKS – IEEE 802.11 Standards – Architecture – Services – HIPERLAN – e Tooth.	9 - Adhoc
UNIT IV Mobile IP – Dy ZRP – DMR.	NETWORK LAYER (namic Host Configuration Protocol – Routing – DSDV – DSR – AO	9 DV –
UNIT V TCP over Wir Retransmit / Retransmissio WTLS – WTP	TRANSPORT AND APPLICATION LAYERS reless Networks – Indirect TCP – Snooping TCP – Mobile TCP Fast Recovery – Transmission/Timeout Freezing – S on – Transaction Oriented TCP – WAP – WAP Architecture – V – WSP – WML – WML Script – WAE – WTA.	7 – Fast elective WDP –
	TOTAL: 45 PE	ERIODS
REFERENCE	S	
1. Jochen So	chiller, "Mobile Communications", Second Edition, Pearson Edu	cation.

- 1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.
- 2. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002.
- 3. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 2003.
- 4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
- 5. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
- 6. Burkhardt, "Pervasive Computing", First Edition, Pearson Education, 2003.

MP9221	WIRELESS SENSOR NETWORKS	LT PC

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UNIT I INTRODUCTION

Challenges for wireless sensor networks, Comparison of sensor network with ad hoc network, Single node architecture – Hardware components, energy consumption of sensor nodes, Network architecture – Sensor network scenarios, types of sources and

sinks, single hop versus multi-hop networks, multiple sinks and sources, design principles, Development of wireless sensor networks.

UNIT II PHYSICAL LAYER

Introduction, wireless channel and communication fundamentals – frequency allocation, modulation and demodulation, wave propagation effects and noise, channels models, spread spectrum communication, packet transmission and synchronization, quality of wireless channels and measures for improvement, physical layer and transceiver design consideration in wireless sensor networks, Energy usage profile, choice of modulation, Power Management .

UNIT III DATA LINK LAYER

MAC protocols – fundamentals of wireless MAC protocols, low duty cycle protocols and wakeup concepts, contention-based protocols, Schedule-based protocols - SMAC, BMAC, Traffic-adaptive medium access protocol (TRAMA), Link Layer protocols – fundamentals task and requirements, error control, framing, link management.

UNIT IV NETWORK LAYER

Gossiping and agent-based uni-cast forwarding, Energy-efficient unicast, Broadcast and multicast, geographic routing, mobile nodes, Data-centric routing – SPIN, Directed Diffusion, Energy aware routing, Gradient-based routing – COUGAR, ACQUIRE, Hierarchical Routing – LEACH, PEGASIS, Location Based Routing – GAF, GEAR, Data aggregation – Various aggregation techniques.

UNIT V CASE STUDY

Target detection tracking, Habitat monitoring, Environmental disaster monitoring, Practical implementation issues, IEEE 802.15.4 low rate WPAN, Operating System Design Issues, Introduction to TinyOS – NesC, Interfaces, modules, configuration, Programming in TinyOS using NesC, Emulator TOSSIM.

TOTAL:45 PERIODS

REFERENCES:

- 1. Kazem Sohraby, Daniel Minoli and Taieb Znati, "Wireless Sensor Networks Technology- Protocols and Applications", John Wiley & Sons, 2007.
- 2. Feng Zhao, Leonidas Guibas, "Wireless Sensor Networks: an information processing approach", Else vier publication, 2004.
- 3. C.S.Raghavendra Krishna, M.Sivalingam and Tarib znati, "Wireless Sensor Networks", Springer publication, 2004.
- 4. Holger Karl , Andreas willig, "Protocol and Architecture for Wireless Sensor Networks", John wiley publication, Jan 2006.
- 5. K.Akkaya and M.Younis, " A Survey of routing protocols in wireless sensor networks", Elsevier Adhoc Network Journal, Vol.3, no.3,pp. 325-349, 2005.
- 6. Philip Levis, "TinyOS Programming", 2006 www.tinyos.net.
- 7. I.F. Akyildiz, W. Su, Sankarasubramaniam, E. Cayirci, "Wireless sensor networks: a survey", computer networks, Elsevier, 2002, 394 422.
- 8. Jamal N. Al-karaki, Ahmed E. Kamal, "Routing Techniques in Wireless sensor networks: A survey", IEEE wireless communication, December 2004, 6 28.

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NW9323 WIRELESS NETWORKS

UNIT I WIRELESS LANS, PANS AND MANS

Introduction, fundamentals of WLAN –technical issues, network architecture, IEEE 802.11- physical layer, Mac layer mechanism, CSMA/CA, Bluetooth- specification, transport layer, middleware protocol group, Bluetooth profiles, WLL –generic WLL architecture, technologies, broadband wireless access, IEEE 802.16 –differences between IEEE 802.11 and 802.16,physical layer, data link layer.

UNIT II WIRELESS INTERNET

Introduction –wireless internet, address mobility, inefficiency of transport layer and application layer protocol, mobile IP – simultaneous binding, route optimization, mobile IP variations, handoffs, IPv6 advancements, IP for wireless domain, security in mobile IP, TCP in wireless domain – TCP over wireless, TCPs -traditional, snoop, indirect, mobile, transaction- oriented, impact of mobility.

UNIT III AD-HOC WIRELESS NETWORK AND WIRELESS SENSOR NETWORK 9

Introduction, issues –medium access scheme, routing, multicasting, transport layer protocol, pricing scheme, QoS provisioning, self-organization, security, addressing, service discovery, energy management, deployment consideration, ad-hoc wireless internet.

UNIT IV WIRELESS SENSOR NETWORK

Introduction – applications of sensor network, comparisons with MANET, issues and design challenges, architecture – layered and clustered, data dissemination, data gathering, Mac protocols, location discovery, quality of sensor network – coverage and exposure, zigbee standard.

UNIT V RECENT ADVANCES IN WIRELESS NETWORK

UWB radio communication- operation of UWB systems, comparisons with other technologies, major issues, advantages and disadvantages, wi-fi systems- service provider models, issues, interoperability of wi-fi and WWAN, multimode 802.11 – IEEE 802.11a/b/g – software radio-based multimode system, meghadoot architecture -802.11 phone, fundamentals of UMTS.

