

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA - III semester

Code	Subject	T	P
MCA 3.1	Data Base Management System	4	-
MCA 3.2	Computer Communication	4	-
MCA 3.3	UNIX Programming	4	-
MCA 3.4	Management Information Systems	4	-
MCA 3.5	Computer Graphics	4	-
MCA 3.6	Data Base Management System Lab	-	4
MCA 3.7	UNIX Programming Lab	-	4

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA 3.1 DATABASE MANAGEMENT SYSTEMS

UNIT I:

Data base System Applications, data base System VS file System, View of Data, Data Abstraction, Instances and Schemas, data Models, the ER Model, Relational Model, Other Models, Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT II:

Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra and Calculus: Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT III:

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOTR – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT IV:

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form.

UNIT V:

Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery.

UNIT VI:

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking. Crash recovery: Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing – recovering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

UNIT VII:

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

UNIT VIII:

Overview of Query Evaluation: The System Catalogue – Introduction to Operator Evaluation – Algorithm for Relational Operations. Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure. Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Extendable vs. Linear hashing.

TEXT BOOKS :

1. Data base Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, TMH
2. Data base System Concepts, 6/e, Silberschatz, Korth, TMH

REFERENCE BOOKS:

1. Data base Management System, 5/e, Elmasri Navathe, Pearson
2. Introduction to Database Systems, 8/e, C.J.Date, Pearson
3. Data base Systems design, Implementation, and Management,5/e, Rob , Coronel, Thomson
4. Database Management System, Connolly Begg, Pearson
5. Database Management systems, Farcia-Molina Ullman Widom, Pearson
6. Database Management Systems, Majumdr, Bhattacharyya, TMH ,96
7. Database System Concepts, Peter ROB,Coronel,Cengage.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA 3.2 COMPUTER COMMUNICATIONS

UNIT I:

Network Hardware reference model: Transmission media, Narrowband ISDN, Broad band ISDN, ATM.

UNIT II:

The data Link layer : Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding window protocols : Data link layer in HDLC, Internet and ATM.

UNIT III:

Channel allocation methods: TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard 802 for LANS – Ethernet, Token Bus, Token ring, Bridges.

UNIT IV:

Network Layer Routing Algorithms: Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention policies, Choke packets and Load shedding.

UNIT V:

Internet Working : Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, OSPF, BGP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

UNIT VI:

The Transport Layer: Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, end to end protocols : UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – BLAST, CHAN, SELECT, DCE.

UNIT VII:

Application Layer: Network Security, Cryptographic Algorithms: DES, RSA. Security Mechanisms : Authentication Protocols, Firewalls.

UNIT VIII:

Application Layer : Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications : SMTP, MIME, World Wide Web : HTTP, Network Management : SNMP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

TEXT BOOKS :

1. Computer Networks and rew, Tanenbaum, 4/e, Pearson
2. Data and computer communications, stallings, 8/e, PHI

REFERENCE BOOKS

1. Data communications and networking Forouzan, 4/e, TMH
2. Computer Networks – A System Approach , Peterson ,Bruce Davie,2/e,Harcourt Asia
3. Compute communications and networking technologies, Gallo, Hancock,Cengage
4. An Engineering approach to compute networking, Kesha ,Pearson
5. Communication networks, 2/e , Leon-Garcia, TMH
6. Computer networks , Anuranjan Misra, ACME Learning
7. Computer networks, C R Sarma, Jaico,
8. Understanding data communications, Held, 7/e , Pearson

UNIT I:

Review of Unix Utilities and Shell Programming: File handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Working with the Bourne shell, What is a shell, shell responsibilities, pipes and input redirection, output redirection, here documents

UNIT II:

Shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT III:

Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, ioctl, umask, dup, dup2. The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

UNIT IV:

Unix Process:Threads and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management, fork, vfork, exit, wait, waitpid, exec, system, Threads, Thread creation, waiting for a thread to terminate, thread synchronization, condition variables, cancelling a thread, threads vs. processes, Signals, Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT V:

Data Management: Management Memory (simple memory allocation, freeing memory) file and record locking (creating lock files, locking regions, use of read/ write locking, competing locks, other commands, deadlocks). Interprocess Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes, FIFOs.

UNIT VI:

Message Queues: IPC, permission issues, Access permission modes, message structure, working message queues, Unix system V messages, Unix kernel support for messages, Unix APIs for messages, client/server example.

