### Year-IV Semester-VII

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Periods</th>
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### Year-IV Semester-VIII

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**ELECTIVE-I**

- 8051. COMPLEXITY THEORY
- 8052. ADVANCED DBMS
- 8053. DATA COMPRESSION
- 8054. EMBEDDED SYSTEM
- 8055. COMPUTER ARCHITECTURE
Dr. A. P. J. Abdul Kalam Technical University, Lucknow  
Study and Evaluation Scheme  
MCA DUAL DEGREE  
(Effective from session 2016-17)

**Year-V Semester-IX**

<table>
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<th>Subject</th>
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**Practicals**

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**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**

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Semester VII

NBC-701 : .Net Framework and C#

Unit-I

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

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

References
1. Wiley,” Beginning Visual C# 2008”, Wrox
2. Fergal Grimes,” Microsoft .Net for Programmers”. (SPI)
3. Balagurusamy,” Programming with C#”, (TMH)

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.

References :
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

**Queueing Theory** Introduction to Queues, Basic Elements of Queueing 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.

NBC-704 : **System Analysis and Design**

Unit – I


Unit – II


Unit – III


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.


Unit – V


References


NBC-705: E-Business Strategies


TEXT BOOK


REFERENCES

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:

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 Servelets, 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
3. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication
4. Bhave, “Programming with Java”, Pearson Education
7. Margaret Levine Young, “The Complete Reference Internet”, 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
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.

Unit-II

Unit-III
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 and other stochastic models.

Unit - V
Other Soft computing approaches: Simulated Annealing, Tabu Search, Ant colony based optimisation, etc.

Reference:

NBC-803 : GRAPH THEORY

Unit I
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 separatability, 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, B, C, 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
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 Model, 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 BP algorithm 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

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:
3. Steven Homer, Alan L. Selman, Computability and Complexity Theory, Springer

NBC-8052: Advanced DBMS

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 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:
2. Ramakrishna and Gehrke,’ Database Management System, Mc Graw Hill

References:

NBC-8053: DATA COMPRESSION

Unit - I:

Unit – II:
Unit-III:

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
5. Text Compression1st 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

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, Booth’s 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. Hardware 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.


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

REFERENCE BOOKS:

Semester IX

NBC-901 : Digital Image Processing

UNIT-I
Introduction and Fundamentals

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:

NBC-902 : MULTIMEDIA AND ANIMATION
Introduction to Multimedia and animation, Multimedia Systems, Design Fundamentals, Elements of multimedia and animation and their use, Background of Art, Color theory overview, Sketching & illustration, Storyboarding, different tools for animation.

Multimedia Projects:

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

Animation:

References:

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.

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:
2. V Raghvan, “ Principles of Compiler Design”, TMH
4. Charles Fischer and Ricard LeBlanc,” Crafting a Compiler with C”, Pearson Education

References:
DISTRIBUTED SYSTEMS

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

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

Unit – IV

Text Books:
3. Vijay K.Garg Elements of Distributed Computing, Wiley
5. Tenanuanbaum, Steen,” Distributed Systems”, PHI

REAL TIME SYSTEM

UNIT-I:
Introduction

UNIT-II:
Real Time Scheduling

UNIT-III:
Resources Sharing
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:**
2. Phillip A Laplanta, Seppo J. Ovaska Real time System Design and Analysis Tools for practitioner, 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:**
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

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:

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, COMPaS, NanOS and PARAM

REFERENCES:
2. A networking Approach To Grid Computing by Daniel Minoli (Chapter 1) (John Wiley and Sons, INC Publication)
4. Fran Berman, Geoffrey C. Fox, Anthony J.G Hey Grid Computing making the global infrastructure a Reality
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

NBC-9054: PATTERN RECOGNITION

Unit I
Introduction:

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:

Unit V
Unsupervised Learning & Clustering:

REFERENCES:
UNIT I
FUNDAMENTAL CONCEPTS
Global Perspectives, Quantum Bits, Quantum Computation, Quantum Algorithms, Quantum Information, Postulates of Quantum Mechanisms.

UNIT II
QUANTUM COMPUTATION

UNIT III
QUANTUM COMPUTERS

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

TEXT BOOK
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.