M.Tech I YEAR I SEMESTER

COMPUTER SCIENCE

COURSE STRUCTURE

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<td>CS LAB- I(COVERING THE EXPERIMENTS OF DATA STRUCTURES &amp; DATABASE MANAGEMENT SYSTEMS)</td>
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DATA STRUCTURES

UNIT I:

UNIT II:

UNIT III:
Dictionaries, ADT, The List ADT, Stack ADT, Queue ADT, Hash Table Representation, Hash Functions, Collision Resolution-Separate Chaining, Open Addressing-Linear Probing, Double Hashing.

UNIT IV:

UNIT V:

TEXT BOOKS:
2. Data Structures, Algorithms and Applications in java, 2/e, Sartaj Sahni, University Press.

REFERENCES BOOKS:
1. Data Structures And Algorithm Analysis, 2/e, Mark Allen Weiss, Pearson.
2. Data Structures And Algorithms, 3/e, Adam Drozdek, Cenage.
4. Data Structures, Algorithm and OOP,Heilman, TMH.
9. Data Structures, Seymour Lipschutz, Schaum’s Outlines, TMH.
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MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

UNIT I :
Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

UNIT II
Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

UNIT III

UNIT IV

UNIT V
Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, PlanarGraphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

TEXT BOOKS:
1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH

REFERENCE TEXTBOOKS:
1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra,TMH
2. Discrete Mathematics, Schaum’s Outlines,Lipschutz,Lipson,TMH.
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005
11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
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COMPUTER ORGANIZATION

UNIT I: Number Systems And Computer Arithematic

UNIT II: Combinational and Sequential Circuits
Decoders, Encoders, MultiPlexers, Half and Full Adders, Shift Registers, Flip-Flops, Binary Counters, Memory Unit.

UNIT III: Memory Organisation
Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory Concept.

UNIT IV: ALU Design
 Addition and Subtraction, Sign and Unsigned Numbers, Multiplication and Division Algorithms, BCD Adders.

UNIT V: Input–Output Organisation
Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, DMA, Input Output Processor, Serial Communication.

TEXT BOOKS:
2. Micro Processor and Interfacing, 2/e, Douglas V. Hall, TMH.

REFERENCE BOOKS:
1. Digital Logic and Computer Organisation, Rajaraman, Radha Krishnan, PHI.
2. Micro Computer Systems : 8086/8088 family, 2/e, Liu, Gibson, PHI.
4. Computer Organisation, 5/e, Hamacher, Vranesic, TMH.
6. Computer Organisation and Design, PalChowdary, PHI.
7. Computer Systems Organisation, jotwani, TMH.
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DATABASE MANAGEMENT SYSTEMS

UNIT I

UNIT II
Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT III

UNIT IV
UNIT V
Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.
Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.
Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOKS:

REFERENCE BOOKS:
1. Database Management System Oracle SQL and PL/SQL, P.K. Das Gupta, PHI.
8. Introduction to Database Systems, C.J. Date, Pearson Education.
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OPERATING SYSTEMS

UNIT-I:
Overview of Operating System

UNIT-II:
Process Management

UNIT-III:
Synchronization
Importance of Synchronization, The Critical-Section Problem, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples
Principles Of Deadlock – Deadlock System Model, Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Detection And Avoidance, Recovery Form Deadlock.

UNIT-IV:
Memory Management Strategies & Virtual Memory Management
Secondary-Storage Structures & I/O Systems
Overview of Mass-Storage Structure, Disk Structure, Disk Scheduling, Disk Management, RAID Structure, I/O Hardware, Application Interface, Kernel I/O Subsystem.

UNIT-V:
File System Interface And Implementation

TEXT BOOKS:
1. Operating System Principles,7/E,Abraham Silberschatz,Peter Baer Galvin,Greg Gagne,
    WILEY INDIA publications.

REFERENCE BOOKS:
1. Operating Systems, 2/e,Dhamdhre.
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DATA COMMUNICATIONS AND COMPUTER NETWORKS

UNIT I:
Network Hardware reference model: Transmission media, Narrowband ISDN, Broad band ISDN, ATM.
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 II:
Channel allocation methods: TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard BO2 for LANS – Ethernet, Token Bus, Token ring, Bridges.

UNIT III:
Internet Working: Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, DSPF, BOP, 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 IV:
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 V:

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. Computer communications and networking technologies, Gallo, Hancock,Cengage
4. An Engineering approach to compute networking, Kesha ,Pearson
5. Communication networks, 2/e , Leon-Garcia, TMH
7. Computer networks, C R Sarma, Jaico,
8. Understanding data communications, Held, 7/e , Pearson
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CS LAB 1

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

DATA STRUCTURES LAB

Exercise 1:
   a) Write C program to perform Linear search for a Key value in a given list.
   b) Write C program to perform Binary search for a Key value in a given list.

Exercise 2:
   a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order
   b) Write C program that implement Quick sort, to sort a given list of integers in ascending order
   c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order

Exercise 3:
   a) Write C program that implement stack (its operations) using arrays
   b) Write C program that implement stack (its operations) using Linked list

Exercise 4:
   a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
   a) Write C program that implement Queue (its operations) using arrays.
b) Write C program that implement Queue (its operations) using linked lists

**Exercise 5:**
- a) Write a C program that uses functions to create and perform various operations on a singly linked list
- b) Write a C program that uses functions to create and perform various operations on a doubly linked list
- c) Write a C program that uses functions to create and perform various operations on a circular linked list

**Exercise 10:**
- a) Write a C program to Create a Binary Tree of integers
- b) Write a recursive C program for Traversing a binary tree in preorder, in order and post order.

**Exercise 11:**
- a) Write a C program to Create and perform various operations on a BST