SRI VENKATESWARA UNIVERSITY, TIRUPATI

Department of Computer Science

ADOPTION OF CBCS SYSTEM FOR TWO YEAR MCAPROGRAMME WITH EFFECT FROM 2020–21

MCA II SEMESTER

MCA 201: Computer Oriented Operations Research

UNIT-I

Linear Programming: Concept ofLinear Programming Model, Development ofLP Model, Graphical Method, Simplex Method, Duality, Formulation of DualProblem, Application ofDuality,(Text Book 1).

UNIT-II

Transportation Problem: mathematical Model for Transportation Problem, Types of transportation problem, Finding the Initial Basic Solution, Optimal Solution by U-V method, Assignment problem, Formulation of Assignment problem-Hungerian Method, Method of Solution, Branch and Bound Technique for Assignment Problem,(Text Book 1).

UNIT-III

Network Techniques: Shortest-Path Model, Systematic Method- Dijkstra'sAlgorithm, Floyid's Algorithm, Minimum Spanning Tree Problem, Prime Algorithm, Krusakals Algorithm, Maximal Flow Problem, Linear Programming Modeling for Maximal Flow Problem, Maximal Flow Problem Algorithm, (Text Book 1).

UNIT-IV

Games and Strategies : Two –Person Zero- Sum Games, Maximin- Minimax Principle, Games Without Saddle Points- Mixed Strategies, Graphic Solution Of 2 x n, And m x 2 Games , Dominance Property, Arithmetic Model For n x n Games, General Solution For m x n Rectangular Games(Text Book 2).

UNIT – V

QueueingTheory:Queueing System, Elements OfQueueing System, Operating Characteristics Of Queueing System, Probability Distributions In QueueingSystem, Classification Of Queueing Models, Poisson Queueing Systems, Non Poisson Queueing Systems. Network Scheduling by PERT / CPM: Rules Of Network Construction, Critical Path Analysis, Probability Considerations In PERT (Text Book 2).

Text Books:

1. R.Pannerselvam., "Operations Research" 2nd Edition, Prentice-Hall of India
2. KantiSwarup., P.K.Gupta and Man Mohan, ., "Operations Research" 12th Edition Sultan chand& Sons

Reference Books:

1. Taha H.A., Operations Research: An Introduction, Prentice-Hall of India
2. S.D.Sharma., Operations Research, KedarNath Ram Nath, Delhi

MCA 202: Data Structures Using Java

UNIT I

Linear Data Structures : Abstract Data Types - Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and Average case Analysis: Definition and an example – Arrays and its representations – Stacks and Queues – Linked lists – Linked list based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

UNIT II

Non-Linear Data Structures; Trees – Binary Trees – Binary tree representation and traversals – Threaded binary trees – Binary tree representation of trees – Application of trees: Set representation and Union-Find operations – Graph and its representations – Graph Traversals DFS and BFS – Connected components, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT III

Search Structures And Priority Queues: AVL Trees – Red-Black Trees – Splay Trees – Binary Heap – Leftist Heap-Implementation of priority Queue ADT with Heap

UNIT IV

Sorting: Insertion sort – Merge sort – Quick sort – Heap sort – Radix Sort- Comparison of sorting algorithms in terms of Complexity - Sorting with disks – k-way merging – Sorting with tapes – Polyphase merge.

UNIT V

Searching And Indexing: Linear Search – Binary Search - Hash tables – Overflow handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing, B+ Trees.

Text Book:

1. SartajSahni, Data Structures, Algorithms and Applications in Java, Second Edition, University Press.
2. Gregory L. Heilman, Data Structures, Algorithms and Object Oriented Programming, Tata Mcgraw-Hill, New Delhi, 2002.

References:

1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill, New Delhi, 1991.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006.

MCA 203: Data Communication and Computer Networks

UNIT I

Introduction, Network models – Internet model, OSI model Physical Layer: Signals – Analog, Digital, Digital Transmission – Coding, Sampling, Analog Transmission – Modulation of digital and analog signal, Multiplexing – FDM, WDM, TDM, Transmission Media – cable, wireless, Circuit switching and Telephone network, DSL Technology, Cable modern, SONET.

UNIT II

Data Link Layer: Error detection and correction, Data link control and Protocols – Stop and wait, Go-back-n, Selective repeat, HDLC, Point to point access, LANS – Traditional Ethernet, Fast Ethernet, Wireless LAN's – IEEE 802.11, Blue tooth, Connecting LANs – Connecting devices, Backbone networks, Virtual LANS, 2G,3G,4G,5G wireless technologies, Satellite networks, Virtual circuit switching, Frame relay, ATM.

UNIT III

Network Layer: Inter-networks, Addressing, Routing, Network layer Protocols, Types of Internet protocols – ARP, IPV4, ICMP, IPV6, Routing – Introduction, Unicast routing, Protocols – RIP, OSPF, BGP, Multicast Routing.

