



Scheme of Examination

Fourth Semester-Master of Computer Application

S.No	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments /Quiz	End Sem. Practical/ Viva	Practical Record/Assignment/Quiz/Presentation	
			1	MCA 401	Artificial Intelligence & Applications		3	1	-	4	70	
2	MCA 402	Mobile computing	3	1	-	4	70	20	10	-	-	100
3	MCA 403	Computer Graphics	3	1	-	4	70	20	10	-	-	100
4	MCA 404	Design & Analysis of Algorithms	3	1	-	4	70	20	10	-	-	100
5	MCA 405	Java Programming & Technologies	3	1	-	4	70	20	10	-	-	100
6	MCA 406	Minor Project -I	-	-	8	8	-	-	-	120	80	200
7	MCA 407	Programming Lab In Java	-	-	2	2	-	-	-	30	20	50
		Total	15	5	10	30	350	100	50	150	100	750

L: Lecture - T: Tutorial - P: Practical



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-401 Artificial Intelligence & Applications

Unit-I

General Issues and Overview of AI

The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP Programming: Syntax and numeric functions, Basic list manipulation functions, predicates and Conditionals, input output and local variables, iteration and recursion, property lists and arrays

Unit-II

Problem Solving, Search and Control Strategies

General problem solving, production systems, control strategies forward and backward chaining, Exhaustive searches depth first breadth first search.

Heuristic Search Techniques

Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem Reduction & AO* algorithm, constraint satisfaction problems.

Unit-III

Knowledge Representations

First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, Horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.

Unit-IV

Natural Language processing: Parsing techniques, context free grammar, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammars, syntactic analysis.

Game playing Minimax search procedure, alpha-beta cutoffs, additional refinements.

Planning Overview an example domain the block world, component of planning systems, goal stack planning, non linear planning.

Unit-V

Probabilistic Reasoning and Uncertainty: Probability theory, bayes theorem and bayesian networks, Certainty factor. **Expert Systems** Introduction to expert system and application of expert systems, various expert system shells, vidwan frame work, knowledge acquisition, case studies, MYCIN. **Learning** Rote learning, learning by induction, explanation based learning.

Books

1. Elaine Rich and Kevin Knight "Artificial Intelligence" - Tata McGraw Hill.
2. Dan W. Patterson "Introduction to Artificial Intelligence and Expert Systems", Prentice India.
3. Nils J. Nilson "Principles of Artificial Intelligence", Narosa Publishing House.



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-402 Mobile Computing

Unit-I

Overview of OSI Model: Significance of layered Model, PDUs, SDUs, IDUs, Higher layer Protocols. Switching and Components. Introduction, Applications, history, of wired & wireless Communication Systems. Radio Transmission: frequencies, signal propagation, antenna, types of modulation, FHSS, DSSS. Multiple Access technology for Wireless Communication: FDMA, TDMA, CDMA Cellular System: Introduction, types.

Unit-II

Mobile Data Communication: Cellular Telephony, Structure, Fading, Small scale fading, Multi-path Fading, Speech Coding, Error Coding and Correction, Hand off Management, Switching and authentication, MTSO interconnections, frequency hopping, frequency reuse. Circuit Switched Data Services & Packet Switched Data Services on Cellular Networks, Personal Communication Systems (PCS) Architecture, Digital Enhanced Cordless Telecommunications (DECT,) Personal Access Comm. System (PACS).

Unit-III

Digital Cellular Systems and Standards: GSM System overview, Architecture, GSM Protocol Model, GSM Mobility Management, SMS security aspects. Broadcast System overview. General Packet Service (GRPS) Architecture, GRPS Network, Interfaces and Procedures (2.5 G), 3G Mobile Services: UMTS and International Mobile Telecommunications (IMT-2000), W-C DMA and CDMA 2000, Quality of service in 3G.

Unit-IV

WLAN: Components and working of Wireless LAN, Transmission Media for WLAN, Infrastructure & Types of WLAN, IEEE 802.11 Standards, Protocols for WLAN, MACA, MACAW, Infrared technology. Wireless Application Protocol (WAP) model, architecture, Gateway, WAP protocols and WML.

