

# **Computer Networks**

**CSE-303**

**L T P**

**Theory: 75**

**3 2 -**

**Sessional: 50**

## **Unit – 1**

### **Introduction**

Network functions, Network topology, Network services, switching approaches, transmission media and systems, multiplexing and signaling techniques, error detection and correction, ISDN and BISDN.

### **Layered Architecture**

Examples, OSI Reference Model, overview of TCP/IP architecture, socket system calls, SNMP, e-mail.

## **Unit – 2**

### **Peer-to-Peer Protocols**

Protocols, service models and end-to-end requirements, ARQ, sliding window, RTP, HDLC, PPP Protocols, statistical multiplexing.

### **MAC and LAN Protocols**

MAC, random access-ALOHA, slotted ALOHA, CSMA, CSMA/CD, canalization- FDMA, TDMA, CDMA, canalization in cellular networks, LAN standards- 802.3, 802.4, 802.5, 802.6, FDDI, 802.11, LAN Bridges.

## **Unit – 3**

### **Packet switching Networks**

Packet N/W topology, Datagram's and virtual circuits- structure of switch/router, connectionless and virtual circuit packet switching, X.25, Routing algorithms, ATM networks, traffic management and QoS- FIFO, priority queues, fair queuing, congestion control techniques.

## Unit – 4

### TCP/IP

Architecture, internet protocol –IP packet, addressing, subnet addressing, IP routing, CIDR, ARP, RARP, ICMP, reassembly, Ipv6, UDP, transmission control protocol- TCP, reliable stream service, operation, protocol, DHCP, Mobile IP, internet routing protocols, multicast routing.

**NOTE:** At least 1 question must be set from each unit.

### BOOKS

1. Leon Gareia and Indra Widjaja: communication networks: fundamental concepts and key architecture. TMH, 2000.
2. S. Tanenbaum: computer networks, 3/e, PHI, 1997.
3. Forouzan, Coombs,\ and Fegan: introduction to data communication and networks, TMH, 1999.
4. William Stallings: data and computer communication 5/e,PHI.

## **Operating systems**

**CSE - 307**

**L T P**

**Theory: 75**

**3 1 -**

**Sessional: 25**

### **Unit - 1**

#### **File & CPU management**

Operating system functions and characteristics, historical evolution of operating systems, Real time systems, Distributed systems, methodologies for implementation of O/S services system calls, system programs, interrupt mechanisms ,concept of threading File systems: Functions of the system, File access and allocation methods, Directory systems: Structured organization, directory and file protection mechanisms, implementation issues; hierarchy of file and device management CPU scheduling: level of scheduling, comparative study of scheduling algorithms, multiple processor scheduling

### **Unit - 2**

#### **Storage & Device management**

Storage management: Storage allocation methods: single contiguous allocation, multiple contiguous allocation, Paging, Segmentation, Combination of paging and segmentation, virtual memory concepts, Demand paging, page replacement algorithms, thrashing. Device management: hardware organization, Device scheduling policies & I/O management Protection: Mechanisms and Policies, implementation

### **Unit - 3**

#### **Deadlock and Concurrency control**

Deadlock: Deadlock characterization, deadlock prevention and Voidance, deadlock detection and recovery, practical considerations

Concurrent Processes: critical section problem, Semaphores, Classical process coordination problems and their solutions, interprocess communications, multithreading.

### **Unit - 4**

#### **Case Studies**

DOS: study of DOS with reference to storage management, device management, file system, interrupt mechanism.

UNIX: Study of UNIX with reference to storage management, file system, concurrency control, CPU scheduling.

