

Department of Computer Science and Engineering

M.E. (Computer Science and Engineering) Full time
Curriculum

Course Code	Course Title	L	T	P	C
Semester – I – Theory					
MM103	Mathematical Foundations for Computer Science	3	1	0	4
MCS102	Computer Architecture	3	0	3	4
MCS103	Operating Systems	3	0	0	3
MCS104	Data Structures and Algorithms	3	0	0	3
MCS105	Microprocessor Based System Design	3	0	3	4
MCSEXX	Elective – I	3	0(1)	0	3(1)
Practical					
MCS106	Computer Lab 1 (OS and Data Structures Lab)	0	0	6	2
Sub Total					23(1)
Semester – II – Theory					
MCS107	Compiler Design	3	1	0	4
MCS108	Database Technology	3	0	0	3
MMG107	Managerial Engineering	3	0	0	3
MCSEXX	Elective 2	3	0(1)	0	3(1)
MCSEXX	Elective 3	3	0(1)	0	3(1)
MCS109	Term Paper & Seminar	0	0	6	2
Practical					
MCS110	Computer Lab 2 (System Software and DBMS Lab)	0	0	6	2
	Industrial Training/ Interdepartmental Project	0	0	3	1
Sub Total					21(2)
Semester – III – Theory					
MCS201	Software Engineering	3	1	0	4
MCS202	Computer Networks	3	0	3	4
MCSEXX	Elective 4	3	0(1)	0	3(1)
MCSEXX	Elective 5	3	0(1)	0	3(1)

Practical					
MCS203	Project Work Phase I	0	0	12	6
Sub Total					20(2)
Semester – IV – Theory					
MCS204	Project Work Phase II	0	0	24	15
Sub Total					15

Total Credits to be Earned for the award of the Degree : 79(+5)

List of Electives

Course Code	Course Title	L	T	P	C
MCSE01	Distributed Computing	3	0	0	3
MCSE02	Soft Computing	3	0	0	3
MCSE03	Agent Based Systems	3	0	0	3
MCSE04	Digital Image Processing	3	0	0	3
MCSE05	Neural Networks	3	0	0	3
MCSE06	Internet Programming	3	1	0	4
MCSE07	Pattern Recognition	3	0	0	3
MCSE08	Multimedia Systems	3	0	0	3
MCSE09	Mobile Communication	3	1	0	4
MCSE10	Advanced Web Technology	3	1	0	4
MCSE11	Legacy Systems	3	1	0	4
MCSE12	Parallel Computers and Algorithms	3	0	0	3
MCSE13	Network Security	3	1	0	4
MCSE14	High Speed Networks	3	1	0	4
MCSE15	Object Oriented Analysis and Design	3	0	0	3
MCSE16	Embedded Systems	3	0	0	3
MCSE17	E-Commerce	3	0	0	3
MCSE18	Data-mining and Data-warehousing	3	0	0	3
MCSE19	Web Services	3	1	0	4
MCSE20	Client-Server Computing	3	0	0	3
MCSE21	Special Elective	3	0	0	3

MMA103	MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE	3	1	0	4
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1. LOGIC **9 3 0**

Statements - Connectives - Truth Tables - Normal forms - Predicate calculus - Inference - Theory for Statement Calculus and Predicate Calculus - automata theorem proving. SETS Sets - Relations – Graphs – Functions. COMBINATORICS: Review of Permutation and Combination - Mathematical Induction - Pigeonhole principle - Principle of Inclusion and Exclusion - generating function - Recurrence relations

2. ALGEBRAIC STRUCTURES **9 3 0**

Semi group - Monoid – Groups (Definition and Examples only) Cyclic group - Permutation group (S_n and D_n) - Substructures - Homomorphism of semi group, monoid and groups - Cosets and Lagrange Theorem – Normal Subgroups - Rings and Fields (Definition and examples only)

3. RECURSIVE FUNCTIONS **9 3 0**

recursive functions – primitive recursive functions – computable and non computable functions. LATTICES: Partial order relation – poset – Hasse Diagram – Boolean algebra.

4. FINITE AUTOMATA AND REGULAR LANGUAGES **9 3 0**

Finite automata and regular languages-Regular expressions and regular languages-Memory required to recognize a language-Non Determinism and Kleene’s Theorem-Pumping Lemma-Decision Problems

5. PUSH DOWN AUTOMATA AND CONTEXT FREE LANGUAGES **9 3 0**

Push down Automata and Context free languages-context free grammars-definition –examples-operations-derivation trees-Ambiguity-PDA and CFG Context free and non –context free languages.

References:

1. J. P. Trembley, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH
2. K.H. Rosen, “Discrete Mathematics and its Applications”, McGraw - Hill Book Company, 1999.
3. **John. C. Martin, “Introduction to Languages and Theory Of Computation”, II edition, McGraw Hill 1997.**
4. **Hopcraft and Ulman ,Introduction to automata,languages and computation,Narosa Publishers 1986.**
5. **Mott, Kandel & Baker, Discrete Mathematics for Computer Scientists & Mathematics 2nd Edition, PHI 2002**

MCS102	COMPUTER ARCHITECTURE	3	0	3	4
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1. INTRODUCTION **6 0 6**
Overview of CPU, Memory, I/O Design – Introduction to Register transfer notation – abstract and concrete RTN - Performance evaluation.

2. CPU ARCHITECTURE **10 0 10**
Instruction sets of different machines – CISC and RISC Processors – Simple RISC Computer (SRC) design - Pipelining Issues – Super Scalar Architectures.

3. MEMORY DESIGN **10 0 10**
Virtual Memory – Cache Design for different architectures and multiprocessor environments – evaluating memory performance.

4. I/O DESIGN **10 0 10**
Speed Limits – Interfacing to different types of I/O Devices – Performance measures.

5. PARALLEL ARCHITECTURES **9 0 9**
Data Flow – Vector Processors – Multi Processor Architecture: SIMD, MIMD – Multi Computer Architecture – Interconnection Networks.

References:

1. Vincent P. Heuring, Harry F. Jordan, **Computer Systems Design and Architecture**, Pearson Education 2003.
2. Stallings, **Computer Organization and Architecture: Designing for Performance** 6th Edition, PHI
3. John P. Hayes, “**Computer Organization and Architecture**”, Tata McGraw Hill 2003
4. D. A. Patterson & J. L. Hennessy, **Computer Architecture – A Quantitative Approach**, Morgan Kaufmann Publishers, 2nd edition – 1996.

