MASTER OF COMPUTER APPLICATION

MCA (LATERAL ENTRY)

Detailed syllabi for students admitted to
KIIT Deemed to be University

SCHOOL OF COMPUTER APPLICATIONS
KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)
BHUBANESWAR - 751024
COURSE STRUCTURES AND DETAILED SYLLABI FOR MCA PROGRAMME (2019–2021) KIIT DEEMED TO BE UNIVERSITY
### THIRD SEMESTER (AUTUMN)

<table>
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<tbody>
<tr>
<td>01</td>
<td>MCA301</td>
<td>Data Base Management System</td>
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<td>02</td>
<td>MCA302</td>
<td>Design and Analysis of Algorithms</td>
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<td>03</td>
<td>MCA303</td>
<td>Object Oriented Analysis &amp; Design using UML</td>
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<td>04</td>
<td>MCA304</td>
<td>Internet Web Technology</td>
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<td>05</td>
<td>MCA305</td>
<td>Operations Research</td>
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<td>06</td>
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<td>Database Lab</td>
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<td>Programming Lab using JAVA</td>
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### FOURTH SEMESTER (SPRING)

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<td>Computer Graphics and Animations</td>
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### FIFTH SEMESTER (AUTUMN)

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**TOTAL**

- - - 26
SIXTH SEMESTER (SPRING)

The entire sixth semester is devoted to practice orientation and training. During the semester students have to undertake compulsory project oriented training for 120 days and submit a project report based on the work done for evaluation.

**SESSIONALS**

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**ELECTIVE-I :**

- MCA411 Mobile Computing
- MCA412 Advanced Computer Architecture
- MCA413 Digital Image Processing
- MCA414 Data Warehousing and Mining
- MCA415 Bio-informatics
- MCA416 Distributed Systems
- MCA417 Software Project Management
- MCA418 Human Computer Interaction

**ELECTIVE-II :**

- MCA511 Parallel and Distributed Algorithms
- MCA512 Theory of Computation
- MCA513 Distributed Database Management
- MCA514 Performance Evaluation and Reliability of Information Systems
- MCA515 Software Configuration Management
- MCA516 Real Time Systems
- MCA517 Embedded Systems
### ELECTIVE-III - THEORY:

<table>
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<tr>
<th>Course Code</th>
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<tr>
<td>MCA522</td>
<td>Soft Computing</td>
</tr>
<tr>
<td>MCA523</td>
<td>Advanced Database</td>
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<tr>
<td>MCA524</td>
<td>Visual Computing</td>
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<tr>
<td>MCA525</td>
<td>Multimedia &amp; Animations</td>
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<td>MCA526</td>
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<tr>
<td>MCA527</td>
<td>Simulation and Modeling</td>
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### ELECTIVE-III - PRACTICAL:

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<tbody>
<tr>
<td>MCA592</td>
<td>Soft Computing Lab</td>
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<tr>
<td>MCA593</td>
<td>PL/SQL Lab</td>
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<tr>
<td>MCA594</td>
<td>Visual Computing Lab</td>
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<tr>
<td>MCA595</td>
<td>Multimedia &amp; Animations Lab</td>
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<tr>
<td>MCA596</td>
<td>Enterprise Resource Planning Lab</td>
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<tr>
<td>MCA597</td>
<td>Simulation and Modeling Lab</td>
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SEMESTER-3

MCA 301 DATA BASE MANAGEMENT SYSTEMS

Basic Concepts: Database & Database users, Characteristic of the database, database systems, Concepts & Architecture, Data models, schemas & instances, Data independence, Database languages & interfaces.

ER, EER & Relational Concepts: Data modeling using the entity relationship approach, Enhanced entity relationship approach, Relational Concepts & Relational database constraints, Database design using ER, EER to Relational mapping.

Relational Model, Languages & Systems: Relational data model, Relational algebra, SQL- a relational database language, Data definition, View & Data Manipulation in SQL, relational database management systems using ORACLE/Relational Calculus.

Relational Database Design: Functional dependencies & Normalization for relational databases, Normal forms based on primary keys (1-NF, 2-NF, 3-NF & BCNF), Loss Less join & dependency preserving decomposition, multi valued dependency & 4NF, Join dependency & 5NF, Algorithms.

Concurrency control & Recovery Techniques: Concurrency control techniques, locking techniques, time stamp ordering, granularity of data items, recovery techniques, recovery concepts, database backup and recovery from catastrophic failures.

Reference Books:

2. Silbersettatz, Korth, Sudarshan , Database system concepts. TMH.
6. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, TMH.

MCA 302 DESIGN AND ANALYSIS OF ALGORITHMS


Divide and conquer algorithms: (Analysis of merge sort, quick sort and heap sort algorithms), Priority queue, Data structure for disjoint sets (Disjoint set operations, linked list representation, disjoint sets)

Dynamic programming: Matrix chain multiplication, Longest Common Subsequences

Greedy Method: Huffman Codes, Concept of Backtracking.
**Graph Algorithms:** Minimum spanning tree (Algorithm of Kruskal & Prim), Single source shortest paths (Dijkstra’s Algorithm), All pairs shortest paths (Floyd-Warshall algorithm)


**Reference Books:**

2. Dasgupta, Papadimitriou & Vazirani, Algorithms, TMH.
7. Goodman, Introduction to the Design & Analysis of Algorithm, TMH.

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**MCA-303 OBJECT ORIENTED ANALYSIS & DESIGN USING UML**

**Introduction to UML:** Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

**Basic Structural Modeling:** Classes, Relationships, common Mechanisms, and diagrams.

**Advanced Structural Modeling:** Advanced classes, advanced relationships, Interfaces types and roles, Packages.

**Class & Object Diagrams:** Terms, concepts, modeling techniques for Class & Object Diagrams.

**Basic Behavioral Modeling-I:** Interactions, Interaction diagrams.

**Basic Behavioral Modeling-II:** Use cases, Use case Diagrams, Activity Diagrams.

**Advanced Behavioral Modeling:** Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

**Architectural Modeling:** Component, Deployment, Component diagrams and Deployment diagrams.

**Reference Books:**

2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech IndiaPvt. Ltd.
4. Atul Kahate, Object Oriented Analysis & Design, TMH.