**NOTE:** Two questions will be set from each section.

**BOOKS**

1. Peterson, J.L & Silberschatz,: operating system concepts Addison Wesley treading
2. Branch Hensom: operating system principles, Prentice Hall of India
3. Tanenbaum.A.S: Operating System
4. Hansen,A.S : Operating systems
5. Haberman, A.N: Introduction to operating systems

# Design and Analysis of Algorithms

CSE-301

L T P

Theory: 100

4 1 -

Sessional: 25

## Unit – 1

### Introduction

Review of elementary data structures, analyzing algorithms, asymptotic notation, recurrence relations, Hash tables. Binary search trees.

### Sorting and Order Statistics

Heap sort, Priority queues, Quick sort, Sorting in linear time, medians and order statistics, dynamic order statistics

## Unit – 2

### Advanced Design and Analysis Techniques

Dynamic programming-Elements, Matrix-Chain multiplication, longest common subsequence, optimal polygon triangulation, Greedy algorithms-Elements, activity-section problem, Huffman codes, task scheduling problem

### Advanced Data Structures

Operations in B-trees, Binomial heaps, Fibonacci heaps, data structure for disjoint sets, strings

## Unit – 3

### Graph Algorithms

Review of graph algorithms, topological sort, strongly connected components, minimum spanning trees-Kruskal and Prim's, single source shortest paths, relaxation Dijkstra's algorithm, Bellman-Ford algorithm, Single source shortest path for directed acyclic graphs, difference constraints and shortest paths, all pairs shortest paths-shortest paths and matrix multiplication, Floyd-Warshall algorithm, Johnson's algorithm.

## Unit – 4

### Flow and Sorting Networks

Flow networks, Ford-Fulkerson method, Maximum bipartite matching, sorting networks, comparison networks, the zero-one principle Bionic sorting network, merging network.

**NOTE:**The question paper will contain 8 questions in all.the student will be required to anser any five.At least one question will be set from each unit and atmost one from unit 1 and 4 each

### **BOOKS**

1. Coremen,Leiserson and Rivest:introduction to algorithms 2/e PHL
2. Horowitz.Ellis and sahani.Sartaj:fundamentals of computer algorithms, galgotia publications
3. Aho.hopcroft and Ullman:the design and analysis of computer algorithms

## Automata Theory

CSE-305

L T P

Theory : 100

4 2 -

Sessional : 50

### Unit - 1

Finite Automata and Regular Expression : Finite State System, Basic Definition Non-Deterministic finite Automata (NFA). Deterministic finite Automata (DFA). Equivalence of DFA and NFA. Finite Automata with E-Moves. Regular expression. Equivalence of finite Automata and expression. Regular expression conversion and vice versa.

### Unit - 2

Introduction to Machines : Concept of basic machines, Properties and limitations of FSM, Moore and Mealy Machines, Equivalence of Moore and Mealy Machines. Conversion of NFA and DFA by Arden's method.

Properties of Regular sets : The Pumping Lemma for regular sets, Application of the pumping Lemma, Closure Properties of regular sets, Myhill-Nerode. Theorem and minimization of Finite Automata, Minimization Algorithm.

### Unit - 3

Grammars : Definition, Context free and Context sensitive Grammar, Ambiguity, Regular grammar, Reduced forms, Removal of useless symbols and unit production. Chomsky Normal Form (CNF), Greibach Normal Form (GNF).

Pushdown Automata : Introduction to push-down machines. Application of push down machines.

### Unit - 4

Turing Machines, Deterministic and Non-Deterministic Turing Machines, Design of T.M. Halting Problem of T.M. PCP Problem.

Chomsky Hierarchy : Chomsky hierarchies of grammars, unrestricted grammar Context sensitive Language, Relation between languages of classes.

Computability : Basic Concepts, Primitive Recursive functions.

**Note:-**The question paper contains 8 questions in all. The students will be required to answer any five. At least one question will be set from each section.