MCS103	OPERATING SYSTEMS	3	0	0	3
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1. INTRODUCTION **11 0 10**

Operating Systems Concepts – System Calls – OS Organization – Factors in OS Design – Basic Implementation Considerations – Time Sharing and Multi Programming – Real Time Systems.

Process Management: Process Concepts , Model – Process Synchronization – Process Scheduling , Threads.

Dead Lock: Detection & Recovery , Avoidance , Prevention- Two Phase Locking Issues.

2. MEMORY MANAGEMENT **9 0 3**

Basic Memory Management – Swapping – Virtual Memory – Page Replacement Algorithms- Segmentation

3. FILE SYSTEM AND I/O MANAGEMENT **9 0 0**

Files – Low Level File Implementations – Memory Mapped Files – Directories, Implementation - Principles of I/O Hardware & Software – Device Drivers – Disks Hardware, Formatting & Arm Scheduling Algorithms.

4. DISTRIBUTED SYSTEMS **8 0 0**

Advantages & Disadvantages of Distributed Systems with Centralized Systems- Hardware & Software concepts – Design Issues – Communications – Client Server Model .

5. CASE STUDIES **8 0 0**

UNIX , Windows 2000.

References

1. Andrew S.Tanenbaum, “Modern Operating Systems”, 2nd edition, Addison Wesley, 2001.
2. Gary Nutt, “Operating Systems A Modern Perspective “, 2nd edition, Pearson Education , 2001.
3. Andrew S.Tanenbaum, “Distributed Operating Systems”, 2nd edition, Pearson Education , 2002
4. Harvey M.Deitel, “Operating System”, 2nd edition, Addison Wesley, 2000.
5. Achyut S.Godbole, “Operating systems”, Ninth reprint, TMH, 2001.
6. Abraham Silberschatz and Peter Galvin, “Operating System Concepts”, Fifth edition, Addison Wesley, 1998.
7. Charles Crowley, “Operating Systems, TMH, 1998.

MCS104	DATA STRUCTURES AND ALGORITHMS	3	0	0	3
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1. LINEAR AND NON-LINEAR DATA STRUCTURES 9 0 0

Stacks, Queues & Lists Implementation and Applications – Cursor implementation of Linked Lists – Trees – Binary Trees – Binary Search Tree – Tree Traversals – AVL Trees – Splay Trees.

2. SEARCHING AND SORTING 9 0 0

Sequential search – Binary search – sorting techniques: Bubble sort, selection sort, insertion sort, heap sort, merge sort, quick sort and radix sort

3. ALGORITHMS 9 0 0

Greedy Algorithms – Dynamic Programming – Back patching – Branch and Bound – Divide and Conquer – Lower Bound Theory.

4. GRAPH AND PARALLEL ALGORITHMS 9 0 0

Graphs – representations – traversals: BFS, DFS – minimum spanning tree – shortest path – bi-connected and strongly components – parallel algorithms – sorting – matrix multiplication

5. SELECTED TOPICS 9 0 0

NP completeness – approximation algorithms – NP hard problems – magic square.

References:

1. E. Horowitz, S. Sahani & Mehta Fundamentals of Data Structures in C++, Galgotia 1999.
2. Langsman, Augestein & Tanenbaum, Data Structures Using C & C++, 2nd Edition, PHI 2002.
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest, Introduction to Algorithms, McGraw Hill Book Company, 1994.
4. Weiss, Data Structures and Algorithm Analysis in C++ 2nd Edition Pearson Education 2003.
5. M.J. Quinn, Designing Efficient Algorithms for Parallel Computers, McGraw Hill Book Company, 1998.
6. Kenneth A. Berman & Jerome L. Paul, Fundamentals of Sequential and Parallel Algorithms Thomson Learning 2003.

MCS105	MICROPROCESSOR BASED SYSTEM DESIGN	3	0	3	4
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1. ARCHITECTURE AND PROGRAMMING ISSUES OF 8086 9 0 9
Intel 8086 architecture – addressing modes – instruction set – format – assembler directives – Assembly language programming
2. ARCHITECTURE FEATURES OF ADVANCED PROCESSORS 9 0 9
Architectural features of 80286, 80386, 80486, Pentium, Pentium Pro, Celeron, PII, PIII & P4 processors, multimedia extensions – Applications
3. CONTROL APPLICATIONS 9 0 9
Microprocessors for Control Applications – Micro controller based design of a system – Real time control using micro controllers.
4. INTERFACING 9 0 9
Interfacing with peripheral devices - Peripheral Controllers – Bus concepts – Bus Standards – Examples – Choosing a bus standard for an application.
5. SPECIAL PURPOSE PROCESSORS 9 0 9
Introduction to Co-processors, DSP Processors, Graphic Processors and their applications

References:

1. **Barry B. Brey, The Intel Microprocessors 8086/8088, 80186/80188, 80286, 386, 486 Pentium, Pentium Pro, Pentium II, PIII, P4: Architecture Programming and Interfacing 6th Edition, Pearson Education, 2003.**
2. **Microprocessors and Micro Computer Based System Design, Mohammed Rafiquzzaman, PHI 2003.**
3. **Liu & Gibson Microcomputer Systems: The 8086/88 Family: Architecture, Programming & Design 2nd Edition PHI 2002.**
4. **The 8086 /8088 family : Design Programming and interfacing , Uffenback , PHI 2002.**
5. **The 8088 and 8086 microprocessor :Programming ,Interfacing , Software , Hardware and Applications. Triebel &Singh ,PHI 2002**

MCS107	COMPILER DESIGN	3	1	0	4
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1.INTRODUCTION **6 2 0**

Compilers-Grammars-Languages-Phases of compiler-compiler writing tools-
Errors-Lexical phase errors, semantic phase errors, semantic errors

2. LEXICAL ANALYZER **10 3 0**

Role of lexical analyzer-input Buffering –Specification and Recognition of tokens –
Language for specifying Lexical analyzer-Finite Automata-Regular expression to
NFA-Optimization of DFA based pattern matches –Design of a Lexical Analyzer
Generator

3. SYNTAX ANALYZER **10 4 0**

Parsers-CFG-derivations and parse trees-capabilities of CFG- Top down parsing-
Bottom Up parsing - LR parsing- SLR parsing -LALR parsing – CLR parsing –
Operator Precedence – Predictive Parsing.

