21CS211A: COMPUTER ORGANIZATION

B.Tech. II Year I Sem. **L T P C**

3 - - 3

Course Objectives

1. To introduce principles of computer organization and the basic architectural concepts.
2. To understand the design concepts of control memory and central processing unit.
3. To explain the computer arithmetic set of operations and instruction set design.
4. To understand the representation of data at the machine level and how computations are performed at machine level, memory organization and I/O organization.
5. To become familiar with pipelining, vector processing and memory organization.

Course Outcomes

1. Able to explain the principles of computer organization and simple register transfer language to specify various computer operations.
2. Able to compare different addressing modes and instruction formats.
3. Able to make use of all computer arithmetic operations.
4. Able to decide the type of data representations and types of memory organizations.
5. Able to compare various types of pipeline and processing.

UNIT - I

Digital Computers: Introduction, Block Diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupt.

UNIT - II

Micro Programmed Control: Control Memory, Address Sequencing, Micro Program example, Design of Control Unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data Types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating– point Arithmetic Operations. Decimal Arithmetic Unit, Decimal Arithmetic Operations

UNIT - IV

Input-Output Organization: Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associate Memory, Cache Memory.

UNIT - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Inter processor communication and synchronization, Cache Coherence.

TEXT BOOK:

1. Computer System Architecture – M. Morris Mano, 3rd Edition, Pearson/PHI.

REFERENCES:

1. Computer Organization – Carl Hamacher, ZvonkoVranesic, SafwatZaky, 5th Edition, McGraw-Hill.
2. Computer Organization and Architecture – William Stallings 6th Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson

21BS2115: DISCRETE MATHEMATICAL STRUCTURES

B.Tech. II Year I Sem. **L T P C**

3 - - 3

Prerequisites: An understanding of Mathematics in general is sufficient.

Course Objectives: ToLearn

1. Propositional Calculus, PredicateLogic and variousprooftechniquesforvalidationofarguments.
2. Set theory, functions, Relations, ordering relations and Algebraic Structures.
3. Discrete mathematics problems that involve Permutations, combinations, Binomial, Multinomial and Inclusion-Exclusion.
4. Generating functions and Recurrence relations.
5. Fundamentalnotionsandapplicabilityofgraphtheory.

Course Outcomes: OnSuccessfulcompletionofthecourse,studentswill beableto

1. ApplyrulesofinferenceforPropositionalandPredicatelogic.
2. Explain the useofSetTheory,relations, and functionsinReal-world scenarios.
3. Demonstrate the concept of permutations and combinations to problem solving.
4. Solve problems involving recurrence relations and generating functions.
5. Applythepropertiesofgraphsandtreesto solveproblemsarisinginReal-world scenarios.

UNIT – I:

Propositional Calculus: Propositions and notations**,** Basic Connectives and Truth tables, Logical Equivalence: Laws ofLogic,LogicalImplication;RulesofInference.

Predicates: Predicates and Quantifiers, Free and Bound variables. Introduction to Proofs, Proof Methods and Strategy: Direct Proof, Indirect Proof, and Proof by Contradiction.

UNIT-II:

Sets and Relations: Sets, Functions,CartesianProducts, Relations and their Properties, Representing Relations, Matrix Representation of Relations, Digraph of a Relation, Composition of Relations, Closures of Relations, Equivalence Relations, Partial Ordering Relations, POSET, Hasse diagrams, Lattices.

Algebraic Structures: Introduction, Algebraic Systems, Semi groups, Monoids and Groups.

UNIT- III:

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with and without Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems. Inclusion-Exclusion, Applications of Inclusion-Exclusion.

UNIT IV:

Generating Functions: Generating Functions, Calculating Coefficient of generating functions.

Recurrence Relations: Solving theFirstOrderLinearRecurrenceRelations, Solving Second order, third and higher order Linear Homogeneous and Non-HomogeneousRecurrence relations. Solving first and Second order Recurrence Relations by Method of Generating Functions.

UNIT – V

Introduction to Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Graph Isomorphism, Sub graphs and Complement of a graph, Connectivity, Euler trails and circuits, , Hamiltonian paths and cycles, Planar Graphs, Euler formula, Chromatic number, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Spanning Trees: The Algorithms of DFS and BFS, Minimum Spanning Trees: The Algorithms ofKruskal'sandPrim's.

TEXT BOOKS:

1. KennethH.Rosen,"Discrete MathematicsanditsApplications",8th Edition,Tata McGraw-Hill.
2. RalphP.Grimaldi,"DiscreteandCombinatorialMathematics",AnAppliedIntroduction,5th edition, Pearson Education.
3. J.P.Tremblay,R.Manohar,"DiscreteMathematicalStructureswithApplicationstoComputerScience",TATAMcGraw-Hill Education.

REFERENCE BOOKS:

1. Joe L. Mott, Abraham Kandel, Theodore P. Baker, "Discrete Mathematics for Computer Scientists and Mathematicians", 2nd Edition, Pearson Education.
2. Richard Johnsonbaugh, "Discrete Mathematics", 8th Edition, Pearson Education.
3. Edgar G.Goodaire, Michael M.Parmenter "Discrete Mathematics with Graph Theory".

