

**DR. RAMMANOHAR LOHIA AVADH UNIVERSITY
AYODHYA U.P.**



Evaluation Scheme & Syllabus

for

Master of Computer Application

of Second Year

On

Choice Based Credit System

(Effective from the Session: 2020-21)

Dr. RamManohar Lohia Avadh University, Ayodhya U.P.

Study and Evaluation Scheme

MCA (Master of Computer Applications)

(Effective From Session 2020-21)

Year – II Semester – III

| Sl. No. | Subject Code | Subject Name | Periods | | | Evaluation Scheme | | | | | Credit |
|---------|----------------|--|---------|---|----|-------------------|----|-------|-----|---------------|--------|
| | | | L | T | P | Sessional Exams | | | ESE | Subject Total | |
| | | | | | | CT | TA | Total | | | |
| | THEORY SUBJECT | | | | | | | | | | |
| 1 | MCA 301 | Operating Systems | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 2 | MCA 302 | PHP Programming | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 3 | MCA 303 | Database Management System | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 4 | MCA 304 | Advanced Java Programming | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 5 | MCA 305 | Computer Based Optimization Techniques | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| 6 | MCA 306 | Design & Analysis of Algorithms | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| | Practical | | | | | | | | | | |
| 7 | MCA 307 | Operating Systems Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 8 | MCA 308 | PHP Programming Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 9 | MCA 309 | Database Management System Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 10 | MCA 310 | Java Programming Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| | | Total | 18 | 6 | 12 | - | - | - | - | 1000 | 32 |

Dr. RamManohar Lohia Avadh University, Ayodhya

Study and Evaluation Scheme

MCA (Master of Computer Applications)

(Effective From Session 2020-21)

Year – II Semester – IV

| Sl. No. | Subject Code | Subject Name | Periods | | | Evaluation Scheme | | | | | Credit |
|----------------|--------------|--------------------------------|---------|---|----|-------------------|----|-------|-----|---------|--------|
| | | | L | T | P | Sessional Exams | | | ESE | Subject | |
| | | | | | | CT | TA | Total | | Total | |
| THEORY SUBJECT | | | | | | | | | | | |
| 1 | MCA 401 | Management Information Systems | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 2 | MCA 402 | Web Technology | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 3 | MCA 403 | Distributed system | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 4 | MCA 404 | Artificial Intelligence | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 5 | MCA 405 | Mobile Computing | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| 6 | MCA 406 | Automata and Compiler design | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| Practical | | | | | | | | | | | |
| 7 | MCA 407 | Mini Project | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 8 | MCA 408 | Web Technology Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 9 | MCA 409 | Distributed system Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 10 | MCA 410 | Artificial Intelligence Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| | | Total | 18 | 6 | 12 | - | - | - | - | 1000 | 32 |

PAPER—I

MCA 301: OPERATING SYSTEMS

Unit-I

Introduction: Definition and types of operating systems, Batch Systems, multi programming, time-sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines.

Unit-II

Process Management: Process concept, Process scheduling, Cooperating processes, Threads, Interprocess communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real-time scheduling and Algorithm evaluation.

Unit-III

Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

Unit-IV

Storage management: Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging in MULTICS and Intel 386, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation, File systems, secondary Storage Structure, File concept, access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Disk structure, disk scheduling methods, Disk management, Swap-Space management, Disk reliability.

Unit-V

Security & Case Study: Protection and Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, language based protection, The Security problem, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption.

Windows NT-Design principles, System components, Environmental subsystems, File system, Networking and program interface, Linux system-design principles, Kernel Modules, Process Management, Scheduling, Memory management, File Systems, Input and Output, Interprocess communication, Network structure, security

References

1. Abraham Siberschatz and Peter Baer Galvin, "Operating System Concepts", Addison-Wesley
2. Milan Milankovic, "Operating Systems, Concepts and Design", Tata McGraw-Hill.
3. Harvey M Deital, "Operating Systems", Addison Wesley
4. Richard Peterson, "Linux: The Complete Reference", Osborne Tata McGraw-Hill.
5. SibsankarHalder and Alex A Aravind, "Operating Systems", Pearson Education
6. D M Dhamdhare, "Operating Systems : A Concept basedApproach", McGraw Hill.

