

Dr. A. P. J. Abdul Kalam Technical University, Lucknow
Study and Evaluation Scheme
MCA DUAL DEGREE
 (Effective from session 2016-17)
Year-IV Semester-VII

S. No.	Course Code	Subject	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CT	TA	Total		
1	NBC-701	.NET FRAMEWORK & C#	3	1	0	30	20	50	100	150
2	NBC-702	COMPUTER GRAPHICS	3	1	0	30	20	50	100	150
3	NBC-703	COMPUTER BASED OPTIMIZATION TECHNIQUES	3	1	0	30	20	50	100	150
4	NBC-704	SYSTEM ANALYSIS AND DESIGN	3	1	0	30	20	50	100	150
5	NBC-705	E-BUSINESS STRATEGIES	3	1	0	30	20	50	100	150
Practicals										
6	NBC-751	.NET-LAB	0	0	3	30	20	50	50	100
7	NBC-752	COMPUTER GRAPHICS-LAB	0	0	3	30	20	50	50	100
8	NGP-701	General Proficiency	0	0	0	-	-	50		50
		Total	15	5	6					1000

Year-IV Semester-VIII

S. No.	Course Code	Subject	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CT	TA	Total		
1	NBC-801	WEB TECHNOLOGY	3	1	0	30	20	50	100	150
2	NBC-802	SOFT COMPUTING	3	1	0	30	20	50	100	150
3	NBC-803	GRAPH THEORY	3	1	0	30	20	50	100	150
4	NBC-804	NEURAL NETWORK	3	1	0	30	20	50	100	150
5	NBC-805	ELECTIVE-I	3	1	0	30	20	50	100	150
Practicals										
6	NBC-851	WEB TECHNOLOGY-LAB	0	0	3	30	20	50	50	100
7	NBC-852	MINI PROJECT	0	0	3	30	20	50	50	100
8	NGP-801	General Proficiency	0	0	0	-	-	50	-	50
		Total	15	5	6	-	-	-	-	1000

ELECTIVE-I

- 8051. COMPLEXITY THEORY
- 8052. ADVANCED DBMS
- 8053. DATA COMPRESSION
- 8054. EMBEDDED SYSTEM
- 8055. COMPUTER ARCHITECTURE

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Study and Evaluation Scheme
MCA DUAL DEGREE
(Effective from session 2016-17)
Year-V Semester-IX

S. No.	Course Code	Subject	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CT	TA	Total		
1	NBC-901	DIGITAL IMAGE PROCESSING	3	1	0	30	20	50	100	150
2	NBC-902	MULTIMEDIA & ANIMATION	3	1	0	30	20	50	100	150
3	NBC-903	MODELING & SIMULATION	3	1	0	30	20	50	100	150
4	NBC-904	ELECTIVE-II	3	1	0	30	20	50	100	150
5	NBC-905	ELECTIVE-III	3	1	0	30	20	50	100	150
Practicals										
6	NBC-951	DIGITAL IMAGE PROCESSING-LAB	0	0	3	30	20	50	50	100
7	NBC-952	MULTIMEDIA & ANIMATION-LAB	0	0	3	30	20	50	50	100
8	NGP-901	General Proficiency	0	0	0	-	-	50	-	50
		Total	15	5	6	-	-	-	-	1000

ELECTIVE-II

- 9041. COMPILER DESIGN
- 9042. CLIENT SERVER COMPUTING
- 9043. DISTRIBUTED SYSTEM
- 9044. REAL TIME SYSTEM
- 9045. DISTRIBUTED DATABASE

ELECTIVE-III

- 9051. CLOUD COMPUTING
- 9052. CLUSTER COMPUTING
- 9053. ENTERPRISES RESOURCE PLANNING
- 9054. PATTERN RECOGNITION
- 9055. QUANTUM COMPUTING

Year-V Semester-X

S. No.	Course Code	Subject	Periods			Evaluation Scheme				Total
						Sessional Exam			Exam	
			L	T	P	CT	TA	Total		
1	NBC-1001	COLLOQUIUM	0	0	2		200	200		200
2	NBC-1002	PROJECT	0	0	24		300	300	500	800

Semester VII

NBC-701 : .Net Framework and C#

Unit-1

The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In-Time Compilation, Framework Base Classes.

Unit-II

C-Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array and Strings, Object and Classes, Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events. Type conversion.

Unit-III

C# Using Libraries: Namespace- System, Input-Output, Multi-Threading, Networking and sockets, Managing Console I/O Operations, Windows Forms, Error Handling.

Unit-IV

Advanced Features Using C#: Web Services, Window Services, Asp.net Web Form Controls, ADO.Net. Distributed Application in C#, Unsafe Mode, Graphical Device interface with C#.

Unit-V

.Net Assemblies and Attribute: .Net Assemblies features and structure, private and share assemblies, Built-In attribute and custom attribute. Introduction about generic.