21CS211C: DATA STRUCTURES USING C

B.Tech. II Year I Sem. **L T P C**

3 - - 3

Prerequisites:

1. A course on "Programming for Problem Solving".

Course Objectives

1. Gaining Basic Knowledge on Linear and Non Linear Data Structures.
2. Exploring basic data structures such as stacks and queues.
3. Introduces a variety of data structures such as hash tables, search trees, tries, heaps, andgraphs.
4. Introduces searching, sorting and pattern matching algorithms.
5. Understand the concepts of Search Trees.

Course Outcomes

1. Ability to design and analyze the time and space complexity and understand the concepts
2. Linked List of data structures.
3. Understand data structure concepts of Stacks and Queues.
4. Understand data structure concepts of Trees, Graphs.
5. Understand the concepts of Searching and Sorting.

UNIT- I

Basic Concepts: Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance Analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non-Linear data structures.

Linked Lists: Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists- Operations for Circularly linked lists, Doubly Linked Lists- Operations-Insertion, Deletion. Representation of single, two-dimensional arrays, sparse matrices-array and linked representations.

UNIT- II

Introduction to Data Structures - Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations, array and linked Implementations in C, Circular Queues - Insertion and deletion operations, Deque (Double ended Queue) ADT, array and linked implementations in C.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

UNIT- IV

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT- V

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, Insertion into an AVL Tree, B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees (Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCES:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.GilbergAndB.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, NarsimhaKarumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson.
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.
11. Advanced Data structures, Peter Brass, Cambridge.

21EC2117: ANLOG CIRCUITS AND DIGITAL DESIGN

B.Tech. II Year I Sem. **L T P C**

3 - - 3

Course Objectives

1. To introduce components such as diodes and BJTs.
2. To know the applications of components.
3. To give understanding of various types of logic families.
4. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
5. To understand the concepts of combinational logic circuits and sequential circuits.

Course Outcomes

Upon completion of the Course, the students will be able to:

1. Know the characteristics of various components.
2. Understand the utilization of components.
3. Know about the logic families and realization of logic gates.
4. Learn Postulates of Boolean algebra and to minimize combinational functions.
5. Design and analyze combinational and sequential circuits

UNIT - I

Diodes and Applications: Junction diode characteristics: Open circuited p-n junction, V-Icharacteristics, effect of temperature, diode resistance, diode capacitance, diode switching times, p-n junction as a rectifier, Tunnel diodes, photo diode, LED.

BJTs: Transistor characteristics: The junction transistor, transistor as an amplifier, CB, CE, CCconfigurations, comparison of transistor configurations, the operating point, self-bias or Emitter bias, bias compensation, thermal runaway and stability.

UNIT -II

Number Systems: Number systems, Complements of Numbers, Codes- Weighted and Non-weighted codes and its Properties, Parity check code and Hamming code.

Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVEOR gate, Universal gates, De Morgan Laws, NAND and NOR DTL gates, HTL and TTL gates, RTL and DCTL, Comparison of logic families.

UNIT - III

Combinational Logic Circuits I: Basic Theorems and Properties of Boolean Algebra, Canonicaland Standard Forms, Digital Logic Gates, Karnaugh Map Method, Product-of-Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation.

UNIT -IV

Combinational Logic Circuits II: Binary Adder-Subtractor, Decimal Adder, Binary Multiplier,Magnitude Comparator, Decoders, Encoders, Multiplexers, De multiplexers, Parity generator.

UNIT - V

Sequential Logic Circuits: Sequential Circuits, Storage Elements: Latches and flip flops,Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Shift Registers, Ripple Counters, Synchronous Counters, Random-Access Memory, Read-Only Memory.

TEXTBOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, JaccobMillman, Christos Halkias and Chethan D. Parikh, Tata McGraw-Hill Education, India, 2010.
2. Digital Design, 5/e, Morris Mano and Michael D. Cilette, Pearson, 2011.

REFERENCES:

1. Electronic Devices and Circuits, Jimmy J Cathey, Schaum's outline series, 1988.
2. Digital Principles, 3/e, Roger L. Tokheim, Schaum's outline series, 1994

21CS211B: OBJECT ORIENTED PROGRAMMING USING JAVA

B.Tech. II Year I Sem. **L T P C**

3 - - 3

Prerequisites

1. Fundamental knowledge of object-oriented concepts, terminology, and syntax, and the steps required to create basic Java programs.
2. Previous experience with at least one programming language

Course Objectives

1. To understand object oriented programming concepts, and apply them in solving problems.
2. To introduce the implementation of packages and interfaces.
3. To introduce the concepts of exception handling and multithreading.
4. To use the collection framework classes in to real time scenarios.
5. To introduce the design of Graphical User Interface using applets and swing controls

Course Outcomes

1. Able to solve real world problems using OOP techniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using java collection framework and I/O classes.
4. Able to develop multithreaded applications with synchronization.
5. Able to develop applets for web applications and GUI based Applications.

