DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

of

MASTER OF TECHNOLOGY (COMPUTER SCIENCE ENGINEERING)

Department of Computer Science

(First Year)

(Session July- December 2016)

College of Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Master of Technology (Computer Science Engineering)

Department of Computer Science

List of Subject (First Year)

Unit 1 : Introduction:

Historical development ,Vision of Cloud Computing, Characteristics of cloud computing, Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments .Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

Unit 2 : Cloud Computing Architecture:

Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure. Cloud Applications :Technologies and the processes required when deploying web services ; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.

Unit –3: Cloud Management & Virtualization Technology:

Resiliency, Provisioning, Asset management, Concepts of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

Unit-4: Cloud Security:

Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

Unit-5 Market Based Management of Clouds , Federated Clouds/Inter Cloud:

Characterization & Definition, Cloud Federation Stack , Third Party Cloud Services.

Case study: Google App Engine, Microsoft Azure, Hadoop , Amazon , Aneka

References

[1]. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub

[2]. Kumar Saurabh, "Cloud Computing" , Wiley Pub

[3]. Krutz , Vines, "Cloud Security " , Wiley Pub

[4]. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub

[5]. Sosinsky, " Cloud Computing" , Wiley Pub

Unit 1: Meaning and definition of artificial intelligence,Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.

Unit 2: Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning.

Unit 3: Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning.

Unit 4: Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

Unit 5: Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems. Detailed Discussion from Example Domains : Industry, Language, Medicine, Verification, Vision, Knowledge Based Systems. Languages and Machines : AI languages and systems, special purpose architectures

References:

[1].Rich E and Knight K, “Artificial Intelligence”, TMH, New Delhi.

[2]. Nelsson N.J., “Principles of Artificial Intelligence”, Springer Verlag, Berlin.

[3]. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall Series in AI, 1995

Unit1: Introduction: Time and Space analysis of Algorithms - Order Notations.

Unit 2: Linear Data Structure:
Linear Data Structures -Sequential representations - Arrays and Lists, Stacks, Queues and Dequeues, strings, Application. Linear Data Structures, Link Representation - Linear linked lists, circularly linked lists. Doubly linked lists, application.

Unit 3: Recursion

Recursion - Design of recursive algorithms, Tail Recursion, When not to use recursion, Removal of recursion.

Unit 4: Non Linear Data Structure

Non-linear Data Structure: Trees - Binary Trees, Traversals and Threads, Binary Search Trees, Insertion and Deletion algorithms, Height-balanced and weight-balanced trees, B-trees, B+ -trees, Application of trees; Graphs - Representations, Breadth-first and Depth-first Search.

Unit 5: Sorting & Searching: Sorting and Searching Algorithms- Bubble sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort and Radix Sort; Linear Search and Binary Search. Hashing - Hashing Functions, collision Resolution Techniques.

Files

File Structures - Sequential and Direct Access. Relative Files, Indexed Files - B+ tree as index. Multi indexed Files, Inverted Files, Hashed Files.

References :

[1] Tanenbaum, A. S., "Data Structures using 'C'", PHI

[2] Weiss Mark Allen, "Algorithms, Data Structures, and Problem Solving with C++", AddisonWesley, Pearson.

[3] Horowitz Ellis & Sartaj Sahni, "Fundamentals of Data Structures", Galgotia Pub.

[4] Aho Alfred V., Hopperoft John E., UIlman Jeffrey D., "Data Structures and Algorithms", Addison Wesley

Unit 1: OOP preliminaries :Contrast with Structured Programming; basic concepts of objects, classes, abstraction, encapsulation, polymorphism, inheritance, dynamic binding & message communication.

Unit 2: C++ preliminaries : Tokens, Keywords, Variable, scope of variables, Data type, pointers, generic pointers, operators-scope resolution, member de-referencing operators, memory management operators, manipulators, type cast operators; Symbolic constants, Type compatibility, Dynamic initialization, Flexible declaration, Reference variable, Call by reference. Objects & Classes, abstract & declaration syntax, visibility label-private, public, protected, Inline concept, Static data member & member function, Array of objects, Pointer to objects & members, Array of pointers to objects.

Unit 3: Functions: Declaration & definition, exploring arrays & strings, function overloading, const function, Passing & returning object through function, The Friend function.

Constructors & Destructors Default constructors, default argument constructor, parameterized constructor, Copy constructor,

Unit 4: Destructor: Inheritance and Polymorphism Visibility modes, Single Inheritance, Multi-level Inheritance, Hierarchical Inheritance, Multiple, Inheritance, Hybrid Inheritance, Virtual base class, abstract class. Function Overloading, Operator overloading, overloading unary, binary, string manipulation using operators. Run time - Virtual function, pointer to object, this pointer, pure virtual function.

