MCTA 301(A)DataMiningandWarehousing

UNIT I

Data Mining: Basic concept ,technology and rules, application of data mining, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

UNITII

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.

UNITIII

Data mining techniques: Exploration of data mining methodologies, decision tables, decision trees, classification rules, association rules, clustering, statistical models &linear models.

Web mining: Introduction to web mining techniques, web basics and HTTP, data sources on the web, personalization, working with logs, forms and cookies, user identification and path analysis. E-Metrics.

UNITIV

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.

UNITV

Data warehousing :Data ware house, OLAP and Data mining. OLTP vs. OLAP. Data Warehouse Design Identifying facts & dimensions, designing fact tables, dimension tables, star flake schema query redirection. OLAP operations Data ware house High Performance Computing architecture, Multidimensional schemes:1 partitioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse testing the data warehouse: developing test plan, testing operational environment Distributed and virtual data warehouses.

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.

MCTA 301(B)Web Engineering

UNIT I

Introduction to Web Engineering : History, Web Applications, 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.

UNIT II

Binding Protocol Address- Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation, Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Super-netting- special case of IP addresses, Ipv6-Motivation, frame format and addressing, comparison of Ipv4 and Ipv6.

UNIT III

ICMP: Introduction, ICMP Header, ICMP message types , ICMP timestamp request and reply, trace route, ping program, Intra & inter domain routing-distance vector routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP, Unicast Routing protocols, IGMP-IGMP message, operation, encapsulation.

UNIT IV

UDP: introduction,UDP Operation , header, 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.

UNIT V

TCP: Introduction, TCP 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.

ReferenceBooks :

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.

MCTA 301(C)Simulation and Modeling

UNIT I

Modeling and simulation: Models types, principles used in modeling, Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation, steps in computer simulation, advantages and disadvantages of simulation, simulation study, classification of simulation languages.

UNIT II

Probability concepts in simulation: Basic concept of probability , discrete and continuous probability function, continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

UNIT III

Simulation of Queueing System: Queuing system, Characteristics of queuing system, Poisson arrival patterns, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

UNIT IV

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves ,Generalization of growth models ,System dynamics diagrams, Multi segment models , Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform ContinuouslyDistributed Random Numbers, Rejection Method.

UNIT V

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :
1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.

MCTA 301(D)Ad-hoc Networks

UNIT I

Ad Hoc Wireless : An introduction, Cellular vs Adhoc wireless Networks, Applications of Adhoc wireless Networks, Issues in Adhoc wireless N/WS. Heterogeneity in Mobile devices, Wireless Sensor N/WS, traffic Profiles, Types of Adhoc Mobile Communications, Types of Mobile Host movements, Challenges facing Ad hoc mobile N/WS. 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.

UNIT II

Adhoc Protocols :- Adhoc Wireless Media Access Protocols, Introduction Synchronous MAC Protocol &asynchronous MAC protocol, Problems in Adhoc channel Access Receiver Initiated MAC protocols, Sender. Initiated MAC Protocol, Existing Adhoc MAC Protocol.

UNIT III

Ad Hoc Routing Protocols: Table-Driven Approaches, DSDV, WRP ,CSGR, Source, Initiated On demand Approaches : AODV, DSR, TORA, SSR, LAR, PAR, ZRP, RDMAR., Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.

UNIT IV

Transport Layer for Ad Hoc Wireless Network : 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.

UNIT V

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. 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.

MCTA 302(A)Software Testing & Quality Assurance

Unit I

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,

UNIT II

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.

UNIT III

The Software Quality Challenge - Software Quality Factors - Components of the Software Quality Assurance System. Pre-Project Software Quality Components -Contract Review - Development and Quality Plans.

UNIT IV

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.

UNIT V

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

MCTA 302(B)Analysis and Design of Embedded Systems

Unit I

Embedded systems and their characteristics, challenges and issues in embedded software development, Hardware and electronics fundamentals for software engineers, categories of different processor microprocessor and micro controller, CPU, memory, peripherals, timers, communication interfaces,

Unit II

Software tool chains used for development and testing of programs, project manager editor, assembler, compiler, linker, locator, loader debugger, monitor and profiler, use of integrated development environment, GNU, command line tools, build process in embedded systems

Unit III

Operating system services: different categories of operating system, kernel architecture, root file system contents, storage device manipulate ions, setting up boot loader , Software architecture for implementing various tasks, round robin with and without interrupts, function queue scheduling architecture, real-time operating systems. Hardware and software development methodology and use of hardware debugging aids like in circuit emulators and logic analyzers.

Unit IV

Architecture of simple RTOS, definition of tasks, task controller, task information, scheduling priority, shared data problems and mutual exclusion critical section implementation. Intertask communication, semaphores, message queues, buffers pipes, reentrance issues, timer functions, interrupts and I/O, designing a real time application using a RTOS like Vworks, µ COS II or embedded linux.

Unit V

Power optimization strategies for processes, ACPI, design case studies, Networked embedded system, distributed embedded architecture, HW and SW architecture, IIC bus, CAN bus, Myrinet network based design, communication analysis, system performance analysis, HW platform design, allocation and scheduling, internet embedded systems. System design techniques.

Reference Books:
1. Simon DE; an embedded software primer; Pearson
2. Ayala K; 8051 programming and interfacing; Peram
3. Vahid F and Givargis T; Embedded system design...; John Wiley
4. Heath Steve; Embedded system designs; Oxford newness

MCTA 302(C)Parallel Computation and Applications

UNIT I

Parallel Processing-Evolution of Parallel architectures-Applications of architectural Parallelism-Architectural classification schemes- parallelism in algorithms- Parameters characterizing algorithm parallelism- speedup and efficiency of parallel algorithms- architectures- interconnection networks.

UNIT II

Array Processors -SIMD array processors: SIMD computer organization- SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, MIMD Computers and Multiprocessors, Shared memory and message passing architecture – overview of shared memory multiprocessor programming- pipelined MIMD- multithreading.

UNIT III

Multiprocessor Architecture -Functional structures, UMA and NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors.

UNIT IV

Data dependence and Parallelism: Discovering parallel operations in sequential code- variables with complex names-sample compiler techniques - data flow principles-data flow architectures- Implementing Synchronization and Data Sharing: The character of information conveyed by synchronization - synchronizing different kinds of cooperative computations-waiting mechanisms- mutual exclusion using atomic read and write.

UNIT V

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

References:

1. Harry F. Jordan and Gita Alaghband, "Fundamentals Of Parallel Processing", Pearson Education, 2003
2. Kaihwang and Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill Series.
3. Kaihwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability".
4. Michael J. Quinn, "Parallel Computing – Theory and Practice", McGraw Hill Publication.