References

1. Wiley, "Beginning Visual C# 2008", Wrox
2. Fergal Grimes, "Microsoft .Net for Programmers". (SPI)
3. Balagurusamy, "Programming with C#", (TMH)
4. Mark Michaelis, "Essential C# 3.0: For .NET Framework 3.5, 2/e, Pearson Education
5. Shibi Parikkar, "C# with .Net Frame Work", Firewall Media.

NBC-702 : COMPUTER GRAPHICS

Unit – I

Introduction and Line Generation: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid point circle generating algorithm, and parallel version of these algorithms.

Unit – II

Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing.

Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non rectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit – III

Three Dimensional: 3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Unit – IV

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surfaces.

Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models– Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

References :

1. Donald Hearn and M Pauline Baker, "Computer Graphics C Version", Pearson Education
2. Amrendra N Sinha and Arun D Udai, "Computer Graphics", Tata MCGraw Hill.
3. Donald Hearn and M Pauline Baker, "Computer Graphics with OpenGL", Pearson education
4. R.K. Maurya, "Computer Graphics" Wiley Dreamtech Publication.
5. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
6. Mukherjee, Fundamentals of Computer graphics & Multimedia, PHI Learning Private Limited, Delhi India.
7. Foley, Vandam, Feiner, Hughes – "Computer Graphics principle", Pearson Education.
8. W. M. Newman, R. F. Sproull – "Principles of Interactive computer Graphics" – Tata MCGraw Hill.

NBC-703 : COMPUTER BASED OPTIMIZATION TECHNIQUES

Unit I

Preliminaries: Inventory Models and Replacement problems: Inventory models –various costs-deterministic inventory models, Single period inventory model with shortest cost, stochastic models, Application of inventory models, Economic lot sizes-price breaks, Replacement problems-capital equipment-discounting costs-replacement in anticipation of failure-group replacement-stochastic nature underlying the failure phenomenon.

Unit II

Linear Programming Problems (LPP): Definition of LPP, Graphical Solutions of Linear Programming Problems, Simplex Method, and Artificial Variable Method, Two Phase Method, Charnes' Big-M Method, Sensitivity Analysis, Revised Simplex Method, Duality, Dual Simplex Method

Unit III

Integer Linear Programming Problems: Integer Linear Programming Problems, Mixed

Integer Linear Programming Problems, Cutting Plane Method, Branch and Bound Method, 0-1 integer linear programming problem.

Transportation Problems: Introduction to Transportation Model, Matrix Form of TP, Applications of TP Models, Basic Feasible Solution of a TP, Degeneracy in TP, Formation of Loops in TP, Solution Techniques of TP, Different Methods for Obtaining Initial Basic Feasible Solutions viz. Matrix Minima Method, Row Minima Method, Column Minima Methods, Vogel's Approximation Method, Techniques for Obtaining Optimal Basic Feasible Solution.

Assignment Problems: Definition, Hungarian Method for AP.

Unit IV

Introduction to NLP: Definition of NLP, Convex Programming Problems, Quadratic Programming Problems, Wolfe's Method for Quadratic Programming, Kuhn-Tucker Conditions, Geometrical Interpretation of KT-Conditions, KT-Points etc.

Dynamic Programming: Bellman's Principle of optimality of Dynamic Programming, Multistage decision problem and its solution by Dynamic Programming with finite number of stages, Solution of linear programming problems as a Dynamic Programming problem

Unit V

Queuing Theory Introduction to Queues, Basic Elements of Queuing Models, Queue Disciplines, Memoryless Distribution, Role of Exponential and Poisson Distributions, Markovian Process, Erlang Distribution, Symbols and Notations, Distribution Of Arrivals, Distribution of Service Times, Definition of Steady and Transient State, Poisson Queues.

References:

1. Hadley, G., "Linear Programming, and Massachusetts", Addison-Wesley .
2. Taha, H.A., "Operations Research – An Introduction", Macmillian
3. Hiller, F.S., G.J. Lieberman, " Introduction to Operations Research", Holden-Day.
4. Harvey M. Wagner, "Principles of Operations Research with Applications to Managerial Decisions", Prentice Hall of India Pvt. Ltd.
5. Swarup K, "Operation Research", S. Chand New Delhi.

NBC-704 : System Analysis and Design

Unit – I

System Concepts and Information Systems Environment: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

Unit – II

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, The War Effort, What Does it take to do System Analysis, Academic & Personal Qualifications, The Multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

Unit – III

Systems Planning & Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Unit – IV

Information Gathering: What Kind of Information do we need? Information about the firms, Information gathering tools, The art of Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Unit – V

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements of form Design.

H/W / S/W Selection and Maintenance: The Computer Industry, S/W Industry, a Procedure for H/W / S/W Selection, Major Phases in Selection, Criteria for S/W Selection, The Used Computer, The Computer Contract.

