AFFILIATED INSTITUTIONS

ANNA UNIVERSITY, CHENNAI

REGULATION - 2009

M.E. NETWORKING AND INTERNET ENGINEERING

II TO IV SEMESTERS (FULL TIME) CURRICULUM AND SYLLABI

SEMESTER II

SL. No	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	CU9257	Communication Network Security	3	0	0	3
2	NI9321	Network Management	3	0	0	3
3	NI9322	Web Design and Management	3	0	0	3
4	MU9357	Service Oriented Architecture	3	0	0	3
5	SE9251	Software Agents	3	0	0	3
6	E1	ELECTIVE -I	3	0	0	3
PRACTICAL						
7	NI9323	Networking And Security Lab	0	0	4	2
		TOTAL	**18**	**0**	**4**	**20**

SEMESTER III

SL. No	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	NI9331	Internet And Web Technologies	3	0	0	3
2		ELECTIVE –II	3	0	0	3
3		ELECTIVE -III	3	0	0	3
PROJECT						
4	NI9332	Project Work (Phase I)	0	0	12	6
		TOTAL	**9**	**0**	**12**	**15**

SEMESTER IV

SL. No	COURSE CODE	COURSE TITLE	L	T	P	C
PROJECT						
1	NI9341	Project Work (Phase II)	0	0	24	12
		TOTAL	**0**	**0**	**24**	**12**

ELECTIVES FOR M.E. NETWORKING AND INTERNET ENGINEERING

SL. No	COURSE CODE	COURSE TITLE	L	T	P	C
1	NI9351	Optical Networks	3	0	0	3
2	NI9352	Cloud And Utility Computing	3	0	0	3
3	NI9353	Pervasive Computing	3	0	0	3
4	NI9354	Ethical Hacking	3	0	0	3
5	SE9261	Language Technologies	3	0	0	3
6	MU9324	Applied Cryptography	3	0	0	3
7	EC9018	E-Commerce Technology	3	0	0	3
8	NI9355	Convergent Networks	3	0	0	3
9	NI9356	Search Engines And Optimizations	3	0	0	3
10	NI9357	Network Infrastructure And Cyber Security	3	0	0	3
11	NI9358	Advanced Network Design And Performance Tuning	3	0	0	3
12	NI9359	Network Routing Protocols	3	0	0	3
13	NI9360	Network System Design Using Network Processor	3	0	0	3
14	NI9361	Performance Evaluation of Computer Networks	3	0	0	3
15	NI9362	LAN Design And Implementation	3	0	0	3
16	MU9358	Human Resource Management	3	0	0	3
17	CS9264	Data Warehousing And Data Mining	3	0	0	3
18	NI9363	Multimedia Communication And Networks	3	0	0	3
19	NI9364	Mobile And Personal Communications	3	0	0	3
20	EC9013	Satellite Communication	3	0	0	3

CU9257 COMMUNICATION NETWORK SECURITY L T P C
3 0 0 3

UNIT I INTRODUCTION ON SECURITY 9

Security Goals, Types of Attacks: Passive attack, active attack, attacks on confidentiality, attacks on Integrity and availability. Security services and mechanisms, Techniques : Cryptography, Steganography , Revision on Mathematics for Cryptography.

UNIT II SYMMETRIC & ASYMMETRIC KEY ALGORITHMS 9

Substitutional Ciphers, Transposition Ciphers, Stream and Block Ciphers, Data Encryption Standards (DES), Advanced Encryption Standard (AES), RC4,principle of asymmetric key algorithms, RSA Cryptosystem

UNIT III INTEGRITY, AUTHENTICATION AND KEY MANAGEMENT 9

Message Integrity, Hash functions : SHA, Digital signatures : Digital signature standards. Authentication Entity Authentication: Biometrics, Key management Techniques.

UNIT IV NETWORK SECURITY, FIREWALLS AND WEB SECURITY 9

Introduction on Firewalls, Types of Firewalls, Firewall Configuration and Limitation of Firewall. IP Security Overview, IP security Architecture, authentication Header, Security payload, security associations, Key Management. Web security requirement, secure sockets layer, transport layer security, secure electronic transaction, dual signature

UNIT V WIRELESS NETWORK SECURITY 9

Security Attack issues specific to Wireless systems: Worm hole, Tunneling, DoS.WEP for Wi-Fi network, Security for 4G networks: Secure Ad hoc Network, Secure Sensor Network

TOTAL: 45 PERIODS

REFERENCES:

1. Behrouz A. Fourcuzan ," Cryptography and Network security" Tata McGraw- Hill, 2008
2. William Stallings,"Cryptography and Network security: principles and practice",2nd Edition,Prentice Hall of India,New Delhi,2002
3. Atul Kahate ," Cryptography and Network security", 2nd Edition, Tata McGraw- Hill, 2008
4. R.K.Nichols and P.C. Lekkas ," Wireless Security"
5. H. Yang et al., Security in Mobile Ad Hoc Networks: Challenges and Solution, IEEE Wireless Communications, Feb. 2004.
6. Securing Ad Hoc Networks," IEEE Network Magazine, vol. 13, no. 6, pp. 24-30, December 1999.
7."Security of Wireless Ad Hoc Networks," http://www.cs.umd.edu/~aram/wireless/survey.pdf.
8. David Boel et.al (Jan 2008) "Securing Wireless Sensor Networks – Security Architecture " Journal of networks , Vol.3. No. 1. pp. 65 -76.
9. Perrig, A., Stankovic, J., Wagner, D. (2004), "Security in Wireless Sensor Networks", Communications of the ACM, 47(6), 53-57

NI9321 NETWORK MANAGEMENT L T P C
3 0 0 3

UNIT I **9**

Data Communication and Network Management Overview: Analogy of Telephone Network Management- Data and Telecommunication Network- Distributed Computing Environments- TCP/IP- Based Networks- Communication Protocols and Standards- Case Histories- Challenges of Information Technology Managers- Network Management: Goals, Organization and Functions- Network and System Management- Network Management System Platform- Current Status and Future of Network Management- Fundamental of Computer Network Technology: Network Topology, LAN, Network Node components- WAN - Transmission Technology- Integrated Services: ISDN, Frame Relay, and Broadband.

UNIT II **9**

SNMP, Broadband and TMN Management- Basic Foundations: Network Management Standards, Network Management Model- Organization Model- Information Model- Communication model- encoding Structure- Macros- Functional Model- SNMPv1 Network Management: Organization and Information Models- Management Network- The History of SNMP Management- Internet Organizations and Standards- The SNMP Model- The Organization Model- System Overview- The Information Model. SNMPv1 Network Management: Communication Model and Functional Models.

UNIT III **9**

SNMP Management: Major Changes in SNMPv2- SNMPv2 System Architecture- SNMPv2 Structure of Management Information- The SNMPv2 Management Information Base- SNMPv2 Protocol- Compatibility with SNMPv1- SNMPv3- SNMPv3 Documentation- SNMPv3 Documentation Architecture- Architecture- SNMPv3 Applications- SNMPv3 Management Information Base- Security- SNMPv3 User- Based Security Model- Access Control- SNMP Management: RMON- Remote Monitoring- RMON SMI and MIBRMON1- RMON2- ATM Remote Monitoring-Case Study.