UNIT I

Object Orientated Paradigm:

Introduction to Procedural and Object oriented programming, A way of viewing world – agents and communities, responsibilities, messages, methods, class and instance, Oops concepts.

Java Basics: Introduction to Java ,JVM Architecture, Java Buzz words, Java Tokens- Comments, Identifiers, Keywords, Separators, Data types, enumerated types, Variables, constants, Type Conversion, Operators, Control Statements, Wrapper Classes, Structure of java with simple standalone program, arrays, console input and output, formatting output, constructors, methods – static and instance, parameter passing, access control modifiers, this reference, overloading methods and constructors, recursion, garbage collection, Inner classes, exploring String and String Buffer class.

UNIT II

Inheritance – Inheritance hierarchies super and sub classes, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism- dynamic binding, static binding, abstract classes and methods. Interfaces – Interfaces vs. Abstract classes, defining an interface, Multiple Inheritance through interface, extending interface.

Packages-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT – III

I/O STREAM - Introduction, Byte-oriented streams, Character – oriented streams, File streams, Random-access file, Serialization.

Exception handling -- Dealing with errors, benefits of exception handling, classification of exceptions-exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catches, throw, throw and finally, built in exceptions and user defined exceptions.

Multithreading – Differences between processes and threads, thread life cycle, creating threads, interrupting threads, multithreading, thread priorities, Synchronization.

UNIT IV

Collection framework in java: Introduction, Util Package interfaces, Retrieving elements from collections.

Collection interfaces: Set, Map, List, Queue, Implementationclasses :HashSet, HashMap, ArrayList, Stack, Linked List, String Tokenizer, Scanner, Calendar class.

UNIT V

AWT - Introduction to AWT, Components, Event, Event-Delegation-Model, Listeners, Layout management and types – border, grid and flow.

Individual components: Label, Button, Checkbox, Radio Button. Choice, List, Menu, Text Field, Text Area.

Applets - Inheritance hierarchy for applets, differences between applets and applications, life cycle of an Applet, passing parameters to applets.

Swings- Introduction to Swing, Swing vs.AWT, Hierarchy for Swing components.

TEXT BOOKS:

1. Java :The complete reference,7th edition, Herbert Schildt,TMH
2. Understanding OOP with java, updated edition, T.Budd, Pearson education

REFERENCES:

1. JAVA Fundamentals- A comprehensive introduction, Herbert Schildt and Dale Skrien, TMH
2. Java for Programmers, P.J.Deitel and H.M.Deitel, Perason education (OR) JAVA: How to program P.J.Deitel and H.M.Deitrl, PHI
3. Thinking in java, Bruce Eckel, Pearson Education
4. Object Oriented Programming through java, P.Radha Krishna, Universities Press.
5. Programming in java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

21HS2117:UNIVERSAL HUMAN VALUES-II

B. Tech II Year II Semester

L	T	P	C
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Pre-requisites: Universal Human Values 1 (desirable)

Course Objective: The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Course Outcomes: By the end of the course, students

1. Are expected to become more aware of themselves, and their surroundings (family, society, nature).
2. Would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
3. Would have better critical ability.
4. Would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
5. Would be able to apply, what they have learnt, to their own self in different day-to-day settings.

UNIT - I: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- Purpose and motivation for the course, recapitulation from Universal Human Values-I
- Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

UNIT - II: Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT - III: Understanding Harmony in the Family and Society- Harmony in Human - Human Relationship

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family):Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

UNIT - IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT - V: Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
  a. Ability to utilize the professional competence for augmenting universal human order
  b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
  a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
  b. At the level of society: as mutually enriching institutions and organizations
- Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

TEXT BOOKS

1. RRGaur, R Asthana, G P Bagaria,"A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. RRGaur, R Asthana, G P Bagaria,"Teachers'Manual for A Foundation Course in HumanValues and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019.ISBN978-93-87034-53-2

REFERENCE BOOKS

1. JeevanVidya: E k Parichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. A.N.Tripathi,"HumanValues",New Age Intl.Publishers,NewDelhi,2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. F Schumacher. "Small is Beautiful"
6. "Slow is Beautiful"–Cecile Andrews
7. J C Kumarappa "Economy of Permanence"
8. PanditSunderlal"Bharat Mein Angreji Raj"
9. Dharampal,"Rediscovering India"
10. Mohandas K. Gandhi, "Hind Swarajor Indian Home Rule"
11. "India Wins Freedom"-Maulana Abdul Kalam Azad
12. Vivekananda-Romain Rolland(English)
13. Gandhi-Romain Rolland(English)

21CS215C: DATA STRUCTURES USING C LAB

B.Tech. II Year I Sem. **L T P C**

- - 31.5

Prerequisites:

1. A Course on "Programming for problem solving".

Course Objectives

1. It covers various concepts of C programming language
2. It introduces searching and sorting algorithms
3. It provides an understanding of data structures such as stacks and queues.