PAPER—II

MCA 302: PHP PROGRAMMING

UNIT I

PHP - Introduction, Environment Setup, Syntax Overview, Variable Types, Constants, Operator Types, Decision Making, Loop Types, Arrays, Strings, Web Concepts, GET & POST,

UNIT II

Advanced PHP: File Inclusion, Files & I O, Functions, Cookies, Sessions, Sending Emails, File Uploading, Predefined Variables, Regular Expression, Error Handling, Bugs Debugging, Date & Time, PHP & MySQL, PHP & AJAX, PHP & XML, Object Oriented, PHP - For C Developers, PHP - For PERL Developers

UNIT III

PHP Form Examples: Form Introduction, Validation Example, Complete Form

PHP login Examples: Login Example, Facebook Login, Paypal Integration, MySQL Login,

UNIT IV

PHP AJAX Examples: AJAX Search, AJAX XML Parser, AJAX Auto Complete Search, AJAX RSS Feed Example

PHP XML Example: PHP - XML Introduction, Simple XML, SAX Parser Example, DOM Parser Example

UNIT V

PHP Frame Works: Frame Works, Core PHP vs Frame Works

PHP Design Patterns: Design Patterns, PHP Function Reference, PHP - Built-In Functions

References

1. The Joy of PHP Programming: A Beginner's Guide – by Alan Forbes. ...
2. PHP & MySQL Novice to Ninja – by Kevin Yank. ...
3. Head First PHP & MySQL – by Lynn Beighley & Michael Morrison. ...
4. Learning PHP, MySQL, JavaScript, and CSS: A Step-by-Step Guide to Creating Dynamic Websites – by Robin Nixon.
5. PHP & MySQL Web Development – by Luke Welling & Laura Thompson
6. PHP & MySQL: The Missing Manual – by Brett McLaughlin
7. PHP: A Beginner's Guide – by Vikram Vaswani
8. Learn PHP & MySQL – Zero to Hero Programming Crash Course – by Paul Madoff
9. Murach's PHP & MySQL – by Joel Murach & Ray Harris
10. Programming PHP – by Kevin Tatroe, Peter MacIntyre & Rasmus Lerdorf “Foreword By: Michael Bourque”

MCA 303: DATABASE MANAGEMENT SYSTEMS

Unit- I

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Unit- II

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Unit- III

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Unit- IV

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit- V

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version schemes, Recovery with concurrent transaction. Transaction Processing in Distributed system, data fragmentation. Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database.

References

1. Date C J, "An Introduction To Database System", Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", Tata Mcgraw-hill Education (India) Pvt. Ltd.
3. Elmasri, Navathe, "Fundamentals Of Database Systems", Pearson Education New Delhi India.
4. G.K. Gupta, "Database Management System", Tata Mcgraw-hill Education (India) Pvt. Ltd.
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication Pvt. Ltd. New Delhi.
6. Majumdar & Bhattacharya, "Database Management System", Tata Mcgraw-hill Education Pvt. Ltd.
7. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill (India) Pvt Ltd. New Delhi.
8. Chakravarti, "Advanced Database Mngement System" Wiley Dreamtech Publications.

PAPER—IV

MCA 304: ADVANCED JAVA PROGRAMMING

Unit-1

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

Unit-2

Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.

JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

Unit-3

Java Beans: Application Builder tools, The bean developer kit(BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB),

Unit-4

Introduction to RMI (Remote Method Invocation): A simple client-server application using RMI.

Java Servlets: Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).

Unit-5

Advanced Java: Java Transaction API (JTA), Java Messaging Services (JMS), JINDI STRUTS, Hibernate, Spring, Real Time Tools & IDE's, Design Pattern, AJAX.