**MCA304 INTERNET WEB TECHNOLOGY**

**An Overview of Java:** Data Types, Variables, and Arrays, Operators, Control Statements.

**Introducing Classes:** Methods, Inner Classes, Packages, Strings, Inheritance & Polymorphism, Abstract class, Interfaces, Exception Handling.

**Java I/O:** Input Stream, Output Stream, File Stream.

**Multithreaded Programming:** Multithreading concepts, Thread Life cycle, Creating multithreaded application, Thread priorities, Thread synchronization.

**Networking with Java:** Networking basics, Sockets, port, java.net – networking classes and interfaces, Implementing TCP/IP based Server and Client, Datagrams – Datagram packet, Datagram server and client.

**Applets:** Applet Architecture, Applet Initialization and Termination, Simple Applet Display Methods, Requesting Repainting.

**AWT & Event Handling:** Layout Managers, Border layout, Flow layout, Grid layout, Card layout, AWT all components, Event delegation Model, Event source and handler, Event categories, Listeners, interfaces, Anonymous classes.

**Swings:** Model view Controller design pattern, Different layout, Menus, Dialog boxes, Text input etc.

**Database Connectivity With Jdbc:** Java database connectivity, Types of JDBC drivers, Writing first JDBC applications, Types of statement objects (Statement, Prepared Statement and Callable Statement), Types of resultset, ResultSet Metadata, Inserting and updating records, JDBC and AWT, Connection pooling.

**Reference Books:**

1. Cay S Horstmann, Fary Cornell, Core Java 2 Volume – I, Java series of Sun Microsystems Press, PHI.
2. Cay S Horstmann, Fary Cornell, Core Java 2 Volume – II, Java series of Sun Microsystems Press, PHI.
3. E.Balguruswami , Programming with Java - A Primer, TMH.
4. James Goodwill , Developing Java Servlets, SAMS
5. Jim Keogh, Complete Reference- J2EE, TMH
6. Patric Naughton, Herbert Schildt, Java 2 Complete Reference, TMH

**MCA305 OPERATIONS RESEARCH**

**Linear programming:** Modeling of linear programming, graphical method for two dimensional problems Simplex method of LPP in standard form . Artificial variable technique- two-phase method, Big M-method, degeneracy, unbounded solution, infeasible solution.

**Sensitivity analysis and dual problem:** Definition of the dual problem, the relationship between the optimal primal and dual solution, the dual Simplex method, sensitivity analysis.

**Special Type of linear programming problem:** Transportation problem and its solution, assignment problem, and its solution by Hungarian method.
**Integer Programming:** Introduction technique, binary integer programming, BIP applications & formulations, Branch & bound techniques & its applications to BIP, Branch & bound algorithm for mixed integer programming.

**Introduction to Game Theory:** Introduction, Two-Person Zero-sum Games, The Maximin-Minimax principle, Games without Saddle point (Mixed Strategies), Graphical Method for $2 \times n$ or $m \times 2$ Games, Dominance Property.

**Dynamic Programming:** Deterministic & Probabilistic dynamic programming.

**Queueing Theory:** Discrete time process, Introduction, formal definition, steady state probabilities, classification terminology, transient processes, Characteristics of Queueing system steady state M/M/1, M/M/1/k and M/M/C queuing models, Birth & Death Process.

**PERT and CPM:** Arrow networks-time estimate earliest expected time, latest allowable occurrence time and slack, critical path probability of meeting scheduled date of completion of project, calculations or CPM network, various floats for activities, critical path, updating project time cast trade off curve - selection of schedule based on cost analysis.

**Reference Books:**

1. Hilier and Liebermann, Introduction to Operations Research, TMH.

**PRACTICALS**

**MCA 391 DATABASE LAB**

Study features of a commercial RDBMS package such as Oracle and Structured Query Language (SQL). Laboratory exercises should include defining schemes for the applications, creation of a database, writing SQL queries to retrieve and manipulate data from the database. Use of host language interface with embedded SQL.

**MCA 392 JAVA Lab**

An overview of JAVA, Data types, variable and arrays, Operators, Control statements, Introducing classes, Methods, Inheritance, Packages and interfaces, Exception handling Applets, JDBC.
SEMESTER - IV

MCA401 SOFTWARE ENGINEERING


Introduction to Design: Importance of design, Design activities and methodologies, Good design characteristics, Cohesion, Coupling, Layered Modular Design, Fan–in and Fan–out, Approaches to design.


Reference books:
3. Ian Sommarville, Software Engineering, Pearson Education.
4. Rajib Mall, Software Engineering, PHI.
MCA402 COMPUTER GRAPHICS & ANIMATION

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

2-D and 3D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 3D viewing and General projection transforms (Parallel & Perspective Projections and their Transformations, clipping)

Viewing and Clipping: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Liang-Barsky line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

Illumination models: Basic Models, Displaying Light Intensities, half-tone patterns and Dithering Techniques

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

Surface Rendering Methods: Polygon Rendering Methods, Gouraud shading Phong Shading

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

Reference books:

4. D. Rogers, Procedures Elements for Computer, TMH.
5. Plastock, Computer Graphics, (Schaum Outline Series), TMH.
7. Plastock, Ccomputer Graphics, TMH.