Course Outcomes

1. Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
2. Ability to implement searching and sorting algorithms

LIST OF EXPERIMENTS:

Week 1: Write a program that uses functions to perform the following operations on Single Linked List:

i)Creation ii) Insertion iii) Deletion iv) Traversal

Week 2: Write a program that uses functions to perform the following operations on doubleLinked List:

i) Creation ii) Insertion iii) Deletion v) Traversal

Week 3: Write a program that uses functions to perform the following operations on CircularLinked List. :

i) Creation ii) Insertion iii)Deletion iv)Traversal

Week 4: Write a program that implement Stack (its operations) using Arrays and Linked list.

Week 5: Write a C program that uses stack operations to convert a given Infix expression into its Postfix.

Week 6: Write a program that implement Queue (its operations) using Arrays and Linked list.

Week 7: Write a C Program to implement a Double Ended Queue ADT using

i) Arrays ii) Doubly Linked List

Week 8: Write a C program to implement all the functions of a Dictionary (ADT) using Hashing.

Week 9: Write a program that use recursive functions to perform the following searching operations for a Key value in a given list of integers:

i) Linear Search ii) Binary Search

Week 10: Write a program to implement the tree traversal methods.

Week 11: Write a program to implement the graph traversal methods.

Week 12: Write a program that implements the following sorting methods to sort a given list of integers in ascending order

i) SelectionSort ii) Quick Sort

Week 13: Write a program that implements the following sorting methods to sort a given list of integers in ascending order

i) Insertion Sort ii) Merge Sort

Week 14: Write a program that implements the following sorting methods to sort a given list of integers in ascending order

i) Radix Sort ii) Heap Sort

TEXTBOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, UniversitiesPress.
2. DataStructuresusingC–A.S.Tanenbaum,Y.Langsam,andM.J.Augenstein, PHI/Pearson Education.

21CS215B: JAVA PROGRAMMING LAB

B.Tech. II Year I Sem. **L T P C**

- - 3 1.5

Prerequisites:

1. Fundamental knowledge of object-oriented concepts, terminology, and syntax, and the steps required to create basic Java programs.
2. Previous experience with at least one programming language

Course Objectives

1. To introduce Java compiler and eclipse platform.
2. To make the student learn an object oriented way of solving problems using java.
3. To make the students to write programs using multithreading concepts and handle exceptions.
4. To make the students to write programs that connects to a database and be able to perform various operations.
5. To make the students to create the Graphical User Interface using Applets, AWT Components & Swing Components.

Course Outcomes

1. Able to use Java compiler and eclipse platform to write and execute java program.
2. Understand and Apply Object oriented features and Java concepts.
3. Able to apply the concept of multithreading and implement exception handling.
4. Able to access data from a Database with java program.
5. Develop applications using Console I/O and File I/O,GUI applications

LIST OF EXPERIMENTS

1) Use eclipse or Netbean platform and acquaint with the various menus, create a test project, add a test class and run it see how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2) Write a java program to demonstrate mutability of StringBuffer class to find out whether a given string is Palindrome or not?

3) Write a program to create a user defined package named **'sample'** and demonstrate importing this package in other program.

4) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

5) a) Develop an applet that displays a simple message.

b) Develop an Applet that receives an integer in one text field & compute its factorial value & returns it in another text filed when the button "Compute" is clicked

6) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box

7) Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

8) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "stop" or "ready" or "go" should appear above the buttons in a selected color. Initially there is no message shown.

9) Write a java program to create an abstract class and abstract methods

10) Suppose that a table named Table.txt is stored in a text file. The first line in the file header and the remaining lines correspond to row in the table. The elements are separated by commas. Write a Java program to display the table using labels in grid layout.

11) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).

12) Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t).it takes a name or phone number as input and prints the corresponding other value from the hash table(hint: use hash tables)

13) Write a java program that correctly implements the producer–consumer problem using the concept of inters thread communication.

14) Write a java program to list all the files in a directory including the files present in all its subdirectories.

TEXT BOOKS:

1. Java how to program, sixth edition,H.M.Ditiel
2. Programming with java, M.P.Bhave

21EC2155: ANLOG CIRCUITS AND DIGITAL DESIGN LAB

B.Tech. II Year I Sem. **L T P C**

- - 2 1

Course Objectives

1. To introduce components such as diodes, BJTs.
2. To know the applications of components.
3. To learn basic techniques for the design of digital circuits
4. To learn basic fundamental concepts used in the design of digital systems.
5. To understand the concepts of sequential circuits.