References

1. Elias M.Awad, "Systems Analysis & Design", Galgotia Publication.
2. Hoffer, "Modern Systems Analysis & Design", Addison Wesley.
3. Kendall, "Introduction to System Analysis & Design", McGraw Hill.

NBC-705 : E-Business Strategies

UNIT I Electronic Commerce Environment and Opportunities: Background – The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview – Electronic Data Interchange – Migration to Open EDI – Electronic Commerce with WWW/Internet – Commerce Net Advocacy – Web Commerce going forward.

UNIT II Approaches to Safe Electronic Commerce: Overview – Secure Transport Protocols – Secure Transactions – Secure Electronic Payment Protocol(SEPP) – Secure Electronic Transaction (SET)- Certificates for Authentication – Security on Web Servers and Enterprise Networks – Electronic cash and Electronic payment schemes: Internet Monetary payment and security requirements – payment and purchase order process - Online Electronic cash.

UNIT III Internet/Intranet Security Issues and Solutions: The need for Computer Security – Specific Intruder Approaches – Security strategies – Security tools – Encryption – Enterprise Networking and Access to the Internet – Antivirus programs – Security Teams.

UNIT IV MasterCard/Visa Secure Electronic Transaction: Introduction – Business Requirements – Concepts – Payment processing – E-mail and secure e-mail technologies for electronic commerce. Introduction – The Mean of Distribution – A model for message handling – Working of Email - MIME: Multipurpose Internet Mail Extensions – S/MIME: Secure

Multipurpose Internet Mail Extensions – MOSS: Message Object Security Services.

UNIT V Internet and Website Establishment: Introduction – Technologies for web servers – Internet tools relevant to Commerce – Internet Applications for Commerce – Internet charges – Internet Access and Architecture – Searching the Internet- Case study.

TEXT BOOK 1. Daniel Minoli and Emma Minoli, "Web Commerce Technology Handbook", Tata McGraw-Hill, 2005.

REFERENCES 1. Andrew B. Whinston, Ravi Kalakota, K. Bajaj and D. Nag, "Frontiers of Electronic Commerce", Tata McGraw-Hill, 2004.

2. Bruce C. Brown, "How to Use the Internet to Advertise, Promote and Market Your Business or Website with Little or No Money", Atlantic Publishing Company, 2006.

Semester VIII

NBC-801 : Web Technology

UNIT I. Introduction:

Introduction and Web Development Strategies, History of Web and Internet, Protocols governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing.

Core Java: Introduction, Operator, Data type, Variable, Arrays, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Event handling, Introduction to AWT, AWT controls, Layout managers.

UNIT II. Web Page Designing:

HTML: list, table, images, frames, forms, CSS, Document type definition, XML: DTD, XML schemes, Object Models, presenting and using XML, Using XML Processors: DOM and SAX, Dynamic HTML.

UNIT III. Scripting:

Java script: Introduction, documents, forms, statements, functions, objects; introduction to AJAX, VB Script, Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API.

UNIT IV. Server Site Programming:

Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP, Introduction to Servlets, Lifecycle, JSDK, Servlet API, Servlet Packages, Introduction to COM/DCOM/CORBA.

UNIT V. PHP (Hypertext Preprocessor):

Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC,

Text books:

1. Burdman, Jessica, "Collaborative Web Development" Addison Wesley
2. Xavier, C, " Web Technology and Design" , New Age International
3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
4. Bhave, "Programming with Java", Pearson Education
5. Herbert Schildt, "The Complete Reference:Java", TMH. 6. Hans Bergsten, "Java Server Pages", SPD O'Reilly
6. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education
7. Margaret Levine Young, "The Complete Reference Internet", TMH
8. Naughton, Schildt, "The Complete Reference JAVA2", TMH
9. Balagurusamy E, "Programming in JAVA", TMH

References:

1. Ramesh Bangia, "Internet and Web Design" , New Age International
2. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
3. Deitel, "Java for programmers", Pearson Education
4. Chris Bates, "Web Programing Building Internet Applications", 2nd Edition, WILEY, Dreamtech
5. Joel Sklar , "Principal of web Design" Vikash and Thomas Learning
6. Horstmann, "CoreJava", Addison Wesley

NBC-802 : SOFT COMPUTING

Unit –I

Introduction to soft computing. Applications of Artificial Neural Networks, fuzzy logic, genetic algorithms and other soft-computing techniques. Their strengths and weaknesses. Synergy of soft computing techniques.

Artificial neural networks : over view of history, Mathematical Models of Neurons, ANN architecture.

Unit-II

Introduction to artificial neural network; Neural Networks: Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Competitive learning networks, Kohonen self organizing networks, Hebbian learning; Hopfield Networks,

Unit-III

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit - IV

Genetic algorithms(Gas), Evolution strategies(Ess), Evolutionary programming(EP), Genetic Programming(GP), Selecting, crossover, mutation, schema analysis, analysis of selection algorithms; convergence; Markov & other stochastic models.