REFERENCES:

- 1. C.Siva Ram Murthy and B.S. Manoj, "Ad-hoc wireless networks-architecture and protocols", Pearson education, 2nd, 2005.
- 2. Kaveh Pahlavan and Prashant Krishnamurthy, "Principle of Wireless network- A unified approach", Prentice Hall, 2006.
- 3. Jochen Schiller, "Mobile Communication", Pearson education, 2nd edition 2005.
- 4. WIlliam Stallings, "Wireless Communication and Networks", Prentice Hall, 2nd edition, 2005.
- 5. Clint Smith and Daniel Collins, "3G wireless networks", Tata Mcgraw Hill, 2nd edition, 2007.

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CP9212 HIGH PERFORMANCE COMPUTER NETWORKS

UNIT I INTRODUCTION

Review of OSI, TCP/IP; Multiplexing, Modes of Communication, Switching, Routing SONET – DWDM – DSL – ISDN – BISDN, ATM.

UNIT II MULTIMEDIA NETWORKING APPLICATIONS

Streaming stored Audio and Video, Best effort service, protocols for real time interactive applications, Beyond best effort, scheduling and policing mechanism, integrated services, RSVP- differentiated services.

UNIT III ADVANCED NETWORKS CONCEPTS

VPN-Remote-Access VPN, site-to-site VPN, Tunneling to PPP, Security in VPN.MPLSoperation, Routing, Tunneling and use of FEC, Traffic Engineering, and MPLS based VPN, overlay networks-P2P connections.

UNIT IV TRAFFIC MODELLING

Little's theorem, Need for modeling, Poisson modeling and its failure, Non- poisson models, Network performance evaluation.

UNIT V NETWORK SECURITY AND MANAGEMENT

Principles of cryptography – Authentication – integrity – key distribution and certification – Access control and: fire walls – attacks and counter measures – security in many layers. Infrastructure for network management – The internet standard management framework – SMI, MIB, SNMP, Security and administration – ASN.1

TOTAL: 45 PERIODS

REFERENCES:

- 1. J.F. Kurose & K.W. Ross, "Computer Networking- A top down approach featuring the internet", Pearson, 2nd edition, 2003.
- Walrand .J. Varatya, "High performance communication network", Margan Kanffman – Harcourt Asia Pvt. Ltd. 2nd Edition, 2000.
- 3. LEOM-GarCIA, WIDJAJA, "Communication networks", TMH seventh reprint 2002.
- 4. Aunurag Kumar, D. MAnjunath, Joy Kuri, "Communication Networking", Morgan Kaufmann Publishers, 1ed 2004.
- 5. Hersent Gurle & petit, "IP Telephony, packet Pored Multimedia communication Systems", Pearson education 2003.
- 6. Fred Halsall and Lingana Gouda Kulkarni, "Computer Networking and the Internet", fifth edition, Pearson education
- 7. Nader F.Mir, "Computer and Communication Networks", first edition.
- 8. Larry I.Peterson & Bruce S.David, "Computer Networks: A System Approach" 1996

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NE9227 WIRELESS NETWORK LAB

LTPC 0042

- I. Using CDMA Spread Spectrum Trainer
- 1) Embedded wireless solutions using CDMA network
- 2) GPS integrated GSM modules using SMS for in tracking & remote monitoring applications
- II. Using GPS Trainer
- 3) Embedded GPS modules interfaced with other embedded modules for location based applications
- 4) GPS integrated GSM modules using SMS for in tracking & remote monitoring applications
- III. Using GSM Trainer
- 5) Developing GSM board+ SIM card based applications emulating mobile phones (Eg. Mobile ATM Vans)
- 6) SMS based remote monitoring/control applications using existing GSM network
- IV. Using Bluetooth Trainer
- 7) Bluetooth based wireless personal area networking (WPAN) printers, mouse, keypads, and mobiles
- 8) Combining RFID and Bluetooth
- V. Mobile Communication Trainer MT2000
- 9) Can be used as stand alone or full product development kit in 49 MHz ISM band
- VI. RFID Development Kit
- 10) Tag all assets inside Embedded Wireless Lab with RFID
- 11) Use of passive and active tags for Library Management system
- VII. Smart Wireless Applications & Wireless Sensor Networks
- 12) Remote door locks and gate openers

Requirement for a batch of 25 students

1. CDMA Trainer	2 Nos
2. GPS Trainer	2 Nos
3. GSM Trainer	2 Nos
4. Bluetooth Trainer	2 Nos.
5. RFID Trainer	2 Nos
6. MT2000	2 Nos
7. Ptolemy (free software)	2 Nos

TOTAL : 60 PERIODS

NW9001 ADVANCED NETWORKS

UNIT I INTRODUCTION

Communicating in the New Era- IP Everywhere- Optical Anywhere- Wireless through the Air- Building Blocks for Next-Generation Networks- IP Networks- Multiservice Networks- VPNs- Optical, Wire line & Wireless Networks- Using Next-Generation Network Services- Network Infrastructure Convergence- Services Convergence- IP Networks

UNIT II LAYER 2 AND LAYER 3 VPN

Layer 2 Internetworking, VPN Service, Provisioning-Benefits of L2VPN, Inter-AS L2VPN, Supported IETF Standards-Technology Overview-Intranet Corporate-Internet Access-Scaling MPLS VPNs to Multi-AS, Multi-Provider, and Hierarchical Networks-Heterogeneous Networks-Managed Central Services

UNIT III WIRE LINE & WIRELESS NETWORKS

Narrowband–Squeezing Voice and Data-Residential Loop for Analog Transmission-Going Digital with PCM and TDM-Narrowband Aggregation for DS1 and E1-ISDN-Frame Relay-Narrowband Aggregation Layer and Digital Loop Carriers-Broadband–Pushing Technology to the Edge-DSL-DSLAM Broadband Aggregation Layer-Wireless Optics-Fixed Wireless-Satellite Wireless.