Course Outcomes

Upon completion of the Course, the students will be able to:

1. Know the characteristics of various components.
2. Understand the utilization of components.
3. Understand the Postulates of Boolean algebra.
4. Know about the logic families and realization of logic gates.
5. Know the minimize combinational functions
6. Design and analyze sequential circuits

LIST OF EXPERIMENTS

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Half Wave Rectifier without filters.
3. Full Wave Rectifier without filters.
4. Switching characteristics of a transistor.
5. Input and output characteristics of BJT in CE Configuration.
6. Input and output characteristics of BJT in CB Configuration.
7. Realization of Boolean Expressions using Gates.
8. Realization of logic gates using DTL, TTL, RTL etc.
9. Design and realization logic gates using universal gates.
10. Generation of clock using NAND / NOR gates.
11. Design a 4 – bit Adder / Subtractor.
12. Design and realization a Synchronous and Asynchronous counter using flip-flop

TEXT BOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, JaccobMillman, Christos Halkias and Chethan D. Parikh, Tata McGraw-Hill Education, India, 2010.
2. Digital Design, 5/e, Morris Mano and Michael D. Cilette, Pearson, 2011.

REFERENCES:

1. Electronic Devices and Circuits, Jimmy J Cathey, Schaum's outline series, 1988.
2. Digital Principles, 3/e, Roger L. Tokheim, Schaum's outline series, 1994

21HS2154: SOFT SKILL FOR PROFESSIONAL SUCCESS

Course category:	**Engineering Sciences**	**Credits**	**1**
Course type:	**Practical**	**Lecture-Tutorial-practice**	**0-0-2**
Pre requisites:	**-**	**Continuous evaluation:** **Semester end evaluation:** **Total Marks:**	**30** **70** **100**

Objectives of the Course

1. To enable students understand the nature and the scope of communication, and overcome the barriers for effective communication.
2. To empower students understand the correlation between communication and building social relations.
3. To enhance the team building and leadership qualities.
4. To make the students realize the significance of goal setting.
5. To impart interpersonal communication skills and life skills required for students' professional success.

Course Outcomes: By the end of the course, the students will be able to:

1. Communicate effectively in academic and social contexts.
2. Understand about themselves with reference to self-discovery and self-awareness.
3. Nurture social behavior, responsibility and accountability leading to the ability to work in teams with diverse groups of people.
4. Apply their creative and critical thinking skills for problem solving and decision making.
5. Identify their short-term and long-term goals; apply emotional intelligence to enhance leadership skills and professionalism.

UNIT 1

Art of Communication – Communication Cycle – Barriers to Communication – Effective Communication - Assertiveness - Reading a Story/Passage loudly with more focus on meaningful pauses and Accent Neutralization - Inter-Personal Communication - Social and Professional Networking.

Activity/ies: Role Plays/Telephonic Conversations - Introducing Oneself and Others – Greetings – Making Requisitions and Apologies.

UNIT 2

Self-Discovery - Self-Awareness – SWOT - Self Esteem - Self and Professional Discipline – Procrastination - Time Management – Professional Behavior and Attitude.

Activity/ies: Situations/Case Studies related to Self-Awareness, Self Esteem, Time Management, Behavior and Attitude.

UNIT 3

Motivation – Cooperation and Coordination – Team Building – Creative Thinking – Problem Solving - Decision Making – Accountability and Social Responsibility.

Activity/ies: Situations/Case Studies related to Motivation, Cooperation and Coordination, Team Building and Decision Making

UNIT 4

Emotional Intelligence (EQ) – Critical Thinking - Bonding – Trust Building - Etiquette (Social, Professional and Email)

Activity/ies: Situations/Case Studies related to Trust Building/Etiquette/Film Critiquing

UNIT 5

Leadership - Organizational Skills - Entrepreneurial Skills - Goal Setting - Long-term and Short- term Goals.

Activity/ies: Situations/Case Studies related to Leadership, Organizational Skills, and Goal Setting.

TEXT BOOKS/REFERENCES

1. Raju, Yadava B, B T Sujatha& C. Murali Krishna. *English for Better Performance*. Orient Blackswan, Pvt., Ltd, 2014.
2. Rajan. *I Love Living*. Mumbai: Jaico Publishers, 2013.
3. Sundararajan, Francis. *Basics of Communication in English: Soft Skills for Listening, Speaking, Reading and Writing*. New Delhi: Macmillan Publishers India Ltd., 2021.
4. Tulgan, Bruce. *Bridging the Soft Skills Gap - How to Teach the Missing Basics to Today's Young Talent*. Jossey-Bass; 1 edition. September 15, 2015.

21MC0003: ENVIRONMENTAL SCIENCE

B. Tech. II Year I Sem **L T P C**

3 - - 0

Course Objectives

Develop ability to

1. Identify the importance of ecosystem and its functions.
2. Understand the natural resources and their usage in day to day life.
3. Understand the concept of bio-diversity, its values and conservation.
4. Be aware of the causes of different types of pollution and its control.
5. Understand various environmental impacts, requirement of various policiesand legislations towards environmental sustainability.

Course Outcomes

After the completion of the course, the student would be able to –

1. Explain ecosystem and its functions namely, food chain, ecological pyramids etc.
2. Acquire knowledge about different types of natural resources such as land, water, minerals, non-renewable energy and their excessive usage leading to detrimental effects on environment.
3. Comprehend ecosystem diversity, its values and importance of hot spots to preserve the same.
4. Explain different types of pollution, its control and impact on global environment.
5. Recognize various environmental impacts and the importance of various acts and policies towards environmental sustainability.