Unit - V

Other Soft computing approaches Simulated Annealing, Tabu Search, Ant colony based optimisation, etc.

Reference:

1. "Introduction to the Theory of Neural Computation", Hertz J. Krogh, R.G. Palmer, Addison- Wesley, California, 1991.
2. "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
3. "Neural Networks: Algorithms, Applications and Programming Techniques", Freeman J.A. & D.M. Skapura, AddisonWesley, Reading, Mass, (1992).

NBC-803 : GRAPH THEORY

Unit 1

Graphs, sub-graphs, some basic properties, Walks, Path & circuits, Connected graphs, Disconnected graphs and component, Euler and Hamiltonian graphs, The traveling sales man problem, Various operation on graphs.

Unit II

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and dijkstra Algorithms.

Cut-sets and cut vertices, some properties, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and seperability, Network flows, mincut theorem, Planar graphs, Combinatorial and geometric dual, Kuratowski to graph detection of planarity, Geometric dual, Some more criterion of planarity, Thickness and Crossings.

Unit III

Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set verses subspaces, orthogonal vectors and subspaces, incidence matrix of graph, sub matrices of $A(G)$, circuit matrix, cut set matrix, path matrix and relationships among A_f , B_f , and C_f , fundamental circuit matrix and rank of B , adjacency matrices, rank-nullity theorem .

Unit IV

Coloring and covering partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Matching, covering, Four color problem.

Unit V

Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Trees with directed edges, Fundamental circuit in digraph, Matrices A , B , C of digraph adjacency matrix of digraph, Enumeration and its types, Counting of labeled and unlabeled trees, Polya's theorem, Graph enumeration with polyas theorem, Graph theoretic algorithm.

References

3. Joshi K. D., "Fundamental of discrete mathematics", New Age International
4. John Truss, "Discrete mathematics for computer scientist"
5. C. L. Liu, "Discrete mathematics"

NBC-804 : Neural Networks

Unit-I:

Neurocomputing and Neuroscience

Historical notes, human Brain, neuron Mode I, Knowledge representation, AI and NN. Learning process: Supervised and unsupervised learning, Error correction learning, competitive learning, adaptation, statistical nature of the learning process.

Unit-II:

Data processing

Scaling, normalization, Transformation (FT/FFT), principal component analysis, regression, covariance matrix, eigen values & eigen vectors. Basic Models of Artificial neurons, activation Functions, aggregation function, single neuron computation, multilayer perceptron, least mean square algorithm, gradient descent rule, nonlinearly separable problems and bench mark problems in NN.

Unit-III

Multilayered network architecture, back propagation algorithm, heuristics for making BPalgorithm performs better. Accelerated learning BP (like recursive least square, quick prop, RPROP algorithm), approximation properties of RBF networks and comparison with multilayer perceptron.

Unit-IV

Recurrent network and temporal feed-forward network, implementation with BP, self organizing map and SOM algorithm, properties of feature map and computer simulation. Principal component and Independent component analysis, application to image and signal processing.

Unit-V

Complex valued NN and complex valued BP, analyticity of activation function, application in 2D information processing. Complexity analysis of network models. Soft computing. Neuro-Fuzzy-genetic algorithm Integration.

References:

1. J.A. Anderson, An Introduction to Neural Networks, MIT
2. Hagen Demuth Beale, Neural Network Design, Cengage Learning
3. R.L. Harvey, Neural Network Principles, PHI
4. Kosko, Neural Network and Fuzzy Sets, PHI

ELECTIVE-I

NBC-8051 : Complexity Theory

UNIT I : Models of Computation, resources (time and space), algorithms, computability, complexity.

UNIT II : Complexity classes, P/NP/PSPACE, reductions, hardness, completeness, hierarchy, relationships between complexity classes.

UNIT III : Randomized computation and complexity; Logical characterizations, incompleteness; Approximability.

UNIT IV : Circuit complexity, lower bounds; Parallel computation and complexity; Counting problems; Interactive proofs.

UNIT V : Probabilistically checkable proofs; Communication complexity; Quantum computation

Textbooks:

1. Christos H. Papadimitriou., Combinatorial Optimization: Algorithms and Complexity , Prentice-Hall
2. Sanjeev Arora and Boaz Barak , Complexity Theory: A Modern Approach, Cambridge University Press
3. Steven Homer , Alan L. Selman , Computability and Complexity Theory , Springer

NBC-8052 : Advanced DBMS

UNIT I: Transaction and schedules, Concurrent Execution of transaction, Conflict and View Serializability, Testing for Serializability, Concepts in Recoverable and Cascadeless schedules.

UNIT II: Lock based protocols, time stamp based protocols, Multiple Granularity and Multiversion Techniques, Enforcing serializability by Locks, Locking system with multiple lock modes, architecture for Locking scheduler

UNIT III: Distributed Transactions Management, Data Distribution, fragmentation and Replication

Techniques, Distributed Commit, Distributed Locking schemes, Long duration transactions, Moss Concurrency protocol.