UNIT IV MULTISERVICE NETWORKS

Global IP Networks-Global Capacity-Globally Resilient IP- Beyond IP- Multiservice Networks-The Origins of Multiservice ATM-Next-Generation Multiservice Networks-Next-Generation Multiservice ATM Switching-Multiprotocol Label Switching Networks Multiservice Core and Edge Switching -Frame-Based & cell based MPLS -MPLS Benefits and Services -Next-Generation Multiservice Routers- -MSSP- Multiservice Transport Platform (MSTP)- MPLS Security

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UNIT V MULTICAST AND NGN NETWORK MANAGEMENT

MPLS Multicast VPN -Multicast Security and Management Considerations-Network Management and Provisioning-Fault ,Configuration Accounting, Performance Management, and Security Management for MPLS-Aware ICMP Ping and LSP Ping/Trace Mechanisms-Dealing with Equal Cost Multipaths-Virtual Circuit Connection Verification and Bidirectional Forwarding Detection-Generic Failure Types-Interoperability of services and network in NGN- Numbering, naming and addressing of NGN.

TOTAL : 45 PERIODS

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REFERENCES:

- 1. Azhar Sayeed, Monique Morrow "MPLS and Next-Generation Networks: Foundations for NGN and Enterprise Virtualization" Cisco Press, Paperback, and Published November 2006, 300 pages.
- 2. Jyh-Cheng Chen ,Tao Zhang "MPLS and IP-Based Next-Generation Wireless Networks:
- 3. Systems, Architectures, and Protocols" Hardcover. Year of Publication: 2003
- 4. Robert Wood "Next-Generation Network Services", cisco press, Year of Publication Nov 2005

NE9251 RELIABILITY ENGINEERING L T P C 3 0 0 3

UNIT I PROBABILITY PLOTTING AND LOAD-STRENGTH INTERFERENCE 9

Statistical distribution, statistical confidence and hypothesis testing ,probability plotting techniques – Weibull, extreme value ,hazard, binomial data; Analysis of load – strength interference, Safety margin and loading roughness on reliability.

UNIT II RELIABILITY PREDICTION, MODELLING AND DESIGN

Statistical design of experiments and analysis of variance Taguchi method, Reliability prediction, Reliability modeling, Block diagram and Fault tree Analysis, petric Nets, State space Analysis, Monte carlo simulation, Design analysis methods – quality function deployment, load strength analysis, failure modes, effects and criticality analysis.

UNIT III ELECTRONICS AND SOFTWARE SYSTEMS RELIABILITY

Reliability of electronic components, component types and failure mechanisms, Electronic system reliability prediction, Reliability in electronic system design; software errors, software structure and modularity, fault tolerance, software reliability, prediction and measurement, hardware/software interfaces.

UNIT IV RELIABILITY TESTING AND ANALYSIS

Test environments, testing for reliability and durability, failure reporting, Pareto analysis, Accelerated test data analysis, CUSUM charts, Exploratory data analysis and proportional hazards modeling, reliability demonstration, reliability growth monitoring.

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UNIT V MANUFACTURE AND RELIABILITY MAQNAGEMENT

Control of production variability, Acceptance sampling, Quality control and stress screening, Production failure reporting; preventive maintenance strategy, Maintenance schedules, Design for maintainability, Integrated reliability programmes, reliability and costs, standard for reliability, quality and safety, specifying reliability, organization for reliability.

REFERENCES

- 1. Patrick D.T. O'Connor, David Newton and Richard Bromley, Practical Reliability Engineering, Fourth edition, John Wiley & Sons, 2002
- 2. David J. Klinger, Yoshinao Nakada and Maria A. Menendez, Von Nostrand Reinhold, New York, "AT & T Reliability Manual", 5th Edition, 1998.
- 3. Gregg K. Hobbs, "Accelerated Reliability Engineering HALT and HASS", John Wiley Sons, New York, 2000.
- 4. Lewis, "Introduction to Reliability Engineering", 2nd Edition, Wiley International, 1996.

AP9252 NEURAL NETWORKS AND ITS APPLICATIONS

UNIT I 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 RADIAL-BASIS FUNCTION NETWORKS AND SUPPORT VECTOR MACHINES RADIAL BASIS FUNCTION NETWORKS

Cover's Theorem on the Separability of Patterns - 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 - □-insensitive Loss Function – Support Vector Machines for Nonlinear Regression

UNIT III COMMITTEE MACHINES

Ensemble Averaging - Boosting – Associative Gaussian Mixture Model – Hierarchical Mixture of Experts Model(HME) – Model Selection using a Standard Decision Tree – A Priori and Postpriori Probabilities – Maximum Likelihood Estimation – Learning Strategies for the HME Model - EM Algorithm – Applications of EM Algorithm to HME Model

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TOTAL: 45 PERIODS

NEURODYNAMICS SYSTEMS

Dynamical Systems – Attractors and Stability – Non-linear Dynamical Systems-Lyapunov Stability – Neurodynamical Systems – The Cohen-Grossberg Theorem.

UNIT IV 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

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 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

PULSED NEURON MODELS

Spiking Neuron Model – Integrate-and-Fire Neurons – Conductance Based Models – Computing with Spiking Neurons.

TOTAL: 45 PERIODS

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.

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REAL TIME EMBEDDED SYSTEMS

UNIT I INTRODUCTION

NE9253

Real Time System – Embedded Systems – Architecture of Embedded System - Simple Programming for Embedded System – Process of Embedded System Development -Pervasive Computing – Information Access Devices – Smart Cards – PIC Microcontroller – ARM Processor.

UNIT II EMBEDDED/REAL TIME OPERATING SYSTEM

Operating System Concepts: Processes, Threads, Interrupts, Events - Real Time Scheduling Algorithms - Memory Management – Overview of Operating Systems for Embedded, Real Time, Handheld Devices – Target Image Creation – Programming in Linux, RTLinux, VxWorks, uC/Os-overview.

UNIT III CONNECTIVITY

Wireless Connectivity - Bluetooth – Other short Range Protocols – Wireless Application Environment – Service Discovery – Middleware.