4. INTERMEDIATE CODE GENERATION **10 4 0**

Syntax Directed Translation scheme-Implementation of Syntax Directed
Translators-Intermediate code- postfix notation, parse trees and syntax trees-Trees
three address code –Quadruples, Triples –Translation of Assignment statements –
Boolean expressions-Declaration –Flow control statements –Back patching.

5. CODE OPTIMIZATION **9 2 0**

Principal source of optimization-Issues in the design of a code generator-Run-Time
storage management –Basic blocks and flow graphs Next use information-Simple
code generator –DAG representation of basic blocks-Peepphole optimization – Code
Generation

References:

1. A.V.Aho, Ravi Sethi,J. D.ullman, Compilers –principles ,Techniques and tools,
Addison Wesley publishing company,1988.
2. Allen I.Holub, compiler Design in C, Prentice Hall of India, 1993.
3. Kenneth C. Loudon, Compiler Construction: Principles & Practice, Thomson
Learning 2003
4. Muchnick, Advanced Compiler Design: Implementation, Academic Press.
5. Compilers Construction & Design , Rajini Jindal ,Umesh Publications ,
Delhi.2002
6. writing Compilers and Interpretteners, Ronald Mak ,2nd Edition , John Miler
&Sons , 1996 .

MCS108	DATABASE TECHNOLOGY	3	0	0	3
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1. INTRODUCTION TO DATABASE 9 0 0
Database Environment – Data Models – Relational Model – Relational algebra and Calculus – SQL: Data Definition, Data Manipulation, Query by Example – Commercial Databases: PL/SQL – Stored Procedure.

2. DATABASE PLANNING 9 0 0
Design and Administration – Fact Finding Techniques – ER Modeling – Enhanced ER Modeling – Normalization

3. SECURITY 9 0 0
Transaction Management – Query Processing – Programmatic SQL – Distributed DBMS: Introduction, Architecture, Design and Advanced Concepts – Query Processing – Updating Distributed Data – Distributed Transaction Management, Concurrency Control – Recovery.

4. INTRODUCTION TO OBJECT DBMS 9 0 0
Concepts – Design – Standards and Systems – Object relational DBMS – OODBMS.

5. DBMS IN WEB APPLICATIONS 9 0 0
Structured and Semi Structured Data: XML and DBMS – Overview: of Data Warehousing– OLAP – Data Mining.

References

1. **Thomas M Connolly, Carolyn E Begg , Database Systems 3/e, A Practical Approach to Design Implementation and Management, Addison Wesley.**
2. **Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications 2001.**
3. **C. J. Date, An Introduction to Database Systems 7/e, Pearson Education.**
4. **Abraham Silberschatz, Henry F Korth, S.Sudershan Database System Concepts Fourth Ed.**
5. **Prabhu, Object Oriented Database Systems: Approaches and Architecture, PHI 2002.**
6. **Morrison, Database Driven Websites, Thomson Learning 2003.**

MMG 107	MANAGERIAL ENGINEERING	3	0	0	3
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1. BASIC CONCEPTS OF MANAGEMENT 9 0 0

Evolution of Management Theory – Functions of Management – MBO, MBE and MIS – Entrepreneurship – Industrial Safety – Industrial Pollution – Industrial Waste control and their Disposal.

2. FINANCIAL MANAGEMENT 9 0 0

Fundamentals of Accounting – Cost Accounting and Control Break even Analysis – Depreciation – Value Analysis – Equipment Replacement Policy – Marketing Management – Market Research – Sales Forecasting.

3. PERSONAL MANAGEMENT 9 0 0

Recruitment and Selection of Man power – Training and Development of Man power – Job Analysis – Job Evaluation and Merit Rating – Wages and Incentives – Industrial Acts and Regulations – Industrial Psychology – Leadership – Morale of Employees – Motivation – Communication Structures.

4. PRODUCT MANAGEMENT 9 0 0

Plant location – Plant Layout – Material Handling – Production Planning and Control – Product Research, Development and Design – Process Planning – Loading and Scheduling Techniques

5. MATERIALS MANAGEMENT AND PURCHASING 9 0 0

Stores and Store-Keeping – Inventory Control – Maintenance Management – Productivity – Method Study – Work Measurement – Quality Control.

References:

1. Industrial Engineering and Production Management, M. Mahajan
2. Industrial Engineering and Production Management, Markand Telsang.
3. Management in Engineering : Principles and practice ,2nd Edition , Freeman-Bell and Balk will , PHI 2002 .
4. Management ,6th Edition , Free man and Gilbert , PHI 2002.
5. Engineering Management , Mazda , Pearson education ,2002 .

MCS109	TERM PAPER AND SEMINAR	0	0	6	2
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- ❖ **The Students are expected to prepare paper on any current emerging technology in computer science.**
- ❖ **The Students are excepted to deliver the seminars on the respective topics.**
- ❖ **The students will be evaluated based on the presentation and demonstration.**
- ❖ **Report and VIVA-VOCE**

MCS201	SOFTWARE ENGINEERING	3	1	0	4
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1. INTRODUCTION **9 3 0**
Computer based System engineering, Project management, Requirement and Specification –Requirement engineering, Requirement Analysis,

2.SYSTEM MODELS **9 3 0**
System models, Requirement definition and specification, Software prototyping, Formal Specification, Model-based specification.

3. SOFTWARE DESIGN **9 3 0**
Architectural design, Object oriented design, Function oriented design, Real-time System design, user interface design, Project Management concepts, Software process and project metric. Software project planning, Risk analysis and management, software quality assurance.

4. PROJECT SCHEDULING AND TRACKING **9 3 0**
Software configuration management, system engineering, software testing techniques, software testing strategies, verification and validation, Dependable system—software reliability, software reuse.

5. OBJECT ORIENTED SOFTWARE ENGINEERING **9 3 0**
Object oriented concepts and principles, Object oriented design, Object oriented analysis, Object oriented Testing, Technical Metrics for object oriented systems , Managing object oriented software engineering,

Reference

- 1) **IAN Sommervilli "Software Engineering", 6th Edition, Pearson Education 2002.**
- 2) **Rogers Pressman "Software Engineering A practitioners Approach", Fifth edition McGraw-Hill-International Edition**
- 3) **Ivar Jacobson, Magnus Christerson, Patrik Jonson, Gunnar Overgaard, "Object Oriented software engineering A use case Driven Approach" Addison Wesley Longman**
- 4) **Stephen R Schach "Classical and Object oriented Software engineering" 4th edition McGraw-Hill International Editions**
- 5) **Carlo, Ghezzi, Mehdi Jazayeri, Dino Mandriol, Fundamentals of Software Engineering 2nd Edition, Pearson Education 2003.**

MCS202	COMPUTER NETWORKS	3	0	3	4
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1. DATA TRANSMISSION 9 0 9

Introduction - motivation and tools - transmission media - local asynchronous communication - long distance communication.