MCA403 ORGANIZATIONAL BEHAVIOR

Basics of OB:
-History of OB: Stages of development- Pre-Scientific, Classical, Behavioural, Modern
-Organization structure & process: Components and their interaction
-Approaches: Traditional & Modern: Contributing disciplines
-Emerging Issues: Globalization, Diversity, Demographics, Ethical behaviour

The Individual:
-Personality: Factors (Big Five), Attributes, Measurement (Myers-Briggs Type Indicator)
-Job Attitude: Components, Major attitudes, Job satisfaction & its measurement, Dissatisfaction
-Motivation: Early theories (Need hierarchy & Two-factor) & Recent Theories (ERG & Expectancy)
The Group:
- Groups: Types, Roles, Norms, Size, Group vs. Team, Cohesiveness, Group Decision Making
- Leadership: Theories (Trait, Behavioural & Contingency), Finding and Creating Effective Leaders
- Conflict: Approach, Sources & Negotiation: Stages in the process and remedial strategies

The Organization:
- Structure: Basics, Common Designs: Simple, Bureaucratic and Matrix structures
- Culture: Basics, Functions: Boundary, Identity, Commitment & Stability and Management
- Change: Agents, Resistance, Management: Lewin's 3-step and Kotter's 8-step models

Reference Books:
Robbins, Sanghi & Judge, Essentials of Organisational Behaviour, PHI.
Kavita Singh, Organisational Behaviour :Text and cases, Pearson Education.
Fiona Wilson, Organisational Behaviour and Work, Oxford.

MCA404 ENTERPRISE COMPUTING

Distributed Computing

Client Server Computing
N-tier architecture, Introduction to MVC, Load-balancing & Clustering, Web-Servers & Application-Servers, Introduction to J2EE APIs

Java Enterprise Applications
Servlets - Java Server Pages - JDBC - Session beans - Entity beans - Programming and deploying enterprise Java Beans - Java transactions, JAVA API for XML (DOM, SAX), Web-Services, SOA (Service Oriented Architecture)

Frameworks & Design-Patterns
Introduction to Struts, Spring, Hibernate. Creational-Design Patterns, Structural Patterns, Behavioral Patterns

Reference Books:
1. Jim Keogh, Complete Reference J2EE , TMH
2. Brett McLaughlin, Building Java Enterprise Applications, O’Reilly
3. Deitel & Deitel, Java How to Program, Prentice Hall.

ELECTIVE-I

MCA411 MOBILE COMPUTING

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. Spreading techniques

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.


Reference Books:

1. Jochen Schiller, Mobile Communications, Pearson Education.

MCA412 ADVANCED COMPUTER ARCHITECTURE

Introduction: Review of basic computer architecture, quantitative techniques in computer design, measuring and reporting performance; CISC and RISC processors,

Pipelining: Basic concepts, instructions and arithmetic pipeline, data hazards, control hazards and structural hazards, techniques for handling hazards, Exception handling, pipeline optimization techniques;

Hierarchical memory technology: Inclusion, Coherence and locality properties, cache memory organizations, techniques for reducing cache misses, virtual memory organization, mapping and management techniques, memory replacement policies;
**Instruction-level parallelism:** basic concepts, techniques for increasing ILP, super-scalar, super-pipelined and VLIW processor architectures, array and vector processors;  
Multiprocessor architecture: Taxonomy of parallel architectures;  
**Centralized shared-memory architecture:** Synchronization, memory consistency, interconnections networks, Distributed shared-memory architecture, cluster computers.

**Reference Books:**

### MCA413 DIGITAL IMAGE PROCESSING

**Digital image fundamentals and transforms:** Digital image fundamentals: image digitization, Elements of visual perception sampling and quantization, image resolution, colour perception & processing, image processing: pixel based transformation, geometric transformation, Basic relationship between pixels – Basic geometric transformations—Introduction to Fourier Transform and DFT – Properties of 2D Fourier transform Discrete Cosine Transform, Haar Transform.  
**Image restoration:** Model of Image Degradation/restoration process, Noise models, Inverse filtering, Least mean square filtering, Constrained least mean square filtering, Blind image restoration, Pseudo inverse, Singular value decomposition.  
**Image segmentation and representation:** Edge detection, Thresholding, Region Based segmentation, Boundary representation.

**Reference Books**
MCA414 DATA WAREHOUSING & DATA MINING

**Introduction of Data Warehouse:** Introduction to Data Warehousing – Batch, OLTP, DSS Applications. Different natures of OLTP and DW databases. Commercial Importance of DW, Data Mart structure, Usage of Data Mart, Security in Data Mart, Data warehouse and Data Mart.

**Basic Elements of Data Warehouse & ETL:** Source System, Data Staging Area, Presentation Server, data Cleaning, Extraction of Data, Transformation of Data, Loading of Data, Practical study of popular ETL tools.

**Modeling:** Dimensional Modeling, Multidimensional Data Model, Data Cubes, OLAP, DW Bus Architecture, Conformed Dimensions, Star Schema and Snowflake Schema, Normalization VS Dimensional Modeling, Slicing and Dicing, Drilling, Drill-up, Drill-down, Drill-within, Drill-across. Bitmap Index, Aggregation & Metadata.

**Introduction to Data Mining:** Basics of data mining, related concepts, Data mining techniques.

**Data Mining Algorithms:** Classification, Clustering, Association rules.

**Web Mining:** Web Content Mining, Web Structure Mining, Web Usage Mining.

**Data Mining Primitives, Languages, and System Architectures:** Data mining primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems.

**Application and Trends in Data Mining:** Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining.

**Reference Books:**
1. J. Hahn and Micheline Kamber - Data Mining: Concepts and Techniques, Morgan Kaufmann
2. R.Kimball, DataWarehouse Toolkit, John Wiley
3. A.K.Pujari, Data Mining, University Press

MCA415 BIOINFORMATICS

**Molecular Biology and Biological Chemistry:** The Genetic Material, Gene structure and Information Content, Protein Structure and Function, The nature of Chemical bonds, Molecular Biology Tools, Genomic Information Content, Data Searches and Pairwise Alignments: Dot Plot, Simple Alignments, Gaps, Scoring Matrices, Needleman and Wunsch Algorithm, Global and local Alignments, Database searches, Multiple sequence Alignments, Substitution Patterns: Patterns of substitutions within Genes, Estimating Substitution numbers, Variations in evolutionary rates between Genes, Molecular clocks, evolution in Organelles.

**Distance based methods of Phylogenetics:** History of Molecular Phylogenies, Phylogenetic trees, Distance matrix methods, Maximum likelihood approaches, Multiple sequence Alignments, Character Based methods of Phylogenetics: Parsimony, Inferred ancestral sequences, Strategies for Faster searches, Consensus trees, tree confidence, Comparison of Phylogenetic methods, Molecular Phylogenies.