UNIT IV **9**

Broadband Networks and services- ATM Technology- ATM Network Management- Broadband Access networks and Technologies-HFC Technology-Data over Cable Reference Architecture-HFC Management-DSL Technologies-ADSL technology-ADSL Management- Telecommunication Management Network-Operation Systems-TMN Conceptual Model- TMN Standard-TMN Architecture-TMN Management Service Architecture-An Integrated view of TMN-Implementation Issues.

UNIT V **9**

Network Management Tools and Systems- Network Statistic Measurement Systems- History of Enterprise Management- Network Management Systems- Commercial Network Management Systems- System Management-Enterprise Management Solutions- Network Management Applications: Configuration management- Fault Management- Performance management- Event correlation Techniques- Security Management- Accounting Management- Report Management- Policy Based Management- Service level Management-Web-Based Management- NMS with Web Interface and Web Based Management- Web Interface to SNMP Management- Embedded Web Based Management- Desktop Management Interface- Web Based Enterprise Management- WBEM: Windows Management Instrumentation- Java Management Extensions-Management of a Storage Area Network.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Mani Subramanian, *Network Management - Principles and Practice*, Addison Wesley, New York, 2000.

REFERENCE:

1. Stephen B. Morris, Network Management – MIBs and MPLS, Pearson Education, 2003.

NI9322 WEB DESIGN AND MANAGEMENT L T P C
3 0 0 3

UNIT I SITE ORGANIZATION AND NAVIGATION 9

User centered design – Web medium – Web design process – Evaluating process – Site types and architectures – Navigation theory – Basic navigation practices – Search – Site maps.

UNIT II ELEMENTS OF PAGE DESIGN 9

Browser compatible design issues - Pages and Layout – Templates – Text – Color – Images – Graphics and Multimedia - GUI Widgets and Forms – Web Design patterns

UNIT III SERVER SIDE PROGRAMMING 9

Dynamic Web Content – Server Side – Communication – Active and Java Server Pages – Firewalls – Proxy Servers – Web Service Implementation.

UNIT IV PRE-PRODUCTION MANAGEMENT 8

Principles of Project Management – Web Project Method – Project Road Map – Project Clarification – Solution Definition – Project Specification – Content – Writing and Managing content.

UNIT V PRODUCTION, MAINTENANCE AND EVALUATION 9

Design and Construction – Testing, Launch and Handover – Maintenance – Review and Evaluation – Case Study.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Themas A. Powell, "The Complete Reference – Web Design", Tata McGraw Hill, Third Edition, 2003.
2. Ashley Friedlein, "Web Project Management", Morgan Kaufmann Publishers, 2001.
3. H. M. Deitel, P. J. Deitel, A. B. Goldberg, "Internet and World Wide Web – How to Program", Third Edition, Pearson Education 2004.
4. Scot Johnson, Keith Ballinger, Davis Chapman, "Using Active Server Pages", Prentice Hall of India, 1999.

REFERENCES:

1. Joel Sklar, "Principles of Web Design", Thomson Learning, 2001.
2. **Van Duyne, Landay, and Hong** "The Design of Sites: Patterns for creating winning web sites", 2nd Edition, Prentice Hall, 2006.
3. Lynch, Horton and Rosenfeld, "Web Style Guide: Basic Design Principles for Creating Web Sites", 2nd Edition, Yale University Press, 2002

MU9357 SERVICE ORIENTED ARCHITECTURE L T P C
3 0 0 3

UNIT I **9**

Software Architecture – Types of IT Architecture – SOA – Evolution – Key components – perspective of SOA – Enterprise-wide SOA – Architecture – Enterprise Applications – Solution Architecture for enterprise application – Software platforms for enterprise Applications – Patterns for SOA – SOA programming models

UNIT II **9**

Service-oriented Analysis and Design – Design of Activity, Data, Client and business process services – Technologies of SOA – SOAP – WSDL – JAX – WS – XML WS for .NET – Service integration with ESB – Scenario – Business case for SOA – stakeholder objectives – benefits of SPA – Cost Savings

UNIT III **9**

SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – software s a service – SOA technologies – proof-of-concept – process orchestration – SOA best practices

UNIT IV **9**

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework - advanced messaging

UNIT V **9**

Transaction processing – paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues

TOTAL: 45 PERIODS

REFERENCES:

1. Shankar Kambhampaly, "Service –Oriented Architecture for Enterprise Applications", Wiley India Pvt Ltd, 2008.
2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education.
3. Mark O' Neill, et al. , "Web Services Security", Tata McGraw-Hill Edition, 2003.

SE9251 SOFTWARE AGENTS L T P C
3 0 0 3

UNIT I AGENTS – OVERVIEW 9

Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II JAVA AGENTS 9

Processes – Threads – Daemons – Components – Java Beans – ActiveX – Sockets – RPCs – Distributed Computing – Aglets Programming – Jini Architecture – Actors and Agents – Typed and proactive messages.

UNIT III MULTIAGENT SYSTEMS 9

Interaction between agents – Reactive Agents – Cognitive Agents – Interaction protocols – Agent coordination – Agent negotiation – Agent Cooperation – Agent Organization – Self-Interested agents in Electronic Commerce Applications.

UNIT IV INTELLIGENT SOFTWARE AGENTS 9

Interface Agents – Agent Communication Languages – Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V AGENTS AND SECURITY 9

Agent Security Issues – Mobile Agents Security – Protecting Agents against Malicious Hosts – Untrusted Agent – Black Box Security – Authentication for agents – Security issues for Aglets.

TOTAL: 45 PERIODS

REFERENCES:

1. Bigus & Bigus, " Constructing Intelligent agents with Java ", Wiley, 1997.
2. Bradshaw, “Software Agents ", MIT Press, 2000.
3. Russel, Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, Pearson Education, 2003.
4. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
5. Gerhard Weiss, “Multi Agent Systems – A Modern Approach to Distributed Artificial Intelligence”, MIT Press, 2000.

NI9323 NETWORKING AND SECURITY LAB L T P C
0 0 4 2

1. Simulation of Network Management Protocols
2. Study of Network Simulator Packages – such as opnet, ns2, etc.
3. Development of applications such as DNS/ HTTP/ E – mail/ Multi - user Chat
4. Performance evaluation of transport protocols using NS2 simulator.
5. Performance evaluation of any two routing protocols using NS2 simulator
6. Implementation of any two Symmetric Key Algorithms

7. Implement RSA algorithm

8. Analyse the components of a Digital Certificate and Display it.

9. Capture and Analyze the Network traffic using Packet Analyser Tools.

TOTAL: 45 PERIODS

NI9331 INTERNET AND WEB TECHNOLOGIES L T P C
3 0 0 3

UNIT I THE INTERNET ARCHITECTURE: 9
Introduction Evolution Components advantages – Web platform architecture web application architecture Classification of internet standards and technologies.