References:

1. Margaret Levine Young, "The Complete Reference Internet", Tata Mcgraw-hill Education Pvt. Ltd.
2. Thampi, "Object Oriented Programming in JAVA" Wiley Dreamtech Publication.
3. Balagurusamy E, "Programming in JAVA", Tata Mcgraw-hill Education Pvt. Ltd.
4. Dustin R. Callway, "Inside Servlets", Addison Wesley.
5. Mark Wutica, "Java Enterprise Edition", QUE.
6. Steven Holzner, "Java2 Black book", Wiley Dreamtech Publication.
7. Liang, "Introduction to Java Programming, Comprehensive Version", Pearson Education.
8. Deitel and Deitel, "Java: How to Program" PHI Learning Private Limited, Delhi India.

MCA 305 : COMPUTER BASED OPTIMIZATION TECHNIQUES

Unit I

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

Unit II

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

Unit III

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

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

Assignment Problems: Definition, Hungarian Method for AP.

Unit IV

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

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

Unit V

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

References:

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

PAPER—VI

MCA 306: DESIGN AND ANALYSIS OF ALGORITHMS

Unit-I

Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences and their solution methods.

Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort

Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort, Medians and order statistics

Unit-II

Advanced Data Structure: Red Black Trees, Augmenting Data Structure, Binomial Heap, B-Tree, Fibonacci Heap, and Data Structure for Disjoint Sets, All kinds of Algorithms on these data structures, Dictionaries and priority Queues, mergeable heaps, concatenable queues

Unit-III

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis

Unit-IV

Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem

Unit-V

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness, Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials and FFT, Number Theoretic Algorithms

References

1. Thomas H Cormen Leiserson "Introduction to Algorithms", PHI Learning Private Limited, Delhi India.
2. Sara Baase and Allen Van Gelder ,Computer Algorithms : "Introduction to Design and Analysis", Pearson Education
3. Jon Kleinberg and Eva Tardos "Algorithm Design", Pearson Education
4. Brassard Bratley "Fundamental of Algorithms", PHI Learning Private Limited, Delhi India.
5. M T Goodrich "Algorithms Design", John Wiley
6. Aho, "Design and Analysis of Computer Algorithms", Pearson Education.
7. Horowitz and Sahani , "Fundamentals of Computer Algorithms", Galgotia Publications Pvt Ltd Delhi India.

MCA -307 : OPERATING SYSTEM LAB

1. To implement CPU Scheduling Algorithms

- ☐ FCFS
- ☐ SJF
- ☐ SRTF
- ☐ PRIORITY
- ☐ ROUND ROBIN

2. Simulate all Page Replacement Algorithms

- ☐ FIFO
- ☐ LRU

3. Simulate Paging Technique of Memory Management

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

MCA -308: PHP Lab

1. PHP Basic
2. PHP arrays
3. PHP for loop
4. PHP functions
5. PHP classes
6. PHP Regular Expression
7. PHP Date
8. PHP String
9. PHP Math
10. PHP JSON
11. PHP Searching and Sorting Algorithm

MCA -309: DBMS Lab

The programme to be implemented using SQL

1. Create Table, SQL for Insertion, Deletion, Update and Retrieval using aggregating functions.
2. Write Programs in PL/SQL, Understanding the concept of Cursors.
3. Write Program for Join, Union & intersection etc.
4. Creating Views, Writing Assertions, Triggers.
5. Creating Forms, Reports etc.
6. Writing codes for generating read and update operator in a transaction using different situations.
7. Implement of 2PL concerning central algorithm.
8. Developing code for understanding of distributed transaction processing.

Students are advised to use Developer 2000 Oracle 8+ version for above experiments. However, depending on the availability of Software's students may use power builder/SQL Server/DB2 etc. for implementation.

SQL COMMANDS]

1. Using Select queries , where clause, order by clause, distinct keywords etc on a sample database. Create a sample Relational Database.
- 2) To create a table, alter and drop table.
- 3) To perform select, update, insert and delete operation in a table.
- 4) To make use of different clauses viz where, group by, having, order by, union, interUNIT, set difference.
- 5) To study different constraints.

