MCIT – 301(A) Ad-hoc Networks

1. **Ad Hoc Networking :** An introduction, Model of operation, symmetric Links, Layer-2 Ad Hoc solutions, Proactive versus reactive protocols, multicast, commercial Applications of Ad Hoc networking, conferencing, Home Networking, Emergency services, personal Area Networks and Bluetooth, Embedded Computing Applications, Sensor Dust, Automotive/PC Interaction. Factors Affecting Ad Hoc Networks, Scalability, Wireless Data Rates, DARPA packet Radio network, Survivable Radio Networks.

2. **Ad Hoc Wireless Media Access Protocols:** Issues in Designing a MAC protocol for Ad Hoc Wireless networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols, Contention-Based Protocols with reservation Mechanisms. Contention –Based MAC Protocols with Scheduling Mechanisms. MAC protocols that use Directional Antennas. Other MAC Protocols.

3. **Overview of Ad Hoc Routing Protocols:** Table-Driven Approaches, Destination Sequenced Distance Vector (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR) , Source-Initiated On –Demand Approaches . Ad Hoc On-Demand Distance Vector Routing (AODV) , Dynamic Source Routing (DSR) , Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) , Location-Aided Routing (LAR) , Power – Aware Routing (PAR), Zone Routing Protocol (ZRP), Source Tree Adaptive Routing (STAR) , Relative Distance Microdiversity Routing (RDMAR) , Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.

4. **Transport Layer for Ad Hoc Wireless Network :** Introduction , Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.

5. **Quality of service in Ad-hoc wireless networks:** Issues and challenges in providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, MAC Layer Solutions, Network Layer Solutions, Qos Frameworks for Ad Hoc Wireless Networks.

6. **Energy Conservation :** Power Life Issues: Power Management, Advances in Device Power Management, Advances in Protocol Power Management, Power Conservation by mobile Applications, Periodic Beaconing On Battery Life, Standalone Beaconing, HF Beaconing with Neighboring Nodes, Comparison of HF Beaconing with and without Neighbors, LF Beaconing with Neighboring Nodes, Comparison of LF Beaconing with and without Neighbors, Deductions, Conclusions, Smart Batteries and Battery Characteristics, Effects of Beaconing on Battery Life.

7. **Sensor Network:** Sensor Network Architecture, Network Protocols, Data Storage and Manipulation, Localization and Management, Data Dissemination, Data Gathering, MAC protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards.

8. **Security issues in Ad Hoc Network:** Security in Ad Hoc Wireless Network, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, and Secure Routing in Ad Hoc Wireless Networks.

Books Suggested

1. Ad Hoc Mobile Wireless Networks : Protocols and Systems, C. K. Toh, Springer.
2. Ad Hoc Network, C E Perkins, Pearson Education.
3. Ad Hoc Wireless Networks : Architectures and protocols, C, Siva Ram Murthy and B.S. Manoj, Pearson Education.

MCIT – 301(B) Data Mining and Warehousing

Introduction : Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K-Method, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis.

Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

The vicious cycle of Data mining, data mining methodology, measuring the effectiveness of data mining data mining techniques. Market baskets analysis, memory based reasoning, automatic cluster detection, link analysis, artificial neural networks, generic algorithms, data mining and corporate data warehouse, OLAP

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.

2. Data Mining; Adriaans & Zantinge; Pearson education.

3. Mastering Data Mining; Berry Linoff; Wiley.

4. Data Mining; Dunham; Pearson education.

5. Text Mining Applications, Konchandy, Cengage

MCIT – 301(C) Web Engineering

Introduction: layering, DNS - encapsulation, de-multiplexing, client /server model, port numbers, standardization process, the Internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU. Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet Mask special case of IP addresses, a subnet example.

Address Resolution Protocol: Introduction, an example, ARP cache, ARP packet format, ARP examples, Proxy ARP, ARP command. RARP: Introduction, RARP packet format, RARP examples, RARP server design. ICMP: Introduction, ICMP message types, ICMP address mask request and reply-ICMP timestamp request and reply-4.4 BSD processing of ICMP Messages.

Ping Program: Introduction, ping program, IP record route option, IP time stamp option. Trace route program: Introduction, trace route program operation, LAN output, and WAN output- IP source routing option. IP routing: Introduction, routing principles, ICMP host, and ICMP redirect errors. Dynamic Routing protocols: introduction, dynamic routing, RIP-OSPF, BGP, CIDR.