UNIT IV: Issues of Recovery and atomicity in Distributed Databases, Traditional recovery techniques, Log based recovery, Recovery with Concurrent Transactions, Recovery in Message passing systems, Checkpoints, Algorithms for recovery line, Concepts in Orphan and Inconsistent Messages.

UNIT V: Distributed Query Processing, Multiway Joins, Semi joins, Cost based query optimization for distributed database, Updating replicated data, protocols for Distributed Deadlock Detection, Eager and Lazy Replication Techniques

Text Books:

1. Silberschatz, Korth and Sudershan, Database System Concept', Mc Graw Hill
2. Ramakrishna and Gehrke, ' Database Management System, Mc Graw Hill

References:

1. Garcia-Molina, Ullman, Widom, ' Database System Implementation' Pearson Education
2. Ceei and Pelagatti, 'Distributed Database', TMH
3. Singhal and Shivratri, 'Advance Concepts in Operating Systems' MC Graw Hill

NBC-8053 : DATA COMPRESSION

Unit - I:

Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

Unit – II:

The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.

Unit-III:

Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markov Compression.

Unit – IV:

Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

Unit-V:

Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers. Structured Vector Quantizers.

Text Books:

1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers
2. Elements of Data Compression, Drozdek, Cengage Learning
3. Introduction to Data Compression, Second Edition, Khalid Sayood, The Morgan Kaufmann Series
4. Data Compression: The Complete Reference 4th Edition by David Salomon, Springer
5. Text Compression 1st Edition by Timothy C. Bell Prentice Hall.

NBC-8054 : EMBEDDED SYSTEMS

Unit-I

Introduction to embedded systems: Classification, Characteristics and requirements, Applications

Unit-II

Timing and clocks in Embedded systems, Task Modeling and management, Real time operating system issues.

Unit-III

Signals, frequency spectrum and sampling, digitization (ADC, DAC), Signal Conditioning and Processing. Modeling and Characterization of Embedded Computation System.

Unit-IV

Embedded Control and Control Hierarchy, Communication strategies for embedded systems: Encoding and Flow control.

Unit-V

Fault-Tolerance, Formal Verification, Trends in Embedded Processor, OS, Development Language

References:

1. Prasad, Embedded /Real Time System, Concept, Design and Programming Black Book, Wiley India
2. H. Kopetz, "Real-Time Systems", Kluwer
3. R. Gupta, "Co-synthesis of Hardware and Software for Embedded Systems", Kluwer
4. Shibu K.V., "Introduction to Embedded Systems", TMH
5. Marwedel, "Embedded System Design", Springer

NBC-8055 : Computer Architecture

UNIT I Introduction: Digital computer generation, computer types and classifications, functional units and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer.

Central Processing Unit: Addition and subtraction of signed numbers, look ahead carry adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation Processor organization, general register organization, stack organization and addressing modes.

UNIT II Control Unit: Instruction types, formats, instruction cycles and subcycles (fetch and execute etc), micro-operations, execution of a complete instruction. Hardwire and microprogrammed control: microprogramme sequencing, wide branch addressing, microinstruction with next address field, pre-fetching microinstructions, concept of horizontal and vertical microprogramming.

UNIT III Memory: Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories. Cache memories: concept and design issues performance, address mapping and replacement) Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.

UNIT IV Input / Output: Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors.

Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.

TEXT BOOK:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.

REFERENCE BOOKS:-

1. Patterson, Computer Organisation and Design, Elsevier Pub. 2009
 2. Vravice, Hamacher & Zaky, "Computer Organization", TMH
 3. Mano, "Computer System Architecture", PHI
 4. John P Hays, "Computer Organization", McGraw Hill
 5. Tannenbaum, "Structured Computer Organization", PHI .
- P Palchaudhry, 'Computer Organization & Design', PHI

Semester IX**NBC-901 : Digital Image Processing****UNIT-I****Introduction and Fundamentals**

Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Image Enhancement in Frequency Domain

Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Lowpass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

UNIT-II**Image Enhancement in Spatial Domain**

Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT-III**Image Restoration**

A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-IV**Morphological Image Processing**

Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT-V Registration

Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation

Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

Text Books:

1. Digital Image Processing 2nd Edition, Rafael C. Gonzales and Richard E. Woods. Published by: Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle
4. Sonka, Digital Image Processing and Computer Vision, Cengage Learning
5. Gonzalez and Woods, Digital Image Processing, Addison Wesley.

NBC-902 : MULTIMEDIA AND ANIMATION

Unit I – Introduction:

Introduction to Multimedia and animation, Multimedia Systems, Design Fundamentals, Elements of multimedia and animation and their use, Back ground of Art, Color theory overview, Sketching & illustration, Storyboarding, different tools for animation .