UNIT II THE CLIENT: 9
Introduction Browser dependent issues Client Caching - DOM basics Events manipulation Object basics - Form and Data manipulation Advanced DOM techniques Error handling XML and client side scripting.

UNIT III THE SERVER: 9
Introduction components - Request and responses Rendering dynamic contents Manipulation of database from server side scripting- caching in server side - performance measures Authentication and security access controls in web servers.

UNIT IV WEB DOCUMENTS DISTRIBUTION AND CACHING: 9
caching the web data - Interactions with enterprise server , application server etc. Web services : architecture, design and implementation issues , advantages and applications of web services.

UNIT V WEB2.0: 9
Introduction, Technology overview - Ajax Overview Rethinking the web application Core technology Security in AJAX case study on AJAX frameworks and libraries.

TOTAL: 45 PERIODS

REFERENCES:

1. Guide to Web Application and Platform Architectures (Springer Professional Computing), 2004.
2. Stefan Jablonski, Ilia Petrov, Christian Meiler, Udo Mayer, 2003
3. Professional JavaScript for Web developers Nicholas C Zakas Web Server Programming Neil Gray, 2003
4. Ajax in Action By Dave crane, Eric Pascarello and Darren James, 2005

NI9351 OPTICAL NETWORKS L T P C
3 0 0 3

UNIT I OPTICAL NETWORK TECHNOLOGY 9

Telecommunication Network Architecture and Services-Circuit Switching-Packet Switching-Optical Networks-Optical Layers-Optical Packet Switching-Transmission Basis- Network Evaluation – Propagation of Signals in Optical Fiber-Modulation and Demodulation formats.

UNIT II OPTICAL NETWORK COMPONENTS 9

Components: Coupler-Isolators and Circulators-Multiplexers and Filters-Optical Amplifiers-Transmitters-Detectors- Switches- Wavelength Converters, Transmission System Engineering: Power penalty- Gain Saturation and Equalization in EDFA- Power Transient and Automatic Control-Cross Talk- Dispersion- Wave Length Stabilization-Fiber Non linearities- Soliton system- over all design Consideration.

UNIT III OPTICAL NETWORKS 9

SONET/SDH: Multiplexing- Layers-Frame Structure-Elements of SONET/SDH Infrastructure- ATM: Functions-Adaptation Layer-QOS-Flow Control- Signaling and Routing, IP: Routing and Forwarding- QOS- MPLS, SAN: ESCON- Fiber Channel- HIPPI

UNIT IV WDM NETWORK DESIGN 9

WDM Network Elements: Line Terminal- Line Amplifier- OXC and its configuration, WDM Network Design: Cost Trade Offs – LTD and RWA Problem- Dimensioning Wave Length Routing Network- Statistical and Maximum Load Dimensioning Model.

UNIT V ADVANCED OPTICAL NETWORKS 9

Access Network: Overview- HFC- FTTC, Photonic Packet Switching: OTDMSynchronization- Buffering-Header processing- Burst Switching- NTT's Optical ATM switches-AON-CORD, Long- Haul Networks- Long- Haul Network Case Study-Long- Haul Undersea Networks- Metro Networks- Metro Ring Case Stud

TOTAL: 45 PERIODS

TEXT BOOK

1. Ramaswami R and Sivarajan K, Optical Networks: A Practical Perspective, Morgan Kaufmann, 2nd Edition, 2001.

REFERENCES

1. Stern T.E and Bala K, Multiwavelength Optical Networks: A Layered Approach, Addison-Wesley.
2. Agrawal G.P, Fiber-Optic Communication Systems, John Wiley and Sons

NI9352 CLOUD AND UTILITY COMPUTING L T P C
3 0 0 3

UNIT I **9**

Introduction to Cloud Computing- The Evolution of Cloud Computing – Hardware Evolution – Internet Software Evolution – Server Virtualization - Web Services Deliver from the Cloud – Communication-as-a-Service – Infrastructure-as-a-Service – Monitoring-as-a- Service – Platform-as-a-Service – Software-as-a-Service – Building Cloud Network

UNIT II **9**

Federation in the Cloud - Presence in the Cloud - Privacy and its Relation to Cloud-Based Information Systems – Security in the Cloud - Common Standards in the Cloud – End-User Access to the Cloud Computing

UNIT III **9**

Introduction - Advancing towards a Utility Model – Evolving IT infrastructure – Evolving Software Applications – Continuum of Utilities- Standards and Working Groups – Standards Bodies and Working Groups – Service Oriented Architecture – Business Process Execution Language – Interoperability Standards for Data Center Management - Utility Computing Technology – Virtualization – Hyper Threading – Blade Servers - Automated Provisioning - Policy Based Automation – Application Management – Evaluating Utility Management Technology - Virtual Test and development Environment - Data Center Challenges and Solutions - Automating the Data Center

UNIT IV **9**

Software Utility Application Architecture - Characteristics of an SaaS - Software Utility Applications - Cost Versus Value - Software Application Services Framework – Common Enablers – Conceptual view to Reality – Business Profits - Implementing Database Systems for Multitenant Architecture

UNIT V **9**

Other Design Considerations - Design of a Web Services Metering Interface – Application Monitoring Implementation - A Design for an Update and Notification Policy - Transforming to Software as a Service - Application Transformation Program – Business Model Scenarios - Virtual Services for Organizations - The Future.

TOTAL: 45 PERIODS

REFERENCES

1. John W. Rittinghouse and ames F. Ransome, “Cloud Computing Implementation, Management and Security”, CRC Press, Taylor & Francis Group, Boca Raton London New York. 2010 [Unit -11 and Unit II]
2. Alfredo Mendoza, “Utility Computing Technologies, Standards, and Strategies”, Artech House INC, 2007 . [Unit -11I to Unit V]
3. Guy Bunker and Darren Thomson, “Delivering Utility Computing”, John Wiley & Sons Ltd, 2006.
4. George Reese, “Cloud Application Architectures”, O’reilly Publications, 2009.

NI9353 **PERVASIVE COMPUTING** **L T P C**
3 0 0 3

UNIT I **9**

What Pervasive Computing is all About: Times are Changing-Decentralization continues-Applied Pervasive computing-Pervasive computing principles-Pervasive Information Technology. Devices: Information Access Devices-Handheld Computers-Sub-Notebooks- Phones. Smart Identification**:** Smart Cards-Smart Labels. Embedded Controls: Smart sensors and Actuators-Smart Appliances-Appliances and Home Networking-Automotive Computing.

UNIT II **9**

Entertainment Systems**:** Television Systems-Game Consoles. Operating Systems**:** Windows CEPalm OS-Symbian EPOC-Java Card-Windows for Smart Cards. Middleware Components**:** Programming Consumer Devices-Smart Card Programming-Messaging Components-Database Components.

UNIT III **9**

WAP**:** The WAP Architecture-Wireless Application Environment. Connectivity**:** Wireless Wide Area Networks-Short Range Wireless Communication-Home Networks. Service Discovery: Universal Plug and Play-Jini-Salutation.