UNIT IV REAL TIME UML

Requirements Analysis – Object Identification Strategies – Object Behavior – Real Time Design Patterns.

UNIT V SOFTWARE DEVELOPMENT AND CASE STUDY

Concurrency – Exceptions – Tools – Debugging Techniques – Optimization – Case Studies -Interfacing Digital Camera with USB port and Data Compressor.

TOTAL: 45 PERIODS

REFERENCES

- 1. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real-Time Systems", Prentice-Hall International, 1999.
- 2. David E-Simon, "An Embedded Software Primer", Pearson Education, 2007. (UNIT II) C.M.Krishna, Kang G.Shin, "Real Time Systems", Mc-Graw Hill, 1997. (UNIT- II)
- 3. B.P.Douglass, "Real Time UML 2nd Edition", Addison-Wesley 2000. ((UNIT IV)
- 4. J.Schiller, "Mobile Communication", Addison-Wesley, 1999. (UNIT III)
- 5. Dr.K.V.K.K.Prasad, "Embedded/Real Time Systems: Concepts, Design and Programming", DreamTech press, Black Book, 2005. (UNIT I)
- 6. R.Barnett, L.O.Cull, S.Cox, "Embedded C Programming and the Microchip PIC", Thomason Learning 2004. (UNIT – I)
- 7. Wayne Wolf, "Computers as Components Principles of Embedded Computer System Design", Mergen Kaufman Publisher, 2006.
- 8. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc-Graw Hill, 2004.

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NE9254 SOFTWARE ENGINEERING METHODOLOGIES

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UNIT I

Definition – systems approach – modeling the process and lifecycle – meaning of process – software process models – tools and techniques – practical process modeling – information systems – planning and managing the project – tracking project – project personnel – effort estimation – risk management – project plan – process models and project management

UNIT II

Capturing the requirements – requirements process – requirements elicitation – types – characteristics – modeling notations – specification languages – prototyping – documentation – validation and verification – measures – specification techniques – designing the system – decomposition and modularity – architectural styles and strategies – issues – characteristics – improvement techniques – design evaluation, validation – documentation

UNIT III

Considering objects – object orientation – OO development – use cases – representing OO – OO system design – program design – OO measurement – writing programs – standards – procedures – guidelines – documentation – programming process

UNIT IV

Testing the program – faults – failures – issues – unit testing – Integration testing – testing OO systems – test planning – automated testing tools - testing the system – principles – function testing – performance testing – reliability, availability and maintainability – acceptance testing – installation testing – automated system testing – test documentation – testing safety critical systems – delivering the system – training – documentation

UNIT V

System maintenance – the changing system – nature of maintenance – problems – measuring maintenance characteristics – techniques and tools – software rejuvenation – evaluation approaches – selection – assessment vs. prediction - evaluating products, processes and resources – improving predictions, products, processes and resources – guidelines – decision making in software engineering – licensing – certification and ethics

TOTAL: 45 PERIODS

REFERENCES

- 1. Shari Lawrence Pfleeger, Joanne M. Atlee, Software Engineering: Theory and Practice, Prentice Hall, 2006
- 2. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, Prentice Hall, 2002

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TOTAL: 45 PERIODS

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UNIT I

CS9225

Web essentials – clients – servers - communication – markup languages – XHTML – simple XHTML pages style sheets – CSS

WEB TECHNOLOGY

UNIT II

Client side programming – Java script language – java script objects – host objects : Browsers and the DOM

UNIT III

Server side programming – java servlets – basics – simple program – separating programming and presentation – ASP/JSP - JSP basics ASP/JSP objects – simple ASP/JSP pages.

UNIT IV

Representing Web data – data base connectivity – JDBC – Dynamic Web pages – XML – DTD – XML schema – DOM – SAX – Xquery.

UNIT V

Building Web applications - cookies – sessions – open source environment – PHP – MYSQL – case studies.

REFERENCES

- 1. Jeffrey C Jackson, "Web Technology A computer Science perspective", Persoson Education, 2007.
- 2. Chris Bates, "Web Programming Building Internet Applications, "Wiley India, 2006.

CP9253 HIGH SPEED SWITCHING ARCHITECTURE LT P C

3003

UNIT I LAN SWITCHING TECHNOLOGY

Switching Concepts, switch forwarding techniques, switch path control, LAN Switching, cut through forwarding, store and forward, virtual LANs.

UNIT II ATM SWITCHING ARCHITECTURE

Blocking networks - basic - and- enhanced banyan networks, sorting networks - merge sorting, re-arrangable networks - full-and- partial connection networks, non blocking networks - Recursive network construction, comparison of non-blocking network, Switching with deflection routing - shuffle switch, tandem banyan switch.

UNIT III QUEUES IN ATM SWITCHES

Internal Queueing -Input, output and shared queueing, multiple queueing networks – combined Input, output and shared queueing - performance analysis of Queued switches.

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UNIT III

Genetic Algorithm in engineering and optimization-natural evolution -simulated annealing and Tabu search .Genetic Algorithm in scientific models and theoretical foundations.

UNIT IV

Implementing a Genetic Algorithm - computer implementation - low level operator and knowledge based techniques in Genetic Algorithm.

UNIT V

Applications of Genetic based machine learning-Genetic Algorithm and parallel processors, composite laminates, constraint optimization, multilevel optimization, real life problem.

TOTAL: 45 PERIODS

REFERENCES

UNIT V

Internally buffered Crossbars.

IP SWITCHING

1. Achille Pattavina, "Switching Theory: Architectures and performance in Broadband ATM networks ", John Wiley & Sons Ltd, New York. 1998

Architectures of Internet Switches and Routers- Bufferless and buffered Crossbar switches, Multi-stage switching, Optical Packet switching; Switching fabric on a chip;

Addressing model, IP Switching types - flow driven and topology driven solutions, IP

Over ATM address and next hop resolution, multicasting, Ipv6 over ATM.