**Genomics and Gene Recognition:** Prokaryotic genomes, Prokaryotic gene structure, GC-content Prokaryotic genomes, Prokaryotic gene density, Eukaryotic genomes, Eukaryotic gene structure, Open reading frames, GC-content Eukaryotic genomes, Gene expression, Transposition, Repetitive elements, Eukaryotic gene density, Protein and RNA structure prediction: Amino acids, Polypeptide composition, Secondary structure, Tertiary and quaternary structure, Algorithms for Modeling Protein Folding,
Structure prediction, Predicting RNA secondary structures, Proteomics: from Genomes to Proteomes, Protein classification, Experimental techniques, Inhibitors and drug design, Ligand screening, X-ray crystal structures, NMR structures, Empirical methods and prediction techniques, Postranslational modification prediction.

**Reference Books:**
2. Teresa Attwood, David Parry-Smith, Introduction to Bioinformatics, Pearson Education.
4. Yi-Ping P. Chen, Bioinformatics Technologies, Springer.
6. Bryan Bergeron, Bioinformatics Computing, PHI.

**MCA416 DISTRIBUTED SYSTEMS**


**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.

**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.

**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.

**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.

**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.

**Reference Books:**
1. Singhal & Shivaratri, Advanced Concept in Operating Systems, TMH
3. Tenanuanbauma and Steen, Distributed Systems, PHI.

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**MCA417 SOFTWARE PROJECT MANAGEMENT**

**Overview of Project Management:** PMI Processes, Software project phases, Organizational structures, Project charter, Statement of Work (SOW)

**Planning Phase:** Development lifecycle models, Matching lifecycles to projects, Project plans, Work Breakdown Structures (WBS)

**Estimation and Budgeting:** Estimation, Budgeting, Project selection, NPV, ROI, Payback models

**Scheduling:** Project network diagram fundamentals, PERT techniques and Gantt charts

**Risk and Change Management:** Risk management, Change control, Development Management, Team models, Requirements process, Configuration management, Software metrics, Programming languages & tools, managing conflict and motivating

**Project Control:** Status reporting, Project metrics, Earned value analysis, Communications Techniques

**Final Phases & Other Issues:** Project Recovery, Documentation, Cutover/Migration, Post Project Reviews, Closing

**Project Success:** Management support, Expectations, Success metrics

**Reference Books:**
4. Walker Royce, Software Project Management, Pearson Education
5. Bob Hughes and Mike Cotterell, Software Project Management, TMH
6. Joel Henry, Software Project Management, Pearson Education
7. Pankaj Jalote, Software Project Management in practice, Pearson Education
MCA418 HUMAN COMPUTER INTERFACE

Introduction to HCI: A Brief History of HCI (A Survey of HCI Technology), User Interface Design and its importance, Principles on User Interface Design Models, Principles, Practices Interaction Design with Direct Manipulation Overview, Scope, Applications

Cognitive Framework of HCI: Definition of HCl, Cognitive perspective in HCI, Human information processing, Role of cognition in HCI design, Visual Perception & Representation, Different mode of perceptions, Theories of vision, Marr’s theory, Constructivist approach, Ecologist approach, How theories of vision can influence interface design, Graphical modeling, Graphical coding

Attention and Interface Design— Memory in Interface Design-Multi-store model of Memory, Memory in HCI design Knowledge, Knowledge representation, Utility of knowledge representation in HCI, Mental models, Utility of mental models in HCI User Modeling, Interaction with Natural Languages, Next Generation Interface, UI Evaluation: Introduction, Cognitive models (KLM, GOMS, Fitt’s Law, Applications of Cognitive Model in HCI),

Introduction to HCI evaluation: Role and goals of Evaluation, Evaluation techniques (Heuristic Evaluation, Evaluation with Cognitive Models, Evaluation with Users, Model-based Evaluation through User Participation (Empirical or experimental methods, Observational method, Query techniques, Physiological monitoring techniques)

Reference Books
2. Alan Dix, Janet Finlay, Gregory Abowd, Russel Beale, Human Computer Interaction, PHI.

PRACTICAL

MCA 491 ENTERPRISE COMPUTING LAB
Remote Method Invocation (Overview, Architecture), Example Demonstrating RMI. Servlets (Servlet Life Cycles, Scopes, Filters & Listeners, Session Tracking & Management, Servlet Chaining), Java Server Pages (Implicit Objects, Tags & Expressions, Scripting, Custom Tag), JDBC (javax.sql, Types of Drivers, Connection Pool, Calling Database Stored Procedures), Session beans - Entity beans - Programming and deploying enterprise Java Beans (Life Cycles, Deployment Descriptors), JAVA API for XML (DOM, SAX), Web-Services Using AXIS, Creational-Design Patterns, Structural Patterns, Behavioral Patterns Examples, Sample Applications Using Struts, Spring, Hibernate.

MCA 492 COMPUTER GRAPHICS & ANIMATION LAB
MCA 493 PROFESSIONAL COMMUNICATION LAB

GD
1. GD Basics: Structure, Motive, Modes, Seating, Formats
2. GD Roles: Leader, Coordinator, Questioner, Facilitator, Abstainer & Blocker
3. GD Strategies: Introduction, Discussion & Summarisation

Résumé
1. Résumé Basics: Sections, Formatting, Ordering, Drafts & Exclusions
2. Types: Functional, Chronological and Hybrid
3. Job letter / Cover letter: Paper form, e-mail and attachments

Interview
1. Interview Types: Fresher, Promotion, Appraisal, Stress, Academic, Exit & Group
2. Interview Strategies: Handling Stress, Trick, Ethical, Weakness & Monetary questions
2. Interview Preparation: Practice with groups, mirror, multimedia and peers with feedback

Reference Books:

SEMESTER-5

MCA 501 ARTIFICIAL INTELLIGENCE

Introduction to Artificial Intelligence: The Foundations of Artificial Intelligence, The History of Artificial Intelligence and The state of the Art.


Informed search Methods: Best-First Search, Heuristic Functions, Memory Bounded search, and Iterative Improvement Algorithms.