UNIT IV **9**

Gateways: Connectivity Gateway-Wireless Gateway-Transcoding-Residential Gateway. Web Application Servers: Architecture and Components-WebSphere Application Server-WebSphere Everyplace Suite-Oracle Portal-to-Go. Device Management**:** Tasks of Device Mangement Systems-Tivoli Device Support Infrastructure-User Profiles and Directory Services.Synchronization: What Synchronization is all About-The Challenge of Synchronizing Data-Industry Data Synchronization Standards-Today's Synchronization Solution.

UNIT V **9**

Portals and Access Services: Internet Portals-Wireless Portal-Broadcasting Portal. Home Services: The System View-Communication Services-Home Automation-Energy Services-Security Services-Remote Home Healthcare Services. Travel and Business Services: Travel Services-Business Services**.** Consumer Services: Interactive Advertisement-Loyalty-Shopping-Payment Services.

TOTAL : 45 PERIODS

TEXT BOOK:

Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, *Pervasive Computing Handbook,* Springer, 2001, ISBN 3-540-6712

NI9354 **ETHICAL HACKING** **L T P C**
3 0 0 3

UNIT I **9**

Casing the Establishment **-**footprinting- Internet Footprinting. -Scanning-Enumeration **–** basic banner grabbing, Enumerating Common Network services. Case study- Network Security Monitoring.

UNIT II **9**

Securing permission **-** Securing file and folder permission. Using the encrypting file system. Securing registry permissions. Securing service - Managing service permission. Default services in windows 2000 and windows xp**.** Unix **-** The Quest for Root. Remote Access vs Local access. Remote access. Local sccess. After hacking root.

UNIT III **9**

Dial-up, PBX, Voicemail, and VPN hacking **-** Preparing to dial up. War-Dialing. Brude-Force Scripting PBX hacking.Voice mail hacking. VPN hacking. Network Devices – Discovery, Autonomous System Lookup. Public Newsgroups. Service Detection.Network Vulnerability. Detecting Layer 2 Media.

UNIT IV **9**

Wireless Hacking - Wireless Footprinting. Wireless Scanning and Enumeration. Gaining Access. Tools that exploiting WEP Weakness. Denial of Services Attacks. Firewalls**-** Firewalls landscape- Firewall Identification-Scanning Through firewalls- packet Filtering-Application Proxy Vulnerabilities . Denial of Service Attacks **:** Motivation of Dos Attackers. Types of DoS attacks. Generic Dos Attacks. Unix and Windows DoS.

UNIT V **9**

Remote Control Insecurities **-** Discovering Remote Control Software. Connection. Weakness.VNC . Microsoft Terminal Server and Citrix ICA. Advanced Techniques - Session Hijacking. Back Dorrs. Trojans. Cryptography. Subverting the systems Environment. Social Engineering. Web Hacking. Web server hacking web application hacking. Hacking the internet User **-** Malicious Mobile code. SSl fraud-mail Hacking. IRC hacking, Global countermeasures to Internet User Hacking.

TOTAL :45 PERIODS

REFERENCES:

1. Stuart McClure, Joel Scambray and Goerge Kurtz, “Hacking Exposed Network Security Secrets & Solutions”, Tata McGraw-Hill Publishers, 2010.
2. Bensmith, Brian Komer, “Microsoft Windows Security Resource Kit”, Prentice Hall of India, 2010.

SE9261 LANGUAGE TECHNOLOGIES L T P C
3 0 0 3

UNIT I INTRODUCTION 9

Natural Language Processing – Linguistic Background- Spoken language input and output Technologies – Written language Input - Mathematical Methods - Statistical Modeling and Classification Finite State methods Grammar for Natural Language Processing – Parsing – Semantic and Logic Form – Ambiguity Resolution – Semantic Interpretation.

UNIT II INFORMATION RETRIEVAL 9

Information Retrieval architecture - Indexing- Storage – Compression Techniques – Retrieval Approaches – Evaluation - Search engines- commercial search engine features- comparison- performance measures – Document Processing - NLP based Information Retrieval – Information Extraction.

UNIT III TEXT MINING 9

Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering- Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV GENERIC ISSUES 9

Multilinguality – Multilingual Information Retrieval and Speech processing - Multimodality – Text and Images – Modality Integration - Transmission and Storage – Speech coding- Evaluation of systems – Human Factors and user Acceptability.

UNIT V APPLICATIONS 9

Machine Translation – Transfer Metaphor - Interlingua and Statistical Approaches - Discourse Processing – Dialog and Conversational Agents – Natural Language Generation – Surface Realization and Discourse Planning.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Daniel Jurafsky and James H. martin, “Speech and Language Processing” , 2000.
2. Ron Cole, J.Marianiet.al “Survey of the State of the Art in Human Language Technology”, Cambridge University Press, 1997.
3. Michael W. Berry “ Survey of Text Mining: Culstering, Classification and Retrieval”, Springer Verlag, 2003.
4. Christopher D.Manning and Hinrich Schutze, “ Foundations of Statistical Natural Language Processing “, MIT Press, 1999.

REFERENCES:

1. James Allen “ Natural Language Understanding “, Benjamin/ Cummings Publishing Co. 1995.
2. Gerald J. Kowalski and Mark.T. Maybury, “Information Storage and Retrieval systems”, Kluwer academic Publishers, 2000.
3. Tomek Strzalkowski “ Natural Language Information Retrieval “, Kluwer academic Publishers, 1999.
4. Christopher D.Manning and Hinrich Schutze, “ Foundations of Statistical Natural Language Processing “, MIT Press, 1999.

MU9324 **APPLIED CRYPTOGRAPHY** **L T P C**

3 0 0 3

UNIT I **9**

Classical Cryptography-The Shift Cipher,The Substitution Cipher,The Affine Cipher Cryptanalysis-Cryptanalysis of the Affine Cipher,Cryptanalysis of the Substitution Cipher,Cryptanalysis of the Vigenere Cipher,Shannon's Theory.

UNIT II **9**

Block Cipher and the Advanced Encryption Standard-Substitution -Permutation Netrworks, Linear Cryptanalysis, Differential Cryptoanalysis , The Data Encryption Standard, The Advanced Encryption Standard, Modes of Operation ,Cryptography Hash Function- Hash Function and Data Integrity, Security of Hash Function ,Iterated Hash Functions, Message Authentication Codes.

UNIT III **9**

The RSA Cryptosystem and Factorin Integer- Intoduction to Public –key Cryptography, Number theory,The RSA Cryptosystem ,Other Attacks on RSA,The ELGamal Cryptosystem,Shanks' Algorithm,Finit Fields,Elliptic Curves over the Reals, Elliptical Curves Modulo a Prime,Signature Scheme –Digital Signature Algorithm.

