Bundelkhand Institute of Engineering & Technology, Jhansi

Syllabus

of

B.Tech.

Information Technology

2nd Year (III & IV Sem.)

DATA STRUCTURE (KCS301)		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to understand		
CO 1	**Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.**	**K1, K2**
CO 2	**Discuss the computational efficiency of the sorting and searching algorithms.**	**K2**
CO 3	**Implementation of Trees and Graphs and perform various operations on these data structure.**	**K3**
CO 4	**Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.**	**K4**
CO 5	**Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.**	**K5, K6**
DETAILED SYLLABUS		**3-1-0**

Unit	Topic	Proposed Lecture
I	**Introduction:** Basic Terminology, Elementary Data Organization, Built in Data Types in C.Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: BigOh, Big Theta and Big Omega, Time-Space trade-off. Abstract Data Types (ADT) **Arrays:** Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Derivation of Index Formulae for 1-D,2-D,3-D and n-D Array Application of arrays, Sparse Matrices and their representations. **Linked lists**: Array Implementation and Pointer Implementation of Singly Linked Lists, DoublyLinked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition Subtraction & Multiplications of Single variable & Twovariables Polynomial.	08
II	**Stacks:** Abstract Data Type, Primitive Stack operations: Push & Pop, Array and LinkedImplementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Iteration and Recursion- Principles of recursion, Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers. Tradeoffs between iteration and recursion. **Queues:** Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.	08
III	**Searching:** Concept of Searching, Sequential search, Index Sequential Search, Binary Search. Concept of Hashing & Collision resolution Techniques used in Hashing. Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Merge Sort, Heap Sort and Radix Sort.	08

IV	**Graphs:** Terminology used with Graph, Data Structure for Graph Representations: AdjacencyMatrices, Adjacency List, Adjacency. Graph Traversal: Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm.	08
V	**Trees:** Basic terminology used with Tree, Binary Trees, Binary Tree Representation: Array Representation and Pointer(Linked List) Representation, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree . A Extended Binary Trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Constructing Binary Tree from given Tree Traversal, Operation of Insertation,Deletion, Searching & Modification of data in Binary Search . Threaded Binary trees, TraversingThreaded Binary trees. Huffman coding using Binary Tree. Concept & Basic Operations for AVL Tree , B Tree & Binary Heaps	**08**

Text books:

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, "Data Structures Using C and C++", PHI
2. Learning Private Limited, Delhi India
3. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.
4. Lipschutz, "Data Structures" Schaum's Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd.
5. Thareja, "Data Structure Using C" Oxford Higher Education.
6. AK Sharma, "Data Structure Using C", Pearson Education India.
7. Rajesh K. Shukla, "Data Structure Using C and C++" Wiley Dreamtech Publication.
8. Michael T. Goodrich, Roberto Tamassia, David M. Mount "Data Structures and Algorithms in C++", Wiley India.
9. P. S. Deshpandey, "C and Data structure", Wiley Dreamtech Publication.
10. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education.
11. Berztiss, AT: Data structures, Theory and Practice, Academic Press.
12. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill.
13. Adam Drozdek "Data Structures and Algorithm in Java", Cengage Learning

Computer Organization and Architecture (KCS302)

Course Outcome (CO)		Bloom's Knowledge Level (KL)
At the end of course , the student will be able to understand		
CO 1	**Study of the basic structure and operation of a digital computer system.**	**K1, K2**
CO 2	**Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floating-point arithmetic operations.**	**K2, K4**
CO 3	**Implementation of control unit techniques and the concept of Pipelining**	**K3**
CO 4	**Understanding the hierarchical memory system, cache memories and virtual memory**	**K2**
CO 5	**Understanding the different ways of communicating with I/O devices and standard I/O interfaces**	**K2, K4**

DETAILED SYLLABUS		**3-1-0**
Unit	**Topic**	**Proposed Lecture**
I	**Introduction:** Functional units of digital system and their interconnections, buses, bus architecture,types of buses and bus arbitration. Register, bus and memory transfer. Processor organization, general registers organization, stack organization and addressing modes.	**08**
II	**Arithmetic and logic unit:** Look ahead carries adders. Multiplication: Signed operandmultiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design. IEEE Standard for Floating Point Numbers	**08**
III	**Control Unit:** Instruction types, formats, instruction cycles and sub cycles (fetch and execute etc),micro operations, execution of a complete instruction. Program Control, Reduced Instruction SetComputer, Pipelining. Hardwire and micro programmed control: micro programme sequencing, concept of horizontal and vertical	**08**
IV	**Memory:** Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memoryorganization. ROM memories. Cache memories: concept and design issues & performance, address mapping and replacement Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.	**08**
V	**Input/Output:** Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types ofinterrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O andDirect Memory Access., I/O channels and processors. **Serial Communication:**Synchronous &asynchronous communication, standard communication interfaces.	**08**

Text books:

1. Computer System Architecture - M. Mano
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky Computer Organization, McGraw-Hill, Fifth Edition, Reprint 2012
3. John P. Hayes, Computer Architecture and Organization, Tata McGraw Hill, Third Edition, 1998. Reference books
4. William Stallings, Computer Organization and Architecture-Designing for Performance, Pearson Education, Seventh edition, 2006.
5. Behrooz Parahami, "Computer Architecture", Oxford University Press, Eighth Impression, 2011.
6. David A. Patterson and John L. Hennessy, "Computer Architecture-A Quantitative Approach", Elsevier, a division of reed India Private Limited, Fifth edition, 2012

Discrete Structures & Theory of Logic (KCS303)		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to understand		
CO 1	**Write an argument using logical notation and determine if the argument is or is not valid.**	**K3, K4**
CO 2	**Understand the basic principles of sets and operations in sets.**	**K1, K2**
CO 3	**Demonstrate an understanding of relations and functions and be able to determine theirproperties.**	**K3**
CO 4	**Demonstrate different traversal methods for trees and graphs.**	**K1, K4**
CO 5	**Model problems in Computer Science using graphs and trees.**	**K2, K6**
DETAILED SYLLABUS		**3-1-0**

Unit	Topic	Proposed Lecture
I	**Set Theory**: Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some generalidentities on sets. Relations: Definition, Operations on relations, Properties of relations, CompositeRelations, Equality of relations, Recursive definition of relation, Order of relations. **Functions:** Definition, Classification of functions, Operations on functions, Recursively defined functions. Growth of Functions. **Natural Numbers**: Introduction, Mathematical Induction, Variants of Induction, Induction withNonzero Base cases. Proof Methods, Proof by counter – example, Proof by contradiction.	**08**
II	**Algebraic Structures:** Definition, Groups, Subgroups and order, Cyclic Groups, Cosets,Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, GroupHomomorphisms, Definition and elementary properties of Rings and Fields.	**08**
III	**Lattices:** Definition, Properties of lattices – Bounded, Complemented, Modular and Completelattice. Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.	**08**
IV	**Propositional Logic:** Proposition, well-formed formula, Truth tables, Tautology, Satisfiability,Contradiction, Algebra of proposition, Theory of Inference. (8) Predicate Logic: First order predicate, well-formed formula of predicate, quantifiers, Inference theory of predicate logic.	**08**
V	**Trees**: Definition, Binary tree, Binary tree traversal, Binary search tree. **Graphs**: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graphcoloring, Recurrence Relation & Generating function: Recursive definition of functions, Recursivealgorithms, Method of solving recurrences. **Combinatorics:** Introduction, Counting Techniques, Pigeonhole Principle	**08**

Text books:

1. Koshy, Discrete Structures, Elsevier Pub. 2008 Kenneth H. Rosen, Discrete Mathematics and Its Applications, 6/e, McGraw-Hill, 2006.
2. B. Kolman, R.C. Busby, and S.C. Ross, Discrete Mathematical Structures, 5/e, Prentice Hall, 2004.
3. E.R. Scheinerman, Mathematics: A Discrete Introduction, Brooks/Cole, 2000.
4. R.P. Grimaldi, Discrete and Combinatorial Mathematics, 5/e, Addison Wesley, 2004
5. Liptschutz, Seymour, " Discrete Mathematics", McGraw Hill.
6. Trembley, J.P & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw Hill.