- 2. Elhanany M. Hamdi, "High Performance Packet Switching architectures", Springer Publications, 2007.
- 3. Christopher Y Metz, "Switching protocols & Architectures", McGraw Hill Professional Publishing, NewYork.1998.
- 4. Rainer Handel, Manfred N Huber, Stefan Schroder, "ATM Networks Concepts Protocols, Applications", 3rd Edition, Addison Wesley, New York. 1999.

UNIT IV PACKET SWITCHING ARCHITECTURES

GENETIC ALGORITHMS AND APPLICATIONS

UNIT I

NE9256

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

Genetic technology: steady state algorithm - fitness scaling - inversion. Genetic programming - Genetic Algorithm in problem solving

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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', Addition-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.

CU9224	SATELLITE COMMUNICATION	LT P C
		3003

UNIT I ELEMENTS OF SATELLITE COMMUNICATION

Satellite Systems, Orbital description and Orbital mechanics of LEO, MEO and GSO, Placement of a Satellite in a GSO, Satellite – description of different Communication subsystems, Bandwidth allocation.

UNIT II	TRANSMISSION, MULTIPLEXING, MODULATION, MULTIPLE		
	ACCESS AND CODING	12	

Different modulation and Multiplexing Schemes, Multiple Access Techniques – FDMA, TDMA, CDMA, and DAMA, Coding Schemes.

UNIT III SATELLITE LINK DESIGN

Basic link analysis, Interference analysis, Rain induced attenuation and interference, lonospheric characteristics, Link Design with and without frequency reuse.

UNIT IV SATELLITE NAVIGATION AND GLOBAL POSITIONING SYSTEM 8

Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Receiver Operation and Differential GPS

UNIT V APPLICATIONS

Satellite Packet Communications , Intelsat series – INSAT series –VSAT, mobile satellite services, IMMERSAT, Satellite and Cable Television, DBS (DTH), VSAT, Satellite Phones.

TOTAL: 45 PERIODS

REFERENCES

- 1. Wilbur L. Pritchard, H.G. Suyderhoud ,Robert A.Nelson, Satellite Communication Systems Engineering, Prentice Hall, New Jersey, 2006.
- 2. Timothy Pratt and Charles W.Bostain, Satellite Communications, John Wiley and Sons, 2003.
- 3. D.Roddy, Satellite Communication, McGrawHill, 2006.
- 4. Tri T Ha, Digital Satellite Communication, McGrawHill, 1990.
- 5. B.N.Agarwal, Design of Geosynchronous Spacecraft, Prentice Hall, 1993

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NE9257 MULTIMEDIA COMPRESSION TECHNOLOGIES LT P C

UNIT I 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 **TEXT COMPRESSION**

Compaction techniques - Huffmann coding - Adaptive Huffmann Coding - Arithmatic coding – Shannon-Fano coding – Dictionary techniques – LZW family algorithms.

UNIT III 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 **IMAGE COMPRESSION**

Predictive techniques – DM, PCM, DPCM: Optimal Predictors and Optimal Quantization - Contour based compression - Transform Coding - JPEG Standard - Sub-band coding algorithms: Design of Filter banks – Wavelet based compression: Implementation using filters – EZW, SPIHT coders – JPEG 2000 standards - JBIG, JBIG2 standards.

UNIT V 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 - DVI technology - PLV performance - DVI real time compression – Packet Video.

TOTAL: 45 PERIODS

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.
- 8. Jan Vozer : Video Compression for Multimedia, AP Profes, NewYork, 1995

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Mathematical Background - Design and Analysis of algorithms - Time and Space Complexity - Basic concepts UNIT II SORTING AND ORDER STATISTICS

Internal sort algorithms - Analysis - Worst-case - Average case - Sorting in Linear Time -Medians and order statistics - Augmenting Data Structures - Red Black Trees - Dynamic - Order Statistics - FFT - Algorithm - Implementation.

UNIT III **DESIGN TECHNIQUES**

Divide and Conquer - Dynamic Programming - Greedy method - Backtracking -- Branch & Bound – Classical examples - Analysis.

UNIT IV **GRAPH AND PARALLEL ALGORITHMS**

Graphs - Representation - Traversals - Topological sort - Minimum spanning tree -Shortest paths - Bi connected and strongly connected components - Parallel algorithms - Sorting - Matrix multiplication - Numerical - Graph.

UNIT V SELECTED TOPICS

NP Completeness - Approximation algorithms - Matrices - Transitive closure - Warshall's - Kronrod's algorithm - Computational Geometry

TOTAL: 45 PERIODS

TEXT BOOKS

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, Introduction to Algorithms, McGraw Hill Book Company, 2002

REFERENCES

- 1. M.J. Quinn, Designing Efficient Algorithms for Parallel Computers, McGraw Hill Book Company, 1998
- 2. Sara Baase, "Computer Algorithms : Introduction to Design and Analysis, Addison Wesley Publishing Company, 1998
- 3. Donald.E.Knuth, Art of Computer Programming Vol (1, 2, 3), Addison Wesley Professional, 1997, 1998

NE9258 **ADVANCED ALGORITHMS**

UNIT I INTRODUCTION

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NE9259 TELECOMMUNICATION AND SWITCHING TECHNIQUES LT P

UNIT I EVOLUTION OF TELECOMMUNICATION SWITCHING AND CIRCUIT

Evolution of Public Switched Telecommunication Networks Strowger exchange, Crossbar exchange, Stored programme exchange Digital exchange – Basic Tele communication equipments – Telephone handset, Hybrid circuit, Echo suppressors and cancellers, PCM coders, Modems and Relays.

UNIT II ELECTRONIC SWITCHING

Circuit Switching, Message switching, Centralized stored programme switching, Time switching, Spare switching, Combination switching – Digital switching system hardware configuration, Switching system software, Organization, Switching system call processing software, Hardware software integration.

UNIT III TELECOMMUNICATION SIGNALLING AND TRAFFIC

Channel associated signaling, Common channel signaling, SS7 signaling protocol, SS7 protocol architecture, Concept of Telecommunication traffic, Grade of service, Modeling switching systems, Blocking models and Delay systems.

