CSC-401 DISCRETE STRUCTURE

UNIT-I

Introduction of Sets: Sets, Type of Sets, Venn Diagrams, Proofs of theorems on sets, Relation & Its types, Composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem, Function & Its Type composition of functions, Recursively defined functions, Pigeonhole principle. Theorem proving Techniques: Mathematical induction, contradiction.

UNIT-II

Groups and rings, subgroups, generators and evaluation of powers, Cosets and Lagrange's theorem, permutation groups and Burnicide's theorem, Codes and group codes, Isomorphism and automorphism, homomorphism and normal subgroups, rings, internal domains and fields, ring homomorphism, polynomial rings and cyclic codes.

UNIT-III

Proposition, First order logic, logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, quantifiers & its Types. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers.

UNIT-IV

Introduction of Graph: Definition of graphs, type of graph, Paths, Cycles and connectivity, Shortest path in weighted graph, Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

UNIT V

Boolean algebra, lattices and algebraic systems, principles of duality, Algebraic system v/s lattices, distributive and complemented lattices, Boolean lattices and Boolean algebra, uniqueness of finite Boolean algebra's, Boolean functions and Boolean expressions, prepositional calculus.

REFERENCES:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Lipschutz; Discrete mathematics (Schaum); TMH
5. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
6. Krishnamurthy V; "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
7. S k Sarkar " Discrete Mathematics", S. Chand Pub.

CSC-402 OBJECT ORIENTED PROGRAMMING & METHODOLOGY

UNIT I

Introduction: Object oriented programming, Introduction, Application, characteristics, difference between object oriented and procedure programming, Comparison of C and C++, Cout, Cin, Data Type, Type Conversion, Control Statement, Loops, Arrays and string arrays fundamentals, Function, Returning values from functions, Reference arguments, Overloaded function, Inline function, Default arguments, Returning by reference.

UNIT II

Object and Classes: Implementation of class and object in C++, access modifiers, object as data type, constructor, destructor, Object as function arguments, default copy constructor, parameterized constructor, returning object from function, Structures and classes, Classes objects and memory, static class data, Arrays of object, Arrays as class Member Data, The standard C++ String class, Run time and Compile time polymorphism.

UNIT III

Operator overloading and Inheritance: Overloading unary operators, Overloading binary operators, data conversion, pitfalls of operators overloading, Concept of inheritance, Derived class and base class, access modifiers, types of inheritance, Derived class constructors, member function, public and private inheritance.

UNIT IV

Pointer and Virtual Function: Addresses and pointers, the address-of operator & pointer and arrays, Pointer and Function pointer, Memory management: New and Delete, pointers to objects, debugging pointers, Virtual Function, friend function, Static function, friend class, Assignment and copy initialization, this pointer, dynamic type information.

UNIT V

Streams and Files: Streams classes, Stream Errors, Disk File I/O with streams, file pointers, error handling in file I/O with member function, overloading the extraction and insertion operators, memory as a stream object, command line arguments, printer output, Function templates, Class templates Exceptions, Containers, exception handling.

REFERENCES:

- David Parsons; Object oriented programming with C++; BPB publication
- Object oriented programming in C++ by Robert Lafore: Galgotia
- Balagurusamy; Object oriented programming with C++; TMH
- Herbert Shildt, “The Complete Reference C++”, Tata McGraw Hill publication

LIST OF EXPERIMENTS:-

1. Write a program that input's a student's marks in five subjects (out of 100) and print the percentage.
2. Write a program to convert given number of days into years, weeks and days.
3. Write a program to find minimum of three numbers using conditional operator.
4. Write a program to print the largest of three numbers.(only if)
5. Write a program to print the mathematical table of a number.
6. Write a program to swap two numbers (call by reference)
7. Write a program to arrange the array elements in ascending order.
8. Write a program to search a specified element in a given array.
9. Write a program to count number of words, characters, vowels in a given string.
10. Write a program to find the product of two matrices.
11. Write a program to make a structure of student with the following details. (Name,Age,Class,Marks, Average, Result)& Get Input from the user for the data Name, Age, Class Marks and Find the average & result of the student if average>=40 result 'P' if not result 'F'
12. Write a program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
13. Write a program to create multilevel inheritance. Create classes A1,A2, A3.
14. Write a program to create an array of pointers. Invoke functions using array objects.
15. Write a program to use pointer for both base and derived classes and call the member function. Use Virtual keyword.
16. Write a program to overload unary operator using friend function.
17. Write a program to overload – operator.
18. Write a program to invoke Constructor and Destructor.
19. Write a program to use this pointer and return pointer reference.
20. Write a program to write text in the file. Read the text from the file from end of file. Display the contents of the file in reverse order.