Unit-V

Introduction to Bluetooth technology, Wireless in local loop (WLL) architecture, products, Satellite as a switch, Components of VSAT system, VSAT topologies, access schemes

Books

1. Jochen Schiller "Mobile Communication", Pearson Education.
2. Raj Panadaya "Mobile and Personal Communication System & services
3. Lee "Mobile Cellular Telecom" 1995 Mc Graw Hill



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-403 Computer Graphics

Unit-I

What is Graphics, Application of Graphics, Elements of Graphics Workstation, Graphics I/P Devices- Keyboard, Trackball, Joystick, Light Pen, Digitizing Tables, Mouse, Touch Panels, Image Scanners . Graphics Display Devices-Raster Scan System, Random Scan System, Arch Of Vector and Raster Scan Display, Refresh CRT, Gray S Hade.

Unit-II

DRAWING GEOMETRY: Point – Plotting, Coordinate System, Point Plotting, Line Drawing –Line Segments, Line Drawing Algo : DDA Algo, Bresenham’s Line Algorithm. Circle Drawing Polygon Representation Ellipse, Rectangle, Filling – Filled Area Primitives, Scan Line Polygon Fill Algo, Flood Fill Algo, Boundary Fill Algorithm

Unit-III

2D Geometric Transformation : Translation, Rotation, Scaling, Geometric Transformation, Coordinate Transform and Composite Transformation, 2D Viewing Transformation & Clipping : World Coordinate System (WCS), Normalized Device Coordinate System , Windows Viewing View Ports Viewing, Point Clipping, Line Segment Clipping, Coahen – Sutherland, Line Clipping, Polygon Clipping.

Unit-IV

3D Geometric Transformation 3D Geometric Transformation: Translation, Rotation, Scaling, Coordinate Transform Geometric Transformation Composite Transformation, 3D Display Methods – Parallel Projection, Perspective Projection 3D Viewing & Clipping.

Unit-V

Segment, Segment Table, Segment Creation, Deletion, Closing, Renaming, Curve Generation , B – Spline Curves, Bezier Curves, Hidden Surface, Z – Buffer Algorithm, Scan Line Algorithm, Painters Algorithm, Depth Comparisons.

Books

1. D.Hearn and M.P. Baker “Computer Graphics” (2nd ed), PHI.
2. COMPUTER GRAPHICS : SCHAUM’S OUTLINE SERIES
3. Roger S. David “Procedural Elements for Computer Graphics”, McGraw Hill.



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-404 Design and Analysis of Algorithms

UNIT-I

Pre-requisites: Data structure & Discrete structures, models of computation, algorithm analysis, order Architecture, time space complexities average and worst case analysis.

UNIT-II

Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.

Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search)

UNIT-III

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

Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem, searching & sorting algorithms.

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.

Back tracking: 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

BOOKS:

1. Ullman "Analysis and Design of Algorithm" TMH
2. Sara Basse, A. V. Gelder, " Computer Algorithms," Addison Wesley
3. T. H. Cormen, Leiserson , Rivest and Stein, "Introduction of Computer algorithm," PHI
4. E. Horowitz, S. Sahni, and S. Rajsekar, "Fundamentals of Computer Algorithms," Galgotia Publication



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-405 Java Programming & Technologies

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.

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-II

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-III

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 managersflow

layout, Grid layout, Border layout, Card layout.

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.

UNIT-IV

Input/output: Exploring Java i.o., Directories, stream classes

The Byte stream: Input stream, output stream, file input stream, file output stream, print stream, Random access file, the character streams, Buffered reader, buffered writer, print writer, serialization.

JDBC: JDBC-ODBC bridge; The connectivity model; The driver manager; Navigating the resultset object contents; java.sql Package; The JDBC exception classes; Connecting to Remote database.

UNIT-V

Networking & RMI: Java Networking: Networking Basics: Socket, Client server, reserved sockets, proxy Servers, Inet address, TCP sockets, UDP sockets.

; RMI for distributed computing; RMI registry services; Steps of creating RMI Application and an example.

Collections: The collections framework, collection interfaces, collection classes.

BOOKS

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
5. Ivor Horton's "Beginning Java 2, JDK 5 Ed., Wiley India.