

**Bachelor of Technology (Computer Engineering )**  
**Scheme of Courses/Examination**  
**(5<sup>th</sup> Semester)**

Sr No.	Course No.	Subject	Teaching Schedule				Examination Schedule				Duration of Exam(Hours)
			L	T	P	Tot	Th	Sess	P/VV	Tot	
1	HUT –302 E	Fundamentals of Management	3	1	-	4	100	50	-	150	3
2	CSE-301	Design & Analysis of Algorithms	4	1	-	5	100	25	-	125	3
3	CSE-303	Computer Networks	3	2	-	5	75	50	-	125	3
4	CSE-305	Automata Theory	4	2	-	6	100	50	-	150	3
5	CSE-307	Operating System	3	1	-	4	75	25	-	100	3
6	CSE-311	Advance Technologies (Pr)	-	-	3	3	-	50	50	100	3
7	CSE-313	Operating System (Pr)	-	-	3	3	-	50	50	100	3
8	CSE-315	Algorithm Design(Pr)	-	-	3	3	-	50	25	75	3
9	CSE-317	Seminar	-	2	-	2	-	50	-	50	-
10	CSE-319	Training Viva						75	-	75	-
		Total	17	9	9	35	450	475	125	1050	-

## FUNDAMENTALS OF MANAGEMENT (HUT-302 E)

L	T	P
3	1	-

Theory : 100  
Sessional : 50

**Note to the paper setter:** The number of questions to be set will be seven, one from each unit. Out of these one question will be compulsory. The examinees will be required to attempt the compulsory one and any other four questions. All questions shall carry equal marks.

### **Unit 1: Financial Management**

Introduction of 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 decision, Features of appropriate capital structure , Sources of finance.

### **Unit 2: Personnel Management**

Personnel management – Meaning. nature and importance. Functions of personnel Management (a) Managerial Functions and (b) Operative functions. Job analysis-Meaning and importance. Process of Job analysis, job Description and job specification. Human Resource Development – Meaning and Concept.

### **Unit 3: Production Management**

Production Management – Definition and Objectives,  
Plant Location: Ideal Plant Location, Factors affecting plant Location.  
Plant Layout : Ideal Plant Layout, Factors affecting plant layout  
Work Measurement: Meaning , Objectives and Essentials of work Measurement  
Production Control: Meaning and importance of production control and steps involved in production control.

### **Unit 4: Marketing Management**

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

## CSE-301 (Design and Analysis of Algorithms)

**L**    **T**    **P**  
**4**    **1**    **-**

**Theory: 100**

**Sessional: 25**

### Unit 1

#### Introduction

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

Sorting and Order Statistics

Heapsort, Priority queues, Quicksort, 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 traingulation, Greedy algorithms- Elements , activity-selection problem, Huffman codes, task scheduling problem.

Advanced data Structures

Operations in B-Trees, Binomial heaps, Fibonacci heaps, data structures for disjoint sets, strings.

### Unit 3

#### Graph Algorithms

Review of graph algorithms, topological sort, strongly connected components, minimum spanning trees- Kruskal and prims, Single source shortest paths, relaxation, Dijkstras algorithm, Bellman- Ford algorithm, Single source shortest paths for directed acyclic graphs, difference constraints and shortest paths, All pairs shortest paths- shortest paths and matrix multiplication, Floyd-Warshall algorithm, Johnsons algorithm.

### Unit 4

#### Flow and Sorting Networks

Flow networks, Ford- Fulkerson method, Maximum bipartite matching, Sorting Networks, Comparison network, The zero- one principle, Bitonic sorting network, merging network

**Note:-** There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

#### Books :

1 Corman, Leiserson and Rivest : Introduction to Algorithms, 2/e, PHI

2 Horowitz, Ellis and Sahni, Sartaj : Fundamentals of Computer Algorithms. Galgotia Publications

3 Aho, Hopcroft and Ullman : The Design and Analyses of Computer Algorithms. Addison Wesley.

4 R.B.Patel, Expert Data Structures with C, Khanna Publications , Delhi, India, 2<sup>nd</sup> Edition 2004, ISBN 81-87325-07-0, pp.1-909

5 R.B.Patel & M.M.S Rauthan, Expert Data Structures with C++, Khana Publications, Delhi , India, 2<sup>nd</sup> Edition 2004, ISBN : 87522-03-8, pp.1-752

# COMPUTER NETWORKS(CSE –303)

**THEORY: 75**  
**SESSIONAL: 50**

L	T	P
3	2	-

## UNIT 1

Network functions, Network Topologies, Network Services, Switching approaches, Transmission media and systems, multiplexing and signaling techniques, Error detection and correction, ISDN and BISDN.

### **Layered architectures**

Example OSI Reference Model, Overview of TCP/IP architecture, Socket System calls, SMTP, Electronic 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**

Multiple access communication ,Random Access – ALOHA, Slotted ALOHA,CSMA, CSMA/CD, Channelization : FDMA,TDMA,CDMA , Channelization in cellular networks, LAN standards 0 802.11,LAN Bridges.

## UNIT 3

### **Packet Switching Networks**

Packet Network topology, Datagrams and Virtual Circuits – Structure of Switch / Router, Connectionless abd virtual circuit packet switching,X.25,Routing Algorithms, ATM Networks, Traffic Management and QoS – FIFO, Priority Quessues, Fair Queieing, Congestion control techniques.