UNIT IV INTEGRATED DIGITAL NETWORKS

Subscriber loop characteristics, Local access wire line and wire less PCM / TDM carrier standards transmission line codes, Digital multiplexing techniques, Synchronous, Asynchronous, Plesiocronous multiplexing techniques, SONET / SDH, Integrated Digital Network (IDN) environment – Principles of Integrated Services Digital Network (ISDN) –

Cellular Mobile Communication Principles.

UNIT V DATA NET WORKS

Data transmission in PSTN – Connection oriented and Connection less protocols – packet switching – ISO-OSI architecture-Satellite based data networks – Multiple access techniques – LAN, WAN – standards – TCP / IP – Internet – Principle of ATM networks.

TOTAL: 45 PERIODS

TEXT BOOKS

- 1. Viswanathan. T, "Telecommunication Switching System and Networks", Prentice Hall of India Ltd., 1994.
- 2. Behrouz Forouzan, "Introduction to Data Communication and Networking", McGraw-Hill, 1998.

REFERENCES

- 1. L.S.Lawton, "Integrated Digital Networks, Galgotta Publication Pvt., Ltd., New Delhi, 1996.
- 2. Syed R. Ali, "Digital Switching Systems", McGraw-Hill Inc., New York, 1998.

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Port Login-Loop port state machine – Design considerations for Arbitrated Loop –fabrics - Fabric login - Simple Name Server - State Change Notification - Private Loop upport

- Fabric Zoning - Building Extended SANs.

UNIT III

Fibre Channel Products – Gigabit Interface Converters (GBICs) – host Bus Adapters – Fibre channel RAID – Fibre channel JBODs – Arbitrated Loop Hubs – hub Architecture – Unmanaged Hubs - Managed Hubs - Switching Hubs - Fabric Switches - Fibre Channel-to-SCSI Bridges - SAN software Products - Problem isolation in SANs -Isolation Techniques – Fibre channel Analyzers.

UNIT IV

Management Studies - Storage Network Management - In-Band management - Out-of-Band Management-SNMP-HTTP-TELNET - Storage Network Management Issues – Storage Resource Management – Storage Management – Storage, Systems, and Enterprise Management Integration.

UNIT V

UNIT I

Basics and Networking Media

Application Studies - Full-motion video - LAN free and Server free Tape Backup server clustering - Internet Service Providers - Campus storage networks - Disaster recovery. Fiber Channel futures - Bandwidth - Fiber channel over Wide Area Networking - Coexistence within Enterprise Networks - Total SAN solutions.

TOTAL: 45 PERIODS

TEXT BOOKS

- 1. Tom Clark, "Designing Storage Area Networks", Addison-Wesley Professional, 1st edition, 1999
- 2. Alex Goldman, "Storage Area Networks Fundamentals", Cisco Press 2002

NE9261 ENTERPRISE NETWORKS LT P C 3003

INTRODUCTION TO NETWORK CONCEPTS, STANDARDS AND

PROTOCOLS Introduction to Computer Networks - Networking Standards and Reference Models -Computer Network Protocols - Data Communication Fundamentals - Transmission

STORAGE AREA NETWORKS

Introduction - Storage and networking concepts - SCSI bus architecture - Networking in front of he server - Networking behind the server - Network -attached Storage - Fibre channel internals - Layers - Data encoding - Framing protocol - class of service - flow control - Name and addressing conventions.

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UNIT I

UNIT II SAN topologies – Point-to Point – Arbitrated Loop – Loop Addressing-Loop Initialization-

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UNIT II LOCAL AND WIDE AREA NETWORK TOPOLOGIES AND HARDWARE

Physical and Logical Topologies - Network Switching - Ethernet Local Area Networks - Networking Hardware - Wide Area Networking Technologies -WAN Topologies - WANs and WAN Transmission Methods - WAN Implementation and Remote Connectivity

UNIT III ENTERPRISE NETWORKING WITH WINDOWS 2000 AND NETWARE

Network Operating Systems - Networking with Windows 2000 – Enterprise Networking with NetWare - NetWare Based Networking

UNIT IV ENTERPRISE NETWORKING WITH UNIX

Networking with UNIX – Internetworking with TCP/IP for Enterprise Applications - Networking with TCP/IP: Internet, Intranet and Extranet - Internet Applications for Enterprise

UNIT V ENTERPRISE NETWORK MANAGEMENT

Troubleshooting Network Problems - Maintaining and Upgrading Computer Networks -Managing Network Design and Implementation - Enterprise Network Security: Issues, Concepts, and Techniques - Introduction to Network Security - Ensuring Network Integrity and Availability

TOTAL: 45 PERIODS

TEXT BOOK

1. Tamara's Network+ - Guide Networks, Second edition, published by Thomson Learning, 2002.

NE9262 OPTICAL COMMUNICATION SYSTEMS AND NETWORKING LT P C 3 0 0 3

UNIT I INTRODUCTION AND TECHNOLOGY

Telecommunication networks - First _second generation of optical Networks - multiplexing techniques - Network evolution - Light propagation in optical fiber - bandwidth - chromatic dispersion -Nonlinear effects - couplers -isolators and circulators - multiplexers and filters -optical amplifiers - Transmitters - detectors - switches - wavelength converters.

UNIT II MODULATION, DEMODULATION AND TRANSMISSION OF OPTICAL SIGNAL 9

Modulation - Demodulation - transmission system engineering -Optical amplifiers - crosstalk - dispersion - fiber non linearities - wavelength stabilization - overall design considerations.

UNIT III NETWORKS

SONET / SDH - Computer Interconnects - Metropolitan Area Networks - Layered architecture - Broadcast networks : -Topologies for broadcast networks -Media - access control protocols - Test beds - optical layer - Node designs - network design and operation - routing and wavelength assignment.

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management - fault management - optical safety - service interface.

