MCSE 201 - Web Technology and Commerce

UNIT-1

Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.

Unit-2

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 cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability,.Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.

Unit-3

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.

Unit-4

Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex. E-Governance: E-Governance architecture, Public private partnership, Readiness, Security , Cyber Crime and Law, IT Act

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.

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References:

1. Web Technology, Achyut Godbole, Atul Kahate, TMH
2. Henry Chan, Raymond Lee, Tharam Dillon , E-Commerce Fundamental and Applications, Willey Publication.
3. Minoli & Minoli, Web Commerce Technology Hand Book, TMH
4. Satyanarayana, E-Government, PHI
5. Uttam K: Web Technologies, Oxford University Press.
6. G. Winfield Treese, Lawrence C. Stewart, Designing Systems for Internet Commerce, Longman Pub.
7. Charles Trepper, E Commerce Strategies, Microsoft Press

MCSE- 202 Information theory, coding and cryptography

Unit1. Information Theory, Probability and Channel: Introduction, Information Measures, Review probability theory, Random variables, Processes, Mutual Information, Entropy, Uncertainty, Shannon's theorem, redundancy, Huffman Coding, Discrete random Variable. Gaussian random variables, Bounds on tail probabilities.

Unit.2 Stochastic Processes: Statistical independence, Bernoulli Process, Poisson Process, Renewal Process, Random Incidence, Markov Modulated Bernoulli Process, Irreducible Finite Chains with Aperiodic States, Discrete-Time Birth-Death Processes, Markov property, Finite Markov Chains, Continuous time Markov chain, Hidden Markov Model.

Unit 3. Error Control Coding: **Channel Coding: Linear Block Codes:** Introduction, Matrix description, Decoding, Equivalent codes, Parity check matrix, Syndrome decoding, Perfect codes Hamming Codes ,Optimal linear codes ,.Maximum distance separable (MDS) codes. **Cyclic Codes:** Introduction**,** generation, Polynomials, division algorithm**,** Matrix description of cyclic codes**,** burst error correction**,** Fire Codes**,** Golay Codes**,** and CRC Codes**. BCH Codes:** Introduction**,** Primitive elements**,** Minimal polynomials**,** Generator Polynomials in terms of Minimal Polynomials**,** Decoding of BCH codes.

Unit.4 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, McEliece Cryptosystem

Unit.5 Advance Coding Techniques: Reed-Solomon codes, space time codes, concatenated codes, turbo coding and LDPC codes (In details)**,** Nested Codes, block (in Details), Convolutional channel coding**:** Introduction, Linear convolutional codes, Transfer function representation & distance properties, Decoding convolutional codes(Soft-decision MLSE, Hard-decision MLSE),The Viterbi algorithm for MLSE, Performance of convolutional code decoders, Soft & Hard decision decoding performance, Viterbi algorithm implementation issues: RSSE, trellis truncation, cost normalization, Sequential decoding: Stack, Fano, feedback decision decoding, Techniques for constructing more complex convolutional codes with both soft and hard decoding.

Text Books and 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

MCSE- 203 Advanced Concept in Data Bases

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 Databases Introduction, Architecture of Distributed Databases , Distributed Database System Design, Distributed Query Processing, Concurrency Control in Distributed Databases, Recovery Control in Distributed Databases. Web Databases, Multimedia Databases, Spatial Databases, Clustering-based Disaster-proof Databases, Mobile Databases.

Unit-4

Object-Oriented Databases Introduction, Concept of Object Oriented Database, Object Oriented Data Model(OODM), Object-Oriented DBMS(OODBMS), Object Data Management Group and Object-Oriented Languages. Object-Relational DBMS, ORDBMS Design, ORDBMS Query Language.

Unit-5

Design of Data Warehouse, Dimension and Measures, Data Marts and Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

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. Patrick O'Neil & Elizabeth O'Neil, Database Principles, Programming and Performance,
4. Morgan Kaufmann Hardcourt India
5. Gillenson, Fundamental of Data Base Management Sytem, Willey India
6. Ceri & Pelagatti, Distributed Databases Principles & Systems,TMH
7. Paulraj Ponniah, Data Ware Housing Fundamental, Willey India.
8. Jiawei Han, Data Mining Concept & Techniques, Elsevier Pub.

MCSE- 204 System Programming

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-II

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 –III

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 optimisation. 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-IV

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-V

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

MCSE- 205 Soft Computing

Unit – I Introduction of soft computing, soft computing vs hard computing. Soft computing techniques. Computational Intelligence and applications, problem space and searching: Graph searching, different searching algorithms like breadth first search, depth first search techniques, heuristic searching Techniques like Best first Search, A* algorithm, AO* Algorithms.
Game Playing: Minimax search procedure, adding alpha-beta cutoffs, additional refinements, Iterative deepening, Statistical Reasoning: Probability and Bayes theorem, Certainty factors and Rules based systems, Bayesian Networks, Dempster Shafer theorem

Unit II: Neural Network: Introduction, Biological neural network: Structure of a brain, Learning methodologies. Artificial Neural Network(ANN): Evolution of, Basic neuron modeling , Difference between ANN and human brain, characteristics, McCulloch-Pitts neuron models, Learning (Supervised & Unsupervised) and activation function, Architecture, Models, Hebbian learning , Single layer Perceptron, Perceptron learning, Windrow-Hoff/ Delta learning rule, winner take all , linear Separability, Multilayer Perceptron, Adaline, Madaline, different activation functions Back propagation network, derivation of EBPA, momentum, limitation, Applications of Neural network.

Unit III: Unsupervised learning in Neural Network: Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Associative memory, hope field network and Bidirectional associative memory. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Introduction to Support Vector machine, architecture and algorithms, Introduction to Kohanan's Self organization map, architecture and algorithms

Unit – IV Fuzzy systems: Introduction, Need, classical sets (crisp sets) and operations on classical sets Interval Arithmetics ,Fuzzy set theory and operations, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic, fuzzification and defuzzification. Fuzzy associative memory.
Fuzzy Logic Theory, Modeling & Control Systems

Unit – V Genetic algorithm : Introduction, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Applications of GA, Differences & similarities between GA & other traditional methods.
Evolutionary Computing: Concepts & Applications. Swarm Intelligence.

References:-

1. S.N. Shivnandam, "Principle of soft computing", Wiley India.
2. David Poole, Alan Mackworth "Computational Intelligence: A logical Approach" Oxford.
3. Russell & Yuhui, "Computational Intelligence: Concepts to Implementations", Elsevier.
4. Eiben and Smith "Introduction to Evolutionary Computing" Springer
5. Janga Reddy Manne; "Swarm Intelligence and Evolutionary Computing"; Lap Lambert Academic Publishing
6. E. Sanchez, T. Shibata, and L. A. Zadeh, Eds., "Genetic Algorithms and Fuzzy Logic Systems: Soft Computing Perspectives, Advances in Fuzzy Systems - Applications and Theory", Vol. 7, River Edge, World Scientific, 1997.
7. Ajith Abraham et.al, **"**Soft computing as transdisciplinary science and technology: proceedings of 4th IEEE International Workshop WSTST' 05" Springer.
8. D.E. Goldberg "Genetic algorithms, optimization and machine learning" Addison Wesley
9. De Jong, Kenneth "A Evolutionary Computation : A Unified Approach" Prentice-Hall Of India Private Limited
10. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.