[SQL FUNCTION]

- 6) To use oracle function viz aggregate, numeric, conversion, string function.
- 7) To understand use and working with joins.
- 8) To understand use and working of sub-queries.
- 9) To make use of transaction control statement viz rollback, commit and save point.
- 10) To make views of a table.
- 11) To make indexes of a table.
- 12) To inbuilt SQL function to create database.

[PL/SQL]

- 13) Introduction to SQL & PL/SQL
- 14) To implement Cursor on a table.
- 15) To implement trigger on a table
- 16) Creating Procedures and Function.
- 17) To implement control structure.
- 18) To implement Packages.

MCA 310: JAVA PROGRAMMING LAB

1. Write a program in Java for illustrating, overloading, over riding and various forms of inheritance.
2. Write programs to create packages and multiple threads in Java.
3. Write programs in Java for event handling Mouse and Keyboard events.
4. Using Layout Manager create different applications.
5. Write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing/AWT.
6. Using Java create Applets.
7. Use Java Language for Client Server Interaction with stream socket connections.
8. Write a program in java to read data from disk file.

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| | THEORY SUBJECT | | | | | | | | | | |
| 1 | MCA 301 | Operating Systems | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 2 | MCA 302 | PHP Programming | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 3 | MCA 303 | Database Management System | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 4 | MCA 304 | Advanced Java Programming | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 5 | MCA 305 | Computer Based Optimization Techniques | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| 6 | MCA 306 | Design & Analysis of Algorithms | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| | Practical | | | | | | | | | | |
| 7 | MCA 307 | Operating Systems Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 8 | MCA 308 | PHP Programming Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 9 | MCA 309 | Database Management System Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 10 | MCA 310 | Java Programming Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
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| | | | | | | CT | TA | Total | | | |
| THEORY SUBJECT | | | | | | | | | | | |
| 1 | MCA 401 | Management Information Systems | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 2 | MCA 402 | Web Technology | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 3 | MCA 403 | Distributed system | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 4 | MCA 404 | Artificial Intelligence | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 04 |
| 5 | MCA 405 | Mobile Computing | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| 6 | MCA 406 | Automata and Compiler design | 3 | 1 | 0 | 20 | 10 | 30 | 70 | 100 | 04 |
| Practical | | | | | | | | | | | |
| 7 | MCA 407 | Mini Project | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 8 | MCA 408 | Web Technology Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 9 | MCA 409 | Distributed system Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| 10 | MCA 410 | Artificial Intelligence Lab | 0 | 0 | 3 | 10 | 10 | 20 | 30 | 50 | 02 |
| | | Total | 18 | 6 | 12 | - | - | - | - | 1000 | 32 |

PAPER—I

MCA 401: MANAGEMENT INFORMATION SYSTEMS

Unit 1: Foundation of Information Systems: Introduction to information system in business, fundamentals of information systems, Solving business problems with information systems, Types of information systems, Effectiveness and efficiency criteria in information system.

Unit 2: An overview of Management Information Systems: Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, MIS & Information Resources Management, End user computing, Concept of an MIS, Structure of a Management information system.

Unit 3: Concepts of planning & control: Concept of organizational planning, The Planning Process, Computational support for planning, Characteristics of control process, The nature of control in an organization.

Unit 4: Business applications of information technology: Internet & electronic commerce, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information System for Managerial Decision Support, Information System for Strategic Advantage.

Unit 5: Managing Information Technology: Enterprise & global management, Security & Ethical challenges, Planning & Implementing changes.

Advanced Concepts in Information Systems: Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management, and Procurement Management.

References

- 1) Brian, “Management Information System”, Tata Mcgraw-hill Education Pvt. Ltd.
- 2) Gordon B. Davis & Margrethe H. Olson, “Management Information System”, Tata Mcgraw-hill Education Pvt. Ltd.
- 3) Brian, “Introduction to Information System”, Tata Mcgraw-hill Education Pvt. Ltd.
- 4) Murdick, “Information System for Modern Management”, PHI Learning Private Limited, Delhi India.
- 5) Jawadekar, “ Management Information System”, Tata Mcgraw-hill Education Pvt. Ltd.
- 6) Jain Sarika, “Information System”, PPM Publication.
- 7) Davis, “Information System”, Palgrave Macmillan.