UNIT IV

Transport Layer: Process-to-Process Delivery, UDP, TCP, Data traffic, Congestion and Control, Quality of service (QOS) and techniques to improve QOS, Integrated services, QOS in Switched networks. Security: Introduction. Symmetric-key and Asymmetric cryptography, Key Management and Kerberos, Message security, Digital signature, User authentication, E-mail Security, Web security, Social Issues.

UNIT V

Application Layer: Design issues, file transfer, access and management. Client-Server model, Socket interface Introduction to DNS, Distribution of name space, DNS in the Internet. Electronic mail, SMTP, File Transfer, FTP, HTTP, World Wide web, Video-conferencing.

Text Books:

1.Forouzan B A, Data Communications and Networking, 4th edition, Tata McGraw-Hill, 2007.
2.Tanenbaum A S, Computer Networks, 4th edition, Pearson Education, 2003.
3.Ajay R. Mishra, Fundamentals of network planning and optimization, Willey,2nd edition,2018

Reference Books:

1. Stallings W, Data and Computer Communications, 7th edition, Pearson Education, 2004.
2. Gallo M A, and Hancock W M, Computer Communications and Networking Technologies, Thomson Brooks/Cole, 2002.

MCA 204: Advanced Database Management Systems

UNIT-I

Introduction: Database- System Application – Purpose of Database Systems – View of Data – Database Languages– Relational Databases – Database Design–Object– based and Analysis – Database Architecture. Entity Relationship Model-Constraints-Entity-Relationship Diagrams, Design Issue-Weak Entity Sets-Database Design for Banking Enterprise and Unified Modeling language. Structure of Relational Databases - Relational Algebra Operation– Modification of the Database.

UNIT-II

SQL : Data Definition- Structure of SQL Queries- Set Operations- Aggregate Functions- Nested Sub queries-Complex Queries – SQL Data Types and Schemas- Integrity Constraints-Authorization- Embedded SQL-Dynamic SQL- -Authorization in SQL.;PL/SQL Programming: Introduction, Control structures, Functions, Exception handling, Cursors, Triggers, Package.

UNIT-III

Object- Databases and XML: Object-based databases – Complex data types, structured types and inheritance in SQL, table inheritance, array and Multiset types in SQL, object identity and reference types in SQL, implementing O-R features, Persistent programming languages, OO vs OR. XML – Structure of XML, Document Schema, Querying and Transformation, API in XML, XML applications.

UNIT-IV

Query Processing: Measures of Query Cost-Selection Operation-Sorting-Joint Operation-Evaluation of Expressions-Query Optimization: Transformation of Relational Expressions-Estimating Statistics of Expression Results-Choice of Evaluation Plans.

UNIT-V

Transactions: Transaction concept, Transaction State-Implementation of Atomicity and Durability-Concurrent Executions- Serializability- Recoverability-Implementation of Isolation-Testing for Serializability, Concurrency Control: Lock Based Protocols-Timestamp-Based Protocols-Validation-Based Protocols-Multiple Granularity-MultiversionSchemes. Deadlock handling-Insert and Delete Operations-Weak Levels of Consistency-Concurrency in Index Structures

Text Book:

1.Silberschatz A. Korth H F, and Sudarsan S, *Database System Concepts*, 5th edition, McGraw-Hill 2002. Chapters 1to 4, 6 to 10 and 13 to 17)

2.SQL, PL/SQL: The Programming Language of Oracle by Ivan Bayross, BPB Publications, 2nd Revised Edition.

Reference Books:

1. Date C J,AnIntroduciton to Database Systems, 7th edition, Pearson Educaiton, 2000.
2. Elmasri R, and Navathe S B, Fundamentals of Database Systems, 4th edition, Pearson Education, 2004.
3. Mannino M V, Database Application Development and Design, McGraw-Hill, 2001.

MCA 205A: E-Commerce

UNIT I

Electronic Commerce: Electronic Commerce Framework; Electronic Commerce and Media Convergence; The Anatomy of E-Commerce Application; Electronic Commerce Organization Applications- The Network Infrastructure for Electronic Commerce: Market Forces Influencing the I- Way; Components of the I Way; Network Access Equipment; the Last Mlle: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way. Case study: B2B ecommerce

UNIT II

The Internet as a Network Infrastructure: The Internet Terminology; Chronological History of the Internet NSFNET: Architecture and Components: Globalization of the Academic Internet; Internet Governance: The Internet Society –An Overview of Internet:Applications –Electronic Commerce; World Wide Web(WWW) as the Architecture: Web Background: Hypertext Publishing; Technology behind the Web: Security and the Web-Consumer-Oriented Electronic Commerce: Oriented Applications; Mercantile Process,Models Mercantile Models from the Consumer's Perspective; Mercantile Models from the Merchant's Perspective. Case study: E-Commerce/High Security (Pci).

UNIT III

Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems; Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems – Inter organizational Commerce and EDI: Legal, security, and Privacy Issues:EDI and Electronic Commerce – EDI Implementation, MIME, and Value- Added Networks : Standardization and EDI;EDI Software Implementation: EDI Envelope for Message Transport: Value- Added Networks (VANs); Internet – Based EDI.Case study: Social Media Marketing.