Unit- 2 – Multimedia Projects:

Multimedia Skills, Hardware, Use of Graphics in Multimedia, Overview of Vector and Raster Graphics, Basic software tools, Multimedia Authoring Tools, Planning and Costing, Designing and Producing, Contents and talent, Delivering, Enhancing and Testing Multimedia Projects.

Unit-3 – Tools of Multimedia:

Paint and Draw Applications, Graphic effects and techniques, Image File Format, Anti-aliasing, Morphing, Multimedia Authoring tools, professional development tools.

Unit-4 - Animation:

Introduction and Principles of Animations, Power of Motion, Animation Techniques, Animation File Format, Making animation for Rolling Ball, making animation for a Bouncing Ball, Animation for the web, GIF, Plugins and Players, Animation tools for World Wide Web.

References:

1. Tay Vaughan, “Multimedia, Making IT Work”, Tata McGraw Hill.
2. Buford, “Multimedia Systems”, Addison Wesley.
3. Sleinreitz, “Multimedia System”, Addison Wesley.
4. Ze-Nian Li and Mark S. Drew, “Fundamentals of Multimedia”, Pearson Education.
5. Prabhat K Andleigh, Kiran Thakrar, “Multimedia systems design”, PHI Learning Private Limited, Delhi India.
6. Elsom Cook – “Principles of Interactive Multimedia” ,Tata McGraw Hill.

NBC-903 : Modelling and Simulation

UNIT I : System definition and components, stochastic activities, continuous and discrete systems, System modeling, Types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.

UNIT II : System simulation, Need of simulation, Basic nature of simulation, techniques of simulation, comparison of simulation and analytical methods, types of system Simulation, real time simulation, hybrid simulation, simulation of pursuit problem, single-server queuing system and an inventory problem, Monte-Carlo simulation, Distributed Lag model, Cobweb model.

UNIT III : Simulation of continuous Systems, analog vs digital simulation, simulation of water reservoir system, simulation of a servo system, simulation of an auto-pilot. Discrete system simulation, fixed timestep vs event-to-event model, generation of random numbers, test of randomness, Monte-Carlo computation vs stochastic simulation.

UNIT IV : System dynamics ,exponential growth models, exponential decay models, logistic curves, system dynamics diagrams, world model.

UNIT V : Simulation of PERT networks, critical path computation, uncertainties in activity duration, resource allocation and consideration, Simulation languages, object oriented simulation.

Textbooks:

- 1) Geoffrey Gordon, “System Simulation”, PHI
- 2) Narsingh Deo, “System Simulation with digital computer”, PHI.
- 3) Averill M. Law, W. David Kelton, “Simulation Modelling and Analysis”, TMH.

ELECTIVE-II

NBC-9041 : Compiler Design

UNIT I: Introduction to Compiler, Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Optimization of DFA-Based Pattern Matchers implementation of lexical analyzers, lexical-analyzer generator, LEXcompiler, Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG.

UNIT II: Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables.

UNIT III: Syntax-directed Translation: Syntax-directed Translation schemes, Implementation of Syntax-directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples,

translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions, procedures call, declarations and case statements.

UNIT IV: Symbol Tables: Data structure for symbols tables, representing scope information. Run-Time Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors.

UNIT V: Code Generation: Design Issues, the Target Language. Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Code Generator.

Code optimization: Machine-Independent Optimizations, Loop optimization, DAG Representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis.

Textbooks:

1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education
2. V Raghvan, "Principles of Compiler Design", TMH
3. Kenneth Louden, "Compiler Construction", Cengage Learning.
4. Charles Fischer and Ricard LeBlanc, "Crafting a Compiler with C", Pearson Education

References:

- 1.K. Muneeswaran, Compiler Design, First Edition, Oxford University Press.
- 2.J.P. Bennet, "Introduction to Compiler Techniques", Second Edition, Tata McGraw-Hill, 2003.
- 3.Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001.

NBC-9042 : CLIENT SERVER COMPUTING

Unit I

Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server Computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

Unit II

Components of Client/Server application: The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA).

The server: Detailed server functionality, the network operating system, available platforms, the network operating system, available platform, the server operating system.

Unit III

Client/Server Network: connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client-Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

Unit IV

Data Storage: magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards.

Network protection devices, Power Protection Devices, UPS, Surge protectors.

Client Server Systems Development: Services and Support, system administration, Availability, Reliability, Serviceability, Software Distribution, Performance, Network management, Help Disk, Remote Systems Management Security, LAN and Network Management issues.

Unit V

Client/Server System Development: Training, Training advantages of GUI Application, System Administrator training, Database Administrator training, End-user training.

The future of client server Computing Enabling Technologies, The transformational system.