Data Structure using C Lab (KCS351)

Write C Programs to illustrate the concept of the following:

1. Sorting Algorithms-Non-Recursive.
2. Sorting Algorithms-Recursive.
3. Searching Algorithm.
4. Implementation of Stack using Array.
5. Implementation of Queue using Array.
6. Implementation of Circular Queue using Array.
7. Implementation of Stack using Linked List.
8. Implementation of Queue using Linked List.
9. Implementation of Circular Queue using Linked List.
10. Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion inBST.
11. Graph Implementation, BFS, DFS, Minimum cost spanning tree, shortest path algorithm.

Computer Organization Lab (KCS352)

1. Implementing HALF ADDER, FULL ADDER using basic logic gates
2. Implementing Binary -to -Gray, Gray -to -Binary code conversions.
3. Implementing 3-8 line DECODER.
4. Implementing 4x1 and 8x1 MULTIPLEXERS.
5. Verify the excitation tables of various FLIP-FLOPS.
6. Design of an 8-bit Input/ Output system with four 8-bit Internal Registers.
7. Design of an 8-bit ARITHMETIC LOGIC UNIT.
8. Design the data path of a computer from its register transfer language description.
9. Design the control unit of a computer using either hardwiring or microprogramming based on its register transfer language description.
10. Implement a simple instruction set computer with a control unit and a data path.

Discrete Structure & Logic Lab (KCS353)

Programming Language/Tool Used: C and Mapple

1. Write a program in C to create two sets and perform the Union operation on sets.
2. Write a program in C to create two sets and perform the Intersectison operation on sets.
3. Write a program in C to create two sets and perform the Difference operation on sets.
4. Write a program in C to create two sets and perform the Symmetric Difference operation.
5. Write a program in C to perform the Power Set operation on a set.
6. Write a program in C to Display the Boolean Truth Table for AND, OR , NOT .
7. Write a C Program to find Cartesian Product of two sets
8. Write a program in C for minimum cost spanning tree.
9. Write a program in C for finding shortest path in a Graph

Note: Understanding of mathematical computation software Mapple to experiment the followings (exp. 10 to 25):

10. Working of Computation software
11. Discover a closed formula for a given recursive sequence vice-versa
12. Recursion and Induction
13. Practice of various set operations
14. Counting
15. Combinatorial equivalence
16. Permutations and combinations
17. Difference between structures, permutations and sets
18. Implementation of a recursive counting technique
19. The Birthday problem
20. Poker Hands problem
21. Baseball best-of-5 series: Experimental probabilities
22. Baseball: Binomial Probability
23. Expected Value Problems
24. Basketball: One and One
25. Binary Relations: Influence

Operating systems (KCS401)		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to understand		
CO 1	**Understand the structure and functions of OS**	**K1, K2**
CO 2	**Learn about Processes, Threads and Scheduling algorithms.**	**K1, K2**
CO 3	**Understand the principles of concurrency and Deadlocks**	**K2**
CO 4	**Learn various memory management scheme**	**K2**
CO 5	**Study I/O management and File systems.**	**K2,K4**
DETAILED SYLLABUS		**3-0-0**

Unit	Topic	Proposed Lecture
I	**Introduction** : Operating system and functions, Classification of Operating systems- Batch,Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure,System Components, Operating System services, Reentrant Kernels, Monolithic and MicrokernelSystems.	**08**
II	**Concurrent Processes**: Process Concept, Principle of Concurrency, Producer / Consumer Problem,Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation; Classical Problem in Concurrency- Dining Philosopher Problem, SleepingBarber Problem; Inter Process Communication models and Schemes, Process generation.	**08**
III	**CPU Scheduling**:Scheduling Concepts, Performance Criteria, Process States, Process TransitionDiagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling.Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection,Recovery from deadlock.	**08**
IV	**Memory Management**: Basic bare machine, Resident monitor, Multiprogramming with fixedpartitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging,Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference	**08**
V	**I/O Management and Disk Scheduling**: I/O devices, and I/O subsystems, I/O buffering, Diskstorage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File systemprotection and security.	**08**

Text books:

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley
2. Sibsankar Halder and Alex A Aravind, “Operating Systems”, Pearson Education
3. Harvey M Dietel, “ An Introduction to Operating System”, Pearson Education
4. D M Dhamdhere, “Operating Systems : A Concept based Approach”, 2nd Edition,TMH
5. William Stallings, “Operating Systems: Internals and Design Principles ”, 6th Edition, Pearson Education

Theory of Automata and Formal Languages (KCS402)		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to understand		
CO 1	**Analyse and design finite automata, pushdown automata, Turing machines, formal languages, andgrammars**	**K4, K6**
CO 2	**Analyse and design, Turing machines, formal languages, and grammars**	**K4, K6**
CO 3	**Demonstrate the understanding of key notions, such as algorithm, computability, decidability, andcomplexity through problem solving**	**K1, K5**
CO 4	**Prove the basic results of the Theory of Computation.**	**K2,K3**
CO 5	**State and explain the relevance of the Church-Turing thesis.**	**K1, K5**
DETAILED SYLLABUS		**3-1-0**

Unit	**Topic**	**Proposed Lecture**
I	**Basic Concepts and Automata Theory**: Introduction to Theory of Computation-Automata,Computability and Complexity, Alphabet, Symbol, String, Formal Languages, Deterministic Finite Automaton (DFA)- Definition, Representation, Acceptability of a String and Language, Non Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, NFA with ε-Transition, Equivalence of NFA's with and without ε-Transition, Finite Automata with output- Moore Machine, Mealy Machine, Equivalence of Moore and Mealy Machine, Minimization of Finite Automata, Myhill-Nerode Theorem, Simulation of DFA and NFA	**08**
II	**Regular Expressions and Languages**: Regular Expressions, Transition Graph, Kleen's Theorem,Finite Automata and Regular Expression- Arden's theorem, Algebraic Method Using Arden's Theorem, Regular and Non-Regular Languages- Closure properties of Regular Languages, Pigeonhole Principle, Pumping Lemma, Application of Pumping Lemma, Decidability- Decision properties, Finite Automata and Regular Languages, Regular Languages and Computers, Simulation of Transition Graph and Regular language.	**08**
III	**Regular and Non-Regular Grammars:** Context Free Grammar(CFG)-Definition, Derivations,Languages, Derivation Trees and Ambiguity, Regular Grammars-Right Linear and Left Linear grammars, Conversion of FA into CFG and Regular grammar into FA, Simplification of CFG, Normal Forms- Chomsky Normal Form(CNF), Greibach Normal Form (GNF), Chomsky Hierarchy, Programming problems based on the properties of CFGs.	**08**
IV	**Push Down Automata and Properties of Context Free Languages**: Nondeterministic PushdownAutomata (NPDA)- Definition, Moves, A Language Accepted by NPDA, Deterministic Pushdown Automata(DPDA) and Deterministic Context free Languages(DCFL), Pushdown Automata for Context Free Languages, Context Free grammars for Pushdown Automata, Two stack Pushdown Automata, Pumping Lemma for CFL, Closure properties of CFL, Decision Problems of CFL, Programming problems based on the properties of CFLs.	**08**

V	**Turing Machines and Recursive Function Theory**:Basic Turing Machine Model,Representation of Turing Machines, Language Acceptability of Turing Machines, Techniques forTuring Machine Construction, Modifications of Turing Machine, Turing Machine as Computer of Integer Functions, Universal Turing machine, Linear Bounded Automata, Church's Thesis, Recursive and Recursively Enumerable language, Halting Problem, Post's Correspondance Problem, Introduction to Recursive Function Theory.	08

Text books:

1. Introduction to Automata theory, Languages and Computation, J.E.Hopcraft, R.Motwani, andUllman.2nd edition, Pearson Education Asia
2. Introduction to languages and the theory of computation, J Martin, 3rd Edition, Tata McGraw Hill
3. Elements and Theory of Computation, C Papadimitrou and C. L. Lewis, PHI
4. Mathematical Foundation of Computer Science, Y.N.Singh, New Age Internationa

Web Designing (KIT 401)		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to understand		
CO 1	**Understand principle of Web page design and about types of websites**	**K3, K4**
CO 2	**Visualize and Recognize the basic concept of HTML and application in web designing.**	**K1, K2**
CO 3	**Recognize and apply the elements of Creating Style Sheet (CSS).**	**K2, K4**
CO 4	**Understanding the basic concept of Java Script and its application.**	**K2, K3**
CO 5	**Introduce basics concept of Web Hosting and apply the concept of SEO**	**K2, K3**

DETAILED SYLLABUS		**3-0-0**
Unit	**Topic**	**Proposed Lecture**
I	**Introduction**: Basic principles involved in developing a web site, Planning process , Domains andHosting, Responsive Web Designing,Types of Websites (Static and Dynamic Websites), WebStandards and W3C recommendations,Introduction to HTML: What is HTML , HTML Documents, Basic structure of an HTMLdocument , Creating an HTML document , Mark up Tags , Heading-Paragraphs , Line Breaks	**08**
II	**Elements of HTML**: HTML Tags., Working with Text , Working with Lists, Tables and Frames,Working with Hyperlinks, Images and Multimedia, Working with Forms and controls	**08**
III	**Concept of CSS**: Creating Style Sheet, CSS Properties, CSS Styling(Background, Text Format,Controlling Fonts) , Working with block elements and objects , Working with Lists and Tables , CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties) CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector) , CSS Color, Creating page Layout and Site Designs.	**08**
IV	Introduction to Client Side Scripting, Introduction to Java Script, Javascript Types , Variables inJS, Operators in JS , Conditions Statements , Java Script Loops, JS Popup Boxes , JS Events , JS Arrays, Working with Arrays, JS Objects ,JS Functions,Using Java Script in Real time ,Validation of Forms, Related Examples	**08**
V	**Web Hosting:** Web Hosting Basics , Types of Hosting Packages, Registering domains , Defining Name Servers, Using Control Panel, Creating Emails in Cpanel , Using FTP Client, Maintaining aWebsiteConcepts of SEO : Basics of SEO, Importance of SEO, Onpage Optimization Basics	**08**

Text Books:

1. Steven M. Schafer, "HTML, XHTML, and CSS Bible, 5ed", Wiley India

Operating System Lab (KCS451)

1. Study of hardware and software requirements of different operating systems (UNIX,LINUX,WINDOWS XP, WINDOWS7/8
2. Execute various UNIX system calls for
    i. Process management
    ii. File management
    iii. Input/output Systems calls
3. Implement CPU Scheduling Policies:
    i. SJF
    ii. Priority
    iii. FCFS
    iv. Multi-level Queue
4. Implement file storage allocation technique:
    i. Contiguous(using array)
    ii. Linked –list(using linked-list)
    iii. Indirect allocation (indexing)
5. Implementation of contiguous allocation techniques:
    i. Worst-Fit
    ii. Best- Fit
    iii. First- Fit
6. Calculation of external and internal fragmentation
    i. Free space list of blocks from system
    ii. List process file from the system
7. Implementation of compaction for the continually changing memory layout and calculate total movement of data
8. Implementation of resource allocation graph RAG)
9. Implementation of Banker‟s algorithm
10. Conversion of resource allocation graph (RAG) to wait for graph (WFG) for each type of method used for storing graph.
11. Implement the solution for Bounded Buffer (producer-consumer)problem using inter process communicationtechniques-Semaphores
12. Implement the solutions for Readers-Writers problem using inter process communication

technique -Semaphore

Web Designing Lab (KIT451)

1. To create a simple html file to demonstrate the use of different tags.
2. To create an html file to link to different html page which contains images, tables, and also link within a page.
3. To create an html page with different types of frames such as floating frame, navigation frame & mixed frame.
4. To create a registration form as mentioned below.

   Procedure: Create an html page named as "registration.html"

   a) set background colors

   b) use table for alignment

   c) provide font colors & size
5. To create an html file by applying the different styles using inline, external & internal style sheets.
6. To write a Javascript program to define a user defined function for sorting the values in an array.
7. To create an html page to explain the use of various predefined functions in a string and math object in java script.
8. To create an html page to explain the use of various predefined functions in a array & Date object in Javascript.
9. To create an html page to demonstrate exception handling in javascript
10. To display the calendar using javascript code by getting the year from the user.
11. To create a html registration form and to validate the form using javascript code.
12. To create a html file. To open new window from the current window using javascript.
13. To create an html page to change the background color for every click of a button using javascript.
14. To create an html page with 2 combo box populated with month & year, to display the calendar for the selected month & year from combo box using javascript.
15. To create a html page to display a new image & text when the mouse comes over the existing content in the page.

Python Language Programming Lab (KCS453)

1. To write a python program that takes in command line arguments as input and print the number of arguments.
2. To write a python program to perform Matrix Multiplication.
3. To write a python program to compute the GCD of two numbers.
4. To write a python program to find the most frequent words in a text file.
5. To write a python program find the square root of a number (Newton's method).
6. To write a python program exponentiation (power of a number).
7. To write a python program find the maximum of a list of numbers.
8. To write a python program linear search.
9. To write a python program Binary search.
10. To write a python program selection sort.
11. To write a python program Insertion sort.
12. To write a python program merge sort.
13. To write a python program first n prime numbers.
14. To write a python program simulate bouncing ball in Pygame.

Bundelkhand Institute of Engineering & Technology, Jhansi

Syllabus

of

B.Tech.

Information Technology

3rd Year (V & VI Sem.)

EIT-501: OPERATING SYSTEM

L	T	P
3	1	0

Unit -I Introduction : Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems.

Unit-II Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation; Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem; Inter Process Communication models and Schemes, Process generation.

Unit-III CPU Scheduling: Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.

Unit-IV Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.

Unit-V I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.
Distributed operating system & file management.

Text Books:

1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley
2. William Stallings, "Operating Systems: Internals and Design Principles ", 6th Edition, Pearson Education
3. Sibsankar Halder and Alex A Aravind, "Operating Systems", Pearson Education

Reference Books:

1. Harvey M Dietel, " An Introduction to Operating System", Pearson Education
2. D M Dhamdhere, "Operating Systems : A Concept based Approach", 2nd Edition, 13 TMH
3. Andrew S tanenbaum,"operating system design and implementation",pearson edition

EIT-502: DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P
3	1	0

Unit -I Introduction: Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions,
Performance measurements, Solving the recursive equations using Substitution Method, Recursive Tree Method and Masters Theorem(with Proof), Searching, Sorting and Order Statistics – Liner Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Heap Sort, Comparison of sorting algorithms, Sorting in linear time – Counting Sort, Bucket Sort.

Unit-II Introduction to Recursion: Tail Recursion, Non-tail Recursion, and its example.
Divide and Conquer: Binary Search, Merge Sort, Quick Sort, Max-Min Problem, Powering a Number, Fibonacci Series, and Tower of Hanoi.

Unit-III Greedy method: Optimal Resource Allocation, Job Scheduling, Fractional Knapsack Problem, Huffman's Algorithm, Minimum Spanning trees – Prim's and Kruskal's algorithms, Single source shortest paths – Dijkstra and Bellman-Ford algorithm.

Unit-IV Dynamic programming: Longest Common Subsequence Problem, 0/1-Knapsack, Matrix Chain Multiplication Problem, All pair shortest paths – Floyd Warshal algorithm.
Backtracking, Branch and Bound: Travelling Salesman Problem, Graph Coloring, n-Queen Problem, Sum of subsets, Hamiltonian Cycles.