UNIT IV **9**

Identification Scheme and Entity Attenuation-Challenge – and – Response in the Secret-key Setting,Challenge – and – Response in the Public key Setting,The Schnorr Identificataon Scheme,Key distribution-Diffie-Hellman Key, Predustribution,Unconditionaly Secure key Predistribution,Key Agreement Scheme-Diffie-Hellman Key agreement,Public key infrastructure-PKI,Certificates,Trust Models.

UNIT V **9**

Secret Sharing Schemes-The Shamir Threshold Scheme,Access Structure and General Scret key sharing,Informataion Rate and Construction of Effcient Schemes,Multicast Securuty and Copyright production-Multicast Security,Braodcast Encryption ,Multicast Re-keying,Copyright Protection ,Tracing Illegally Redistribution keys.

TOTAL : 45PERIODS

TEXT BOOK:

1. Douglas R. Stinson ,"Cryptography Theory and Practice ", Third Edition, Chapman & Hall/CRC,2006

REFERENCES:

1. Menges A. J , Oorschot P, Vanstone S.A,"Handbollk of Appliled Cryptography" CRC Press,1997.
2. William Stallings, "Cryptography and Network Security: Principles and Practices", Third Edition, Pearson Education,2006.
3. Wenbo Mao, "Modern Cryptography – Theory and Practice", Pearson Education, First Edition, 2006.
4. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007.

5. Wade Trappe and Lawrence C. Washington, “Intrduction to Cryptography with Coding Theory” Second Edition, Pearson Education, 2007.

EC9018 E-COMMERCE TECHNOLOGY L T P C
3 0 0 3

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 SECURITY 9

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

UNIT V INTER/INTRA ORGANIZATIONS ELECTRONIC COMMERCE 9

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 PERIODS

TEXT BOOKS

1. Ravi Kalakota and Andrew Whinston B, Frontiers of Electronic commerce, Addison Wesley, 1996

REFERENCES

1. Pete Loshin, Paul Murphy A, Electronic Commerce, Jaico Publishers, 2nd Edition, 1996.
2. David Whiteley, e-Commerce:Strategy, Technologies and Applications, McGraw Hill, 2000.

NI9355 CONVERGENT NETWORKS L T P C
3 0 0 3

UNIT I TRADITIONAL VOICE NETWORKS 9

Traditional voice networks – state of voice communication – Enterprise Telephonic Signaling – Signaling Systems – Call routing and dial plan – defining and measuring voice quality

UNIT II PACKET VOICE AND DATA NETWORKS 9

Voice digitization and coding –Quality of Service criteria for packet telephony – WAN protocols for integrated voice and data service, Design considerations for WAN protocols

UNIT III VOICE/DATA INTEGRATION 9

Review of IP features for voice / data integration, Voice over IP transport and Signaling protocols ,Initial Network Planning and Design, Delay Budgets and Loss Plans, Establishing an Integrated Dialing Plan

UNIT IV IMPLEMENTATION AND CISCO ROUTER CONFIGURATION 9

Enabling Network-Wide Quality of Service, Establishing Router-PBX Connectivity, Establishing Network-Wide Calling Capability, Resolving Voice Quality Issues

UNIT V IP TELEPHONY 9

IP Basics – IP Telephony Concepts: From Legacy Telephony to IP Telephony Supplementary Services / Extended phone Features –Unified Messaging – Unity Administration, Call Management.

TOTAL : 45 PERIODS

TEXT BOOK:

1. Scott Keagy Integrating Voice and Data Networks, Cisco Press. 2000

REFERENCE

1. Oliver C. Ibe, Converged Network Architecture, Delivering voice and data over IP, ATM and frame relay, john Wiley and Sons, I edition, 2001

NI9356 SEARCH ENGINES & OPTIMIZATIONS L T P C
3 0 0 3

UNIT I 9

Introduction to Web Search Engines: Roadmap - Architecture - Overview of Crawlers: Design - Working principles Engineering the large scale crawlers : DNS caching, prefetching Link extraction and normalization Robot exclusion Avoiding repetitions etc.

UNIT II 9

Indexing : The indexing process - Methodologies - Various Indexing Algorithms Index compression techniques stemming - Retrieval : Relevance ranking - Retrieval techniques - Various retrieval algorithms Similarity search.

UNIT III **9**

Link Analysis: Need & Importance - Techniques. Clustering: Clustering of web search results : Formulation and approaches - Collaborative filtering techniques – Dynamic clustering - Query Optimization techniques

UNIT IV **9**

Social Network Analysis: Page Rank HITS Resource discovery on Web. Multimedia Retrieval in search engines Semantic Web and search engines - Focused crawling – Vertical search engines. Making your page visible to search engines - Search engine marketing techniques

UNIT V **9**

Recent Trends in search engine domain Case studies Implementation of search engine using appropriate technologies.

TOTAL : 45 PERIODS

REFERENCES:

1. Mining the Web: Discovering Knowledge from Hypertext Data (Hardcover) By Soumen Chakrabarti, 2002
2. Understanding Search Engines: Mathematical Modeling and Text Retrieval (Software, Environments, Tools) Michael W. Berry, Murray Browne, 2005

NI9357 NETWORK INFRASTRUCTURE AND CYBER SECURITY **L T P C**
3 0 0 3

UNIT I **9**

Local Area Network (LAN) Infrastructure - Bridges and Switches - IP Routing Topology – Controlling Data Movement with Filters and VLANs. Wide Area Network (WAN) Infrastructure – WAN Switching Technologies - WAN Transmission Technologies - WAN Connectivity Methods – Voice Over Data Systems. Planning, Implementing, and Maintaining a Network Infrastructure using TCP/IP- Network Security using IPSec and wireless devices. Infrastructure using Certificate Services, Performance monitoring Clustering, planning backup and recovery strategies. Routing and Remote Access.

UNIT II **9**

Windows 2000 Networking - Install and Configure Protocols - Network Bindings and Packet Filters Dynamic Host Configuration Protocol(DHCP)-Scoping - DHCP Options - IP Routing - RIP Routing -OSPF & Static Routing – Demand Dial Routing - Monitoring Traffic - LAN Internet Connection Sharing - Modem Internet Connection Sharing - IP Security - IPSec Assignment - DNS Overview - DNS Servers - DNS Monitoring - Certificate Management - Remote Access Services - RAS Policies - RAS and VPN. Windows Internet Naming Services(WINS) - WINS Monitoring.

UNIT III **9**

Design the infrastructure - Windows 2000 network services - Network implementation plan - Protocols supported by Windows 2000. Implementing TCP/IP IP Addressing - IP Routing. Network Monitor - Windows 2000 Administration tools. DHCP Services - Installing DHCP Services for Remote Access Services - Troubleshooting DHCP. Remote

Access Service - Configuring RAS - IP Routing on RAS. IPSec Protocol, Monitoring IPSec. Virtual Private Network - Creating VPN Interfaces - Point to Point Protocol - Using routing and Remote Access with DHCP. Managing and Monitoring Remote Access - Accounting - Net Shell. Network Address Translation (NAT) – Installing and configuring NAT.