Planning: A simple planning agent form problem solving to planning, planning in situation calculus. Basic representations for planning. A partial-order planning example, A partial order planning algorithm.
Making simple Decisions: Combining beliefs and desires Under Uncertainty, The Basis of Utility theory, Utility Functions, Decision Networks and The Value of Information.

Neural network:-Learning in Neural and Belief Networks, How the Brain Works, Neural Network Perceptions. Multilayered feed forward Networks , Back Propagation algorithm, Applications of Neural Networks.

Agents that communicate: Communication as an action, steps of communication, A formal grammar for a subset of English, syntactic analysis (Parsing), Definite Clause Grammar (DCG), Augmenting a Grammar, Semantic Interpretation, Ambiguity and Disambiguation, A communicating Agent.

Practical Natural Language Processing: Practical applications, Efficient parsing, Scaling up the lexicon, scaling up the grammar ambiguity, Discourse, Understanding.

Reference Books:
2. Winston P.H, Artificial Intelligence, Addison Wesley.
3. Rich E & Knight K, Artificial Intelligence, TMH.

MCA502 CRYPTOGRAPHY AND NETWORK SECURITY


Classical Encryption Techniques: Substitution ciphers, Transposition ciphers, Stream and block ciphers, cryptanalysis.

Modern Symmetric-key Encryption: Modern Techniques: Simplified DES, Block Cipher Principles, The Data Encryption Standard(DES), Strength Of DES, Differential And Linear Cryptanalysis, Block Cipher Design Principles, AES.

Modern Encryption Algorithms: Multiple DES, Block Cipher Modes of Operation, International Data Encryption Algorithms, Blowfish, RC5, A5/1, CAST, Characteristics Of Advanced Symmetric Block Ciphers.


Message Integrity & Authentication: Message Integrity, Authentication Functions, Message Authentication Codes (MAC), Hash Functions, Security Of Hash Functions And Macs. Hash And MAC Algorithms (MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA-1), SHA-512), HMAC.


Key Management: Key Distribution, KDC, Session keys, KERBEROS, Diffie-Hellman Key Exchange, X.509 Authentication Service, PKI.


Reference Books:
4. John Hershey, Cryptography Demystified Part I, TMH.
5. B. Schmeien, Applied Cryptography, John Wiley.

MCA 503 MANAGEMENT SUPPORT SYSTEMS

An Overview: Managerial decision-making & Information systems, Managers and computerised supports, the need for computerised support. A framework for decision supports the concept of decision support system. Group system, EIS expert systems & intelligent agents, knowledge management system.


DSS: An Overview: DSS configurations, characteristics and capabilities of DSS, components of DSS. The data management subsystems the model management subsystems, the user DSS classifications, DSS Vs MIS. Data, Warehousing, Analysis,

Mining & Visualisation: Data warehousing, Analysis & visualisation, Sources of data. Data collection problems & quality, DBMS in DSS, Data warehousing, Data mining Data visualisation and multidimensionality, Geographic Information systems.

Modelling & Analysis: Modelling for MSS, Static & dynamic models, Trealing certainty, uncertainty & risk, Influence diagrams, Heuristic programming Simulation, Multidimensional modeling, Visual interactive modeling & simulation, Quantitative software packages-OLAP.

DSS Development: Introduction to DSS Development, The traditional SDLC, alternate development methodologies, Prototyping, DSS technology and tools, Development Platforms, Development tool selection, Team development DSS, End user developed ,DSS, Putting the system together Research directions and future of DSS.


Enterprise Decision support systems: Enterprise systems: Concepts & Definitions and its evolution, Characteristics of EIS, Comparing and integrating EIS & DSS. Organizational DSS, supply & value chains and Decision support, Supply chain problems & solutions,

Computerized systems: MRP, ERP & SCM. Introduction to knowledge management: knowledge, Organizational learning & Organizational memory, Knowledge management.

Impact of MSS: Introduction, Overview, Organizational structure & related areas, MSS support to business process reengineering, personal management issues, Impact on individuals, Impact on productivity, Quality & competitiveness, issues of legality, privacy & Ethics.

Reference Books:

1. E. Turban & J.E. Aronson, Decision support system & Intelligent System, Pearson Education.
2. R.H. Sprague & E.D Carlson, Building Effective DSS, PHI.
3. Loifi, Decision Support Systems operations and Management, TMH.
4. Mallach, Decision support and Data Warehouse Systems, TMH.

Elective – II

MCA511 PARALLEL AND DISTRIBUTED ALGORITHMS

Motivations for parallel processing, Abstract Models of parallel and distributed computation, Taxonomy, PRAM, BSP, Multithreading, Distributed Shared Memory, complexity measures: The PRAM Model: balancing, divide and conquer, parallel prefix computation, pointer jumping, symmetry breaking, list ranking, backtracking, branch-and-bound, divide and conquer, sorting and searching, graph algorithms, parallel complexity and complexity classes, lower bound.


Interconnection Networks: Static and Dynamic , topologies (arrays and mesh networks, trees, systolic networks, hypercubes, butterfly) and fundamental algorithms, matrix algorithms, sorting, graph algorithms, routing, relationship with PRAM models; Asynchronous Parallel Computation.

Distributed Algorithms: models and complexity measures, safety, liveness, termination, logical time and event ordering, global state and snapshot algorithms, mutual exclusion, clock synchronization, election, termination detection, routing, Distributed graph algorithms.


Applications: Sorting and Searching: algorithms for different models and their comparison,

Reference Books:

1. V. Rajaraman , C. Murthy, Parallel Computers: Architecture and Programming, PHI.
3. SashiKumar, Shikhare, Introduction to Parallel Processing, PHI.

**MCA512 THEORY OF COMPUTATION**

**Models of Computation**: Machine models (Turing Machines, Non-determinism, Post machines, Two Counter Machines), Logic (Proposition and Predicate Logic), Grammars and Languages, lambda Calculus, Term Rewriting.

**Undecidability**: Undecidable Problems, Reductions, Rice's Theorem, Recursively Enumerable and Recursive Languages, Oracle Machines and the Arithmetic Hierarchy, Axioms for Number Theory, Computation as a Number Theoretic concept, Undecidable and Incompleteness.