Unit-V Graph Algorithms: Breath First Search, Depth First Search.
Selected Topics: String Matching, Theory of NP-completeness, Approximation algorithms and Randomized Algorithms.

Text Books:

1. Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice Hall of India.
2. RCT Lee, SS Tseng, RC Chang and YT Tsai, "Introduction to the Design and Analysis of Algorithms", Mc Graw Hill, 2005.

Reference Books:

1. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms",
2. Berman, Paul," Algorithms", Cengage Learning.
3. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008.

EIT-503: E-COMMERCE

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Unit -I Introduction: Definition of Electronic Commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of E-Commerce, advantages and disadvantages, framework, Impact of E-commerce on business, E-Commerce Models.

Unit-II Network Infrastructure for E- Commerce:
Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Mobile Commerce: Introduction, Wireless Application Protocol, WAP technology, Mobile Information device.

Unit-III Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

Unit-IV Encryption: Encryption techniques, Symmetric Encryption: Keys and data encryption standard, Triple encryption, Secret key encryption; Asymmetric encryption: public and private pair key encryption, Digital Signatures, Virtual Private Network.

Unit-V Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking.
EDI Application in business, EDI standardization and VAN, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

Text Books:

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison- Wesley.
2. Pete Lohsin , John Vacca "Electronic Commerce", New Age International
3. Laudon, "E-Commerce: Business, Technology, Society", Pearson Education

Reference Books:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education
2. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
3. Turban, "Electronic Commerce 2004: A Managerial Perspective", Pearson Education

EIT-504: COMPUTER GRAPHICS

L	T	P
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Unit -I Introduction and Line Generation**:** Types of computer graphics, Graphic Displays-Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid point circle generating algorithm,Video Display device, Anti Aliasing, character generation.

Unit-II Transformations**:** Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing.
Windowing and Clipping: Multiple Windowing, Viewing transformations, 2-D Clipping algorithms-Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non rectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit-III Three Dimensional: 3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Unit-IV Curves and Surfaces**:** Quadric surfaces, Introductory concepts of Spline, Bspline and Bezier curves and surfaces.
Hidden Lines and Surfaces**:** Back Face Detection algorithm, Depth buffer method, A-buffer method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows

Text Books:

1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education
2. Amrendra N Sinha and Arun D Udai,” Computer Graphics”, TMH
3. Donald Hearn and M Pauline Baker, “Computer Graphics with OpenGL”, Pearson education

Reference Books:

1. Steven Harrington, “Computer Graphics: A Programming Approach” , TMH
2. Rogers, “ Procedural Elements of Computer Graphics”, McGraw Hill

EIT-505: INFORMATION SECURITY AND CYBER LAWS

L	T	P
2	1	0

Unit -I History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services,

Information System Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security.

Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.

Unit-II Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards.Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges.

Unit-III Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies

Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection

Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

Unit-IV Security metrics- Classification and their benefits, Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data Mining Security, Building Security into Software Life Cycle

Ethics- Ethical Issues, Issues in Data and Software Privacy, Cyber Crime Types & overview of Cyber Crimes, Digital media Forensics.

Text Books:

1. Godbole,“ Information Systems Security”, Willey
2. Merkov, Breithaupt,“ Information Security”, Pearson Education

Reference Books:

1. Yadav, “Foundations of Information Technology”, New Age, Delhi
2. Schou, Shoemaker, “ Information Assurance for the Enterprise”, Tata McGraw Hill

EIT - 551: OPERATING SYSTEM LAB

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1. Study of hardware and software requirements of different operating systems (UNIX, LINUX, WINDOWS XP, WINDOWS 7/8).
2. Write a program in C to implement First Come First Serve algorithm and round robin scheduling algorithm.
3. Write a program in C to implement non preemptive SJF and non preemptive priority scheduling algorithm.
4. Write a program in C to implement preemptive SJF and preemptive priority scheduling algorithm.
5. Write a program in C to implement Banker's Algorithm.
6. Write a program for Conversion of resource allocation graph (RAG) to wait-for-graph (WFG) for each type of method used for storing graph in C.
7. Write a program in C where parent process counts number of vowels in the given sentence and child process will count number of words in the same sentence. Use FORK and JOIN construct.
8. Write a program in C where parent process sorts array elements in descending order and child process sorts array elements in ascending order. Use FORK and JOIN construct.
9. Write a program in C to implement the contiguous file allocation technique.
10. Implement the solution for Bounded Buffer (Producer-Consumer) problem using inter process communication technique – Semaphores in C.
11. Implement the solution for Dining-Philosopher problem using inter process communication technique – Semaphores in C.

EIT - 552: ALGORITHMS LAB

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1. Implementation of Recursive Binary & Linear Search Algorithm.
2. Implementation of Heap Sort.
3. Implementation of Merge Sort.
4. Implementation of Selection Sort.
5. Implementation of Insertion Sort.
6. Implementation of Quick Sort.
7. Implementation of Matrix Chain Multiplication algorithm by using dynamic programing.
8. Implementation of 0/1 knapsack problem algorithm by using dynamic programing.
9. Study of NP-Complete theory.
10. Study of Cook's theorem.
11. Study of sorting network.

EIT - 554: COMPUTER GRAPHICS LAB

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1. Write a program to draw a line using DDA Algorithm.
2. Write a program to draw a line using Bresenham's Algorithm.
3. Write a program to draw a circle using Mid Point Circle generation Algorithm.
4. Write a program for addition, subtraction, multiplication using 3*3 matrix.
5. Write a program to clip a line using Cohen Sutherland line Clipping Algorithm.
6. Write a program to clip a line using Liang Barsky Algorithm.
7. Write a program to clip a convex polygon using Sutherland Hodgeman polygon clipping.
8. Write a program to clip a concave polygon using Weiler – Atherton polygon clipping.
9. Write a program for Text Clipping.
10. Write a program to Translate, rotate, scale, shearing and reflection using 2D Transformation.
11. Write a program for Flying Kite.

EIT-601: COMPUTER NETWORK

L	T	P
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Unit -I Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

Unit-II Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

Unit-III Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6.

Unit-IV Transport Layer: Transport Layer - Design issues, connection management, session Layer-Design issues, remote procedure call. Presentation Layer-Design issues, cryptography - TCP - Window Management.

Unit-V Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

Text Books:

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, “Computer Networks”, Pearson Education
3. W. Stallings, “Data and Computer Communication”, Macmillan Press

Reference Books:

1. Anuranjan Misra, “Computer Networks”, Acme Learning
2. G. Shanmugarathinam, ”Essential of TCP/ IP”, Firewall Media

EIT-602: SOFTWARE PROJECT MANAGEMENT

L	T	P
3	1	0

Unit -I **Introduction and Software Project Planning**

Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

Unit-II **Project Organization and Scheduling**

Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

Unit-III **Project Monitoring and Control**

Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators:Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

Unit-IV **Software Quality Assurance and Testing**

Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

Unit-V **Project Management and Project Management Tools**

Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools.

Text Books:

1. M. Cotterell, “Software Project Management”, Tata McGraw-Hill Publication.
2. Royce, “Software Project Management”, Pearson Education

Reference Books:

1. Kieron Conway, “Software Project Management”, Dreamtech Press
2. S. A. Kelkar, “Software Project Management”, PHI Publication.

EIT-603: ERP

L	T	P
2	1	0

Unit -I ERP Introduction, Benefits, Origin, Evolution and Structure**:** Conceptual Model of ERP, The Evolution of ERP, The Structure of ERP.

Unit-II Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing(OLAP), Product Life Cycle Management(PLM), LAP, Supply chain Management.

Unit-III ERP Marketplace and Marketplace Dynamics**:** Market Overview, Marketplace Dynamics, The Changing ERP Market.
ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications.

Unit-IV ERP Implementation Basics, ERP Implementation Life Cycle, Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees,

Unit-V ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture.
Using ERP tool: either SAP or ORACLE format to case study

Text Books:

1. Mary Summer, "Enterprise Resource Planning"- Pearson Education
2. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI
3. Rahul V. Altekar "Enterprise Resource Planning", Tata McGraw Hill.