PAPER—II

MCA 402: WEB TECHNOLOGY

Unit I: Introduction:

Introduction to web, protocols governing the web, web development strategies, Web applications, web project, web team.

Unit II: Web Page Designing:

HTML: list, table, images, frames, forms, CSS;

XML: DTD, XML schemes, presenting and using XML

Unit III: Scripting:

Java script: Introduction, documents, forms, statements, functions, objects; event and event handling; introduction to AJAX, VB Script

Unit IV: Server Site Programming:

Introduction to active server pages (ASP), ASP.NET, java server pages (JSP), JSP application design, tomcat server, JSP objects, declaring variables, and methods, debugging, sharing data between JSP pages, Session, Application: data base action , development of java beans in JSP, introduction to COM/DCOM.

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.

References

- 1.Xavier, C, “ Web Technology and Design” , New Age International.
- 2.Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication.
- 3.Ramesh Bangia, “Internet and Web Design” , New Age International
- 4.Bhave, “Programming with Java”, Pearson Education
- 5.Ullman, “PHP for the Web: Visual QuickStart Guide”, Pearson Education
- 6.Deitel, “Java for programmers”, Pearson Education

PAPER—III

MCA 403: DISTRIBUTED SYSTEMS

Unit-I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models. Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks. Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.

Unit-II

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms. Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Unit-III

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

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

Unit-IV

Failure Recovery in Distributed Systems: Concepts in Backward and Forward recovery, Recovery in Concurrent systems, obtaining consistent Checkpoints, Recovery in Distributed Database Systems. Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.

Unit -V

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

REFERENCES:

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

PAPER—IV

MCA 404: ARTIFICIAL INTELLIGENCE

Unit-I

Introduction : Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

Unit-II

Introduction to Search : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

Unit-III

Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

Unit-IV

Machine Learning : Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data - EM algorithm, Reinforcement learning,

Unit-V 5

Pattern Recognition : Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

REFERENCES:

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Pearson Education
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, McGraw-Hill
3. E Charniak and D McDermott, “Introduction to Artificial Intelligence”, Pearson Education
4. Dan W. Patterson, “Artificial Intelligence and Expert Systems”, Prentice Hall of India,

PAPER—V

MCA 405: MOBILE COMPUTING

Unit – I Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM:air -interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Unit – II Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit – III Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit – IV Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit – V Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

References:

1. J. Schiller, “Mobile Communications”, Addison Wesley.
2. Charles Perkins, “Mobile IP”, Addison Wesley.
3. Charles Perkins, “Ad hoc Networks”, Addison Wesley.
4. Upadhyaya, “Mobile Computing”, Springer New York.

PAPER VI

MCA 406: AUTOMATA AND COMPILER DESIGN

UNIT I

COMPILERS: GRAMMARS & AUTOMATA:- Languages – Grammars – Types of grammars – Context free grammar - regular expression - Recognizing of patterns - finite automation (deterministic & non deterministic) Conversion of NDFA to DFA - Conversion of regular expression of NDFA – Thompson’s construction- minimization of NDFA –Derivation - parse tree – ambiguity, CNF, GNF, Mealy and Moore machine, push down automata, Turing machine

UNIT II

LEXICAL ANALYSIS:- Lexical analysis- handles - token specification - design of lexical analysis (LEX) - Automatic generation of lexical analyzer - input buffering - A language for specifying lexical analyzers - implementation of lexical analyzer

UNIT III

SYNTAX ANALYSIS – PARSING:- Definition - role of parsers - top down parsing - bottom-up parsing - Left recursion - left factoring - Handle pruning , Shift reduce parsing - operator precedence parsing – FIRST- FOLLOW- LEADING- TRAILING- Predictive parsing - recursive descent parsing. LR parsing – LR (0) items - SLR parsing – Canonical LR - LALR parsing - generation of LALR - Ambiguous grammars - error recovery

UNIT IV - SYNTAX DIRECTED TRANSLATION:- Intermediate Languages - prefix - postfix - Quadruple - triple - indirect triples – syntax tree- Evaluation of expression - three-address code- Synthesized attributes – Inherited attributes – Conversion of Assignment statements- Boolean expressions –Backpatching - Declaration - CASE statements.