UDP: introduction, UDP header, UDP checksum, IP Fragmentation, UDP Server design. DNS Introduction-basics, message format, simple example, pointer quires, resource records, caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router.

TCP: Introduction, services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design.

SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification. Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books :

1. W. Richard Stevens, TCP/IP Illustrated Volume-I "The Protocols ", Addison W 2

2. Jaiswal .S, TCP\IP Principles, Architecture, Protocols And Implementation, First Edition,

Galgotia Publications Pvt Ltd.

MCIT – 302(A) Software Testing & Quality Assurance

Introduction to software testing, concepts, issues and techniques, test activities, management and automation, Coverage and usage testing based on checklist, input domain portioning and boundary testing, object oriented testing: testing OOA and OOD models, object oriented testing strategies, test case design for OO software, testing methods applicable at the class level, interclass test case design, Web application testing, debugging, security & reliability.

Programming style and program quality: simple style rules, comment statements, program quality, quantifying program quality, Software quality and quality Assurance: Principle of Software Quality Assurance (SQA), Applying SQA to software project, proven factors for SQA success, SQA during software requirements, SQA during software design phase, SQA during software code and test, Advance quality engineering topics.

Human factors in software engineering: Human factors history, HCL requirements and design process, HCL testing.

Reference Books:

1. Ali Behforooz and Frederick J. Hudson, Software Engineering Fundamentals, Oxford University Press
2. JeffTain, Software Quality Engineering: Testing, Quality Assurance and Quantifiable improvement, Willy Pub.
3. Aditya Mathur, Foundation of Software Testing 1/e, Pearson Education
4. Paul C. Jorgensen, Software Testing, A Craftsman's Approach, Second Edition, CRC Press

MCIT – 302(B) Digital Image Processing

Image capture and digitization, Image Representation, data structures for picture representation Image Transformation, Fast Fourier Transform, Walsh Transform, Hadmark Transform, Hotelling Transform, Hough Transform. Boundary detection, Image Enhancement, Spatial Domain, Frequency Domain, Histogram, Low Pass Filtering, High Pass Filtering, Thresh olding, Global Thrsholding. Texture analysis, texture classification feature extraction, rule-based picture segmentation. Introduction to Color Images, Representation, Segmentation.

Reference Books :

1. "Digital Image Processing"- R.C.Gonzalez and P.Wintex,Addison weslay.

2. "Fundamentals of Digital Image Processing"- A.K.Jain, Prentice Hall,India.

3. Image Processing analysiss and Machine Vision, Cengage

MCIT – 302(C) Grid Computing

UNIT – I
The Grid - The Evolution of the Grid - Grids and Grid Technologies, Overview of Grid systems, Grid activities, Grid Business Areas, Applications, Programming models -A Look at a Grid Enabled Server and Parallelization Techniques – Grid applications

UNIT – II
The concept of virtual organizations – Grid architecture – Grid architecture and relationship to other Distributed Technologies – computational and data Grids, semantic grids.

UNIT – III
Grid Management systems, Grid security, Grid-Enabling software and Grid enabling network services, Data Grid - Virtualization Services for Data Grids, Peer-to-Peer Grids - Peer-to-Peer Grid Databases for Web Service Discovery, Merging the Grid service Architecture with Web service Architecture, Relationship between Web services & Grid services

UNIT – IV
Open Grid Services Infrastructure (OGSI):Introduction-Grid services- High-level introduction to OGSI-Technical details- Introduction to service data components- Grid service: Naming & change management recommendations, Open Grid Service Architecture (OGSA):OGSA Basic Services: Common Management model (CMM)-service domains- policy architecture- security architecture- Mastering & Accounting- common distributed Logging

UNIT – V
Grid Middleware, Resource management and scheduling, setting up Grid, deployment of Grid software and tools, and application execution, Compilers, Languages and Libraries for the Grid, Grid Application Description Languages, Application Partitioning, Grid Portals

REFERENCES:

1. Joshy Joseph, Craig Fallenstein, "Grid Computing", Pearson Education, New Delhi, 2004.
2. Fran Bermn, Geoffrey Fox, Anthony Hey J.G., "Grid Computing: Making the Global Infrastructure a Reality", Wiley, USA, 2003.
3. Ian Foster, Carl Kesselman, "The Grid2: Blueprint for a New Computing Infrastructure", Morgan Kaufman, New Delhi, 2004
4. Ahmar Abbas, "Grid Computing: Practical Guide to Technology and Applications", Delmar Thomson Learning, USA, 2004.