Reference Books:

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill
2. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology

EIT-604: GRAPH THEORY

L	T	P
2	1	0

Unit -I Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

Unit-II Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

Unit-III Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability, network flows
Planer graphs, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

Unit-IV Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix.
Coloring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem
Discussion of Graph theoretic algorithm wherever required.

Text Books:

1. Deo, N, “Graph theory with applications to Engineering and Computer Science”, PHI
2. Gary Chartrand and Ping Zhang, “Introduction to Graph Theory”, TMH
3. Robin J. Wilson, “Introduction to Graph Theory”, Pearson Education

Reference Books:

1. Harary, F,” Graph Theory”, Narosa
2. Bondy and Murthy,”Graph theory and application”. Addison Wesley.
3. V. Balakrishnan, “Schaum's Outline of Graph Theory”, TMH
4. Geir Agnarsson, “Graph Theory: Modeling, Applications and Algorithms”, Pearson Education

Syllabus of Elective Subjects

EIT-611 SOFTWARE QUALITY ENGINEERING

L	T	P
3	1	0

Unit -I **Introduction**

Defining Software Quality, Software Quality Attributes and Specification, Cost of Quality, Defects, Faults, Failures, Defect Rate and Reliability, Defect Prevention, Reduction, and Containment, Overview of Different Types of Software Review, Introduction to Measurement and Inspection Process, Documents and Metrics.

Unit-II **Software Quality Metrics**

Product Quality Metrics: Defect Density, Customer Problems Metric, Customer Satisfaction Metrics, Function Points, In-Process Quality Metrics: Defect Arrival Pattern, Phase-Based Defect Removal Pattern, Defect Removal Effectiveness, Metrics for Software Maintenance: Backlog Management Index, Fix Response Time, Fix Quality, Software Quality Indicators.

Unit-III **Software Quality Management and Models**

Modeling Process, Software Reliability Models: The Rayleigh Model, Exponential Distribution and Software Reliability Growth Models, Software Reliability Allocation Models, Criteria for Model Evaluation, Software Quality Assessment Models: Hierarchical Model of Software Quality Assessment.

Unit-IV **Software Quality Assurance**

Quality Planning and Control, Quality Improvement Process, Evolution of Software Quality Assurance (SQA), Major SQA Activities, Major SQA Issues, Zero Defect Software, SQA Techniques, Statistical Quality Assurance, Total Quality Management, Quality Standards and Processes.

Unit-V **Software Verification, Validation & Testing:**

Verification and Validation, Evolutionary Nature of Verification and Validation, Impracticality of Testing all Data and Paths, Proof of Correctness, Software Testing, Functional, Structural and Error-Oriented Analysis & Testing, Static and Dynamic Testing Tools, Characteristics of Modern Testing Tools.

Text Books:

1. Jeff Tian, “Software Quality Engineering” (SQE), Wiley
2. Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Addison-Wesley

EIT-612 SOFTWARE TESTING

L	T	P
3	1	0

Unit -I Introduction

Faults, Errors, and Failures, Basics of software testing, Testing objectives, Principles of testing, Requirements, behavior and correctness, Testing and debugging, Test metrics and measurements, Verification, Validation and Testing, Types of testing, Software Quality and Reliability, Software defect tracking.

Unit-II White Box and Black Box Testing

White box testing, static testing, static analysis tools, Structural testing: Unit/Code functional testing, Code coverage testing, Code complexity testing, Black Box testing, Requirements based testing, Boundary value analysis, Equivalence partitioning, state/graph based testing, Model based testing and model checking, Differences between white box and Black box testing.

Unit-III Integration, System, and Acceptance Testing

Top down and Bottom up integration, Bi-directional integration, System integration, Scenario Testing, Defect Bash, Functional versus Non-functional testing, Design/Architecture verification, Deployment testing, Beta testing, Scalability testing, Reliability testing, Stress testing, Acceptance testing: Acceptance criteria, test cases selection and execution,

Unit-IV Test Selection & Minimization for Regression Testing

Regression testing, Regression test process, Initial Smoke or Sanity test, Selection of regression tests, Execution Trace, Dynamic Slicing, Test Minimization, Tools for regression testing, Ad hoc Testing: Pair testing, Exploratory testing, Iterative testing, Defect seeding.

Unit-V Test Management and Automation

Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of automation, Design & Architecture for automation, Generic requirements for test tool framework, Test tool selection, Testing in Object Oriented Systems, Testing strategies- Preventive vs Reactive approach, analytical vs heuristic approach.

Text Books:

1. S. Desikan and G. Ramesh, "Software Testing: Principles and Practices", Pearson Education.
2. Aditya P. Mathur, "Fundamentals of Software Testing", Pearson Education.
3. Srinivasan desikan, gopal swamy ramesh,"software testing- principles and practices" pearson education.

Reference Books:

1. Naik and Tripathy, "Software Testing and Quality Assurance", Wiley
2. K. K. Aggarwal and Yogesh Singh, "Software Engineering", New Age International Publication.
3. Boris beizer,"software testing techniques",dreamtech

EIT-613 SOFTWARE RELIABILITY

L	T	P
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Unit -I Introduction

Defining Software Reliability, Software Reliability Attributes and Specification, Concept of Defects, Faults, Failures, Defect Rate and Reliability, Defect Prevention, Reduction, and Containment, Overview of Different Types of Software Review, Introduction to Measurement and Inspection Process, Documents and Metrics.

Unit-II Software Reliability Metrics

Collection of fault and failure data, Measurement of internal and external product attributes, Customer Problems Metric, Customer Satisfaction Metrics, In-Process Quality Metrics: Defect Arrival Pattern, Phase-Based Defect Removal Pattern, Defect Removal Effectiveness, Metrics for Software Maintenance, Software Reliability indicators, Software Reliability Metrics, Static Code Metrics, Dynamic Metrics.

Unit-III Software Reliability Assessment Models

Basics of Reliability Theory, Software Reliability Problem, Modeling Process, Software Reliability Models, Parametric Reliability Growth Models, The Rayleigh Model, Exponential Distribution and Software Reliability Growth Models, Software Quality Assessment Models: Hierarchical Model of Software Quality Assessment.

Unit-IV Software Reliability Allocation Models

Software Reliability Allocation Models, Criteria for Model Evaluation, Optimal Reliability Allocation, Quality Planning and Control, Quality Improvement Process, Evolution of Software Quality Assurance (SQA), Major SQA Activities, Major SQA Issues, Zero Defect Software.

Unit-V Software Reliability Techniques

Reliability Techniques: Trending Reliability Techniques, Predicting Reliability Techniques, Error Seeding, Failure Rate, Curve Fitting, Reliability Growth, Models and Tools: Study of tools like CASRE, SARA, SMERFS.

Text Books:

1. John Musa, “Software Reliability Engineering”, McGraw-Hill
2. Fenton, and Pfleeger, “Software Metrics: A Rigorous and Practical Approach”, International Thomson Computer Press

Reference Books:

1. Jeff Tian, “Software Quality Engineering” (SQE), Wiley
2. Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Addison-Wesley

EIT - 651: COMPUTER NETWORK LAB

L	T	P
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1. Write a program in C to implement framing with time delay.
2. Write a program in C to implement framing with character stuffing.
3. Write a program in C to implement framing bit stuffing.
4. Study how to connect different types of devices with CAT Cable.
5. Implement Dijkstra's Algorithm to compute the shortest path through Graph.
6. Configure a Network using Distance Vector Routing protocol.
7. Configure Network using Link State Vector Routing protocol.
8. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
9. Write a program in C to Implementation of Hamming code technique.
10. Write a program in C to determine the class of IP address from the Input binary notation.
11. Write a program in C to implement Client Server programming.

EIT - 652: SOFTWARE PROJECT MANAGEMENT LAB

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Do the following exercises for project developed in mini project lab.