Files & advanced features, C++ file streams, stream classes, detecting end-of-file, file pointers & their manipulations, Managing console I/O, Templates & Exception handling, class templates, templates function.

Unit 5: Object oriented Databases : Relational v/s object oriented databases, The architecture of OO databases, Query languages for OO databases, Gemstone/O2/orion. Distributed object oriented systems: Object management group, CORBA.

References:

[1] Object Oriented Programming using C++, Robert Lafore, Pearson

[2] Waite Groups C++ Primer Plus, Stephen Prata, Techmedia.

[3] C++ Primer, Lippman & Lajoie, Pearson.

[4] The C++ Programming Language, B.J. Stroustrup, Pearson.

[5] C++ Complete Reference, Shield, MGH

[6] Object Oriented Programming using C++, Balagurusamy, TMG

[7] Introduction to OOP by Witt KV, Galgotia Pub.

UNIT 1 : Flynn's and Handler's Classification of parallel computing structures. Pipelined and Vector Processors. Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic, Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit. **Basic Computer Organization and Design:** Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory- Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.

UNIT 2: Micro programmed Control: Control Memory, Address Sequencing, Micro program Example, Design of Control Unit. **Central Processing Unit:** introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC)

UNIT 3: Input/output Organization: Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), Serial Communication. Data and control hazards and method to resolve them. SIMD multiprocessor structures.

UNIT 4: Interconnection networks. Parallel Algorithms for array processors, Search algorithms, MIMD multiprocessor systems,

UNIT 5: Scheduling and load balancing in multiprocessor systems, Multiprocessing control and algorithms.

References:

[1] Advance Computer Architecture, parthsarthy, Cengage (Thomson)

[2] Computer Architecture and Organisation- John Hays, Mc.Graw-Hill.

[3] Computer Architecture and Parallel Processing- Hwang And Briggs, TMH.

UNIT 1: Review of Networking and O.S. Fundamentals, ISO-OSI Model, different layers and their functions, LAN, MAN, WAN, Communication media & principles IEEE standards etc.

UNIT 2: Internetworking with TCP/IP, Basic concepts, Principles, Protocols and Architecture, Address handling Internet protocols and protocol layering. DNS, Applications: TELNET, RLOGN, FTP, TFTP, NFS, SMTP, POPL, IMAP, MIME, HTTP,STTP,DHCP, VOIP, SNMP.

UNIT 3: Introduction to Router, Configuring a Router, Interior & Exterior Routing, RIP, Distance Vector Routing, OSPF, BGP, Uni-cast, Multicast and Broadcast. Multicast routing protocols: DVMRP, MOSPF, CBT, PIM, MBONE, EIGRP, CIDR, Multicast Trees, Comparative study of IPv6 and IPv4.

UNIT 4: VPN addressing and routing, VPN Host management, ATM Concepts, Services Architecture, Equipments and Implementation

UNIT 5: Introduction to wireless transmission and medium access control, wireless LAN: IEEE 802.11, Hiper LAN , Bluetooth Mobile Network and Transport layer, WAP GSM and CDMA: Network architecture and management

References:

[1] Computer Networks: Tanenbaum.

[2] Internetworking with TCP/IP: Comer.

[3] Data Communications, Computer Networks and Open Systems: Hallsall.

[4]. Data Communications, Stalling.

[5] Mobile Communication: Schiller, Pearson Education

[6] Computer Communications and network Technology, Gallo, Cengage (Thomson)