References:

1. Patrick Smith & Steave Guengerich, "Client / Server Computing", PHI Learning Private Limited, Delhi India.
2. Dawna Travis Dewire, "Client/Server Computing", Tata McGraw-hill Education Pvt. Ltd.
3. Majumdar & Bhattacharya, "Database management System", Tata McGraw-hill Education Pvt. Ltd.
4. Korth, Silberchatz, Sudarshan, "Database Concepts", Tata McGraw-hill Education Pvt. Ltd.
5. Elmasri, Navathe, S.B, "Fundamentals of Data Base System", Addison Wesley

NBC-9043 : DISTRIBUTED SYSTEMS

Unit-I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models.

Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks.

Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.

Unit-II

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Unit-III

Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.

Unit-IV

Failure Recovery in Distributed Systems: Concepts in Backward and Forward recovery, Recovery in Concurrent systems, Obtaining consistent Checkpoints, Recovery in Distributed Database Systems.

Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.

Unit-V

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

Text Books:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Ramakrishna, Gehrke, "Database Management Systems", McGraw Hill
3. Vijay K. Garg Elements of Distributed Computing, Wiley
4. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education
5. Tenanuanbaum, Steen, "Distributed Systems", PHI
6. Gerald Tel, "Distributed Algorithms", Cambridge University Press

NBC 9044 : REAL TIME SYSTEM

UNIT-I:

Introduction

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT-II:

Real Time Scheduling

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT-III:

Resources Sharing

Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.

UNIT-IV:

Real Time Communication

Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols

UNIT-V:

Real Time Operating Systems and Databases

Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Characteristic of Temporal data, Temporal Consistency, Concurrency Control, Overview of Commercial Real Time databases

Text Books:

1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Phillip A Laplanta, Seppo J. Ovaska Real time System Design and Analysis Tools for practitioner, Wiley
3. Mall Rajib, "Real Time Systems", Pearson Education
4. Albert M. K. Cheng, "Real-Time Systems: Scheduling, Analysis, and Verification", Wiley.
5. KRISHNA, Real-Time Systems, Mc Graw Hills

NBC-9045 : Distributed Database

Unit-1

Introduction to Distributed Data system, Distributed Database Architecture, Distributed Data base Design, Transaction processing Concurrency Control techniques, Security.

Unit-2

Types of Data Fragmentations, Fragmentation and allocation of fragments, Distribution transparency, access primitives, integrity constraints.

Unit-3

Grouping and aggregate function, Query processing, Equivalence transformation of queries.

Unit-4

Evaluation, parametric queries, Query optimization, Join and general queries.

Unit-5

Management of Distributed transaction and concurrency control: Distributed Date base Administration, Catalogue Management Authorisation, Security and protection. Examples of distributed database systems. Cost Analysis

References:

1. Ceri & Palgathi, "Distributed Database System", McGraw Hill.
2. Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", Mc Graw Hill.
3. Date C. J, "An Introduction to Database System, Voll & II", Addition Wesley.
4. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill.
5. Elmasari, Navathe, "Fundamentals of Data Base Systems", Addition Wesley.
6. Data C. J, "An Introduction to Database System", Addition Wesley
7. Rama Krishnan, Gehke, "Database Management System", McGraw Hill

ELECTIVE-III

NBC-9051 : CLOUD COMPUTING

Unit-I

Introduction to Cloud Computing

Cloud computing, Properties & Characteristics, Service models, Deployment models, Virtualization concepts

Unit-II

Cloud as IaaS(Infrastructure as a Service)

Introduction to IaaS, Private Cloud Environment, Public Cloud Environment, Managing Hybrid Cloud environment

Unit-III

Platform as a Service (PaaS)

Introduction to PaaS, Cloud platform & Management, Computation, Storage, Case studies

Unit-IV

Software as a Service (SaaS)

Introduction to SaaS, Web services, Web 2.0, Web OS, Case studies

Unit-V

Cloud issues and challenges

Cloud provider Lock-in, Security and Privacy issues in the Cloud, VM-Ware ESX Memory Management Capacity Planning and Disaster Recovery in Cloud Computing

Text Books:

1. Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde, Dr. Deven Shah Cloud Computing Black Book Kogent Learning
2. Dr. Kumar Saurabh, Cloud Computing, Wiley
3. Cloud Computing, Das Gupta, et al., PHI Learning
4. Cloud Computing: Concepts, Technology & Architecture (The Prentice Hall Service Technology Series from Thomas Erl) Kindle Edition
5. Cloud Computing Explained: Implementation Handbook for Enterprises 2nd ed. Edition by John Rhoton

NBC-9052 : CLUSTER COMPUTING

UNIT I:

Basic concepts in Distributed Systems

Notion of time Distributed Mutual exclusion, Consensus, Failure models Paradigms for process interaction in distributed programs, Programming Paradigms, Shared memory, Message passing, Workflows

UNIT II:

Introduction to Cluster Computing, Cluster Middleware: An Introduction, Early Cluster Architecture and High Throughput Computing Clusters, Networking, Protocols and I/O for Clusters, Setting Up and Administering a Cluster

UNIT III:

Cluster Technology for High Availability, Performance Models and Simulation, Process Scheduling, Load Sharing and Load Balancing, Distributed Shared Memory,

UNIT IV:

Introduction to Grid Architecture, Characterization of Grid, and Grid related standard bodies, Grid types, Topologies, Components and Layers, Comparison with other approaches.