UNIT IV

Intra organization Electronic Commerce: Internal Information System: Macro forces and Internal Commerce; Work-Flow Automation and Coordination; Customization and Internal Commerce; Supply Chain Management (SCM) – The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems; Making a Business Case for a Document Library; Types of Digital Document Library; Types of Digital Documents; Issues behind Document Infrastructure; Corporate Data Warehouses. Case study: Email Marketing, Email Personalization

UNIT V

M-Commerce: Introduction to Mobile Commerce, Limitations, history, applications,architecture, transaction models, payment methods, advantages, disadvantages Case study: Mobile app marketing case study: O2 Priority Moments gets small businesses on side.

Text Book:

1. Ravi Kalakota and Andrew B.Whinston. Frontiers of Electronic commerce, Pearson Education.

Reference Books:

1. Henry Chan, Raymond Lee. TharanDillan and E.Chany,E-Commerce, Wiley,2003.
2. DanjelMinoli and EmunaMimoli, Web Commrece Technology, Tata MicGraw Hill, 1999.
3. Marilyn Greenstein and Todd M Feinman, aElectronic Commerce, TaraMcGraw Hill Edition.

MCA 205B:Cyber Security

UNIT I

History of Cyber Security-Introduction to Cyber Security-Definition-Key terms-cyber Attacks and Security tools-Security Threats-Vulnerability assessments-roles in Security-Cyber Security-today- Critical Thinking in Cyber Security

UNIT II

Cyber Threat Actors and their Motives-Security Attacks, Actors and their Motive-A brief overview of types of actors and their motives-Hacking organizations-Major different types of cyber-attack-Security Attack Definition-Security services-Security Mechanisms-Network Security Model-Organizational Threats-Attacks-Security Architecture Attacks-Security Architecture -Attack models-Malware and Ransomware-Threat Examples-Threat Protection Defined-Internet Security Threats – Mapping-Internet Security Threats - Packet Sniffing-Security Threat - IP Spoofing-Security Threats - Denial of service-Security Attacks - Host insertions-What is Social Engineering, Phishing and Vishing- Cyber warfare

UNIT III

Overview of Cyber Security Concepts-CIA Triad – Confidentiality-CIA Triad – Integrity-CIA Triad – Availability-Non - Repudiation - How does it apply to CIA?-Access Management-Incidence Response-Key Concepts - Incident Response-Incident Response Process-Introduction to Frameworks and Best Practices-IT Governance Process-Cybersecurity Compliance and Audit Overview-Pentest Process and Mile 2 CPTE Training-OWASP framework

UNITIV

Introduction to Key Security Tools -Introduction to Firewall-Firewalls - Packet Filtering-Firewalls - Application Gateway-Firewalls - XML Gateway-Firewalls - Stateless and Stateful- Firewall Administration – Firewall Selection-Firewall Administration – Firewall Configuration-IDPS Administration-VPN Administration-Antivirus/Antimalware-Penetration Testing Introduction-Penetration test Methodologies-Vulnerability Tests

UNIT V

Cyber Security –Organizational implications-cost of cybercrimes and IPR issues Web threats for organizations: the evils and Perils-Social media marketing Security and privacy Implications- Digital Forensic- Protecting people privacy in the organizations Forensic best practices for organizations. Case Studies.

Text Books

1. Nina Godbole&SunitBelapure "Cyber Security", Wiley India, 2012.
2. Cyber Security by Paul Augustine, Crescent Publication
3. Information Security Policies, Procedures, and Standards: Guidelines for Effective Information Security Management, Thomas Peltier, Auerbach Publication

References:

1. Harish Chander, "cyber laws & IT protection", PHI learning pvt.ltd, 2012.
2 MS.M.K.Geetha&Ms.SwapneRaman"Cyber Crimes and Fraud Management, "MACMILLAN,2012.
3. PankajAgarwal : Information Security& Cyber Laws (Acme Learning), Excel, 2013.

MCA 205C:Neural Networks

UNIT I

Introduction: What is Neural network, Human Brain, Models of a Neuron, Neural networksviewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks, Learning Process: Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem,Memory, Adaption, Statistical nature of the learning process,

UNIT II

Single Layer Perceptrons: Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception – convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment.

UNIT III

Multilayer Perceptron: Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, BACK PROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT IV

Self-Organization Maps: Two basic feature mapping models, Self-organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantifier, contexed Maps.

UNIT V

Neuro Dynamics: Dynamical systems, stability of equilibrium states, Attractors, Neurodynamical models, manipulation of attractors' as a recurrent network paradigm

HOPFIELD MODELS – Hopfield models.

Text Book:

Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004

Reference Books:

Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
Neural networks in Computer intelligence, Li Min Fu TMH 2003
Neural networks James A Freeman David M S kapura Pearson Education 2004

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