UNIT VII:

Semaphores: Unix system V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores.

Shared Memory: Unix system V shared memory, working with a shared memory segment, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example.

UNIT VIII:

Sockets: Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example client/server program, advanced socket system calls, socket options.

TEXT BOOKS:

1. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

2. Advanced Unix Programming, N B Venkateswarlu, BSP

REFERENCE BOOKS:

1. Unix and shell Programming, Sumitabha Das, TMH
2. A Beginner's Guide to Unix, N.P.Gopalan, B.Sivaselva, PHI
3. Unix Shell Programming, Stephen G.Kochan, Patrick Wood, 3/e, Pearson
4. Unix and shell Programming, N B Venkateswarlu, Reem, New Delhi
5. Unix Programming, Kumar Saurabh, Wiley,India
6. Unix Shell Programming, Lowell Jay Arthus & Ted Burns,3/e, GalGotia
7. Unix Concepts and Applications, Das, 4/e, TMH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA 3.4 MANAGEMENT INFORMATION SYSTEMS

UNIT I:

Management Information systems: A Framework: Importance of MIS, Management Information systems: A Concept, MIS: A Definition, Nature and Scope of MIS

Structure and Classification of MIS: Structure of MIS, MIS Classification.

UNIT II:

Information and System Concepts: Information: A Definition, Types of Information, Information Quality, Dimensions of Information, Systems: a Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System,

Information system as an Enabler: Introduction, changing concepts of IS, IS as an Enabler.

UNIT III:

Basics of Computer system: A computer System, Computer Hardware Classification, Computer Software, Programming Languages

Database Management: Introduction, Database Hierarchy, Files- The Traditional Approach, Databases- The Modern Approach, Database Structure, Database Management System, Types of Database Structures or Data Models, Structured Query Language (SQL), Normalisation, Advances in Database Technology.

UNIT IV:

Telecommunications and Networks: Telecommunications, Types of Signals, communication Channel, Characteristics of Communication Channels, Communications Hardware, Communication Networks, computer Networks in India, Applications of Communication

UNIT V:

E-Business and e-Commerce: Introduction, Cross- Functional Enterprise Information system, e-Commerce

Decision-Making and Decision-Support Systems: Decision-Making: A Concept, Simon's Model of Decision-Making, Types of Decisions, Methods for Choosing among Alternatives, Decision- Making and MIS, Decision support Systems – Why?, Decision Support Systems: A Framework, Characteristics and Capabilities of DSS

System Development Approaches: System Development Stages, System Development Approaches

UNIT VI:

Systems Analysis and Design Systems Analysis: Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools Systems Design, Design Objectives, conceptual Design, Design Methods, Detailed System Design

UNIT VII:

Implementation, Maintenance, Evaluation and Security of IS: Implementation Process, Hardware and Software selection, System Maintenance, Evaluation of MIS, IS Security, Protecting Information System, IS Controls

UNIT VIII:

Information system Planning: Information System Planning, Planning Terminology, The Nolan Stage Model, The four-Stage Model of IS Planning, Selecting a Methodology, Information Resource Management (IRM), Organisation Structure and Location of MIS

TEXT BOOKS:

1. Management Information Systems, Managerial Perspectives, 2/e, D P Goyal, Macmillan.
2. Management Information Systems: Managing the Digital Firm, 10/e, Laudon, Kenneth, PHI

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

REFERENCE BOOKS:

1. Management Information systems, Conceptual foundations, structure and development, 2/e, Gordon B. Davis, Margrethe H. Olson, TMH
2. Management Information systems, 7/e, James A O'Brien, George M Marakas, TMH
3. Management Information systems, Mahadeo Jaiswal, Monika Mital, Oxford Higher Education
4. Management Information systems, 9/e, James A O'Brien, George M Marakas, Ramesh Behl, TMH
5. Management Information systems, The manager's view, Robert Schultheis, Mary sumner, TMH
6. Management Information System, W.S Jawadekar, TMH.
7. Management Information System, David Kroenke, TMH.
8. MIS and Corporate Communications, Wadwha, Jimmy Dawar, P.Bhaskara Rao, Kanishka pub.
9. Managing Information Technology, 6/e, Carol V. Brown, Daniel W. DeHayes, Jeffrey A. Hoffer, Martin, E. Wainright, and William C. Perkins. 2008, PHI
10. Information Technology for Management: Transforming Organizations in the Digital Economy, Turban, Efraim, Ephraim McLean, and James Wetherbe. 2007, John Wiley & Sons.
11. Management Information Systems, Nirmalya Bagchi, Vikas
12. Management Information Sysyets, Indrajit Chatterje, PHI

UNIT I :

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.