UNIT-I

ECOSYSTEMS: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, Field visits.

UNIT-II

NATURAL RESOURCES: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy Resources-renewable and non-renewable.

UNIT-III

BIODIVERSITY AND BIOTIC RESOURCES: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies. Global Environmental Issues and Global Efforts: Green House Gases And its effect, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT-V

ENVIRONMENTAL POLICY, LEGISLATION & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economic aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. ErachBharucha, Textbook of Environmental Studies for Undergraduate Courses, University Grants Commission.
2. R. Rajagopalan, Environmental Studies, Oxford University Press.

REFERENCES:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin& Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by AnubhaKaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications. 6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

21CS221D: OPERATING SYSTEMS

B.Tech. II Year II Sem. **L T P C**
3 - - 3

Course Objectives

1. Provide an introduction to operating system concepts (i.e, Operating System services, OSStructure)
2. Introduces the way an ***operatingsystem*** can make the computer more productive by the effective **management of processes** (i.e., threads,scheduling, Synchronization)
3. Introduce basic UNIX commands, system call interface for process management; inter process communication and I/O inUNIX.
4. To understand the basic **memory management** of operating system.
5. To elucidate **deadlocks**, present a number of various techniques for preventing or avoiding or recovering from deadlocks in a computer system

Course Outcomes

1. Will be able to explain services & structure of operating systems.
2. Demonstrate the knowledge of the components of computer and their respective roles in computing and illustrate various methods of process scheduling, synchronization.
3. Ability to recognize and resolve user problems related to memory management with standard operating system techniques.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use eacheffectively to implement file system directory Structures.
5. Will be able to apply security mechanisms and techniques to handle deadlocks.

UNIT - I

Overview-Introduction:Operatingsystemobjectives,Userview,Systemview,Operatingsystem definition , OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments. Operating System services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OSStructure.

UNIT - II

Process and CPU Scheduling: Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Operations onProcesses,Systemcalls-fork(),exec(),wait(),exit(),. Process Scheduling-Basic concepts, Scheduling Criteria, Scheduling algorithms, Multiple Processor Scheduling, Real-Time Scheduling, Thread scheduling, Linux scheduling and Windows scheduling.

Interprocesscommunication: Background, IPC using ordinarypipes and named pipes in Unix.

Process Synchronization: Background, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization in Linux andWindows.

UNIT - III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock. **Protection**: System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights.

UNIT - IV

Memory Management: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of Page Table.

Virtual Memory Management: Background, Demand Paging, Copy-on-Write, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing, Virtual memory in Windows.

UNIT - V

Storage Management-File System: Concept of a File, System calls for file operations- **o**pen(), read(), write(), close(), seek(), unlink(), Access methods, Directory, File System Mounting, File Sharing, Protection.

File System Implementation: File System Structure, File System Implementation, Directory Implementation, Allocation methods, Free-space Management, Efficiency, and Performance.

Mass Storage Structure: Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap space Management.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCES:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005,Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internal - The New Frontiers U. Vahalia, Pearson Education.

21CS221E: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Sem. **L T P C**
3 - - 3

Course Objectives

1. To understand the basic database concepts, applications, data models, schemas and instances.
2. To demonstrate the use of constraints and relational algebra operations.
3. To become proficient in the basics of SQL and construct queries using SQL and normalization techniques.
4. To demonstrate the basic concepts of transaction processing and concurrency control.
5. To familiarize the concepts of database storage structures and the access techniques

Course Outcomes

1. Demonstrate the basic elements of a relational database management system.
2. Ability to design entity relationship model and convert in to relational model.
3. Formulate SQL queries on the data and apply normalization for the development of application software.
4. Analyze transaction processing, concurrency control and recovery management techniques.
5. Analyze the storage structures and indexing.

UNIT – I

Introduction: Database system applications, Purpose of data base systems, Data Independence, Data Abstraction- View of data,Database System architecture, data models, schema and instances,
Database Design Process, ER Diagrams - Entities, Attributes, Relationships, Constraints, keys, additional features of E-R model, Conceptual design with the E-R model.

UNIT - II

The Relational Model: Introduction to the relational model, Integrity constraints over relations,
Enforcing integrity constraints, querying relational data,
Logical database design: E-R to relational, Introduction to views, Destroying/altering tables and views.
Relational Algebra and Calculus: relational algebra operators, relational calculus- Tuple and domain relational calculus,
SQL: Forms of Basic SQL Query-examples, aggregate functions, Built-in functions, set comparison operators, nested queries, correlated queries, group by, having, order by, joins. Transaction control commands, cursors, stored procedures, Triggers.

UNIT – III

Schema Refinement and Normal Forms: Introduction to schema refinement, functionaldependencies, reasoning about FDs. Normal forms - 1NF, 2NF, 3NF, BCNF, properties ofdecomposition, normalization, schema refinement in database design, other kinds of dependencies- 4 NF,5NF.