2. PACKET TRANSMISSION 9 0 9

Packets-frames-error detection-LAN technologies and network topology-interface hardware-Extending LANs: fiber modems, repeaters, bridges and switches—Long distance digital connection technologies- WAN technologies and routing.

3. INTERNETWORKING 9 0 9

Network ownership ,service paradigm and performance-protocols and layering-internetworking concepts, architecture and protocols-IP internet protocol addresses-binding protocol addresses(ARP) –IP datagrams and datagram forwarding-IP encapsulation, fragmentation and reassembly: UDP- TCP: reliable transport service

4. NETWORK APPLICATIONS 9 0 9

Client server interaction-the socket interface-file transfer-remote file access-domain name system-electronic mail-CGI technology for dynamic web documents-java technology for active web documents-network security-RPC and middleware.

5. NETWORK MANAGEMENT 9 0 9

Introduction to SNMP RMON1 and RMON2

References

- 1. Douglas E Comer ,Ralph E Droms Computer Networks and Internets,2/e Pearson Education 2003.**
- 2. William Stallings , SNMP ,SNMPv2,SNMPv3& RMON 1&2, 3rd Edition, Pearson Education 2003.**
- 3. Andrew S Tanenbaum Computer Networks 4th Edition, Pearson Education 2003.**
- 4. Forouzan ,Data Communications And Networking 2nd Edition TMH.**
- 5. Peterson Davie, “Computer Networks” , Addison Wesley, 2001.**
- 6. Willam A.Shay, Under standing data communications and Networks 2nd Edition ,Thomson books,2003 .**

MCSE01	DISTRIBUTED COMPUTING	3	0	0	3
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1. SOFTWARE ARCHITECTURES 9 0 0

Client - Server Architectures - Challenges - Design Methodology - Intranets and Groupware - Hardware and Software for Intranet - Groupware and Features - Network as a Computer - The Internet - IP Addressing - Internet Security - Open Systems - Concepts and Reality.

2. OPERATING SYSTEM ISSUES 9 0 0

Distributed Operating Systems - Transparency - Inter-Process Communication - Client - Server Model - Remote Procedure Call - Group Communications - Threads –

3.SYSTEM MODELS 9 0 0

System Models - Process Synchronization - Deadlocks - Solutions - Load Balancing - Distributed File Systems - Distributed Shared Memory Systems - Micro-Kernels.

4. FUNDAMENTAL DISTRIBUTED COMPUTING ASPECTS 9 0 0

Theoretical Foundations - Logical Clocks - Vector Clocks - Global State - Termination - Correctness - Election Algorithms - Termination Detection - Fault Tolerance - Missing Token - Consensus Algorithms - Byzantine - Consensus - Interactive Consistency.

5. MANAGING DISTRIBUTED DATA 9 0 0

Distributed Databases - Distribution Transparency - Distributed Database Design - Query Translation – Query Optimization - Concurrency Control - Object-Oriented Databases - Strategic Considerations - Applications of Object-oriented Databases.

References:

1. **Tanenbaum, Distributed Systems: Principles and Paradigms, Pearson Education 2003**
2. **Albert Fleishman, Distributed Systems - Software Design & Implementation, Springer-Verlag, 1994.**
3. **Mukesh Singal and Shivaratu N.G., Advanced Concepts in Operating Systems, McGraw Hill, Newyork 1994.**
4. **George Coulouris and Jean Dollimore, Distributed Systems - Concepts and Design 3rd Edition, Pearson Education 2003.**
5. **Tanenbaum, Distributed Operating Systems, Pearson Education 2003**

MCSE02	SOFT COMPUTING	3	0	0	3
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1. ARTIFICIAL NEURAL NETWORKS 9 0 0

Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning -Back propagation networks - Kohnen's self organizing networks - Hopfield network..

2.FUZZY SYSTEMS 9 0 0

Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition - Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.

3.NEURO - FUZZY MODELING 9 0 0

Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls - Simulated annealing – Evolutionary computation.

4.GENETIC ALGORITHMS 9 0 0

Survival of the Fittest - Fitness Computations - Cross over - Mutation -Reproduction - Rank method - Rank space method

5.SOFTCOMPUTING AND CONVENTIONAL AI 9 0 0

AI search algorithm - Predicate calculus - Rules of inference – Semantic networks - Frames - Objects - Hybrid models - Applications.

References

- 1. Jang J.S.R., Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Pearson Education 2003.**
- 2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill, 1997.**
- 3. Laurene Fausett, "Fundamentals of Neural Networks", Pearson Education, 2003.**
- 4. George J. Klir and Bo Yuan, "Fuzzy sets and Fuzzy Logic", Prentice Hall, USA 1995.**
- 5. Nih J.Nelsson, "Artificial Intelligence - A New Synthesis", Harcourt Asia Ltd., 1998.**
- 6. D.E . Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley,N.Y, 1989.**

MCSE03	AGENT BASED SYSTEMS	3	0	0	3
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1. INTRODUCTION 9 0 0

Definitions - History - Intelligent Agents - Structure-Environment - Basic Problem Solving Agents-Formulating - Search Strategies - Intelligent search - Game playing as search.

2. KNOWLEDGE BASED AGENTS 9 0 0

Representation - Logic-First order logic - Reflex Agent - Building a knowledge Base - General Ontology -Inference - Logical Recovery

3.PLANNING AGENTS 9 0 0

Situational Calculus - Representation of Planning - Partial order Planning- Practical Planners – Conditional Planning - Replanning Agents

4. AGENTS AND UNCERTAINTY 9 0 0

Acting under uncertainty - Probability Bayes Rule and use - Belief Networks - Utility Theory – Decision-Network - Value of Information - Decision Theoretic Agent Design.