UNIT IV **9**

Cyber Security : Secure Programming - Least-privilege programming and impersonation – Input cleanliness - Worm anatomy. OS security - Windows ACLs and security policies - Vista security additions - SE Linux domain type enforcement policies - Database Security. Network Security -Firewall configuration IPSec - IPv6 - Network intrusion detection and monitoring - Honeypots - Wireless security Network scanning. Defensive system design - Security architectures – Penetration testing.

UNIT V **9**

Introduction to Cyber Crime and Security - Denial of Service Attacks - Malware – Encryption Internet Fraud and Cyber Crime Industrial Espionage in Cyberspace Cyber Terrorism and Information Warfare Cyber Detective. Legal aspects -Cyber Law and Ethics Trust - Risks – Threats & Vulnerabilities Management - Disaster Recovery - Key Management -Security Planning, Web security. Cyber attacks - Cyber warfare - Cyber terrorism - Cyber hooliganism, Slammer worm, Titan Rain, Administrative security **-** Network Security - Procedural Controls - Auditing & Monitoring - Role-Based Access Control (RBAC) - Systems Management Responsibilities.

TOTAL : 45 PERIODS

REFERENCES:

1. Edward Amoroso - Cyber Security , Silicon Press, September 27, 2006
2. Author: Microsoft - Als Microsoft Windows 2000 Network Infrastructure Administration Subgenre: Certification Guides / General, John Wiley & Sons Inc (10/06/2006).
3. Steven Andres, Brian Kenyon - Security Sage's Guide to Hardening the Network Infrastructure Subgenre: Security / General, Networking / Network Protocols, Elsevier Science Ltd (07/01/2004)

NI9358 ADVANCED NETWORK DESIGN AND PERFORMANCE TUNING **L T P C**
3 0 0 3

UNIT I ADVANCED NETWORKS INTRODUCTION: **9**

Switching concepts; Switch forwarding techniques; switch path control - LAN switching; cut through forwarding; store and forward; ATM Switching Switch models - Blocking networks basic and enhanced banyan networks - sorting networks merge sorting - rearrangeable networks - full and partial connection networks - nonblocking networks construction and comparison of non-blocking network.

UNIT II QUEUES AND IP SWITCHING: **9**

Internal queuing Input, output and shared queuing - multiple queuing networks combined input, output and shared queuing performance analysis of queued switches, Addressing mode - IP switching types-flow driven and topology driven solutions - IP Over ATM address and next hop resolution multicasting - IPv6 over ATM

.

UNIT III NETWORK PERFORMANCE INTRODUCTION: 9

Need for performance evaluation Role of performance evaluation - performance evaluation Methods Performance Metrics and Evaluation Criteria CPU and I/O Architectures Distributed and Network Architectures Secondary Storage Topologies Computer Architecture - Fundamental Concepts and Performance Measures.

UNIT IV NFS PERFORMANCE TUNING: 9

NFS server constraints, NFS client improvements, NFS over WANs, Automounter and other tricks.

UNIT V NETWORK PERFORMANCE TUNING: 9

Network Performance, Design and Capacity Planning: Locating bottlenecks, Demand management, Media choices and protocols, Network topologies: bridges, switches and routers, Throughput and latency considerations, Modeling resource usage.

TOTAL : 45 PERIODS

REFERENCES:

1. Ranier Handel, Manfred N Huber, Stefan Schrodder. ATM Networks-concepts, protocols, applications, 3rd Edition, Adisson Wesley, New York,1999.
2. Achille Patavina, Switching Theory: Architectures and performance in Broadband ATM Networks. John Wiley & Sons Ltd., New York.1998.
3. Christopher Y Metz, Switching protocols & Architectures. McGraw Hill, New York.1998. 4. Thomas G. Robertazzi, Computer Networks and Systems: Queueing theory and Performance Evaluation , Third Edition, Springer, 2000.
4. Domenico Ferrari , Giuseppe Serazzi ,Alexandro Zeijher, Measurement & Tuning of Computer Systems Prentice Hall Inc,1983.

NI9359 NETWORK ROUTING PROTOCOLS L T P C
3 0 0 3

UNIT I CIRCUIT SWITCHING NETWORKS 9

AT and T's, Dynamic alternative routing.

UNIT II PACKET SWITCHING NETWORKS 9

Distance vector routing, Interdomain routing EGP,BGP, Link state Routing, Apple talk routing and SNA Routing

UNIT III HIGH SPEED NETWORKS 9

Routing in optical networks, Routing in ATM networks, Routing in PLANET networks Deflection Routing

UNIT IV MOBILE NETWORKS 9

Routing in cellular radio mobile communication networks, Packet radio Routing

UNIT V MOBILE AD-HOC NETWORKS (MANET) 9

Internet based mobile ad-hoc networking, communication strategies, routing algorithms Destination sequenced Distance Vector (DSDV), Dynamic source Routing (DSR), Adhoc

On demand Distance Vector (AODV) & Temporarily Ordered Routing algorithm (TORA), Quality of service

TOTAL : 45 PERIODS

TEXT BOOK:

1. Steen Strub M, Routing in Communication networks, Prentice Hall International , New York, 1995

REFERENCE:

1. William Stallings, High speed Networks TCP/IP and ATM Design Principles, Prentice Hall, New York, 1998.

NI9360 NETWORK SYSTEM DESIGN USING NETWORK PROCESSORS L T P C
3 0 0 3

UNIT I INTRODUCTION 9

Introduction and overview-Basic Terminology and Example Systems - Review of Protocols and Packet Formats

UNIT II TRADITIONAL PROTOCOL PROCESSING SYSTEMS 9

Conventional computer hardware and its use in low-end network systems- Algorithms for protocol processing-packet processing functionality-Software architectures for protocol processing on conventional hardware-advanced hardware architectures

UNIT III NETWORK PROCESSOR TECHNOLOGY 9

Motivation for network processors-Complexity of network processor design-network processor architectures-Scaling a network processor-a review of commercial network processor architectures-languages

UNIT IV NETWORK PROCESSORS AND PROGRAMMING 9

Discussion of Intel® IXP2XXX network processor-Intel®: reference platform; embedded RISC processor-Intel®: programmable packet processor hardware and programming-Intel®: more on programming the packet processors- a programming example-Programming example; switching fabrics

UNIT V ALTERNATIVE ARCHITECTURES 9

Network processor design tradeoffs-Active and programmable networks-Active network applications-Commercial network processors-Benchmarks for Network Processors

TOTAL : 45 PERIODS

TEXT BOOK

1. Comer D, Network Systems Design Using Network Processors, Intel® IXP1200 Version, Prentice Hall, 2003.

NI9361 PERFORMANCE EVALUATION OF COMPUTER NETWORKS L T P C
3 0 0 3

UNIT I **9**

Introduction to queuing paradigm – Queuing theory – Queuing models – Case studies: Performance model of a distributed file service – Single bus multiprocessor modeling – Teranet, a light wave network, Performance model of a shared medium packet switch. Introduction to single queuing system – The M/M/1 queuing system – Little's law – Reversibility and Burke's theorem – The state dependent M/M/1 queuing system – The M/M/1/N queuing system: The finite buffer case – The M/M/αqueuing system: Infinite number of services – The M/M/m/m queue: A loss system – Central server CPU model – Transient solution of the M/M/1/αqueuing system.