UNIT - IV

Transaction Management: Transaction concept, transaction state, implementation of atomicityand durability, concurrent executions, Serializability, recoverability, implementation of isolation.
Concurrency Control and Recovery System: Concurrency control, lock based protocols, time-stamp based protocols, validation based protocols, multiple granularity.
Recovery system - failure classification, storage structure, recovery and atomicity, log based recovery,

shadow paging, recovery with concurrent transactions.

UNIT – V

Overview of External Storage : Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning

Overview of Indexing: Tree structured indexing - intuition for tree indexes, indexedsequential access method (ISAM), B+ Trees .

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw Hill Education (India) Private Limited, 3rd Edition. (Part of UNIT-I, UNIT-II, UNIT-III, UNIT-V)
2. Data base System Concepts, A. Silberschatz, Henry. F. Korth, S. Sudarshan, McGraw Hill Education(India) Private Limited l, 6th edition.(Part of UNIT-I, UNIT-IV)

REFERENCES:

1. Database Systems, 6th edition, R Elmasri, ShamkantB.Navathe, Pearson Education..
2. Introduction to Database Systems, C.J.Date Pearson Education
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
4. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.

21CS221F: FORMAL LANGUAGES AND AUTOMATA THEORY

B.Tech. II Year II Sem. **L T P C**
3 - - 3

Course Objectives

1. To introduce Formal Languages, Automata Theory and Abstract models of Computation and Computability, Computational complexities and NP – Completeness.
2. To acquire knowledge in computationaltheory.
3. Explainthetheoreticalfunctionsofcomputerscienceconcerningtherelationshipsbetween languages and machines, the inherent limits of what can be computed and inherent efficiency of solvingproblems.
4. To realize the theoretical concepts and techniques involved in the software system development.
5. Build the foundation for students to pursue research in the areas of Automata Theory, Formal Languages and Computational power ofmachines.

Course Outcomes

1. Acquire a fundamental understanding of the core concepts in automata theory and formal languages.
2. An ability to design grammars and automata (recognizers) for different languageclasses.
3. Apply the theoretical concepts and techniques in designing the softwaresystems.
4. An ability to identify formal language classes and prove language membershipproperties.
5. Anabilitytoproveanddisprovetheoremsestablishingkeypropertiesofformallanguages andautomata.

UNIT - I

Automata: Strings, Alphabet, Language, Operations, Finite State Machine, definitions, finite automation model, acceptance of strings and languages, Deterministic finite automation, Non deterministic Finite automata, Conversion of NFA to DFA, Equivalence NFA and DFA, , minimization of FSM, equivalence between two FSM's, Finite automata with Epsilon transitions, Moore and Malay machines, Equivalence between Mealy and Moore machines.

UNIT - II

Regular Expressions: Regular sets, regular expressions, identity rules, Algebraic Laws for Regular Expressions, Applications of Regular Expressions, equivalence between RE and FA, inter conversion between RE and FA, Arden's theorem, Pumping lemma, Closure properties of regular sets (proofs not required), DecisionPropertiesofRegularLanguages,regulargrammars, rightlinearandleftlineargrammars, equivalence between regular linear grammar and FA, inter conversion between RE andRG.

UNIT - III

ContextFreeGrammars: ContextfreeGrammars,Derivationtrees,LeftMostDerivations,Right Most Derivations, Ambiguity in Context-Free Grammars, Specifications of Context Free Grammars, Normal Forms: Chomsky Normal Form (CNF), Greibach Normal Form (GNF), and Applications of Context-FreeGrammars.

Pushdown Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence PDA's and CFG's, Deterministic Pushdown Automata.

UNIT - IV

Turing Machine: Turing machine, definition, model, design of TM, Computable Functions, recursiveenumerablelanguage,Church'sHypothesis,Countermachine,typesofTM's(Proofsnot required).

UNIT-V

Classes of Problems: Chomsky hierarchy of languages, linear bounded automata and context sensitive language, Introduction to DCFL and DPDA,LR(O) Grammar, decidability of problems, Universal Turing Machine, post correspondence problem. Turing reducibility, definition of P and NP problems, NP complete and NP hard problems.

TEXT BOOKS:

1. Hopcroft, John E.; Motwani, Rajeev; Ullman, Jeffrey D. (2013). Introduction to Automata Theory, Languages, and Computation (3rd Ed.). Pearson. ISBN 1292039051
2. Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata Theory and Computation", Pearson Education 2009
3. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekaran, 2nd edition, PHI.

REFERENCES:

1. John C Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata McGraw Hill Publishing Company, New Delhi, 2007
2. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning
3. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.

21CS221G: DESIGN AND ANALYSIS OF ALGORITHMS

B.Tech. II Year II Sem.

L	T	P	C
3	-	-	3

Course Objectives

1. To analyze performance of algorithms.
2. To understand and choose the appropriate algorithm design technique for a specified application.
3. To solve problems using algorithm design techniques such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
4. To analyze the impact of algorithm design techniques on each application solved.
5. To introduce and understand P and NP classes

Course Outcomes

1. Able to analyze the different algorithm design techniques for a given problem.
2. Able to design algorithms for various computing problems.
3. Able to argue the correctness of algorithms using inductive proofs and invariants.
4. Able to synthesize set operations
5. Able to explain about coping with the limitations of algorithms.