[7] Wireless and Mobile Network Architecture: Yi Bing Lin, Wiley

Advance Data Structure & Algorithm

1 Implementation of singly doubly and circular linked list

2 Implementation of circular queue

3 Implementation of binary search tree

4 Implementation of hash table

5 Implementation of heaps

6 Implementation of AVL rotation

7 Implementation of breadth first search technique

8 Implementation of depth first search techniques

9 Implementation of prim's algorithm

10 Implementation of dijkstra's algorithm

11 Implementation of kruskal's algorithm

12 Implementation of searching techniques

13 Implementation of sorting techniques

Object Oriented Technology

1 Program of bubble sort

2 Program of sequential sort

3 Program of Binary search

4 Program of template to stack & single array

5 Program of template queue in a single array

6 Program of template a singly linked list

7 Program of template priority queue

8 Program of queue as array template

9 Program to find minimum maximum element in linked list

10 Program to sort given list of names in ascending order

11 Program for single inheritance

12 Program for multiplication of two matrix in Java

13 Program for hybrid inheritance

14 Program for different type of signature overloaded

15 Program for multiple inheritance

Advance Computer Architecture

1 Explain vector processors

2 Explain array processor

3 Explain data and control hazards

4 Explain interconnection network

5 Explain load balancing in multiprocessor

Advance Computer Network

1 Explain Bluetooth mobile network

2 Explain GSM and CDMA

3 Explain ATM concepts

4 Define FTP, SMTP, NFS, TFTP

5 Explain AD-HOC network

UNIT 1: Introduction: Internet and networking Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET. Web Browsers, Caching, Downloading and Rendering, Persistent Connections, DNS,caching and prefetching, CSS Expressions and performance, Buffering, Weblog Optimization and Security: Parallel Downloading, Controlling caches, Content compression.

UNIT 2: Search engines: Searching techniques used by search engines, keywords, advertisements, Search engine optimization for individual web pages: header entries, tags, selection of URL, alt tags, Search engine optimization for entire website: Hyperlinks and link structure, page rank of Google, click rate, residence time of website, frames, scripts, content management system, cookies, Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP. Object request brokers, component technology.

UNIT 3: Introduction to JavaScript: Introduction, Obtaining user inputs, memory concepts, Operators, Control Structures, Looping constructs, break, continue statements, Programmer defined functions, Scoping rules, Recursion and iteration, Array declaration and allocation, passing arrays to function, Objects: String, Date, Boolean, Window, document; using cookies, Handling Events Using JavaScript.

UNIT 4: Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, information-selling on the web. Internet payment system, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex. E-Governance

Unit 5: Advaced technologies for e-commerce: Introduction to mobile agents. WAP: the enabling technology:The WAP model, WAP Architecture, Benefit of WAP to e-commerce. Web Security, Encryption Schemes, Secure Web documents, Digital signatures and firewalls

Reference Books:

1. Peter Smith, “Professional Website performance”, Wiley India Pvt. Ltd.

2. Maro Fischer, “ Website Boosting: Search Engine, Optimization, Usability, Website Marketing”, Firewall Media, New Delhi.

3. Deitel H.M., Deitel P.J., “Internet & World wide Web: How to program”, Pearson Education.

4. Kogent Learning, “Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book”, Wiley India Pvt. Ltd.

5. Boronczyk, Naramore, “Beginning PHP, Apache, MySQL Web Development”, Wiley India

6. Web Technology, Achyut Godbole, Atul Kahate, TMH

7. Henry Chan, Raymond Lee, Tharam Dillon , E-Commerce Fundamental and Applications, Willey Publication.

8. Minoli & Minoli, Web Commerce Technology Hand Book, TMH

9. Satyanarayana, E-Government, PHI

10. Uttam K: Web Technologies, Oxford University Press.

11. G. Winfield Treese, Lawrence C. Stewart, Designing Systems for Internet Commerce, Longman Pub.

12. Charles Trepper, E Commerce Strategies, Microsoft Press

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UNIT 1: **Source Coding -** Introduction to information theory, uncertainty and information, average mutual information and entropy, source coding theorem, Shannon-fano coding, Huffman coding, Arithmetic coding, Lempel-Ziv algorithm, run-length encoding and rate distortion function.

UNIT 2: Channel capacity and coding - channel models, channel capacity, channel coding, information capacity theorem, random selection of codes. Error control coding: linear block codes and their properties, decoding of linear block code, perfect codes, hamming codes, optimal linear codes and MDS codes.

UNIT 3: Cyclic codes - polynomials, division algorithm for polynomials, a method for generating cyclic codes, matrix description of cyclic codes, burst error correction, fire codes, golay codes, CRC, circuit implementation of cyclic codes. BCH codes: minimal polynomials, generator polynomial for BCH codes, decoding of BCH codes, Reed-Solomon codes and nested codes.

UNIT 4: Convolutional codes - tree codes and trellis codes, polynomial description of convolutional codes, distance notions for convolutional codes, generation function, matrix description of convolutional codes, viterbi decoding of convolutional codes, distance bounds for convolutional codes, turbo codes and turbo decoding

Unit 5: Coding for Secure Communications: Review of Cryptography, Introduction, Encryption techniques and algorithms, DES, IDEA , RC Ciphers ,RSA Algorithm ,Diffi-Hellman, PGP, Chaos Functions, Cryptanalysis, Perfect security, Unicity distance, Diffusion and confusion, Mc ElieceCryptosystem.

References:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.