5. HIGHER LEVEL AGENTS 9 0 0

Learning agents - General Model - Inductive Learning - Learning Decision Trees- Reinforcement Learning -Knowledge in Learning - Communicative agents -Types of communicating agents - Future of AI

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References

1. Stuart Russell and Peter Norvig Artificial Intelligence - A Modern Approach, Pearson Education, 2003.

2. Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 1999.

3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992.

MCSE04	DIGITAL IMAGE PROCESSING	3	0	0	3
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1. DIGITAL IMAGE FUNDAMENTALS 9 0 0
Image Transforms - Walsh, Hadamard, Discrete cosine, Hotelling Transforms, Image formation, File formats – FFT.

2. IMAGE ENHANCEMENT AND RESTORATION 9 0 0
Histogram modification techniques - Image smoothing - Image Sharpening - Image Restoration - degradation Model - Digitalization of Circulant and block circulant matrices - Algebraic approach to restoration.

3. IMAGE COMPRESSION AND SEGMENTATION 9 0 0
Compression Models - Elements of information theory - Error free Compression -Image segmentation - Detection of Discontinuities - Edge linking and boundary detection - Threshold - Regions Oriented Segmentations - Morphology.

4. FEATURE EXTRACTION 9 0 0
Image feature description - Interpretation of Line drawings, Image pattern recognition algorithms.

5. KNOWLEDGE REPRESENTATION AND USE 9 0 0
Knowledge representations and use - Image analysis using Knowledge about scenes - Image understanding using two dimensional methods.

References

1. Gonzalez R & Woods B.E., Digital Image Processing, Iind Ed., Pearson Education 2002
2. Nick Efford, Digital Image Processing, Pearson Education 2000.
3. Chanda & Majumder, Digital Image Processing, Pearson Education 2000.
4. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
5. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

MCSE05	NEURAL NETWORKS	3	0	0	3
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1. BACK PROPAGATION 9 0 0

Introduction to Artificial Neural Systems - Perceptron - Representation - Linear separability - Learning - Training algorithm - The back propagation network - The generalized delta rule - Practical considerations - BPN applications.

2. STATISTICAL METHODS 9 0 0

Hopfield nets - Cauchy training - Simulated annealing - The Boltzmann machine. Associative memory - Bidirectional associative memory - Applications.

3. COUNTER PROPAGATION NETWORK & SELF ORGANIZING MAPS 9 0 0

CPN building blocks - CPN data processing. SOM data processing - Applications.

4. ADAPTIVE RESONANCE THEORY AND SPATIO TEMPORAL PATTERN CLASSIFICATION 9 0 0

ART network description - ART1 - ART2 - Application. The formal avalanche - Architecture of spatio temporal networks - The sequential competitive avalanche field - Applications of STNs.

5. NEO – CONGNITRON 9 0 0

Cognitron - Structure & training - The neocognitron architecture - Data processing - Performance – Addition of lateral inhibition and feedback to the neocognitron. Optical neural networks - Holographic correlators.

References

- 1. James Freeman A. and David Skapura M., Neural Networks - Algorithms, Applications & Programming Techniques Pearson Education, 2000.**
- 2. Yegnanarayana B., Artificial Neural Networks, Prentice Hall of India Private Ltd., New Delhi, 1999.**
- 3. Laurene Fausett, Fundamentals of Neural Networks, Pearson Education 2003.**

MCSE06	INTERNET PROGRAMMING	3	1	0	4
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1. INTRODUCTION TO INTERNET SERVICES:CLIENT SIDE SCRIPTING

6 2 0

Overview – Hyper Text Markup Language – Java Script Programming – DHTML:

2. FUNDAMENTALS OF JAVA

9 3 0

Features of Java – Object Oriented Concepts – Classes – Objects – Abstract Class – Interfaces - Packages – Exception Handling – Multi Threading.

3. CORE JAVA

10 4 0

Abstract Window Toolkit – JFC - Applets – Networking .

4. ADVANCED JAVA

10 4 0

Networking - JDBC – Servlets – JSP (Java Server Pages) – JAVA BEANS .

5. ENTERPRISE TECHNOLOGIES

10 2 0

RMI – Intoduction to EJB .

References

1. **Deitel & Deitel, Internet & World Wide Web How to program, Prentice Hall 2000.**
2. **Java 2: The Complete Reference, D. Norton and H. Schildt, Tata McGraw-Hill 2000.**
3. **Java Servlets: Application Development, Karl Moss, 2/e, Tata McGraw- Hill.**
4. **Bruce Eckel, Thinking in Java 2nd Edition, Pearson Education 2000.**
5. **Cay S. Horstmann, Gray Cornell, Core Java 2 Vol. 1 & 2. Pearson Education 2001**

MCSE07	PATTERN RECOGNITION	3	0	0	3
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1. PATTERN RECOGNITION 9 0 0

Overview of pattern recognition - Discriminant functions - Supervised learning - Parametric estimation -Maximum likelihood estimation - Bayesian parameter estimation - Perceptron algorithm - LMSE algorithm -Problems with Bayes approach - Pattern classification by distance functions - Minimum distance pattern classifier.

2. UNSUPERVISED CLASSIFICATION 9 0 0

Clustering for unsupervised learning and classification - Clustering concept - C-means algorithm - Hierarchical clustering procedures - Graph theoretic approach to pattern clustering - Validity of clustering solutions.

3. STRUCTURAL PATTERN RECOGNITION 9 0 0

Elements of formal grammars - String generation as pattern description - Recognition of syntactic description - Parsing - Stochastic grammars and applications - Graph based structural representation.

4. FEATURE EXTRACTION AND SELECTION 9 0 0

Entropy minimization - Karhunen - Loeve transformation - Feature selection through functions approximation - Binary feature selection.

5. RECENT ADVANCES 9 0 0

Neural network structures for Pattern Recognition - Neural network based Pattern associates – Unsupervised learning in neural Pattern Recognition - Self organizing networks - Fuzzy logic - Fuzzy pattern classifiers - Pattern classification using Genetic Algorithms.

References

- 1. Robert J.Schalkoff, Pattern Recognition : Statistical, Structural and Neural Approaches, John Wiley & Sons Inc., New York, 1992.**
- 2. Tou and Gonzales, Pattern Recognition Principles, Wesley Publication Company, London, 1974.**
- 3. Duda R.O., and Hart.P.E., Pattern Classification and Scene Analysis, Wiley, New York, 1973.**
- 4. Morton Nadier and Eric Smith P., Pattern Recognition Engineering, John Wiley & Sons, New York, 1993**

MCSE08	MULTIMEDIA SYSTEMS	3	0	0	3
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1. INTRODUCTION 9 0 0

Multimedia applications - System architecture - Objects of Multimedia Systems -Multimedia databases.