List of exercises:

1. Write the complete problem statement
2. Draw Work Breakdown Structure
3. Write the software requirement specification document
4. Draw the entity relationship diagram
5. Draw the data flow diagrams at level 0 and level 1
6. Draw use case diagram
7. Draw activity diagram of all use cases.
8. Draw PERT chart.
9. Draw GANTT chart.
10. Draw sequence diagram of all use cases
11. Draw collaboration diagram of all use cases

Bundelkhand Institute of Engineering & Technology, Jhansi

Syllabus

of

B.Tech.

Information Technology

4th Year (VII & VIII Sem.)

EIT-701: CRYPTOGRAPHY & NETWORK SECURITY

L	T	P
3	1	0

Unit -I Introduction to security attacks, services and mechanism, Classical encryption techniques-substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers.
Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, fiestal structure, Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES

Unit-II Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption, Fermat's and Euler's theorem, Primality testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA

Unit-III Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA)
Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature algorithm,

Unit-IV **Failure Recovery in Distributed Systems:** Concepts in Backward and Forward recovery, Recovery in Concurrent systems, Obtaining consistent Checkpoints, Recovery in Distributed Database Systems.
Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.
Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure.
Authentication Applications: Kerberos, Electronic mail security: pretty good privacy (PGP), S/MIME.

Unit-V IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management.
Introduction to Secure Socket Layer, Secure electronic, transaction (SET)
System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats.

Text Books:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education.
2. Behrouz A. Frouzan: Cryptography and Network Security, TMH
3. Atul Kahate, "Cryptography and Network Security", TMH

Reference Books:

1. Bruce Schiener, "Applied Cryptography". John Wiley & Sons
2. Bernard Menezes," Network Security and Cryptography", Cengage Learning.
3. Abhijit das, C.E. Veni madhavan, "public key cryptography: theory and practice",pearson education
4. Prakash C. Gupta,"cryptography and network security",PHI

EIT-702: ARTIFICIAL INTELLIGENCE

L	T	P
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Unit -I **Introduction**: Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

Unit-II **Introduction to Search** : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

Unit-III **Knowledge Representation & Reasoning**: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

Unit-IV **Machine Learning**: Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data - EM algorithm, Reinforcement learning,

Unit-V **Pattern Recognition**: Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA),
Expert System- Architecture ,typical expert system- MYCIN, DART, XOON

Text Books:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson Education
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill

Reference Books:

1. E Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson Education
2. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India,

Syllabus of Elective Subjects

EIT- 711: COMPUTATIONAL GEOMETRY

L	T	P
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Unit -I Convex hulls: construction in 2d and 3d, lower bounds; Triangulations: polygon triangulations, representations, point-set triangulations, planar graphs

Unit-II Voronoi diagrams: construction and applicat ions, variants;
Delayney triangulations: divide-and-conquer, flip and incremental algorithms, duality of Voronoi diagrams, min-max angle properties

Unit-III Geometric searching: point-location, fractional cascading, linear programming with prune and search, finger trees, concatenable queues, segment trees, interval trees; Visibility: algorithms for weak and strong visibility, visibility with reflections, art-gallery problems

Unit-IV Arrangements of lines: arrangements of hyper planes, zone theorems, many-faces complexity and algorithms; Combinatorial geometry: Ham-sandwich cuts.

Unit-V Sweep techniques: plane sweep for segment intersections, Fortune's sweep for Voronoi diagrams, topological sweep for line arrangements; Randomization in computational geometry: algorithms, techniques for counting; Robust geometric computing, Applications of computational geometry;

Text Books:

1. Computational Geometry: An Introduction by Franco P. Preparata and Michael Ian Shamos; Springer Verlag
2. Mark de Berg , Marc van Kreveld , Mark Overmars , and Otfried Schwarzkopf, Computational Geometry, Algorithms and Applications , Springer-Verlag,

Reference Books:

1. Ketan Mulmuley, Computational Geometry: An Introduction Through Randomized Algorithms, Prentice-Hall
2. Joseph O'Rourke, Computational Geometry in C, Cambridge University Press

EIT-712: COMPUTATIONAL COMPLEXITY

L	T	P
3	1	0

Unit -I Models of Computation, resources (time and space), algorithms, computability, complexity.

Unit-II Complexity classes, P/NP/PSPACE, reduction s, hardness, completeness, hierarchy, relationships between complexity classes.

Unit-III Randomized computation and complexity; Logical characterizations, incompleteness; Approximability.

Unit-IV Circuit complexity, lower bounds; Parallel computation and complexity; Counting problems; Interactive proofs.

Unit-V Probabilistically checkable proofs; Communication complexity; Quantum computation

Text Books:

1. Christos H. Papadimitriou., Combinatorial Optimization: Algorithms and Complexity , Prentice-Hall
2. Sanjeev Arora and Boaz Barak , Complexity Theory: A Modern Approach, Cambridge University Press

Reference Books:

1. Steven Homer , Alan L. Selman , Computability and Complexity Theory , Springer

EIT-713: PARALLEL ALGORITHMS

L	T	P
3	1	0

Unit -I Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.

Unit-II Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Cost-optimality, An example of illustrate Cost- optimal algorithms- such as summation, Min/Max on various models.

Unit-III Parallel Sorting Networks, Parallel Merging Algorithms on CREW/EREW/MCC, Parallel Sorting Networks on CREW/EREW/MCC/, linear array

Unit-IV Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

Unit-V Graph Algorithms - Connected Graphs, search and traversal, Combinatorial Algorithms-Permutation, Combinations, Derrangements.

Text Books:

1. M.J. Quinn, “Designing Efficient Algorithms for Parallel Computer”, McGrawHill.
2. S.G. Akl, “Design and Analysis of Parallel Algorithms”

Reference Books:

1. S.G. Akl, ”Parallel Sorting Algorithm” by Academic Press

EIT-714: PATTERN RECOGNITION

L	T	P
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Unit -I **Introduction:** Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

Unit-II **Statistical Patten Recognition:** Bayesian Decision Theory, Classifiers, Normal density and discriminant functions,

Unit-III **Parameter estimation methods:** Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

Unit-IV **Nonparametric Techniques:** Density Estimation, Parzen Windows, K-Nearest Neighbor Estimation, Nearest Neighbor Rule, Fuzzy classification.

Unit-V **Unsupervised Learning & Clustering:** Criterion functions for clustering, Clustering Techniques: Iterative square - error partitional clustering – K means, agglomerative hierarchical clustering, Cluster validation.

Text Books:

1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification”, 2nd Edition, John Wiley, 2006.
2. C. M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2009.

Reference Books:

1. S. Theodoridis and K. Koutroumbas, “Pattern Recognition”, 4th Edition, Academic Press, 2009.

EIT-715: DISCRETE STRUCTURES

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Unit -I Set Theory: Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some general identities on sets. Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations. Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions. Growth of Functions. Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases. Proof Methods, Proof by counter – example, Proof by contradiction.

Unit-II Algebraic Structures: Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphisms, Definition and elementary properties of Rings and Fields, Integers Modulo *n*.

Unit-III Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram. Lattices: Definition, Properties of lattices – Bounded, Complemented, Modular and Complete lattice.
Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.

Unit-IV Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference
Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.

Unit-V Trees : Definition, Binary tree, Binary tree traversal, Binary search tree.
Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs,
Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.
Combinatorics: Introduction, Counting Techniques, Pigeonhole Principle, Multinomial Theorem.

Text Books:

1. B. Kolman, R.C. Busby, and S.C. Ross, Discrete Mathematical Structures, PHI
2. Liu and Mohapatra, "Elements of Distcrete Mathematics", McGraw Hill
3. Jean Paul Trembley, R Manohar, Discrete Mathematical Structures with Application to Computer Science, McGraw-Hill

Reference Books:

1. R.P. Grimaldi, Discrete and Combinatorial Mathematics, Addison Wesley,
2. Kenneth H. Rosen, Discrete Mathematics and Its Applications, McGraw-Hill,
3. S. Chakraborty, B.K. Sarkar, Discrete Mathematics, Oxford Higher Education

EIT-716: THEORY OF AUTOMATA AND FORMAL LANGUAGES

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Unit -I Introduction; Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition tabl e, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transit ion, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem

Unit-II Regular expression (RE), Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

Unit-III Context free grammar (CFG) and Context Freee Languages (CFL): Definition, Examples, Derivation , Derivation trees, Am biguity in Grammer, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Memership, Pumping lemma for CFLs,

Unit-IV Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA

Unit-V Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory.