UNIT V **ACCESS NETWORKS & SWITCHING**

Network architecture overview - today's access networks - future Access networks optical access network architecture - application area - OTDM - mux and demuxing synchronization - broadcast OTDM networks - switch bared networks - OTDM Test beds

TOTAL: 45 PERIODS

1. Rajiv Ramaswamy and Kumar N.Sivarajan, "Optical Networks - A Practical Persepctive", Morgan Kauffman, 2004

REFERENCES

TEXT BOOK

UNIT IV

1. D.W.Smith, Optical Network Technology, Chapman and Hall, London, 1995

LT P C NE9263 DISTRIBUTED COMPUTING

UNIT I INTRODUCTION

Characterization of Distributed Systems - Examples - Resource Sharing and the Web -Challenges - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols -Case Studies.

PROCESSES AND DISTRIBUTED OBJECTS UNIT II

Interprocess Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications - Java RMI -Case Study.

UNIT III **OPERATING SYSTEM ISSUES – I**

The OS Layer - Protection - Processes and Threads - Communication and Invocation -OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures -Cryptography Pragmatics - Case Studies - Distributed File Systems - File Service Architecture - Sun Network File System - The Andrew File System

UNIT IV **OPERATING SYSTEM ISSUES – II**

Name Services - Domain Name System - Directory and Discovery Services - Global Name Service - X.500 Directory Service - Clocks, Events and Process States -Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States -Distributed Debugging - Distributed Mutual Exclusion - Elections - Multicast Communication Related Problems.

CONTROL AND MANAGEMENT Network Management functions - configuration Management - performance

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UNIT V DISTRIBUTED TRANSACTION PROCESSING

Transactions - Nested Transactions - Locks - Optimistic Concurrency Control -Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction Recovery - Overview of Replication And Distributed Multimedia Systems

TOTAL: 45 PERIODS

TEXT BOOK

1. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems Concepts and Design, Pearson Education, 3rd Edition, 2002.

REFERENCES

- 1. Sape Mullender, Distributed Systems, Addison Wesley, 2nd Edition, 1993.
- 2. Albert Fleishman, Distributes Systems- Software Design and Implementation, Springer-Verlag, 1994
- 3. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education, 2004.
- 4. Andrew S Tanenbaum , Maartenvan Steen, Distibuted Systems Principles and Pardigms, Pearson Education, 2002
- 5. Mugesh Singhal, Niranjan G Shivaratri, Advanced Concepts in Operating Systems, Tata McGraw Hill Edition, 2001

CS9256	MULTIMEDIA SYSTEMS	LT P C
		3003

UNIT I INTRODUCTION AND QOS

Introduction-QOS Requirements and Constraints-Concepts-Resources- Establishment Phase-Run-Time Phase-Management Architectures.

UNIT II OPERATING SYSTEMS

Real-Time Processing-Scheduling-Interprocess Communication-Memory and Management-Server Architecture-Disk Management.

UNIT III FILE SYSTEMS AND NETWORKS

Traditional and Multimedia File Systems-Caching Policy-Batching-Piggy backing-Ethernet-Gigabit Ethernet-Token Ring-100VG AnyLAN-Fiber Distributed Data Interface (FDDI)- ATM Networks-MAN-WAN.

UNIT IV COMMUNICATION

Transport Subsystem-Protocol Support for QOS-Transport of Multimedia-Computer Supported Cooperative Work-Architecture-Session Management-MBone Applications.

UNIT V SYNCHRONIZATION

Synchronization in Multimedia Systems-Presentation-Synchronization Types-Multimedia Synchronization Methods-Case Studies-MHEG-MODE-ACME.

TOTAL : 45 PERIODS

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TEXT BOOKS:

1. Ralf Steinmetz and Klara Nahrstedt, "Multimedia Systems", Springer, I Edition 2004.

REFERENCES

- 1. Ralf Steinmetz and Klara Nahrstedt, Media Coding and Content Processing, Prentice hall, 2002.
- 2. Vaughan T, Multimedia, Tata McGraw Hill, 1999.
- 3. Mark J.B., Sandra K.M., Multimedia Applications Development using DVI technology, McGraw Hill, 1992.
- 4. K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovacovic, D. A. Milovacovic, Multimedia Communication Systems: Techniques, Standards, and Networks, Prentice Hall, 1st Edition, 2002
- 5. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson, 2004.

CS9266	AGENT BAS	ED IN I ELLI	GENI SY	SIEMS			, (
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UNIT I	INTRODUCTION						9

Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics -Constraint Satisfaction Problems - Game playing

UNIT II KNOWLEDGE REPRESENTATION AND REASONING

Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events

UNIT III PLANNING AGENTS

Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-Multi-agent Planning

UNIT IV AGENTS AND UNCERTAINITY

Acting under uncertainty – Probability Notation-Bayes Rule and use - Bayesian Networks-Other Approaches-Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions

UNIT V HIGHER LEVEL AGENTS

Knowledge in Learning-Relevance Information-Statistical Learning Met hods-Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars-Future of AI

TOTAL : 45 PERIODS

TEXT BOOK:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence - A Modern Approach", 2nd Edition, Prentice Hall, 2002

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REFERENCES:

1. Michael Wooldridge, "An Introduction to Multi Agent System", John Wiley, 2002.

2. Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 1999.

3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992.

NE9266	SIMULATION OF COMMUNICATION	LTPC
	SYSTEMS AND NETWORKS	3 0 0 3

UNIT I MODELLING OF COMMUNICATION SYSTEM 9

Model of speech and picture signals, Pseudo noise sequences, Non-linear sequences, Analog channel model, Noise and fading, Digital channel model-Gilbert model of bustry channels, HF, Troposcatter and satellite channels, Switched telephone channels, Analog and Digital communication system models, Light wave system models.

UNIT II SIMULATION OF RANDOM VARIABLES AND RANDOM PROCESS 9

Univariate and multivaraiate 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 ESTIMATION OF PERFORMANCE MEASURES

Quality of an estimator, estimator for SNR, Probability density functions of analog communication system, BER of digital communication systems, Montre carlo method and Importance sampling method, estimation of power spectral density of a process

UNIT IV 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 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 PERIODS

TEXT BOOK:

1. M.C.Jeruchim, Philip Balaban and K.Sam Shanmugam, "Simulation of communications systems", Plenum Press, New York, 1992

REFERENCES:

- 1. A.M.Law and W.David Kelton, "Simulation Modelling and analysis", Mc Graw Hill Inc., New York ,1991
- 2. J.F.Hayes, "Modelling and Analysis of Computer Communication networks, Plenum Press, New York, 1984
- 3. Jerry Banks and John S.Carson, Discrete-event system Simulation, Prentice Hall,Inc.,New Jersey,1984

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NW9003 **NETWORK PROCESSOR**

UNIT I INTRODUCTION

Traditional protocol processing Systems – Network processing Hardware – Basic Packet Processing Algorithms and data Structures - Packet processing functions - Protocol Software - Hardware Architectures for Protocol processing - Classification and Forwarding – Switching Fabrics.