2. COMPRESSION AND FILE FORMATS 9 0 0

Types of compression - Image compression - CCITT - JPEG - Video image compression - MPEG-DVI Technology - Audio compression - RTF format - TIFF file format - RIFF file format - MIDI - JPEG DIB - TWAIN.

3. INPUT/OUTPUT TECHNOLOGIES 9 0 0

Traditional devices - Pen input - Video display systems - Scanners - Digital audio - Video images and animation.

4. STORAGE AND RETRIEVAL 9 0 0

Magnetic Media - RAID - Optical media - CD-ROM - WORM - Juke box - Cache management – DVD.

5. APPLICATION DESIGN 9 0 0

Application classes - Types of systems - Virtual reality design - Components - Databases - Authoring Systems - Hyper media - User interface design - Display/Playback issues - Hypermedia linking and embedding.

References

1. **Andleigh PK and Thakrar K, Multimedia Systems Design, Pearson Education, 2003**
2. **Vaughan T, Multimedia, Tata McGraw Hill, 1999.**
3. **Koegel Buford JFK, Multimedia Systems, Addison Wesley Longman, 1999.**
4. **Steinmetz, Multimedia: Computing, Communicatio and Application Pearson Education 1996**
5. **Rao, Bojkovic & Milovanovic, Multimedia Communication Systems: Techniques standards & Networks PHI 2003**

MCSE09	MOBILE COMMUNICATION	3	1	0	4
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1. INTRODUCTION **9 3 0**
Medium access control - Telecommunication systems - Satellite systems - Broadcast systems.

2. STANDARDS **9 3 0**
Wireless LAN - IEEE 802.11 - HIPERLAN - Bluetooth.

3. ADHOC NETWORKS **9 3 0**
Characteristics - Performance issues - Routing in mobile hosts.

4. NETWORK ISSUES **9 3 0**
Mobile IP - DHCP - Mobile transport layer - Indirect TCP - Snooping TCP - Mobile TCP - Transmission / time-out freezing - Selective retransmission - Transaction oriented TCP.

5. APPLICATION ISSUES **9 3 0**
Wireless application protocol - Dynamic DNS - File systems - Synchronization protocol - Context-aware applications - Security - Analysis of existing wireless network .

References

- 1. J. Schiller, Mobile Communications, Addison Wesley,2000.**
- 2. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley,1993.**

MCSE10	ADVANCED WEB TECHNOLOGY	3	1	0	4
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1. FUNDAMENTALS 9 3 0

Introduction to the web - Web- enabling Technologies - Web service Protocol - Web Design concepts - Examining good and bad web design - Page Design Resources.

2. SIMPLE DESIGN ISSUES 9 3 0

Page Design - HTML - Web page style considerations - Page composition - Type faces - Tag parameters - Color and graphics for web pages - WYSIWYG web page editor - Dreamweaver.

3. ADVANCE DESIGN ISSUED 9 3 0

Advanced Page design - tables and frames - preparing graphics and animations forms - cascading style sheets -user interface design - page grid - page templates - usability testing.

4. SCRIPTING IN DESIGN 9 3 0

Typography and Graphic design for the web - Creating transparent GIF - Lean graphics - Image maps – Palette map - Web programming - Web site Garage - W3C HTML validation services - Net mechanic - DHTML - XML.

5. TOOLS AND APPLICATIONS 9 3 0

Online Applications - Developing an on-line shopping application - Data Base design issues - connecting Data Base with tools such as Java, ASP.

References

1. Deitel and Deitel, Internet and World Wide Web how to program, Prentice Hall, 2000.
2. Bob Breed Love, Web Programming Unleashed, Sams net Publications, 1996. DHTML `O' Reiley Publications, 2000.
3. Goldfarb, The XML handbook 2nd Edition, Pearson Education 2000.
4. Hall, Core Web Programming 1st Edition, Pearson Education 1998.
5. Walther, Active Server Pages 2.0 Unleashed, Techmedia.

MCSE11	LEGACY SYSTEMS	3	1	0	4
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1. MVS/Z/OS, TSO, JCL **9 3 0**

MVS overview-Z/OS enhanced features over MVS-architectural summary-subsystems-TSO ISPF-JCL-Job entry subsystems-introduction of parameters and coding rules-JOB Statements-EXEC Statement, condition, disposition, DD Statements-DCB Parameters-Instream data-JCL procedures

2. VSAM **9 3 0**

Symbolic Names-SDSF-Utilities-System Abend Codes-Access Method Services-VSAM Concepts-VSAM Internal organization-VSAM Catalog Management-Generation Data Groups(GDG).

3. VS COBOL FOR OS/390 & Z /OS **9 3 0**

Introduction-Program Organization-COBOL DIVISIONS-Language Syntax-I/O and File handling-Environmental interconnectivity-with CICS,DB2,IMS etc-Compiling debugging and error codes

4. DB2 APPLICATION PROGRAMMING **9 3 0**

Relational DBMS-An introduction-Overview of DB/UDB7.1-DB2 Objects-Executing SQL form SPUFI/QMF-Coding SQL in host application languages-Coding dynamic SQL in host languages-Performance monitoring-DB2 utilities-DB2 with CICS-DB2 Connectivity with other DBMS.

5. CICS **9 3 0**

CICS Concepts-An introduction-Batch vs Online processing-CICS components for interconnectivity-Application programming-MAPS and displays-File handling-CICS Queuing Facilities-CICS-Debugging Techniques-Program Control

Note: Course Materials to be Provided by Industry Partners.