**Computable functions**: Primitive Recursive and mu-recursive functions, non-numeric functions.

**Computational Complexity**: Tractability, P, NP, Polynomial Hierarchy, Completeness, Randomized Computation, Probabilistic Computation, Quantum Computation.

**Reference Books**:

3. DLP Mishra & N Chandra Sekharan, Theory of Computer Science, PHI

**MCA513 DISTRIBUTED DATABASE MANAGEMENT**

**Introduction**: Distributed Data Processing, Distributed Database system (DDBS), Advantages & Disadvantages of DDBS, Problem areas, Overviews of relational DBMS (RDB concepts, Normalization, Integrity rules, relational Data languages) DBMS Architecture (DBMS standardization, Architecture middles for DDBMS)

**Distributed Database Design**: (alternative design strategies, distribution design issues, fragmentation, allocation) Semantic Data Control (View Management, Data Security, Semantic integrity control)

**Query Processing**: (Object of Query Processing, Complexity of relational algebra operations, Characterization of query processors, layers of query processing) Query decomposition), Query Decomposition and localization of Distributed Data, Optimization of distributed queries (Query optimization, Centralized query optimization, join ordering in fragment queries, Distributed query optimization algorithms)

**Transaction Management**: (Definition properties and types of transaction, architecture), Distributed Concurrency control (serializability, Texnomy of concurrency control mechanisms, locking and algorithms, Optimistic concurrency control algorithms)

**Distributed DBMS Reliability**: (Reliability concepts and measures, Failure and fault tolerance in distributed reliability protocols)
Parallel Database Systems (Database servers, Parallel architectures, parallel DBMS techniques, parallel execution problems, Parallel execution for hierarchical architecture)

**Distributed object Database Management System:** (Fundamentals of object concepts and modules, Object distribution design, Architectural issue, Object management Distributed object storage, Transaction Management).

**Reference Books:**
1. Ceri, Distributed Database Management, TMH.
3. Korth, Silberchatz, Sudarsan, Database System and Concept, TMH.

**MCA514 Performance Evaluation and Reliability of Information Systems**

**Review of probability and statistics:** Introduction, random variables, probability distributions, densities, jointly distributed random variables, expectation.

**Stochastic processes:** Introduction, basic definitions, Poisson process, birth-death process, Markov process.

**Queueing Theory:** Queueing systems, networks of queues, Queueing network models, computational methods for queueing network solutions.

**Parameter estimation and hypothesis testing:** Models of information systems, Introduction to reliability measures.

**Selection of Techniques and Metrics:** Selecting an evaluation technique, selecting performance metrics, commonly used performance metrics, utility classification of performance metrics, setting performance requirements.

**Performance measures:** Estimation of MTF and other reliability parameters, Software metrics and software reliability models, Workload design, Benchmarks, case studies.

**Reference Books:**

**MCA515 SOFTWARE CONFIGURATION MANAGEMENT**

**Overview of Software Configuration Management:** Introduction, Common Myths, Importance of SCM, benefits of SCM

**Software Development Process:** Software Lifecycle, SDLC phases, Communications breakdown problem, Shared Data Problems, Multiple Maintenance problem, Simultaneous update problem
SCM Basic Concepts: Introduction, Overview, Baselines, Check in, Check out, Parallel Development and branching, Version naming, Source and Derived Items, System Building and Releases

Phases of SCM implementation: Introduction, Objectives, SSM implementation phases, SCM tool retirement, Reasons for SCM failure

Configuration Identification: Impact of configuration item selection, Baselines, Configuration item selection, Designation, Configuration item description,

Configuration Control: Change, Deviations and Waivers, Problems of Uncontrolled Change, Configuration Control phases, File based versus change based change management, Escalation, Notification and fixes, Problem – reporting, tracking, change request and identification. Defect – Classification, severity, prevention

Status Accounting: Status accounting and information gathering, Status accounting reports, Status accounting and automation

Configuration verification and audits: Software reviews, Configuration verification, Functional Configuration Audits, Physical Configuration Audits, Role of SCM team in Configuration Audits

Reference Books:


MCA 516 REAL TIME SYSTEMS

Introduction: What is real time, Applications of Real-Time systems, A basic model of Real-time system, Characteristics of Real-time system, Safety and Reliability, Types of Real-time tasks, timing constraints, Modelling timing constraints

Real-Time Task Scheduling: Some important concepts, Types of Real-time tasks and their characteristics, Task scheduling, Clock-Driven scheduling, Hybrid schedulers, Event-Driven scheduling, Earliest Deadline First (EDF) scheduling, Rate monotonic algorithm (RMA). Some issues Associated with RMA. Issues in using RMA practical situations.


Commercial Real-time operating systems: Time services, Features of a Real-time operating system, Unix as a Real-time operating system, Unix-based Real-time operating systems, Windows as a Real-time operating system, POSIX, A survey of contemporary Real-time operating systems. Benchmarking real-time systems.

Real-time Communication: Examples of applications requiring real-time communication, Basic concepts, Real-time communication in a LAN. Soft Real-time communication in a LAN. Hard real-time communication in a LAN. Bounded access protocols for LANs. Performance comparison, Real-time communication over packet switched networks. Qos framework, Routing, Resource reservation, Rate control, Qos models.

Reference Books:

MCA 517 EMBEDDED SYSTEMS

Introduction: An embedded system, Processor in the system, other hardware units, software embedded into a systems, exemplary embedded system-on-chip (SOC) and VLSI circuit

Devices and Device Drivers; I/O devices, Timer and counting devices, serial communication using the IC, CAN and advance I/O buses between the networked multiple devices, Host system or computer parallel communication between the networked I/O multiple devices using the ISA, PCI, PCI-X and advance buses, Device drivers, Parallel port devices drivers in a system, Serial port device drives in a system, Interrupt servicing (Handling) mechanism.

Software and Programming Concept: Processor selection for an embedded system, memory selection for an embedded system, Embedded programming in C++, Multiple processes and application, problem of sharing data by multiple tasks and routines, Inter process Communication.