UNIT V:

System Infrastructure, Traditional paradigms for distributed computing, Web Services, Grid standards: OGSA and WSRF, Case Studies of Cluster Systems: Beowulf, COMPaaS, NanOS and PARAM

REFERENCES:

1. Grid and Cluster Computing, Prabhu C.S.R, PHI Learning Private Limited
2. A networking Approach To Grid Computing by Daniel Minoli (Chapter 1) (John Wiley and Sons, INC Publication)
3. Distributed and Cloud Computing, First Edition, Geoffrey C. Fox, KaiHwang, Jack J. Dongarra, Elsevier India Pvt. Ltd.-New Delhi
4. Fran Berman, Geoffrey C. Fox, Anthony J.G Hey Grid Computing making the global infrastructure a Reality
5. High Performance Cluster Computing: Architectures and Systems, Vol. 1, Prentice Hall
6. In search of clusters (2nd ed.), Gregory F. Pfister, IBM, Austin, TX, Prentice-Hall

NBC-9053 : Enterprise Resource Planning

Unit-I

Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system

Unit-II

ERP Domain, ERP Benefits classification, Present global and Indian market scenario, milestones and pitfalls, Forecast, Market players and profiles, Evaluation criterion for ERP product, ERP Life Cycle: Adoption Decision, Acquisition, Implementation, Use & Maintenance, Evolution and Retirement phases, ERP Modules

Unit- III

Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in Evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendor's evaluation criterion, ERP Implementation approaches and methodology, ERP Implementation strategies, ERP Customization, ERP-A manufacturing Perspective

Unit- IV

Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP Implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

Unit- V

Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or Qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.

References

1. A. Lexis Leon, "Enterprise Resource Planning", TMH
2. Brady, Manu, Wegner, "Enterprise Resource Planning", pearson

NBC-9054 : PATTERN RECOGNITION

Unit-I

Introduction:

Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

Unit-II

Statistical Patten Recognition:

Bayesian Decision Theory, Classifiers, Normal density and discriminant functions,

Unit – III

Parameter estimation methods:

Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

Unit - IV

Nonparametric Techniques:

Density Estimation, Parzen Windows, K-Nearest Neighbor Estimation, Nearest Neighbor Rule, Fuzzy classification.

Unit - V

Unsupervised Learning & Clustering:

Criterion functions for clustering, Clustering Techniques: Iterative square - error partitional clustering – K means, agglomerative hierarchical clustering, Cluster validation.

REFERENCES:

1. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", 2nd Edition, John Wiley, 2006.
2. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2009.
3. S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Edition, Academic Press, 2009.

UNIT I

FUNDAMENTAL CONCEPTS

Global Perspectives, Quantum Bits, Quantum Computation, Quantum Algorithms, Quantum Information, Postulates of Quantum Mechanisms.

UNIT II

QUANTUM COMPUTATION

Quantum Circuits – Quantum algorithms, Single Orbit operations, Control Operations, Measurement, Universal Quantum Gates, Simulation of Quantum Systems, Quantum Fourier transform, Phase estimation, Applications, Quantum search algorithms – Quantum counting – Speeding up the solution of NP – complete problems – Quantum Search for an unstructured database.

UNIT III

QUANTUM COMPUTERS

Guiding Principles, Conditions for Quantum Computation, Harmonic Oscillator Quantum Computer, Optical Photon Quantum Computer – Optical cavity Quantum electrodynamics, Ion traps, Nuclear Magnetic resonance.

UNIT IV

QUANTUM INFORMATIONS

Quantum noise and Quantum Operations – Classical Noise and Markov Processes, Quantum Operations, Examples of Quantum noise and Quantum Operations – Applications of Quantum operations, Limitations of the Quantum operations formalism, Distance Measures for Quantum information.

UNIT V

QUANTUM ERROR CORRECTION

Introduction, Shor code, Theory of Quantum Error –Correction, Constructing Quantum Codes, Stabilizer codes, Fault – Tolerant Quantum Computation, Entropy and information – Shannon Entropy, Basic properties of Entropy, Von Neumann, Strong Sub Additivity, Data Compression, Entanglement as a physical resource.

TEXT BOOK

1. Micheal A. Nielsen. & Issac L. Chiang, “Quantum Computation and Quantum Information”, Cambridge University Press, Fint South Asian edition, 2002.
2. Eleanor G. Rieffel, Wolfgang H. Polak, “Quantum Computing - A Gentle Introduction” (Scientific and Engineering Computation) Paperback – Import, 3 Oct 2014
3. Computing since Democritus by Scott Aaronson
4. Computer Science: An Introduction by N. David Mermin
5. Yanofsky's and Mannucci, Quantum Computing for Computer Scientists.