CSC-403 ANALYSIS & DESIGN OF ALGORITHMS

UNIT–I

Introduction of Algorithms, Analysis of algorithms: Space Complexity, Time Complexity, recurrence relation and Asymptotic Notation, Divide and Conquer: General Methods, Analysis and Design, Binary Search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II

Greedy Strategy: Introduction, examples of greedy method like optimal merge pattern, Huffman coding, Minimum spanning trees, knapsack problem, job sequencing with dead lines single source shortest path algorithms.

UNIT-III

Dynamic Programming: Introduction, Problem based on this approach such as 0/1 Knapsack Multistage graph, reliability design, Floyd-warshall algorithms.

UNIT-IV

Backtracking Concept and its example like 8 Queen's problem, Hamiltonian cycle, Graph coloring problem, 15 Puzzle problem, Least Cost Search.

UNIT-V

Introduction to branch & bound method, examples of branch & bound methods like traveling sales man problem, meaning of lower bound theory and its use in solving algebraic problem. NPcompleteness & NP hard problems. Basic Concept of non deterministic algorithms. NP hard and NP complete classes.

REFERENCES:

1. Coremen Thomas, Leiserson CE, Rivest RL; Introduction to Algorithms; PHI.
2. Horowitz & Sahani; Analysis & Design of Algorithm
3. Dasgupta; algorithms; TMH
4. Ullmann; Analysis & Design of Algorithm;
5. I.Chandra Mohan " Design and Analysis of Algorithms" PHI

LIST OF EXPERIMENTS: -

1. Implement Binary Search using C++.
2. Implement Quick sort using C++.
3. Implement Strassen Matrix multiplication on the given matrix.
4. Implement Merge sort on the given list of elements.
5. Implement Job sequencing problem using C++.
6. Implement Floyd warshall algorithm using C++.
7. Implement 8 – queens problem using backtracking.
8. Implement graph coloring problem using C++.
9. Implement 0/1 knapsack using branch and bound.
10. Implement travelling salesman problem using C++

CSC-404 DIGITAL COMMUNICATION

UNIT-I

Introduction: Introduction to Communication system, Need for modulation. Amplitude Modulation, Time domain and frequency domain description, power relations in Am waves. Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT-II

Base Band Modulation: Base band system, sampling theorem, Sampling and signal reconstruction, Aliasing, Types of sampling, Quantization, PCM, Companding, DPCM, ADPCM, Delta modulation, Adaptive delta modulation, T1 carrier system.

UNIT-III

Digital Modulation Techniques:- Modulation techniques for ASK, QASK, FSK, M-ary FSK, BPSK, DPSK, DEPSK, QPSK, M-ary PSK, QAM, MSK, GMSK.

UNIT-IV

Digital Carrier Demodulation Techniques:- Coherent and non-coherent detection of ASK, QASK, FSK, PSK, QPSK, M-ary PSK, DPSK, Noise temperature, Noise bandwidth, Noise figure.

UNIT-V

Information Theory:- Measure of information, Entropy, Source encoding, Error free communication over Noisy channel, Channel capacity of discrete memory less channel, Channel capacity of continuous channel, Practical communication system in lights of Shannon theorem.

REFERENCE BOOKS:

1. Modern Digital and Analog Communication Systems, B. P. Lathi, (3rd Edition), Oxford Publication.
2. Principles of Communication Systems, Taub & Schilling, (2nd Edition), Tata McGraw Hill Publication.
3. S.Haykin, Communication systems, John Wiley 2001
4. Bhattacharya Amitabh, "Digital Communication", Tata McGraw-Hill, 1st Ed., 2006.

List of Experiments:

1. To understand Sampling theorem and sample speech and audio signal.
2. To generate and observe Pulse Amplitude Modulation, Pulse Width Modulation and Pulse position modulation waveforms.
3. To transmit and receive digital signal using Amplitude Shift Keying.
4. To transmit and receive digital signal using Frequency Shift Keying.
5. To transmit and receive digital signal using Phase Shift Keying (BPSK and QPSK)
6. To understand Pulse Code Modulation to digitize Speech signal.
7. To understand time division Multiplexing and De-multiplexing.
8. To Implement Differential pulse code Modulation and Demodulation.
9. To understand the concept of Delta Modulation and to achieve the Delta Modulation /De-Modulation.