Text Books:

1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science : Automata
2. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house

Reference Books:

1. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education
2. Y.N.Singh "Mathematical Foundation of Computer Science", New Age International

EIT-721: DATA MINING & DATA WAREHOUSING

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Unit -I Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation

Unit-II Concept Description: Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases

Unit-III Classification and Predictions: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbor classifiers, Genetic Algorithm.
Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon, Density Based Methods-DBSCAN, OPTICS, Grid Based Methods- STING, CLIQUE, Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis

Unit-IV Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

Unit-V Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse, Data Warehouse query tools.

Text Books:

1. Alex Berson and Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

Reference Books:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction To Data Mining”, Pearson Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wile-Interscience, 2006.

EIT-722: DISTRIBUTED DATABASE

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Unit -I Transaction and schedules, Concurrent Execution of transaction, Conflict and View Serializability, Testing for Serializability, Concepts in Recoverable and Cascadeless schedules.

Unit-II Lock based protocols, time stamp based protocols, Multiple Granularity and Multiversion Techniques, Enforcing serializablity by Locks, Locking system with multiple lock modes, architecture for Locking scheduler

Unit-III Distributed Transactions Management, Data Distribution, Fragmentation and Replication Techniques, Distributed Commit, Distributed Locking schemes, Long duration transactions, Moss Concurrency protocol.

Unit-IV Issues of Recovery and atomicity in Distributed Databases, Traditional recovery techniques, Log based recovery, Recovery with Concurrent Transactions, Recovery in Message passing systems, Checkpoints, Algorithms for recovery line, Concepts in Orphan and Inconsistent Messages.

Unit-V Distributed Query Processing, Multiway Joins, Semi joins, Cost based query optimization for distributed database, Updating replicated data, protocols for Distributed Deadlock Detection, Eager and Lazy Replication Techniques

Text Books:

1. Silberschatz, orth and Sudershan, Database System Concept', Mc Graw Hill
2. Ramakrishna and Gehrke,' Database Management System, Mc Graw Hill
3. Garcia-Molina, Ullman,Widom,' Database System Implementation' Pearson Education

Reference Books:

1. Ceei and Pelagatti,'Distributed Database', TMH
2. Singhal and Shivratri, 'Advance Concepts in Operating Systems' MC Graw Hill

EIT-724: DATA COMPRESSION

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Unit -I Compression Techniques: Loss less compression, Lossy Compression, Measures of prefonnance, Modeling and coding, Mathematical *Preliminaries* for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

Unit-II The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.

Unit-III Coding a sequence, Generating a binary code, Comparison of Binary and Huffman cding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression.

Unit-IV Distortion criteria, Models, Scalar Ouantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

Unit-V Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers. Structured Vector Quantizers.

Text Books:

1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers
2. Elements of Data Compression,Drozdek, Cengage Learning
3. Introduction to Data Compression, Second Edition,Khalid Sayood, The Morgan aufmann Series.

Reference Books:

1. Data Compression: The Complete Reference 4th Edition by David Salomon, Springer
2. Text Compression 1st Edition by Timothy C. Bell Prentice Hall

EIT-723:BIOINFORMATICS

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Unit -I Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary & reference systems, finding new type of data online.
Molecular Biology and Bioinformatics: Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, overview of the bioinformatics applications.

Unit-II Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA, Analyzing DNA,DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.

Unit-III Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, mounting/unmounting files, tar, gzip / gunzip, telnet, ftp, developing applications on Linux OS, Understanding and Using Biological Databases, Overview of Java, CORBA, XML, Web deployment concepts.

Unit-IV Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.

Unit-V Macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: sequence alignment algorithms, regular expressions, hierarchies and graphical models, Phylogenetics. BLAST.

Text Books:

1. D E Krane & M L Raymer, " Fundamental concepts of Bioinformatics", Perason Education.
2. Rastogi, Mendiratta, Rastogi, "Bioinformatics Methods & applications, Genomics, Proteomics & Drug Discovery" PHI, New Delhi

Reference Books:

1. Shubha Gopal et.al. "Bioinformatics: with fundamentals of genomics and proteomics", Mc Graw Hill.
2. O'Reilly, " Developing Bio informatics computer skills", CBS
3. Forsdyke, "Evolutionary Bioinformatics", Springer

EIT -725: IT IN FORENSIC SCIENCE

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Unit -I Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric System Security.
Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, Matching Biometric Samples, Verification by humans.
Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification

Unit-II **Introduction to Information Hiding:** Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography
Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

Unit-III **A Survey of Stenographic Techniques:** Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques.
Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.

Unit-IV **Watermarking and Copyright Protection:** Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.
Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

Unit-V Computer Forensics, Rules of evidence, Evidence dynamics, Evidence collection, Data recovery, Preservation of digital evidence, surveillance tools for future warfare,

EIT - 751: CRYPTOGRAPHY & NETWORK SECURITY LAB

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12. Write a program in java to implement Caesar Cipher technique.
13. Write a program in java to implement the Playfair Cipher.
14. Write a program in java to implement Pure Transposition Cipher.
15. Implement a program in java to encrypt and decrypt using the Hill cipher substitution technique.
16. Develop a program in java to implement Data Encryption Standard for encryption and decryption.
17. Develop a program in java to implement RSA algorithm for encryption and decryption.
18. Develop a program in java to implement Diffie Hellman Key Exchange Algorithm for encryption and Decryption.
19. Write a program in java to implement Message Digest Algorithm.
20. Develop a program in java to implement Secure Hash Algorithm (SHA-1).
21. Write a program to implement the digital signature scheme in java.
22. Write a program in java Implement the AES Encryption and decryption.

EIT - 752: ARTIFICIAL INTELLIGENCE LAB

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1. Write a program in C to implement Depth First Search.
2. Write a program in C to implement 8-PUZZLE using Best First Search.
3. Write a program in C to implement Traveling Salesman Problem
4. Write a program in C to implement ALPHA-BETA search.
5. Write a program in C to implement Tower of Hanoi problem
6. Write a program in C to implement N-QUEENS PROBLEM.
7. Write a program in C to implement A* Algorithm
8. Write a program in C to implement Hill Climbing Algorithm
9. Write a program in C to implement Water Jug Problem.
10. Write a program in C to implement Tic Tac Toe
11. Write a program in C to implement String Matching.

EIT- 801: DISTRIBUTED SYSTEMS

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Unit -I **Characterization of Distributed Systems**: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models, Introduction to Distributed operating system.
Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks. Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.

Unit-II **Distributed Mutual Exclusion**: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.
Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Unit-III **Agreement Protocols**: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.
Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory**.**

Unit-IV **Failure Recovery in Distributed Systems:** Concepts in Backward and Forward recovery, Recovery in Concurrent systems, Obtaining consistent Checkpoints, Recovery in Distributed Database Systems.
Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.

Unit-V **Transactions and Concurrency Control**: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.
Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

Text Books:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Ramakrishna, Gehrke," Database Management Systems", McGraw Hill
3. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education

Reference Books:

1. Vijay K.Garg Elements of Distributed Computing , Wiley
2. Gerald Tel, "Distributed Algorithms", Cambridge University Press
3. Tenanuanbaum, Steen," Distributed Systems", PHI
4. Sukumar ghosh,"Distributed systems- an algorithmic approach",CRC Press

EIT-811: REAL TIME SYSTEM

L	T	P
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Unit -I Introduction

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

Unit-II Real Time Scheduling

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

Unit-III Resources Sharing

Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.