## UNIT 4

### **TCP/IP**

Architecture, Internet Protocols – 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** There will be 8 questions in all. 2 questions will be set from each unit. Students have to attempt five questions selecting at least one from each unit.

### **BOOKS**

1. Leon Garrcia and Indra Widjaja: communication Networks – Fundamentals and Concepts and Key Architectures – TMH 2000.
2. A.S. Tanenbaum: Computer Networks 3/e .PHI, 1997.
3. Frozen, Coombs and Fagan: Introduction to Data Communication and Networks.TMH, 1999.
4. William Stallings: Data and Communication 5/e .PHI.

# Automata Theory

## CSE-305

**L**     **T**     **P**  
**4**     **2**     **-**

**Theory:**     **100**  
**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.

### Unit-3

**Grammars:** Definitions, Context free and Context sensitive Grammar, Ambiguity, Regular Grammar, Reduced forms, Removal of useless symbols and unit production, Chomsky Normal form (CNF), Griebach 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:** There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

### Text Books

1. R.B. Patel, & Prem Nath, Theory of Automata and Formal Languages, Umesh Publication, New Delhi, 1st Edition 2005, ISBN-81-88114-53-7, pp. 1-496.
2. John C. Martin: Introduction to Language and the Theory of Computation, MGH.

### Books

1. Lewis & Papadimitriou: Elements of the Theory of Computation. PHI.
2. Daniel I.A. Cohen: Introduction to Computer Theory: John Wiley.
3. J.E. Hopcroft and J.D. Ullman: Introduction to Automata Theory Languages and Computation, Narosa.
4. Introduction to Automata Theory, Language & computations –Hopcroft & O.D. Ullman, R. Motwani.
5. Theory of Computer Sc. (Automata, Languages & Computation): K.I.P. Mishra & N. Chandershekar.
6. Introduction to formal language & Automata- Peter Linz.

# Operating System(CSE-307)

L T P  
3 1 -

Theory: 75  
Sessionals:25

## UNIT 1

File and CPU Management:

Operating system functions and characteristics, historical evolution of operating system, Real time systems, Distributed systems, Methodologies for implementation of o/s service system calls, system programs, interrupt mechanisms, concept of threading.

File System: Functions of the systems, file access and allocation methods, Directory system: structured organization, Directory and file protection mechanism, implementation issues; hierarchy of file and device management.

CPU Scheduling: Levels of scheduling, comparative study of scheduling algorithms, multiple processor scheduling.

## UNIT 2

Storage and 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 and I/O Management.

Protection: Mechanism and Policies, implementation.

## UNIT 3

Deadlocks and Concurrency Control:

Deadlock: Deadlock characterization, Deadlock prevention and avoidance, Deadlock detection and recovery, practical considerations.

Concurrent Processes: Critical section problem, Semaphores, Classical process coordination, problems and their solutions, interprocess communication, 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: there will be 8 questions in all. Two questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

#### Books

1. Peterson, J.L. & Silberschatz, A., Operating System concepts, Addison, Wesley.
2. Brinneh, Hansen, operating system principles: Prentice Hall of India
3. Haberman, A.N. introduction to operating system, design Galgotia Publication, New Delhi.
4. Tanenbaum, A.N.: introduction to operating system
5. Hansen, P.B. Architecture of concurrent programs. PHI
6. Shaw, A.C., Logic design of operating systems, PHI.

## Algorithm Design (CSE-315)(Pr.)

L T P  
- - 3

Practical: 25  
Sessionals:50

### EXPERIEMENT

- 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 if every vertex is of even degree. Give an algorithm and implement to find the Euler Circuit in a graph with 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 nxn 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[i, j] and M[k, i] are adjacent if**

(a)  $I-k+1$  and  $j-1$  or

(b)  $I=k$  and  $j=1+-1$

For ex. In the following figure 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

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 knapsack 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. considers some examples :**

<b>Infix</b>	<b>postfix</b>
(i) a+b	ab+
(ii) (a+B)*C	ab+*

(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  $+$ ,  $-$ ,  $*$  and  $/$ . (Hint: Make a left to right scan off 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  $+$ ,  $-$ ,  $*$ , and  $/$ . (Hint: Make a left to right scan of  $E$  using a stack to store operators until both the left and right operands of an operator have been output in postfix form). Note that  $E$  may contain parenthesis.

## Operating System (CSE-313)

L T P  
- - 3

Practical: 50  
Sessionals:50

### EXPERIMENTS

- 1 Study of H/W & 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 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 program & 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.

## **Advance Technologies (Pr) (CSE-311)**

L T P  
- - 3

Practical: 50  
Sessionals:50

### EXPERIMENT

1. Learn Basics of Java language and its development libraries/ tools.
2. Generate an editor screen containing menus, dialog boxes etc using Java.
3. Create an applet with a text field and three buttons. When you press each button, make some different text appear in the text field. Add a check box to the applet created, capture the event and insert different text in the text field.
4. Create an applet with a button and a text field. Write a `handleEvent()` 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 beanbox or into your own beans enabled program builder tool.
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. Java Networking Java Sockets and RMI.
8. Programming under development tool ASP.net.
9. Using JAVA develop a front end for a contact management program using a flat file database. DB needs to be distributed or centralized.