## BOOKS

1. R. B. Patel & Prem Nath, Theory of Automata and Formal Language, Umesh Pub.
2. John C. Martin : Introduction to Languages and the Theory of Computation, MGH.
3. Lewis & Papadimitriou : Elements of the Theory of Computation PHI
4. Daniel I.A. cohen : Introduction to Computer Theory : John Wiley.
5. Introduction to Automata Theory Language & computations – Hopcroft & O.D. Ullman R. Motwani

## Operating System (Pr)

CSE-313

**L T P**

**Practical : 50**

**- - 3**

**Sessional: 50**

1. Study of H/w and S/w requirement of different operating system.
2. Implementation of contiguous, linked and indirect allocation strategies assuming randomly generated free space list.
3. Implementation of worst, best & first fit for contiguous allocation assuming randomly generated free space list.
4. Implementation of Compaction for the continually changing memory layout & calculate total movement of data.
5. Calculation of external & internal fragmentation for different programs & for different page size.
6. Implementation of resource allocation graph.
7. Implementation of Banker's algorithm.
8. Conversion of response allocation graph to wait for graph.
9. Implementation of Bernstein's condition for concurrency.
10. Implementation of Fork & Join construct.
11. Implementation of "Semaphore" for concurrency.
12. Study of system calls and various OS management services in Unix/Linux OS and their implementation.

## Advanced Technologies (Pr)

CSE – 311

L T P

Practical: 50

- - 3

Sessional: 50

1. Learn Visual Basic environment and develop simple calculator.
2. Generate an editor screen containing menus, dialog boxes etc. using visual basic.
3. Create an applet with a text field and three buttons. When you press each button , make some different text appear in text field. Add a check box to the applet created, capture the event, and insert different text into the text field.
4. Create an applet with a button and a text field . Write a handle Event() so that if the button has the focus, characters typed into it will appear in the Text Field.
5. Create your own Java Bean called Valve that contains two properties: a Boolean called 'on' and an integer called 'level'. Create a manifest file, use jar to package your bean, then load it into the bean box or into your own Beans- enabled program builder tool e.g. BDK so that you can test it.
6. Develop a servlet that gets invoked when a form on a Web page in HTML is submitted. Create a cookie object and enter/display value for that cookie.
7. Using VB develop a front end for a contact management program using a flat file database containing names, addresses, telephone numbers, e-mail addresses etc. You should be able to easily add new names to the database. When typing in the name to be looked up, use automatic name completion. The database may be distributed or centralized.
8. Java Networking – Java Sockets and RMI.
9. Programming under development tool ASP.net.

### BOOKS:

1. Core Java Volume I and II from Sun Micro Systems.
2. Huges, Java Networking, Hut Pub. Pune.
3. Java 2 : The complete Reference 4/e TMH Delhi
4. Java Beans Programming from the Ground Up : Joseph O'Neil. TMH, Delhi.
5. Java Servlets, Application Development : Karl Moss, TMH, Delhi.

## Algorithm Design (Pr)

COT-311

L T P

Practical: 25

- - 3

Sessional: 50

1. Implement the minimum cost spanning tree algorithm.
2. Implement the shortest path algorithm.
3. Implement the algorithm to compute roots of optimal subtrees.
4. An Euler circuit for an undirected graph is a path that starts and ends at the same vertex and uses each edge exactly once. A connected undirected graph  $G$  has an Euler circuit. If and only every vertex is of even degree. Give an algorithm and implement to find the Euler Circuit in a graph with  $e$  edges provided one exists.
5. Give an algorithm to determine whether a directed graph with positive and negative cost edges has negative cost cycle.
6. Write an algorithm in which given an  $n \times n$  matrix  $M$  of positive integers is given and that finds a sequence of adjacent entries starting from  $M[n,1]$  and ending at  $M[1,n]$  such that the sum of the absolute values of differences between adjacent entries is minimized. Two entries  $M[l,j]$  and  $M[k,l]$  are adjacent if

