

## **Artificial Intelligence (MCA-401)**

### **UNIT-I**

**Introduction:** Overview of AI, AI technique and problems, Characteristics of AI, LISP Programming, input output and local variables, Numeric and Basic list manipulation functions, predicates and conditionals, Iteration and recursion, property lists and arrays.

### **UNIT-II**

**Search and Control Strategies:** overview of production systems, characteristics of production systems, control strategies, forward and backward chaining, study of depth first and breadth first search, Hill climbing Techniques, branch and bound technique, best first search & A\* algorithm, AND / OR graphs, problem reduction & AO\* algorithm, constraint satisfaction problems.

### **UNIT-III**

**Knowledge Representations:** Problems in representing knowledge, knowledge representation using propositional and predicate logic, skolemization, resolution principle & unification, interface mechanisms, horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

### **UNIT-IV**

**Planning:** Planning, various types of planning techniques like goal stack planning, hierarchical planning , non linear planning. Parsing techniques, context free grammar, recursive ransitions nets, augmented transition nets, case and logic grammars, semantic analysis. Introduction to game playing, game playing techniques like minimax procedure.

### **UNIT-V**

**Probabilistic Theory and Expert System:** Introduction of Probability theory, bayes theorem and bayesian networks, certainty factor. Introduction to expert system and application of expert systems, various expert system shells, vidwan frame work, knowledge acquisition, case studies, MYCIN.

### **References:-**

1. Rich E and Knight K, "Artificial Intelligence", TMH, New Delhi.
2. Nelsson N.J., "Principles of Artificial Intelligence", Springer Verlag, Berlin.

**Analysis Design and Algorithms(MCA-402)**

**UNIT - I**

**Introduction:** Data structure, models of computation, algorithm analysis Algorithms, Designing algorithms, analyzing algorithms, asymptotic notations, heap and heap sort, order architecture, time space complexities average and worst case analysis.

**UNIT-II**

**Divide and conquer:** Introduction to divide-and-conquer Structure of divide-and-conquer algorithms, Binary search, quick sort, strassen's matrix Multiplication; Analysis of divide and conquer run time recurrence relations.

**UNIT-III**

**Study of Greedy Method:** Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths .

**UNIT-IV**

**Dynamic programming:** Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Traveling salesman Problem, longest Common sequence, Overview, 8-queen problem, and Knapsack problem

**UNIT-V**

**Computational Complexity:** Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples. Combinational algorithms, string processing algorithm, Algebraic algorithms, set algorithms.

**References:**

1. Cormen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. Michael T Goodrich, Roberto Tamassia, Algorithm Design, Wiley India

**Computer Graphics & Multimedia (MCA-403)**

**UNIT -I**

Introduction to Raster scan displays, Storage tube displays, refreshing, flickring, interlacing, colour monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball, tablets and joysticks, graphical input techniques etc.

**UNIT -II**

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Bezier Method, B-spline Method.

**UNIT -III**

2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen. Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.

**UNIT -IV**

An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases. Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia -Tools, presentation tools, authoring tool.

**UNIT -V**

Compression & Decompression – Multimedia Data & File Format standards :-TIFF, MIDI, JPEG, DIB, MPEG,RTF, – Multimedia I/O technologies - Digital voice and audio – Video image and animation–Full motion video – Storage and retrieval technologies.

**References:-**

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
2. Prabat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI Learning, 3rd Indian reprint edition, 2008.
3. Tay Vaughan, "Multimedia making it work", Tata McGraw Hill edition.
4. Amarendra N Sinha & Arun D Udai, "Computer Graphics", McGraw Hill publication Fundamental of Computer Graphics and Multimedia, Mukherjee, PHI Learning

## **Web Technology (MCA-404)**

### **UNIT I**

History of the internet, internetworking concepts, architecture, and protocol: switch, router, protocols for internetworking, internet address and domains. Introduction World Wide Web (WWW), working of web browser and web server, N-tier architecture, services of web server, Common gateway interface (CGI), Uniform Resource Locator (URL), Hyper Text Transfer Protocol (HTTP), feature of HTTP protocol HTTP request-response model, Hyper Text Transfer Protocol Secure (HTTPS).

### **UNIT II**

Introduction to Hyper Text Markup Language (HTML), HTML elements, XHTML syntax and Semantics, eXtensible Markup Language (XML), element, attributes, entity declarations. DTD files and basics of Cascading Style Sheet (CSS). Document object Model (DOM) history and levels, Document tree, DOM event handling.