CSC-405 DATA COMMUNICATION

UNIT - I

Introduction: Data Communication, Components, data representation, data flow and basic model, Serial & Parallel transmission, Data transmission modes, Analog & digital transmission methods, Encoding, Unipolar, Polar, Bipolar, Line & Block codes. Data compression and data compression techniques.

UNIT-II

Multiplexing: Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Statistical Time Division Multiplexing (STDM)**,** Spread spectrum: Frequency Hopping & Direct Sequence. Terminal handling & Polling. Network Switching Techniques: Circuit, Message, Packet & Hybrid. X.25, ISDN.

UNIT-III

Physical Layer: Physical layer characterization, Physical layer Interface and Standards, digital Interface, Connection, specifications & configuration. Modem, Types of Modem, features, signal constellation, block schematic. Network Devices, Active and Passive Hubs, Repeaters, Bridges, Two & Three layer Switches & Gateway, Network Topologies.

UNIT-IV

Transmission Media: Transmission line characteristics, distortions, Crosstalk. Guided Media and Unguided media, Electromagnetic polarization , Rays and Waves front , Electromagnetic spectrum, Radiation & Propagation of Waves, Inverse square law, Wave attenuation and absorption, Terrestrial Propagation, Skip distance, Radio waves, Microwave, Infrared & Satellite Communication system .

UNIT-V

Data Link Layer: Transmission Errors, Content Error, Flow integrity Error, Error detection & Correction methods, Parity checking, Checksum Error Detection, Cyclic Redundancy Check, Hamming Distance, Interleaved codes, Block Parity, Convolution code, Hardware Implementation, Checksum.

References:

1. Forouzan, “Data communication and Networking”, 5e, TATA Mc Graw
2. Stallings William, “Data & Computer Communication”, Pearson Education
3. Godbole A., “Data Communication & Network” , TMH
4. Miller, “ Data Network and Comunication”, Cengage Delmar Learning

List of Experiments

1. Study of Data Communication and Networking. Identify five components of Data communication system.
2. Study of computer network topology and OSI model layered architecture.
3. Study of multiplexing and switching.
4. To Study different types of transmission media.
5. To Study interconnection of cables for data communication.
6. To Study fiber optic communication.
7. To establish a straight over and a Cross over cable in LAN.
8. To Study LAN using Star topology.
9. To Study LAN using Bus topology.
10. To Study LAN using Tree topology
11. Write a program in C to generate Hamming code.

CSC-406 OPERATING SYSTEM

UNIT I

Introduction:- History of operating System, Types of Operating System: Batch Processing, Real Time, Multitasking & Multiprogramming, Time-sharing system, Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling.

UNIT II

Processes Management:- The Process concept, The process control block, Systems programmer's view of processes, Operating system services for process management, Scheduling algorithms, First Come first serve, Round Robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues, Performance evaluation of scheduling algorithms stated above.

UNIT III

Deadlock:- Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Process Management in Linux.

File Management:- File system, access methods, free space managements, allocation methods, directory systems, protection, organization,sharing & implementation issues, Disk & Drum Scheduling, File system in Linux & Windows

UNIT IV

I/O Management:- I/0 devices organization, I/0 devices organization, I/0 buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations.

Device Management:- Path managements, Sub module, Procedure, Scheduler, Handler, Interrupt Service Routine.

UNIT V

Memory Management:- Memory Hierarchy, MFT & MVT, logical and physical address space, Concept of swapping and Paging, Memory management without swapping or paging, contiguous and non-contiguous allocation, segmentation, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation and paging combined with segmentation. Structure & implementation of Page table, Virtual memory, Cache Memory Organization.

REFERENCES:

1. Silberschatz ,"Operating system", Willey Pub.
2. Stuart,"Operating System Principles, Design & Applications",Cengage Learning.
3. Tannanbaum, "Modern operating system",PHI Learning.
4. Dhamdhere, "Operating System",TMH.
5. Achyut S Godbole,"Operating System", TMH.

List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5.Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6.Write a program to implement classical inter process communication problem (producer consumer).
7. Write a program to implement classical inter process communication problem (Reader Writers).
8.Write a program to implement classical inter process communication problem(Dining_Philosophers).
9. Write a program to implement & Compare various page replacement algorithms.
10.Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11.Write a program to implement Banker's algorithms.
12.Write a program to implement Remote Procedure Call.
13.Write the Devices Drivers for any Device or peripheral.