$i=k\pm 1$  and  $j=1$  OR

$l=k$  and  $j=l\pm 1$

For e.g. in the following fig. Sequence 7,5,8,7,9,6,12 is a solution

1	9	6	12
8	7	3	5
5	9	11	4
7	3	2	6

Matrix of positive integers

7. Write a complete LC branch and bound algorithm for the job sequencing with deadlines problem. Use the fixed tuple size formulation.
8. Write a LC branch and bound algorithm for the knapstack problem using the fixed tuple size formulation.
9. The postfix representation of an infix arithmetic expression LDR is defined recursively to the postfix representation of L followed by the postfix representation of R followed by 0. L & R are respectively the left and right periods of 0. Consider some examples:

<b>Infix</b>	<b>Postfix</b>
i) $a+b$	$ab+$
ii) $(a+b)*c$	$ab+c*$
iii) $(a-b)/(c+d)$	$ab+cd-$

(a) Write an algorithm to evaluate a postfix expression E. Assume E is presented as a string and that there exists an algorithm NEXT\_TOKEN(E) that returns the next token (i.e. operator or operand) in E. When all tokens in E have been extracted, NEXT\_TOKEN(E) returns. Assume that the only operators in E are binary +, -, \*, /. (Hint: Make a left to right scan of E using a stack to store operands and results. When even an operator is run in E, the top two operands on the stack are its right and left operands).

10. Write an algorithm to obtain the postfix form of an infix expression E. Again assume E has only the binary operators +, -, \*, /. (Hint: Make a left to right scan of E using a stack to store operands until both the left and right operator have been output in postfix form). Note that E may contain parenthesis

# **Business Management**

**HUT - 302E**

**L T P**

**Theory: 100**

**3 1 -**

**Sessional: 50**

## **Business Environment**

Business: Concept, nature and objectives, Social responsibility of business, Meaning of environment, constituents of business environment; economic, social, political, legal and technological environment.

## **General Management**

Management: Definition, nature and significance of management, Henry Fayol's principles of management, functions of management (i) Planning (ii) Organizing (iii) Staffing (iv) Directing and Controlling, Human Relations Approach

## **Financial Management**

Introduction to financial management; Objectives of financial decisions, Status and duties of financial executives. Financial Planning-tools of financial planning. Management of working capital; factors affecting requirements of working capital. Capital structure decisions. Features of appropriate capital structure; sources of finance.

## **Personal Management**

Production management-meaning, nature and importance; functions of personnel management-(a) managerial functions (b) operative functions. Job analysis, meaning and importance: process of job analysis, job description and job specification. Human Resource Development-Meaning and concept

## **Production management**

Production Management-Definition and objectives; Plant location-Ideal plant location, Factors affecting plant location. Work measurement- Meaning, objectives and essentials of work measurement and techniques. Production control-Meaning and importance of production control and steps involved in production control. Plant Layout-Ideal plant layout, factors affecting plant layout

## **Marketing management**

Nature, scope and importance of marketing management, Modern marketing concepts. Role of marketing in economic development, Marketing mix, Marketing information system. Meaning, nature and scope of international marketing

### **Suggested Reading:**

1. Business Environment- Francis Charunilam(Himalayas Publishing House)
2. Management-Harold, Koontz and Cyrilo Donell(McGraw Hill)
3. Principles of Personnel management-Edwin B Flippo(McGraw Hill)
4. Personnel management and industrial relations-D.C. Sharma and r. C. sharma(S J Publications, Monurt).
5. Basic Marketing-Cundiff and Still(PHI India)
6. Marketing Management-S.A. Sherlakar(Himalayas Publishing House)
7. Principles and practices of management-L.M. Prasad(S.Chand)
8. Financial Management- I. M. Pandey(Vikas Publishing House, New Delhi)
9. International Marketing-Vern Innebre and Ravi Sarathy
10. Production Management-E.S. Buffa and W. H. nTaurusat, Richard D. Irwin, Homewood, Illionis.
11. Personnel management-C. B. Mamoria (Himalayas Publishing House)