UNIT II NETWORK PROCESSOR TECHNOLOGY

Network Processors: Motivation and purpose - Complexity of Network Processor Design - Network Processor Architectures architectural variety, architectural characteristics Peripheral Chips supporting Network Processors: Storage processors, Classification Processors, Search Engines, Switch Fabrics, Traffic Managers.

UNIT III COMMERCIAL NETWORK PROCESSORS

Multi-Chip Pipeline, Augmented RISC processor, Embedded Processor plus Coprocessors, Pipelilne of Flomogeneous processors. Configurable Instruction set processors - Pipeline of Electrogeneous processors - Extensive and Diverse processors - Flexible RISC plus Coprocessors - Scalability issues - Design Tradeuffs and consequences.

UNIT IV NETWORK PROCESSOR: ARCHITECTURE AND PROGRAMMING CASE STUDY

Architecture: Intel Network Processor: Multiheaded Architecture Overview - Features -Embedded EISC processor - Packet Processor Hardware - Memory interfaces - System and Control Interface Components - Bus Interface. Programming Software Development Kit-IXP Instruction set – register formats – Micro Engine Programming – Intra thread and Inter-thread communication - thread synchronization - developing sample applications control plane - ARM programming.

UNIT V IOS TECHNOLOGIES

CISCO COS - Connectilvity and scalability - high availability - IP routing - IP services -IPV6 - Mobile IP - MPLS - IP Multicast 0 Manageability - QoS - Security - Switching -Layer VPN2.

TOTAL: 45 PERIODS

REFERENCES:

- 1. Douglas E.Comer "Networks Systems Design using Network Processors" Prentice Hall JaN. 2003.
- 2. Panas C. Lekkas, "Network Processors: Architectgures, Protocols and Paradigms Telecom Engineering)", McGraw Hill, Professional, 2003.
- 3. Patrick Crowley, M a Eranklin, H. Hadminglu, PZ Onfryk, "Network Processor Design, Issues and Practices Vol-1" Morgan Kaufman, 2002.
- 4. Patrick Crowley, M a Frankliln, H. Hadimioglyum PZ Onufryk, Network Processor Design, Issues and Prentices vol.II, Morgan Kaufman, 2003.

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- 5. Erik, J.Johnson and Aaron R.Kunze, "IXP2400/2806 Programming: The Microengine Coding Grade" Intel Press.
- 6. Hill Carlson, "Intel Internet Exchange Architecture & Applications a Practical Guide to Intel's network Processors" Intel press.
- 7. www.cisco.com

CS9254 SOFT COMPUTING

UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition

UNIT III NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks -Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT IV FUZZY LOGIC

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

UNIT V NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

TEXT BOOKS:

- 1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
- **2.** George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
- **3.** James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

REFERENCES:

- 1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998
- **2.** David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.

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TOTAL: 45 PERIODS

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- **3.** S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
- 4. S.N.Sivanandam · S.N.Deepa, "Introduction to Genetic Algorithms", Springer, 2007.
- 5. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.

NW9004 CRYPTOGRAPHY AND NETWORK SECURITY L T P C

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UNIT I INTRODUCTION AND NUMBER THEORY

Classic Cipher Techniques – Substitution Ciphers, Mono-alphabetic Substitution and Poly-alphabetic Substitution – Transposition Ciphers. Number Theory and Finite Arithmetic, Counting in Modulus ρ Arithmetic, Congruence Arithmetic, Fermat's Theorem and Euler's Theorem- Exponentiation.

UNIT II SINGLE AND PUBLIC KEY CIPHERS

DES - 3DES - AES - RSA Algorithm, ElGamal Algorithm - Key Management using Exponential Ciphers - Diffie-Hellman.

UNIT III MESSAGE AUTHENTICATION, DIGITAL SIGNATURES AND CERTIFICATES

Security Services and Mechanisms – Message Authentication (Integrity) – MAC – Hash Functions – Digital Signature: Digital Signature Standards (FIPS 186-2), DSA (ANSI X9.30), RSA (ANSI X9.31) – RSA Certification –PKI Certificates.

UNIT IV TRUSTED IDENTITY AND WIRELESS SECURITY

Security Concerns – Password System: Fixed and One time Passwords (S/Key) RFC 2289 – Callback Systems, Challenge and Response Systems – RADIUS – Kerberos v4 & v5 – Needham Schroeder Protocol – ITU-T X.509 – Authentication: Framework, Simple, Protected, Strong – PKI Life Cycle Management - Current Wireless Technology - Wireless Security WEP Issues.

UNIT V PROTOCOLS AND FIREWALLS

SSL/TLS - SSH - IPSec – Firewall Concepts, Architecture, Packet Filtering, Proxy Services and Bastion Hosts – Electronic Mail Security – PGP, S/MIME.

TOTAL: 45 PERIODS

REFERENCES:

- **1.** William Stallings "Cryptography and Network Security: Principles and Practice", 3rd Edition, Pearson Education, 2002.
- **2.** William Stallings "Network Security Essentials: Applications and Standards", 2nd Edition, Pearson Education, 2000.
- **3.** Behrouz A.Forouzan, "Cryptography and Network Security", special edition, Tata McGraw Hill, 2007.
- 4. Bruce Scheneier, "Applied Cryptography", John Wiley & Sons, 1994.
- 5. Douglas R.Stinson, "Cryptography: Theory and Practice", CRC Press Series on Discrete Mathematics and its Applications, 1995.

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