2. Kishor S. Trivedi "Probability and Statistics with Reliability, Queuing and Computer Science Applications", Wiley India, Second Edition.

3. J.C.Moreira, P.G. Farrell "Essentials of Error-Control Coding", Willey Student Edition

4. San Ling and Chaoping "Coding Theory: A first Course", Cambridge University Press, 2004.

5. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.

6. Cole, "Network Security", Bible, Wiley INDIA, Second Addition

7. Proakis and Masoud, "Digital Communication" ,McGraw-Hill ,2008

Unit 1:DBMS Concept Introduction, Data Model, Entity & Attributes, Relationship, E-R Model, Relational Data Model, Domain Tuples, Attributes, Key, Schema, Integrity Constraints, Relational Algebra & Relational Calculus, Normalization & Normal Form.

Unit 2: Query Processing and Optimization Introduction, Query Processing, Syntax Analyzer, Query Decomposition: - Query Analysis, Query Normalization, Semantic Analyzer, Query Simplifier, Query Restructuring. Query Optimization, Cost Estimation in Query Optimization, Structure of Query Evaluation Plans, Pipelining and Materialization.

Unit 3: Distributed Database: Distributed database architecture, levels of distribution transparency, DDB design, Translation of global queries, Query optimization for DDB, Concurrency control for DDB

Unit 4: Object Oriented Database: OO paradigm, OO data models: Object identifiers, Relationship and Integrity, ER Diagramming model for OO relationships, Object relational data models

Unit 5 : Data Warehousing: Components, Building a data warehouse, Data extraction, cleanup and transformation, OLAP, Future Trends in data models: Semantic data models, DM for loosely structured data items, Multimedia database. **Data Mining :** Data, Information and Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing, Data Reduction, Data Mining Statistics. Data Mining Techniques

References :

[1] C. J. Date: An Introduction to Database Systems , Addison-Wesley

[2] Avi Silberschatz, Henry F. Korth ,S. Sudarshan ,Data Base System Concepts, TMH

[3] Ceri & Pelagatti, Distributed Databases Principles & Systems,TMH

[4] Paulraj Ponniah, Data Ware Housing Fundamental, Willey India.

[5] Jiawei Han, Data Mining Concept & Techniques, Elsevier Pub.

[6] Alex Berson, Stephen J Smith; "Data Warehousing, Data Mining, and OLAP"; Tata McGraw-Hill Publishing Company Limited, 1997, ISBN 0-07-058741-8

[7] S Ceri, G Pelagatti; ""Distributed Databases: Principles and Systems"; Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-066215-0

[8] M Tamer Ozsu, P Valduriez; "Principles of Distributed Database Systems"; Pearson Education Pvt. Ltd., 2005, ISBN 81-7808-375-2.

[9] J. L. Harrington; "Object Oriented Database Design Clearly Explained"; Morgan Kaufmann Publishers, 2001, ISBN 0-12-326428-6.

[10] A K Majumdar, P Bhattacharya; "Database Management Systems"; Tata McGraw-Hill Publishing Company Limited, 2004, ISBN 0-07-462239-0

UNIT 1: Fundamental Concepts: - Introduction to Artificial Neural Networks (ANN). Learning Process: - error–correction learning, Hebbian learning, competitive learning, Boltzmann learning, the credit-assignment problem, supervised learning, and other learning techniques.

UNIT 2: Single neuron/ Perceptron networks: - training methodology, typical application to linearly separable problems. Multilayer Perceptron: - Back propagation algorithm, virtues and limitation of BP algorithm, modifications to back-propagation.

UNIT 3: Radial-basis function Networks – interpolation problem, Covers theorem, regularization networks, applications. Recurrent Networks.

UNIT 4: Introduction to Fuzzy systems, Membership function, Fuzzy relational operation, fuzzy IF THEN rules, Sugeno and Mamdani type systems, Adaptive Neuro-Fuzzy sytems, training methods.

UNIT 5: Application of ANN and Fuzzy systems to non-stationary time series prediction; pattern classification; control; communication engineering; system identification and pattern classification.

References:

[1] S. Haykin, Neural Networks, A Comprehensive Foundation; Pearson Education, India 2008 (ISBN- 81-203-2373-4).

[2] M. T. Hagan, Howard B. Demuth, Mark H. Beale, Neural Network Design; (ISBN: 0-9717321-0 8); Thomson 2002

[3] Jang, Sun and Mizutani, Neuro-Fuzzy and Soft-Computing – A computational approach to learning and machine intelligence; Prentice Hall of India; ISBN-81-203-2243-6

Unit 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. **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.

Unit 2: 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.