Hardware and Software Co-design: Embedded system project management, Embedded system design and co-design issues in system development process, design cycle in the development phase for an embedded system, Use of software tools for development of an embedded system, Issues in embedded system design.

Reference Books:
1. Raj Kamal, Embedded System Architecture, Programming and Design, TMH.
2. Ralf Niemann, Hardware/software co-design for data flow dominated embedded systems, Kulwer Academic Publisher.
3. Sriram V. Iyer and Pankaj Gupta, Embedded Real time system Programming, TMH

ELECTIVE-III

MCA522 SOFT COMPUTING
**Fuzzy logic:** Fuzzy set theory: crisp sets, fuzzy sets, crisp relations, fuzzy relations, Fuzzy Systems: Crisp logic predicate logic, fuzzy logic, fuzzy Rule based system, Defuzzification Methods.

**Neural Networks:** Fundamentals of Neural Networks: Models of an artificial Neuron, Neural Network Architecture, Learning methods


**Associative memory:** Auto correlators, Kosko’s Discrete BAM, Exponential BAM, Associative memory for Real-coded Pattern Pairs, Applications.


**Reference Book**
1. S.Rajasekaran, G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic, and Genetic Algorithm (synthesis and Application), PHI

**MCA523 ADVANCED DATABASE**


**Concurrency Control and Recovery Technique:** Two-Phase Locking, Timestamp ordering, Multi-version Concurrency Control Technique, Optimistic Concurrency Control Technique, Granularity of data items. Other Concurrency Control Techniques, Recovery concepts, Deferred update, Immediate update, Shadow paging, The ARIES Recovery Algorithm, Recovery in multi-database system, Recovery from Catastrophic failures.


**Object Oriented and Object Relational Databases:**

**Mobile Databases:** Location and Handoff Management, Effect of Mobility on Data Management, Concurrency Control, Transaction Commit Protocols, Mobile Database, Recovery Schemes.

**Multimedia Databases:** Multimedia Data Structures and formats, Multimedia Database Design, Retrieval Techniques.

**Reference Books:**

1. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, TMH.
2. C. J. Date, Introduction To Database Systems, Addison Wesley.
4. Silbersettatz, Korth, Sudarshan, Database system concepts. TMH.

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**MCA524 VISUAL COMPUTING**

**Introduction to VB.NET:** Event Driven Programming, .NET as better Programming Platform, .NET Framework, .NET Architecture, The Just-In-Time Compiler, .NET Framework class library introduction.

**VB.NET Development Environment:** Creating Applications, Building Projects, Using simple components, Running VB.NET applications.

**Mastering VB Language:** Data, Operators, Conditionals and Loops, Procedures, Error Handling, Classes and Objects.

**Windows Applications in VB.NET:** Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons, List Boxes, Combo Boxes. Picture Boxes, Scrollbars, Splitters, Timer, Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars.

**Object Oriented Programming in VB.NET:** Class and Object, Properties, methods and events, Constructors and Deststructors, Method overloading, Inheritance, Access modifiers : Public, Private, Protected, Friend, Overloading and Overriding, Interfaces, Polymorphism.

**Databases Connectivity with ADO.Net:** The ADO .NET Object Model, Database : Connections, DataAdapters, and DataSets, DataReader, Connection to database with server explorer, Multiple Table Connection, Finding and Sorting Data in DataSets, Using XML Data

**Web Services:** SOAP, WSDL, Disco and UDDI, Instantiating - Invoking Web Services, Creating Proxy Classes with WSDL, Creating Web Service Project.

**Reference Books:**
1. Francesco Balena, Programming Microsoft Visual Basic.NET, MicroSoft Press, PHI
3. Murach’s VB.NET database programming with ADO.NET -Anne Prince and Doug Lowe
4. Jeff Salvage, The Visual Basic.NET COACH, Addison Wesley

MCA525 MULTIMEDIA & ANIMATIONS

Introduction to Animation: History, Uses, Types and Principles of Animation, Some Techniques of Animation, Animation on the WEB, 3D Animation, Special Effects, Creating Animation.

Creating Animation in Flash: Introduction to Flash Animation, Introduction to Flash, Working with the Timeline and Frame-based Animation, Working with the Timeline and Tween based Animation, Understanding Layers - Actionscript.


Motion Caption: Formats, Methods, Usages, Expression, Motion Capture Software’s, Script Animation Usage, Different Language of Script Animation Among the Software.

Concept Development: Story Developing, Audio & Video, Color Model, Device Independent Color Model, Gamma and Gamma Correction, Production Budgets, 3D Animated Movies.

Reference books:

1. Ranjan Parekh, Principles of Multimedia, TMH.
2. Ashok Banerji, Ananda Mohan Ghosh, Multimedia Technologies, TMH.

MCA526 ENTERPRISE RESOURCE PLANNING

Introduction to Enterprise Resource Planning (ERP): Fundamentals of enterprise resource planning (ERP) systems concepts, and the importance of integrated information systems in an organization, illustrating procurement, production, and sales business processes using ERP software.

Use of Business Intelligence: Application of "intelligent" techniques from CS (AI, data mining), and OR (stochastic modeling, simulation, forecasting) to business decision-making. Use of any tool to access and present data, search for patterns, identify exceptions, forecast, optimize, and schedule resources.

ERP System Administration & PORTALs: System administration and performance monitoring practices for an ERP. User management attributes and system security. Introduction to Enterprise Portals.

Overview of different Functional Modules of ERP: Supply Chain Management (SCM), Customer Relation Management (CRM), HR, FINANCE, Sales & Distribution, Material Management etc.

About Different ERP-Packages: Introduction to SAP, ORACLE-APPS, People Soft, Siebel, etc.

Reference Books:

4. N. Venkateswaran, ERP (Enterprise Resource Planning), Scitech.

MCA 527 SIMULATION AND MODELLING

System models: Role of simulation. Entities, Attributes, States and Activities.

Types of systems: Deterministic, Stochastic, Continuous and Discrete systems. Steps in simulation studies.