MCSE12	PARALLEL COMPUTERS AND ALGORITHMS	3	0	0	3
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1. INTRODUCTION 6 0 0

Fundamentals – Data parallelism – Shared variable – Generation communication – Message passing

2. MULTIPROCESSOR ARCHITECTURE 10 0 0

Computational demand of modern science – Advent of Parallel processing - Parallel processing Terminology – PRAM Algorithms – PRAM Model of Parallel Computation – Reducing the number of processors – Problem Defying Fast Solution on PRAMS – Processor Arrays – Multiprocessors – Multi computers – Fylnns’ Taxonomy

3. PARALLEL PROCESSOR 10 0 0

Parallel programming languages – Programming parallel processes – C* - SEQUENIC – nCUBE C, OCCAM, C_LINDA

4. ALGORITHM 10 0 0

Elementary parallel Algorithms – Matrix Multiplication – Fast Fourier Transform – Sorting – Dictionary Operation – Graph Algorithm – Combinational Search

5. CASE STUDIES 9 0 0

Overview & Main Features of EVAL – Syntax Description – Operations & Expressions – Modules – Substitutes

References

1. Vipin Kumar , An Introduction to Parallel Computing: Design and Analysis of Algorithms 2nd Edition Pearson Education 2002.
2. Kai Hwang, Advanced Computer Architecture, TMH 2003.
3. Wilkinson, Parallel Programming, Pearson Education 1999.
4. Parallel Computing Theory and Practice, Michael J Quinn, McGraw Hill

MCSE13	NETWORK SECURITY	3	1	0	4
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1. INTRODUCTION	9 3 0
Attacks - Services - Mechanisms - Conventional Encryption - Classical and Modern Techniques – Encryption Algorithms - Confidentiality.	
2. PUBLIC KEY ENCRYPTION	9 3 0
RSA - Elliptic Curve Cryptography - Number Theory Concepts	
3. MESSAGE AUTHENTICATION	9 3 0
Hash Functions - Digest Functions - Digital Signatures - Authentication protocols.	
4. NETWORK SECURITY PRACTICE	9 3 0
Authentication, Applications - Electronic Mail Security - IP Security - Web Security.	
5. SYSTEM SECURITY	9 3 0
Intruders - FireWalls - Current Standards.	

References

1. Stallings, *Cyptography & Network Security - Principles & Practice*, Pearson Education, 1999.
2. Bruce, Schneier, *Applied Cryptography*, 2nd Edition, Toha Wiley & Sons, 1996.
3. Wadlow, *The Process of Network Security*, Pearson Education 2000.
4. Charles P. Pfleeger, *Security in Computing*, Pearson Education 1997.

MCSE14	HIGH SPEED NETWORKS	3	1	0	4
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1. NETWORK EVOLUTION AND CONCEPTS 9 3 0

Local area networks - Metropolitan area networks - Wide area networks - multimedia communication - basic concepts - comparison between traditional and multimedia communications - transmission rates comparison

2. TRADITIONAL NETWORKS 9 3 0

Suitability issue of transforming multimedia data - Ethernet - switched Ethernet - priority Ethernet - Token ring - priority Token ring- FDDI - ISDN - Information superhighway - Internet - repeaters - bridges - router - gateways

3. HIGH SPEED NETWORKS 9 3 0

Components of multimedia networks - multimedia network protocols - multimedia information loading - ATM networks - ATM cells - ATM protocols resource allocation mechanism

4. MULTIMEDIA NETWORK CONTROL TECHNIQUES 9 3 0

Multimedia traffic requirements - performance of network carrying video traffic- quality requirements and measures - frame size - frame depth - compression ratio - multimedia network management protocols - reliability issues.

5. SONET 9 3 0

SONET - switching technologies for multimedia communications - wireless access.

References

1. Halsall, **Data Communications Computer Networks and Operating Systems**, Pearson Education
2. Borko Furht, **"Multimedia systems and techniques"**, Kluwer Academic publishers, 1996
3. Nalin K. Sarda, **Multimedia Information & Networking 1st Edition** Pearson Education 1999.
4. Wolf Gary Effelsberg, Otto Spaniol, Andre D., **"High speed networking for multimedia applications"** , Kluwer Academic publishers, 1996
5. Larry L.Ball, **"Multimedia network integration and management"**, McGraw-Hill, 1996
6. Andrew S.Tanenbaum, **"Computer Networks"** , 3/E, Prentice Hall, 1996

MCSE15	OBJECT ORIENTED ANALYSIS AND DESIGN	3	0	0	3
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1. OBJECT ORIENTED DESIGN PRINCIPLES 9 0 0

The Object model – Classes and objects – Complexity – Classification – Notation – Process – Pragmatics – Binary and entity relationship – Object types – Object state – OOAD life cycle

2. OBJECT ORIENTED ANALYSIS 9 0 0

Overview of Object Oriented Analysis – Shaler/Mellor, Coad/Yourdan, Rambaug, Booch – UML – Usecases – Conceptual model – Behavior analysis – Overview of diagrams – Aggregation.

3. OBJECT ORIENTED DESIGN METHODS 9 0 0

UML – Diagrams – Collaborations – Sequence – Class – Design patterns and frameworks – Comparisons with other design methods.

4. MANAGING OBJECT ORIENTED DEVELOPMENT 9 0 0

Managing analysis and design – Evaluation – Testing – Coding – Maintenance - Metrics

5. CASE STUDIES IN OBJECT ORIENTED DEVELOPMENT 9 0 0

Design of foundation class libraries – Object Oriented Databases – Client/Server computing – Middleware

References:

1. Craig Larman, “Applying UML and Patterns”, Addison Wisley, 2000
2. Grady Booch, James Rambaug, Ivar Jacobson , “The Unified Modeling Language User guide”, Addison Wisley 1999
3. Ali Bahrami, “Object Oriented System Development”, McGraw Hill International Edition 1999
4. Fowler, “Analysis Patterns”, Addison Wisley, 1994
5. Erich Gamma, “Design Patterns”, Addison Wisley, 1994

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MCSE16	EMBEDDED SYSTEM	3	0	0	3
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1. OVERVIEW **9 0 0**

Overview of embedded systems, Design challenge, Processor technology , IC technology, Design technology- Custom-Single purpose processors: Custom single purpose processor design, optimizing custom single processors, Basic architecture, operation, programmers view, development environment, Application specific instruction set processors, selecting a microprocessor

2. STANDARD SINGLE-PURPOSE PROCESSORS **9 0 0**

peripherals Timers, counters, watchdog timers, UART ,Pulse width modulator, LCD controller, Keypad controller, ADC, Real time clocks

3. MEMORY **9 0 0**

Memory write ability and storage performance, Common memory types, composing memories, memory hierarchy and cache, advanced RAM: DRAM, FPM DRAM, EDO DRAM, SDRAM, RDRAM, Memory management Unit

4. INTERFACING **9 0 0**

Arbitration, Muti-level bus architectures, Serial protocols: I2C bus, CAN bus, Fire Wire bus, USAB, Parallel protocols :PCI and ARM bus, Wireless Protocols: IrdA, Bluetooth,IEEE802.11

5. CASE STUDIES **9 0 0**

Digital Camera: Case study of embedded system - Brief study State Machine and Concurrent Process Models - Control systems: Open loop and closed loop systems, General control systems and PID controllers, Fuzzy control, Practical issues related to computer based control, Benefits of computer based control implementations

Reference

1. Frank Vahid and Tony Givargis, Embedded System Design: A Unified Hardware and Software Introduction, Wiley 2001
2. Mazidi, The 8051 Microcontrollers & Embedded Systems, Pearson Education 2003.
3. Janathan W. Valvano, Embedded Microcomputer Systems: Real-time Interfacing, Thomson Learning 2003.