Unit-IV Real Time Communication

Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols

Unit-V Real Time Operating Systems and Databases

Features of RTOS, Time Services, UNIX as RTOS, POSIX, Issues, Characteristic of Temporal data, Temporal Consistency, Concurrency Control, Overview of Commercial Real Time databases

Text Books:

1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.

Reference Books:

1. Mall Rajib, “Real Time Systems”, Pearson Education
2. Albert M. K. Cheng , “Real-Time Systems: Scheduling, Analysis, and Verification”, Wiley.

EIT-812: EMBEDDED SYSTEMS

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Unit -I Introduction to embedded systems: Classification, Characteristics and requirements, Applications

Unit-II Timing and clocks in Embedded systems, Task Modeling and management, Real time operating system issues.

Unit-III Signals, frequency spectrum and sampling, digitization (ADC, DAC), Signal Conditioning and Processing. Modeling and Characterization of Embedded Computation System.

Unit-IV Embedded Control and Control Hierarchy, Communication strategies for embedded systems: Encoding and Flow control.

Unit-V Fault-Tolerance, Formal Verification., Trends in Embedded Processor, OS, Development Language

Text Books:

1. H.Kopetz, "Real-Time Systems", Kluwer
2. Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000
3. R.Gupta, "Co-synthesis of Hardware and Software for Embedded Systems", Kluwer

Reference Books:

1. Shibu K.V., "Introduction to Embedded Systems", TMH
2. Embedded System Design, Marwedel, Peter, Kluwer Publishers, 2004
3. Marwedel, "Embedded System Design", Springe

EIT-813: DIGITAL IMAGE PROCESSING

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Unit -I Introduction and Fundamentals

Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Unit-II Image Enhancement in Frequency Domain

Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

Unit-III Image Restoration

A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

Unit-IV Morphological Image Processing

Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

Unit-V Registration

Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation

Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

Text Books:

1. Rafael C. Gonzalez & Richard E. Woods, “Digital Image Processing”, 3edition, Pearson,
2. A.K. Jain, “Fundamental of Digital Image Processing”, PHI,

Reference Books:

1. Bernd Jahne, “Digital Image Processing”, 5thEd., Springer.
2. William K Pratt, “Digital Image Processing: Piks Inside”, John Wiley & Sons

EIT-814: MULTIMEDIA SYSTEMS

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Unit -I Introduction

Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products

Stages of Multimedia Projects

Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.

Unit-II Multimedia Building Blocks

Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture.

Animation Techniques: Shading, anti-aliasing , Morphing.

Unit-III Data Compression

Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modelling. Finite Context Modelling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.

Unit-IV Speech Compression & Synthesis

Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression.

Unit-V Images & Video

Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database.Content based retrieval for text and images,

Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in Multimedia.

Text Books:

1. Tay Vaughan, “Multimedia, Making IT Work”, McGraw Hill.
2. Buford, “Multimedia Systems”, Addison Wesley.

Reference Books:

1. Mark Nelson, “Data Compression Hand Book”, BPB.
2. Sleinreitz, “Multimedia System”, Addison Wesley.

EIT-821: NEURAL NETWORKS

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Unit -I Neuro-computing and Neuroscience Historical notes, human Brain, neuron Mode l, Knowledge representation, Al and NN. Learning process: Supervised and unsupervised learning, Error correction learning, competitive learning, adaptation, statistical nature of the learning process.

Unit-II Data processing Scaling, normalization, Transformation (FT/FFT), principal component analysis, regression, co-variance matrix, eigen values & eigen vectors. Basic Models of Artificial neurons, activation Functions, aggregation function, single neuron computation, multilayer perceptron, least mean square algorithm, gradient descent rule, nonlinearly separable problems and bench mark problems in NN.

Unit-III Multilayered network architecture, back propagation algorithm, heuristics for making BP-algorithm performs better. Accelerated learning BP (like recursive least square, quick prop, RPROP algorithm), approximation properties of RBF networks and comparison with multilayer perceptran.

Unit-IV Recurrent network and temporal feed-forward network, implementation with BP, self-organizing map and SOM algorithm, properties of feature map and computer simulation. Principal component and Independent component analysis, application to image and signal processing.

Unit-V Complex valued NN and complex valued BP, analyticity of activation function, application in 2D information processing. Complexity analysis of network models. Soft computing. Neuro-Fuzzy-genetic algorithm Integration.

Text Books:

1. J.A. Anderson, An Intoduction to Neural Networks, MIT
2. Hagen Demuth Beale, Neural Network Design, Cengage Learning
3. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.

Reference Books:

1. R.L. Harvey, Neural Network Principles, PHI
2. Kosko, Neural Network and Fuzzy Sets, PHI
3. "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.

EIT-822: NATURAL LANGUAGE PROCESSING

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Unit -I Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax.

Unit-II Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.

Unit-III Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top- Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

Unit-IV Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

Unit-V Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

Text Books:

1. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, NLP: A Paninian Perspective, Prentice Hall, New Delhi
2. James Allen, Natural Language Understanding, Pearson Education

Reference Books:

1. D. Jurafsky, J. H. Martin, Speech and Language Processing, Pearson Education
2. L.M. Ivansca, S. C. Shapiro, Natural Language Processing and Language Representation
3. T. Winograd, Language as a Cognitive Process, Addison-Wesley

EIT-823: MOBILE COMPUTING

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Unit -I Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Unit-II Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.
Global Mobile satellite systems: case studies of the IRIDIUM and GLOBALSTAR Systems.

Unit-III Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit-IV Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit-V Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Text Books:

1. J. Schiller, Mobile Communications, Addison Wesley.
2. Charles Perkins, Mobile IP, Addison Wesley.
3. Dharam prakash Agrawal and Qing-An Zeng, "Introduction to Wireless and Mobile Systems" 3rd edition, Cengage learning 2013.

Reference Books:

1. Charles Perkins, Ad hoc Networks, Addison Wesley.
2. Upadhyaya, "Mobile Computing", Springer
3. Evaggelia Pitoura and George Samarus, "Data Management for Mobile Computing", Kluwer Academic Press, 1998

EIT-824: SOFT COMPUTING

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Unit -I **Artificial Neural Networks**

Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning – Back propagation networks - Kohnen's self organizing networks - Hopfield network.

Unit-II **Fuzzy Systems**

Fuzzy sets, Fuzzy Relations and Fuzzy reasoning, Fuzzy functions - Decomposition - Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.

Unit-III **Neuro - Fuzzy Modeling**

Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls - Simulated annealing – Evolutionary computation.

Unit-IV **Genetic Algorithms**

Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction - Rank method - Rank space method.

Unit-V **Application Of Soft Computing**

Optimiation of traveling salesman problem using Genetic Algorithm, Genetic algorithm based Internet Search Techniques, Soft computing based hybrid fuzzy controller, Intoduction to MATLAB Environment for Soft computing Techniques.

Text Books:

1. Sivanandam, Deepa, " Principles of Soft Computing", Wiley
2. Jang J.S.R, Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Prentice
3. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill
4. Laurene Fausett, "Fundamentals of Neural Networks", Prentice Hall

Reference Books:

1. D.E. Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley
2. Wang, "Fuzzy Logic", Springer

EIT - 851: DISTRIBUTED SYSTEMS LAB

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1. Write a program to simulate the functioning of Lamport's logical clock in 'C'.
2. Write a program to simulate the Distributed Mutual Exclusion in 'C'.
3. Write a program to implement a Distributed chat server using TCP sockets in 'C'.
4. Implement RPC mechanism for a file transfer across a network in 'C'
5. Write a JAVA code to implement 'Java RMI' mechanism for accessing methods of remote systems.
6. Write a code in 'C' to implement sliding window protocol.
7. Implement corba mechanism by using C++ program at one end and java program at the other.
8. Create CORBA based server-client application.
9. Write a JAVA code to implement RPC mechanism
10. Design XML Schema and XML instance document
11. Write a program to Incrementing a counter in shared memory