UNIT II **9**

The M/G/1 queuing system – Priority system for multi class traffic – Introduction to networks of queues – The product form solution – Algebraic topological interpretation of the product form solution – Recursive solution of non-product form networks – Queuing networks with negative customers.

UNIT III **9**

Introduction to numerical solution of models – Closed queuing networks: Convolution algorithm – Mean value analysis – PANACEA: approach for large markovian-Norton's equivalent for queuing networks – Simulation communication networks.

UNIT IV **9**

Introduction to stochastic petrinets – Bus oriented multiprocessor model – Toroidal MPN lattices – The dining philosophers problem – A station oriented CSMA/CD protocol model – The alternating bit protocol – SPN's without product form solution – Introduction to discrete time queuing system – Discrete time arrival processes – The Geom/Geom/m/N queuing system and The Geom/Geom/m/1 system.

UNIT V

Case studies: Queuing on a space division packet switch, Queuing on a single buffered banyan network, DQDB erasure station location – Introduction to network traffic modeling – Continuous time models – Discrete time models – Solution methods – Burstiness – Self similar traffic.

TOTAL : 45 PERIODS

TEXT BOOK:

1. Thomas G. Robertazzi, Computer Networks and System: Queuing theory and Performance Evaluation, Third Edition, Springer, 2000. ISBN 0-387-95037-0.

NI9362 LAN DESIGN AND IMPLEMENTATION LT P C
3 0 0 3

UNIT I **9**

Introduction: Networks – LAN definition, Components, Models, Applications – Data Communication Models: Layered Architecture – OSI Model – TCP/IP Protocol Suite – IEEE Standards – Data Transmission – Analog and Digital Signals – Digital And Analog Transmission – Multiplexing – Data Rate – Transmission Media: Guided Media – Unguided Media – Transmission Impairment – Performance

UNIT II **9**

Error Detection: Types of Errors – Detection – Vertical, Longitudinal and Cyclic Redundancy Checks – Error Correction – LAN Topologies – Bus, Ring, Star and Hybrid Topologies – Flow and Error Control – Medium Access Methods: Random Access – Controlled Access

UNIT III **9**

Logical Link Control: Services – LLC Protocol – Service/ Protocol Association – Ethernet 10 Mbps: Access Method CSMA/CD – Layers – Mac Sublayer – Physical Layer – Implementation – Ethernet Evolution: Fast and Gigabit Ethernet: Bridged Ethernet – Switched Ethernet – Full Duplex Ethernet – MAC Control – Fast Ethernet – Mac Sublayer – Physical Layer – Implementation – Gigabit Ethernet – Mac Sublayer – Physical Layer – Implementation – Token Bus: Physical Vs Logical Topology – Token Passing – Service Classes – Ring Management - Layers – Mac Sublayer – Physical Layer.

UNIT IV **9**

Token Ring: Access Method: Token Passing – Layers – Mac Sublayer – Physical Layer – Ring Management – Priority and Reservation Levels – Implementing Priorities –ATM LANS: Architecture – LANE – Client Server Model – LANE Operation – Frame Format – Wireless LANs: Wireless Transmission – ISM Frequency Band – Architecture – Mac Sublayer – Physical Layer –High Data Rate Standard – LAN performance: Parameters – Efficiency – Efficiency of CSMA/CD and Token Ring

UNIT V **9**

Connecting LANS: Repeaters – Bridges – Routers – Gateways – other devices – TCP/IP: Overview – Network Layer – Addressing Subnetting – Other Protocols in the Network Layer – Transport Layer – IPV6 & ICMPV6 – Data Encryption: Conventional Methods – Public Key Methods – Authentication – Network Management: Configuration, Fault, Performance, Security and Accounting Management- SNMP

TOTAL : 45 PERIODS

TEXT BOOK:

Behrouz A. Forouzan, Local Area Network, Tata Mc-Graw Hill, 2003, ISBN: 0-07-048666-
2. (Chapters 1- 20)

MU9358 HUMAN RESOURCE MANAGEMENT L T P C
3 0 0 3

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT 9

Evolution of human resource management – the importance of the human factor – objectives of human resource management – role of human resource manager – human resource policies – computer applications in human resource management.

UNIT II THE CONCEPT OF BEST FIT EMPLOYEE 9

Importance of human resource planning – forecasting human resource requirement – internal and external sources. Selection process-screening – tests - validation – interview - medical examination – recruitment introduction – importance – practices – socialization benefits.

UNIT III TRAINING AND EXECUTIVE DEVELOPMENT 9

Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices - benefits – self development – knowledge management.

UNIT IV SUSTAINING EMPLOYEE INTEREST 9

Compensation plan – reward – motivation – theories of motivation – career management – development, mentor – protégé relationships.

UNIT V PERFORMANCE EVALUATION AND CONTROL PROCESS 9

Method of performance evaluation – feedback – industry practices. Promotion, demotion, transfer and separation – implication of job change. The control process – importance – methods – requirement of effective control systems grievances – causes – implications – redressal methods.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Decenzo and Robbins, Human Resource Management, Wilsey, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India,2001.

REFERENCES:

1. Human Resource Management, Eugence Mckenna and Nic Beach, Pearson Education Limited, 2002.
2. Dessler Human Resource Management, Pearson Education Limited, 2002.
3. Mamoria C.B. and Mamoria S.Personnel Management, Himalaya Publishing Company, 1997.
4. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
5. Ivancevich, Human Resource Management, McGraw Hill 2002.

CS9264 DATA WAREHOUSING AND DATA MINING LT P C
3 0 0 3

UNIT I **9**

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II **9**

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III **9**

Classification and Prediction: - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT IV **9**

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V **9**

Mining Object, Spatial, Multimedia, Text and Web Data:

Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

TOTAL : 45 PERIODS

REFERENCES

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2008.
2. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
3. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
4. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.