MCSE17	E-COMMERCE	3	0	0	3
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1. INTRODUCTION 9 0 0

Infrastructure for Electronic Commerce - Networks - Packet Switched Networks -

TCP/IP Internet protocol - Domain name Services - Web Service Protocols - Internet

applications - Utility programs – Markup Languages - Web Clients and Servers -

Intranets and Extranets - Virtual private Network.

2. CORE TECHNOLOGY 9 0 0

Electronic Commerce Models - Shopping Cart Technology - Data Mining - Intelligent

Agents – Internet Marketing - XML and E-Commerce.

3. ELECTRONIC PAYMENT SYSTEMS 9 0 0

Real world Payment Systems - Electronic Funds Transfer - Digital Payment -Internet

Payment Systems - Micro Payments - Credit Card Transactions - Case Studies.

4. SECURITY 9 0 0

Threats to Network Security - Public Key Cryptography - Secured Sockets Layer -

Secure Electronic Transaction - Network Security Solutions - Firewalls.

5. INTER/INTRA ORGANIZATIONS ELECTRONIC COMMERCE 9 0 0

EDI - EDI application in business - legal, Security and Privacy issues - EDI and

Electronic commerce - Standards - Internal Information Systems - Macro forces - Internal

commerce - Workflow Automation and Coordination - Customization and Internal

commerce - Supply chain Management.

References:

- 1. Ravi Kalakota and Andrew B Whinston , Frontiers of Electronic commerce, AddisonWesley, 1996**

- 2. Pete Loshin, Paul A Murphy , Electronic Commerce, II Edition , Jaico Publishers 1996.**
- 3. David Whiteley, e - Commerce : Strategy, Technologies and Applications - McGraw Hill , 2000.**

MCSE18	DATA-MINING AND DATA-WAREHOUSING	3	0	0	3
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1. INTRODUCTION 9 0 0
Relation to statistics, databases, machine learning - Taxonomy of data mining tasks - Steps in data mining process - Overview of data mining techniques.

2. VISUALIZATION AND STATISTICAL PERSPECTIVES 9 0 0
Visualization - Dimension reduction techniques - Data summarization methods -
Statistical Perspective - Probabilistic - Deterministic models - Clustering - Regression
analysis - Time series analysis – Bayesian learning.

3. PREDICTIVE MODELING 9 0 0
Predictive Modeling - Classification - Decision trees - Patterns - Association rules -
Algorithms.

4. DATA WAREHOUSING 9 0 0
Design - Dimensional Modeling - Meta data - Performance issues and indexing -VLDB
issues – Development life cycle - Merits.

5. APPLICATIONS 9 0 0
Tools - Applications - Case Studies.

References

1. **Usama M.Fayyad, Geogory Piatetsky - Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, "Advances in Knowledge Discovery and Data Mining", The M.I.T Press, 1996.**
2. **Jiawei Han, Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kauffmann Publishers,2000.**
3. **Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.**
4. **Sean Kelly, "Data Warehousing in Action", John Wiley & Sons Inc., 1997.**

MCSE19	WEB SERVICES	3	1	0	4
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1. WEB SERVICES CONCEPTS- XML SCHEMA BASIC 9 3 0

Introduction to Web services, Benefits of Web services, How Web services work
 Understanding XML Schema – Basic. Elements and attributes, Complex types and simple types Occurrence constraints, Element groups, nil values.

2. UNDERSTANDING TO XML SCHEMA – ADVANCED 9 3 0

Namespaces, Qualification, Global declarations, Modular schemas, Extensions and restrictions, Substitution groups, importing types.

3. UNDERSTANDING WEB SERVICES STANDARDS 9 3 0

Understanding Soap (Simple Object Access Protocol) SOAP and XML, SOAP messages, SOAP message exchange model, SOAP encoding and XML schemas, SOAP data types, SOAP transports.

4. UNDERSTANDING WSDL (WEB SERVICES DESCRIPTION LANGUAGE) 9 3 0

Describing Web services, WSDL anatomy, Defining data types and messages, defining a Web service interface, defining a Web service implementation, Message patterns.

5. UNDERSTANDING UDDI (UNIVERSAL DIRECTORY AND DISCOVERY INTERFACE) 9 3 0

UDDI registries, UDDI publish Interface, UDDI inquiry Interface, Using UDDI and WSDL together.

References:

1. Keith Ballinger, .NET web services Architecture & Implementation, Pearson Education 2003.
2. Deital & Deital, C# How to Program, Pearson Education 2002.
3. Pardi, XML in Action: Web Technology, PHI 2002

MCSE20	CLIENT SERVER COMPUTING	3	0	0	3
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1. INTRODUCTION TO CLIENT/SERVER

Necessity for Client/Server computing – Components of Client/Server – Benefits of Client/Server - Client/Server models – Planning for Client/Server – Technical planning.

2. MIGRATING TO CLIENT/SERVER

Impact of Client/Server – Hardware – Technology – Software – Database management system – Data warehousing.

3. NETWORKING

The basics – System and Network management – middleware – communication – essential techniques.

4. CASE TOOLS

Using CASE Tools – Benefits of CASE – Other functions – Workflow – Database Design – Object Oriented Development.

5. APPLICATION DEVELOPMENT

Events – Domain – Application Models – GUI Development – Upgrading to Client/Server – Performance tuning and Optimization.

References:

- 1. Jenkins et al., “Client/Server Unleashed” Techmedia, SAMS Publishing 2001**
- 2. Roger Fournier, A Methodology for Client/Server and Web Application Development, Prentice Hall 1999.**
- 3. David Ruble, Practical Analysis & Design for Client/Server & GUI Systems, Prentice Hall 1997.**