Unit 3: 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.**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.

Unit 4: 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.

Unit 5: 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. **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.

References:

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.

Unit 1: Overview of language processors, Elements of assembly level programming, Design of assembler ,Macro definition, Design of Macro preprocessor , Relocating and linking concepts , Design of linker ,Programming Environments.

Unit 2: Aspects of Compilation, overview of the various phases of compiler , Scanning, Syntax error handling ,Symbol table conceptual design , Intermediate Code conceptual Design , Intermediate code interfaces ,Dynamic storage allocation techniques , Dynamic Programming code generation algorithm ,Principal sources of optimization , Approaches to compiler development. Register allocation techniques. Concurrentisation and vectorisation of programs.

Unit 3: Motivation and overview, Structure of a Parallelizing compiler. Parallelism detection: data dependence, direction vectors, loop carried and loop independent dependences. Compilation for Distributed Machines Data partitioning, instruction scheduling, register allocation, machine optimization. Dynamic compilation. Introduction to code optimization. Classical theory of data flow analysis. Bi-directional data flows. Unified algorithms for data flow analysis. Program representation for optimisation - SSA form, etc. Efficient code generation for expressions. Code generator generators (CGGs). Code generation for pipelined machines.

Unit 4: Design Issues in distributed operating system, Networking Issues , Communication Protocols , Message Passing , RPC in heterogeneous environment , Resource allocation ,Algorithms for Distributed control. Distributed Deadlock detection ,Mechanism for building Distributed File System, Distributed shared memory , Distributed scheduling .

Unit 5: Resource Security and Protection: The Access Matrix model , Advanced models of protection,.Cryptography, Authentication, Multiprocessor System Architecture , Structure of multiprocessor operating systems , Process synchronization, scheduling , Memory management, Fault tolerance. Case studies :Unix Operating system, Amoeba, Andrew.

References:

1. Dhamdhere, Systems Programming and Operating systems, TMH
2. Keith Cooper , Engineering a Compiler , Elsevier Pub
3. Mak , Writing compilers and Interpreters , Wiley India
4. Singhal & Shivaratri , Advanced concepts in Operating Systems, TMH
5. Sinha , Distributed operating system , PHI

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Web Technologies

List Of Suggested Experiments:

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com the website should consist the following pages.Home page, Registration and user Login, User Profile Page, Books catalog, Shopping Cart, Payment By credit card. Order Confirmation.

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using Servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

5. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

6. Implement the "Hello World!" program using JSP Struts Framework.

7. Write a simple calculator servlet that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands. It should check in a database if the same expression is already computed and if so, just return the value fromdatabase. Use MySQL or PostgreSQL.

8. Create a web Service in Java that takes two city names from the user and returns the distance between these two from data available from a table in MySql. Write a java and a C# client which use the above service.

9. Write a Java program that finds digest value of a given string.

10. Write a Java program that generates a key pair and encrypts a given file using RSA algorithm

Advance Database Management System

1. Study of DBMS, RDBMS and ORDBMS.
2. To study data definition language system.
3. To study data manipulation statements.
4. Study of SELECT commands with different clauses.
5. Study of SINGLE ROW function (character, numeric, data functions).
6. Study of GROUP functions (avg, count, max, min, sum).
7. Study of various type of SET-OPERATORS (Union, intersect, minus).
8. Study of various type of Integrity constraints.
9. Study of various types of JOINS.
10. To study views and indices

Advance Soft Computing:

1. Write a program for A* algorithm, AO* Algorithms
2. Write a program for Breadth first search, Depth first search techniques.
3. Write a program for Adaline , Madaline.
4. Explain Adaptive resonance theory
5. Write a program for Fuzzy set theory and operations, Fuzzy set versus Crisps set.

Information Theory Coding & Cryptography

1. Write a program for determination of various entropies and mutual information of a given channel. Test various types of channel such as

a) Noise free channel.

b) Error free channel

c) Binary symmetric channel

d) Noisy channel

Compare channel capacity of above channels.

2. Write a program for generation and evaluation of variable length source coding using C/MATLAB

a) Shannon – Fano coding and decoding

b) Huffman Coding and decoding

c) Lempel Ziv Coding and decoding

3. Write a Program for coding & decoding of Linear block codes.

4. Write a Program for coding & decoding of Cyclic codes.

5. Write a program for coding and decoding of convolutional codes.

6. Write a program for coding and decoding of BCH and RS codes.

7. Write a program to study performance of a coded and uncoded communication system (Calculate the error probability).

8. Write a simulation program to implement source coding and channel coding for transmitting a text file.