Statistical tools and techniques: Generation of pseudo random numbers, random variate generation for uniform, Poisson and normal distributions.

Sampling: Estimation, maximum likelihood estimation, confidence intervals and hypothesis testing, stochastic processes and Markov models. Discrete event simulation languages.

Simulation of inventory and Queuing systems: single and multiserver queues, network of queues.

Modelling and performance evaluation of computers: Computer communication networks. Workload characterization. Continuous system simulation languages, growth and decay models,

Verification and validation of simulation models - input/output validation, performance measures and their estimation. Case studies.

Reference Books:

1. A. M. Law and W. D Kelton, Simulation Modeling and Analysis, TMH.
4. N. Deo, System Simulation with digital computers, PHI
5. Gordon, System Simulation, PHI.
PRACTICAL

MCA591 AI LAB

The laboratory should use languages such as PROLOG or LISP to solve the laboratory exercises.

Topics may include data types, conditionals, lexical variables, recursion, I/O structures etc.

It is also suggested that an expert system shell such as IITM rule may be used to create a small expert for, say, trouble shooting merged VCR etc. Some suggested experiments are tour of India, Stable marriage problem, game planning (such as bridge), coin change problem etc.

MCA592 SOFT COMPUTING LAB

Artificial intelligence (Algorithms)

P1: Simulate dfs.
P2: Simulate bfs.
P3: Simulate a*.
P4: Simulate ao*.
P5: Simulate 8-puzzle problem.

Artificial neural network

P1: Implement and function using adapline with bipolar inputs and outputs.
P2: Implement and function using medaline with bipolar inputs and outputs.
P3: Mathlab program to implement discrete hopfield network and test for input pattern.
P4: Mathlab program to implement full computer propagation network for a given input pattern.
P5: Mathlab program to implement back propagation network for a given input pattern.
P6: Implement art 1 network for clustering input vectors with vigilance parameter.

Fuzzy logic

P1: Mathlab program to implement fuzzy set operation and properties.
P2: Program to implement composition of fuzzy and crisp relations.
P3: Perform max-min composition of two matrices obtained from cartesian product.
P4: Verify the various laws associated with fuzzy set.

Genetic algorithm

P1: Mathlab program for maximizing f(x)=x2 using GA, where x is ranges from 0 to 31. Perform only 5 iteration.
P2: Implementation in few application areas.

MCA593 PL/SQL LAB


PL/SQL structures: Simple blocks, Control structures, PL/SQL records, Recognizing the Basic PL/SQL Block and Its Sections, Describing the Significance of Variables in PL/SQL, Distinguishing Between PL/SQL and Non-PL/SQL Variables, Declaring Variables and Constants, Executing a PL/SQL Block.
Error checking – exception handling: Defining exceptions, Using the when others clause, Ensuring complete error checking, Passing error messages to calling routine.

Boolean logic in PL/SQL: Identifying the Uses and Types of Control Structures, Constructing an IF Statement, Constructing and Identifying Different Loop Statements, Controlling Block Flow Using Nested Loops and Labels, Using Logic Tables, If-then-else structure, Testing for numbers characters and Booleans.

Cursors in PL/SQL: Cursor basics, Using a cursor for a multi-row SQL query.

Iteration in PL/SQL: For loop, While loop.

Triggers in PL/SQL: Triggers and database events, Defining a trigger, Timing a trigger, Enabling and disabling a trigger.

Stored procedures, functions and packages: Basics of stored procedures, Basics of functions, Basics of packages, Defining stored procedures & functions, Function and stored procedures prototypes, Passing arguments to functions and stored procedures, Recompiling functions and stored procedures.

MCA594 VISUAL COMPUTING LAB


Mastering VB Language: Data Types, Operators, Conditionals and Loops, Procedures.


Handling and Throwing Exceptions: Debugging an Application, Creating Throwing and Handling Exceptions.

Data Access Using ADO: The ADO .NET Object Model, Database: Connections objects, DataAdapters objects, and DataSets object, DataReader objects, Connection to database with server explorer, Multiple Table Connection, Finding and Sorting Data in DataSets, Using XML Data with XmlReader object

Web Services: UDDI, Instantiating - Invoking Web Services, Creating Proxy Classes.

References Book:
1. Francesco Balena, Programming Microsoft Visual Basic.NET, MicroSoft Press, PHI
3. Murach’s VB.NET database programming with ADO.NET -Anne Prince and Doug Lowe
4. Jeff Salvage, The Visual Basic.NET COACH, Addison Wesley

MCA595 MULTIMEDIA & ANIMATION LAB

Flash workflow & Workspace, Working with Flash documents, Drawing Basis, Working with graphic objects, Using symbols, instances and library assets, Creating animation (Animation basics, Timeline effects, Twinned animation, Special effects, Working with text, sound & video), various masking effects to animated images. Creating and using movie clip symbols. Organizing a movie clip timeline. Creating

Reference Book:
Robert Reinhardt and Snow Dowd, Macromedia Flash - Bible

MCA596 ENTERPRISE RESOURCE PLANNING LAB (Using SAP)

Introduction SAP R/3 architecture, Introduction to SAP ABAP/4, Open SQL–statements, Simple reporting, Selection screens, Transaction code creation, Data Dictionary, Reporting.

Basics of Dialog Programming, Interface Programming, Scripts, SmartForms, IDOCs, ALE, EDI.

Use of SAP as a tool to access and present data, search for patterns, identify exceptions, forecast, optimize, and schedule resources.

Examine and apply techniques used in SAP R/3 for system configuration and integration with a focus on finance, materials management, sales and distribution modules.

MCA597 SIMULATION AND MODELING LAB

Implementation of discrete-event simulation model in high level languages (C / C++).
Implementation of various distributions, Program for Parameter Estimation, Hypothesis Testing
C++ Implementation of an MM1 Queuing System.
Modeling other systems (two servers in series) by modifying the basic C++ implementation.
Modifying the basic program to Simulate the two servers in series.
Events and Event list,
Design of models; C++ implementation of at least one system model
Implementation of an M/M/G Queuing System.
Modified M/M/1 program with output.