### **UNIT III**

Introduction to Java Script, Basic concepts, variables and data types, functions, conditional statements, Loops, Operators, Arrays, Standard Objects and form processing in Java

### **UNIT IV**

Evaluation of web applications, type of web documents, feature of web pages, multitier web applications, introduction to Apache web server. Security in application: authentication, authorization, auditing, security issues, security on the web, proxy server, Firewall. Middleware Concepts, CORBA, Java Remote Method Invocation (RMI), EJB, Microsoft's Distributed Component Object Model( DCOM) Web server and its deployment, Web client, services of web server, mail server proxy server, multimedia server.

### **UNIT V**

Introduction to servlet, Overview Architecture Handling HTTP Request, Get and post request, redirecting request multi-tier applications. Introduction to JSP, basic JSP, Java Bean class and JSP. Setting up an Open Data Base Connectivity (ODBC) data source.

### **References:-**

1. Web Technologies- A computer science perspective By Jeffrey C. Jackson, Pearson Education .
2. Web Technologies-TCP/IP Architecture, and Java Programming By Achyut S. Godbole and Atul Kahate
3. An introduction to Web Design+Programming by Paul S. Wang Sanda, S Katila,CENGAGE Learning.

## **Java Technology Elective-I (A) (MCA-405)**

### **UNIT-I**

**The Java Environment:** History of Java: Comparison of Java and C++; Java as an object oriented language: Java buzzwords; A simple program, its compilation and execution; the concept of CLASSPATH; Basic idea of application and applet; **Basics:** Data types; Operators- precedence and associativity; Type conversion; The decision making – if, if else, switch; loops – for, while, do...while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords.

### **UNIT-II**

**Object Oriented Programming in Java:** Class; Packages; scope and lifetime; Access specifiers; Constructors; Copy constructor; this pointer; finalize () method; arrays; Memory allocation and garbage collection in java keywords. **Inheritance:** Inheritance basics, method overriding, dynamics method dispatch, abstract classes.

### **UNIT-III**

**Interfaces:** defining an interface, implementing & applying interfaces, variables in interfaces, extending interfaces. **Multithreading and Exception Handling:** Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception handling; The try, catch and throw; throws Constructor and finalizers in exception handling; Exception Handling.

### **UNIT-IV**

**Applets:** Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet. **The AWT:** The class hierarchy of window fundamentals; The basic user interface components Label, Button, Check Box, Radio Button, Choice menu, Text area, Scroll list, Scroll bar; Frame; Layout managers- flow layout, Grid layout, Border layout, Card layout.

### **UNIT-V**

**The Java Event Handling Model:** Java's event delegation model – Ignoring the event, Self-contained events, Delegating events; The event class hierarchy; The relationship between interface, methods called, parameters and event source; Adapter classes; Event classes action Event, Adjustment Event, Container Event, Focus Event, Item Event, Eey Event, Mouse Event, Text Event, Window Event.

### **References:-**

1. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill
2. Deitel "Java- How to Program:" Pearson Education, Asia
3. Horstmann & Cornell "Core Java 2" (Vol I & II ) , Sun Microsystems
4. Ivan Bayross "Java 2.0" : BPB publications

**Advanced Data Base Management System Elective-I (B)(MCA-405)**

**UNIT-I**

**Introduction:** Objected oriented database, Object Relational Databases, Objects, Object Identity and its implementation, Architecture of Object Oriented and Object Relational databases, Clustering, Equality and Object Reference, Persistent Programming Languages, Cache Coherence, Specialization, Generalization, Aggregation and Association.

**UNIT-II**

**Deductive Databases and Active Database:** Data log, Evaluation of Data log program, Recursion, Recursive queries with negation, Parallel architectures, shared nothing/shared disk/shared memory based architectures, Data partitioning, Intra-operator parallelism, pipelining , ECA Rules, Query Processing and Concurrency Control, Recursive query processing, Compensation and Databases Recovery, multi-level recovery.

**UNIT-III**

**Distributed Database:** DDBMS, Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel, Databases, and Parallel Query Evaluation.

**UNIT-IV**

**Transaction:** Transaction process, Property of Transaction, Advanced transaction models, Save points, Nested transaction, Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors, Shared disk systems.

**UNIT-V**

**Multimedia Databases:** Modeling ,Storage of Image data, Multimedia Data, Multimedia Data Formats, Video Data Model, Audio & Handwritten Data, Geographic Information Systems (GIS),Data Structures- R-tree, k-d tree, Quad trees, Content Based Retrieval, Color Histograms, Textures, etc., Image Features, Spatial and Topological Relationships.

**References:**

1. Elmasri, Navathe, "Fundamentals Of Database Systems", Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Toledo; Data base management systems;TMH
4. Elmagarmid.A.K. "Database transaction models for advanced applications", Morgan Kaufman.
5. Transaction Processing, Concepts and Techniques, J. Gray and A. Reuter, Morgan Kauffman.