UNIT V -CODE OPTIMIZATION:- Local optimization- Loop Optimization techniques – DAG – Dominators- Flow graphs – Storage allocations- Peephole optimization – Issues in Code Generation.

References:-

1. Alfred V Aho , Jeffery D Ullman , Ravi Sethi, " Compilers , Principles techniques and tools ", Pearson Education 2011
2. Raghavan V., “Principles of Compiler Design”, Tata McGraw Hill Education Pvt. Ltd., 2010.
3. David Galles, “Modern Compiler Design”, Pearson Education, Reprint 2012.
4. Dasaradh Ramaiah. K., “Introduction to Automata and Compiler Design”, PHI, 2011

MCA 407: MIS LAB/ MINI PROJECT

Use of designer tools like for making DFD/ERDs using **process analyst tool** or any other tool etc.

- Laboratory experiments in use of interactive SQL and other 4GLs.
- Designing and implementing fully functional information system by using any language.
- Develop software for implementation of information system for the supply chain management.
- Develop the software module for the testing of the software routines.

Note : Students are advised to use **Oracle 91, JAVA2, and Visual Basic 6**. However depending upon the availability of software's, Mini project may also be planned & carried out throughout the semester to understand the important concepts of database and testing until the end of semester.

MCA 408: Web Technology Lab

Objectives:-

1. Write HTML/Java scripts to display your CV in navigator, your Institute website, Department Website and Tutorial website for specific subject
2. Design HTML form for keeping student record and validate it using Java script.
3. Write an HTML program to design an entry form of student details and send it to store at database server like SQL, Oracle or MS Access.
4. Write programs using Java script for Web Page to display browsers information.
5. Write a Java applet to display the Application Program screen i.e. calculator and other.
6. Writing program in XML for creation of DTD, which specifies set of rules. Create a style sheet in CSS/ XSL & display the document in internet explorer.
7. Using ASP for server side programming, ASP for user name and password and to retrieve & match the value. It display success and failure messages. ASP for creating text file local drive, ASP for keeping the student record in database.
8. Program to illustrate JDBC connectivity. Program for maintaining database by sending queries. Design and implement a simple servlet book query with the help of JDBC & SQL. Create MS Access Database, Create an ODBC link, Compile & execute JAVA JDVC Socket.
9. Design and implement a simple shopping cart example with session tracking API.

MCA 409: DISTRIBUTED SYSTEM LAB

The following programs may be developed preferably on 'UNIX' platform:-A part from the above other problems may be given as per Course Instructor.

1. Simulate the functioning of Lamport's Logical Clock in 'C'.
2. Simulate the Distributed Mutual Exclusion in 'C'.
3. Implement a Distributed Chat Server using TCP Sockets in 'C'.
4. Implement RPC mechanism for a file transfer across a network in 'C'
5. Implement 'Java RMI' mechanism for accessing methods of remote systems.
6. Simulate Balanced Sliding Window Protocol in 'C'.
7. Implement CORBA mechanism by using 'C++' program at one end and 'Java program on the other.

MAC 410: ARTIFICIAL INTELLEGENCE LAB

1. Study of Uniformed search strategies
2. Study of Informed search strategies
3. Study of Local search algorithms and optimistic problems
4. Study of Adversarial Search, Search for games
5. Study of Alpha - Beta pruning.
6. Theory of first order logic
7. EM algorithm
8. Statistical learning and Naive Bayes models
9. Study of PCA, LDA, NN, SVM and K – means clustering.