UNIT II :

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.

UNIT III :

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. (p.nos 204-227 of text book-1).

UNIT IV :

2-D viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

UNIT V :

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.

UNIT VI :

3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing : Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping

UNIT VII :

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

UNIT VIII :

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

TEXT BOOKS:

1. Computer Graphics *C version*, Donald Hearn, M.Pauline Baker, Pearson
2. Computer Graphics Principles & practice, 2/e, Foley, VanDam, Feiner, Hughes, Pearson

REFERENCE BOOKS:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, 2/E, PHI
2. Computer Graphics, Zhigang xiang, Roy Plastock, Schaum's outlines, 2/E, TMH
3. Procedural elements for Computer Graphics, David F Rogers, 2/e, TMH
4. Principles of Interactive Computer Graphics, Neuman , Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

7. Computer Graphics, Shirley, Marschner, Cengage
8. Computer Graphics, Rajesh Maurya, Wiley, india
9. Computer Graphics Pradeep Bhatiya, IK intentional

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA 3.6 DBMS Lab

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
11. Create table for various relation
12. Implement the query in sql for a) insertion b) retrieval c) updation d) deletion
13. Creating Views
14. Writing Assertion
15. Writing Triggers
16. Implementing operation on relation using PL/SQL
17. Creating Forms
18. Generating Reports

Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory etc.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
M.C.A II YEAR I SEMESTER

MCA 3.7 UNIX PROGRAMMING LAB

Note: Student needs exposure to all programs, but expected to complete at least 15

1. Programs using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process cots : sniffer
5. Program using TCP sockets (Client and Server)
6. Program using UDP sockets (Client and Server)
7. Program using URL class to download webpages
8. Write a shell script for sorting, searching and insertion/deletion of elements in a list
9. Create two processes to run a for loop, which adds numbers 1 to n, say one process adds odd numbers and the other even
10. By creating required number of processors, simulate a communication between them as below:
11. Create a file that is shared among some users, write a program that finds whether a specific user has created read and write operations on the file
12. Create a shared lock and exclusive lock among some number of processes, say 1 to 10 on any data of 100 elements. For example, process 5 wants a shared lock on elements 5 to 50 or process 8 wants exclusive lock on elements 32 to 45. Create access violations on the locks and show what occurs, then.
13. Write a program demonstrating semaphore operation on a shared file for reading but not writing
14. Create a distributed key among some processes which exchange messages of the form (m, Ti, I) for resource sharing, where m=request, reply, release, Ti=time stamp and I=process id
15. Write a program demonstrating mutual exclusion principle
16. Write a program which reads a source file name and destination file name using command line arguments and then converts into specified format (i.e. either from lower case to upper case or upper case to lower case or inverse of each)
17. Write a program which takes a set of filenames along with the command line and print them based on their size in bytes either ascending or descending order
18. Write a program which takes directory name along the command line and displays names of the files which are having more than one link
19. Write a program to demonstrate the use of temporary files
20. Write a program to demonstrate the use of exec family functions
21. Write a program to display the good morning, good afternoon, good evening and good night depending on the users log on time
22. Write a program to demonstrate the working of simple signal handler that catches either of the two user defined signals and prints the signal number
23. Write a program to demonstrate the locking mechanism while accessing the shared files
24. Write a shell script containing a function mycd() using which, it is possible to shuttle between directories
25. write a shell script which works similar to the wc command. This script can receive the option -l, -w, -c to indicate whether number of lines/words/characters
26. Write a program to print prime numbers between x and y Write a shell script which deletes all lines containing the word
27. Write a shell script which deletes all lines containing the word "UNIX" in the files supplied as arguments to this shell script
28. Write a shell script which displays a list of all files in the current directory to which you have read, write and execute permissions
29. Write a menu-driven program which has the following options:
30. Write a shell script for renaming each file in the directory such that it will have the current shell's PID as an extension. The shell script should ensure that the directories do not get renamed
31. Write a program which demonstrates the shared memory functions

Dr E.V.Prasad, Chairman, B.O.S-CSE.