NI9363 MULTIMEDIA COMMUNICATION AND NETWORKS LT P C
3 0 0 3

UNIT I IP NETWORKS 9

Open Data Network Model – Narrow Waist Model of the Internet - Success and Limitations of the Internet – Suggested Improvements for IP and TCP – Significance of UDP in modern Communication – Network level Solutions – End to End Solutions - Best Effort service model – Scheduling and Dropping policies for Best Effort Service model

UNIT II ADVANCED ROUTING 9

Intra AS routing – Inter AS routing – Router Architecture – Switch Fabric – Active Queue Management – Head of Line blocking – Transition from IPv4 to IPv6 – Multicasting – Abstraction of Multicast groups – Group Management – IGMP – Group Shared Multicast Tree – Source based Multicast Tree – Multicast routing in Internet – DVMRP and MOSPF – PIM – Sparse mode and Dense mode

UNIT III GUARANTEED SERVICE MODEL 9

Best Effort service model – Scheduling and Dropping policies – Network Performance Parameters – Quality of Service and metrics – WFQ and its variants – Random Early Detection – QoS aware Routing – Admission Control – Resource Reservation – RSVP - Traffic Shaping Algorithms – Caching – Laissez Faire Approach - Possible Architectures – An Overview of QoS Architectures

UNIT IV MULTIMEDIA COMMUNICATION 9

Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions, Media Levity, Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Jitter – Fixed playout and Adaptive playout – Recovering from packet loss – RTSP –– Multimedia Communication Standards – RTP/RTCP – SIP and H.263

UNIT V WIRELESS MULTIMEDIA COMMUNICATION 9

End to End QoS provisioning in Wireless Multimedia Networks – Adaptive Framework – MAC layer QoS enhancements in Wireless Networks – A Hybrid MAC protocol for Multimedia Traffic – Call Admission Control in Wireless Multimedia Networks – A Global QoS Management for Wireless Networks

TOTAL : 45 PERIODS

REFERENCES

1. Jean Warland and Pravin Vareya, 'High Performance Networks', Morgan Kauffman Publishers, 2002
2. Mahbub Hassan and Raj Jain, 'High Performance TCP/IP Networking', Pearson Education, 2004.
3. William Stallings, 'High Speed Networks: Performance and Quality of Service', 2nd Edition, Pearson Education, 2002.
4. Kurose and Ross, 'Computer Networks : A top down Approach', Pearson Education, 2002
5. Nalin K Sharda, 'Multimedia Information Networking', Prentice Hall of India, 1999
6. Aura Ganz, Zvi Ganz and Kitti Wongthawaravat, 'Multimedia Wireless Networks: Technologies, Standards and QoS', Prentice Hall, 2003.
7. Ellen Kayata Wesel, 'Wireless Multimedia Communications: Networking Video, Voice and Data', Addision Wesley, 1998

NI9364 MOBILE AND PERSONAL COMMUNICATIONS LT P C
3 0 0 3

UNIT I INTRODUCTION AND CELLULAR CONCEPTS 9

Enabling Concepts for Mobile and Personal Communications - Mobile and Personal Communication: Past, Present, and Future - Mobile and Personal Communication: Some Related Network Aspects - The Cellular Concept - Multiple Access Technologies for Cellular Systems - Cellular System Operation and Planning: General Principles – Initial Implementations of the Cellular Concept: Analog Cellular Systems

UNIT II DIGITAL CELLULAR MOBILE SYSTEMS 9

Introduction - GSM: The European TDMA Digital Cellular Standard - IS-136: The North American TDMA Digital Cellular Standard (D-AMPS) - PDC: The Japanese TDMA Digital Cellular Standard - IS-95: The North American CDMA Digital Cellular Standard

UNIT III MOBILE DATA COMMUNICATION 9

Specialized Packet and Mobile Radio Networks - Circuit-Switched Data Services on Cellular Networks - Packet-Switched Data Services on Cellular Networks - Data Over Low Power Wireless or Cordless Telecommunications Networks - Wireless Local-Area Networks (wireless LANs) - Support of Mobility on the Internet: Mobile IP – Mobile Multimedia: Wireless ATM (WATM)

UNIT IV OTHER MOBILE SYSTEMS 9

IMT-2000: Third-Generation Mobile Communication Systems - Introduction - IMT-2000 Radio Aspects - IMT-2000 Network Aspects - Global Mobile Satellite Systems - Introduction - The Iridium System - The Globalstar System - The ICO System – The Teledesic System

UNIT V PERSONAL COMMUNICATION SYSTEMS 9

CT2 (Cordless Telephony 2) Systems - DECT (Digital Enhanced Cordless Telecommunications - PACS (Personal Access Communication System) - PHS (Personal Handy Phone System) - PCS in North America - Personal Mobility and Universal Personal Telecommunication (UPT) - Introduction - UPT: Concept and Service Aspects - Functional Architecture for UPT - Numbering, Routing, and Billing Aspects – Scenarios for Partitioning and Location of Service Profile Information - Access Security - Requirements for UPT

TOTAL : 45 PERIODS

TEXT BOOK

1. Raj Pandya, Mobile and Personal Communication Systems and Services, Wiley-IEEE Press , April 2004.

REFERENCES

1. Vijay Garg, Joseph Wilkes E, Wireless and Personal Communications Systems Fundamentals and Applications, AT&T IPM Corporation, Prentice Hall Publication.
2. Dunlop J, and Smith D.G, Telecommunications Engineering, 3rd Edition.
3. Chapman and hall Bellamy, J.C , Digital Telephony, Wiley Publications.
4. Krzysztof Wesolowski, Mobile Communication Systems, Wiley Publications, 2002.

EC9013 SATELITTE COMMUNICATION LT P C
3 0 0 3

UNIT I ORBITAL MECHANICS 9

Kepler's laws of motion, Orbits, Orbit Equations, Orbit Description, Locating the Satellite in the Orbit and with Respect to Earth, Orbital Elements-Look Angle Determination and Visibility - Orbital Perturbations, Orbit Determination, Launch Vehicles, Orbital Effects in Communication System - Performance Attitude control; Satellite launch vehicles. spectrum allocations for satellite systems.

UNIT II SPACECRAFT SUB SYSTEMS AND EARTH STATION 9

Spacecraft Subsystems, Altitude and Orbit Control, Telemetry and Tracking, Power Systems, Communication Subsystems, Transponders, Antennas, Equipment Reliability, Earth Stations, Example of payloads of operating and planned systems.

UNIT III SPACE LINKS 9

The Space Link, Satellite Link Design - Satellite uplink -down link power Budget, Basic Transmission Theory, System Noise Temp, G/T Ratio, Noise Figure, Downlink Design, Design of Satellite Links for Specified C/N - Microwave Propagation on Satellite-Earth Paths. Interference between satellite circuits, Energy Dispersal, propagation characteristics of fixed and mobile satellite links.

UNIT IV MULTIPLE ACCESS TECHNIQUES AND NETWORK ASPECTS 9

Single access vs. multiple access (MA). Classical MA techniques: FDMA, TDMA. Single channel per carrier (SCPC) access - Code division multiple access (CDMA). Demand assignment techniques. Examples of MA techniques for existing and planned systems (e.g. the satellite component of UMTS).Mobile satellite network design, ATM via satellite. TCP/IP via satellite - Call control, handover and call set up procedures. Hybrid satellite-terrestrial networks

UNIT V SERVICES AND APPLICATIONS 9

Fixed and mobile services - Multimedia satellite services - Advanced applications based on satellite platforms - INTELSAT series - INSAT, VSAT, Remote Sensing – Mobile satellite service: GSM. GPS, INMARSAT, Navigation System, Direct to Home service (DTH), Special services, E-mail, Video conferencing and Internet connectivity

TOTAL : 45 PERIODS

TEXT BOOK

1. Dennis Roddy, Satellite Communications, McGraw Hill International Editions, Third Edition, 2001