UNIT - I

Notation of an Algorithm: Fundamentals of Algorithmic Problem Solving, Fundamentals of the Analysis of Algorithm Efficiency–Order Notations and its properties, Mathematical analysis for Recursive -Towers of Hanoi and Non-recursive algorithms

Divide and conquer- General method-Control abstraction, Solving Recurrence Relation using Substitution method and Master's Theorem, applications - Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication, Finding Maximum and Minimum element.

UNIT - II

Greedy Method- General method-Control abstraction, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

UNIT - III

Dynamic Programming: General Method, applications-Multi Stage Graphs, Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.

UNIT - IV

Backtracking: General method-Control abstraction, applications-The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V

Branch and Bound: General Method-Control abstraction, applications-15-Puzzle Problem - LC search, 0/1 Knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution, Traveling sales person problem.

NP-Hard and NP-Complete problems: Basic concepts, Non-deterministic algorithms, NP – Hard and NP- Complete classes, Cook's theorem- proof of reduction.

TEXT BOOKS:

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers
2. M.T. Goodrich, Robert Tamassia, Algorithm design: Foundations, Analysis and Internet examples, Wiley student Edn, John Wiley &sons.
3. ParagHimanshu Dave, HimanshuBhalchandraDave, Design and Analysis algorithms Pearson Publication.

REFERENCES:

1. Allen Weiss, Data structures and Algorithm Analysis in C++, 2nd Edn, Pearson Education
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein,"Introduction to Algorithms", Third Edition, PHI Learning Private Limited.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education.

21BS2215: COMPUTER ORIENTED STATISTICAL METHODS

B.Tech. II Year II Sem.

L	T	P	C
3	-	-	3

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

1. The theory of Probability of single and multiple variables
2. Different random variables and various probability distribution functions.
3. Discrete and continuous of the Bernoulli, binomial, poison and the Normal distributions.
4. How to apply the five step test procedure for test of hypothesis concerning a population mean when the sample size is smalland how the statistical procedure(ANOVA) are related to the other statistical procedure.
5. Stochastic processes and Markov chains.

Course Outcomes: After learning the contents of this paper the student must be able to

1. Apply the concepts of probability and distributions to some case studies
2. Understand a random variable that describes randomness or an uncertainty in certain realistic situations.
3. Identify the suitable distribution among Binomial, Poisson and Geometric distribution.
4. Decide the null or alternative hypotheses using the suitable test statistic.
5. Understand about the Markov process and Markov chains which are used to study signals in communications and time series analysis

UNIT - I Probability

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule.

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables.

Unit- II: Discrete Distributions

Bernoulli, Binomial, Geometric Distributions and Poisson distribution.

Continuous Distribution: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Gamma and Exponential Distributions.

Unit- III: Estimation & Test of Hypothesis

Concept of Point estimation and its properties (definition only), Concept of interval estimation with examples. Null and Alternative Hypothesis, Critical region, Type I and Type II errors, level of significance, one tail, two-tail tests. Large sample test for single proportion, difference of proportions, single mean, difference of means

Unit- IV: Small Sample tests

t-Test for single mean, difference of means, paired t-test, F-test.

ANOVA: Introduction, ANOVA for one-way classification only.

UNIT - V Stochastic Processes and Markov Chains

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, nstep transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.

2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

4. Irwin Miller, MarylessMiller,Mathematical Statistics with applications, 8th edition Pearson Publishers.

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

21CS225G: DESIGN AND ANALYSIS OF ALGORITHMS LAB

B.Tech. II Year II Sem.

L	T	P	C
-	-	3	1.5

Course Objectives

1. To write programs in java to solve problems using divide and conquer strategy.
2. To write programs in java to solve problems using backtracking strategy.
3. To write programs in java to solve problems using greedy and dynamic programming techniques.

Course Outcomes

1. Able to write programs in java to solve problems using algorithm design techniques such as Divide and Conquer, Greedy, Dynamic programming, and Backtracking.

Week 1: Write a java program to implement Merge Sort algorithm for sorting a list of integers inascending order.

Week 2: Write a java program to implement Quick Sort algorithm for sorting a list of integers inascending order.

Week 3: Write a java program to implement the Depth First Search (DFS) algorithm for a graph.

Week 4: Write a. java program to implement the Breadth First Search (BFS) algorithm for a graph.

Week 5: Write a java program to implement greedy algorithm for job sequencing with deadlines.

Week 6: Write a java program to implement Dijkstra's algorithm for the Single source shortestpath problem.

Week 7: Write a java program that implements Prim's algorithm to generate minimum costspanning tree.

Week 8: Write a java program that implements Kruskal's algorithm to generate minimum costspanning tree.

Week 9: Write a java program to implement Dynamic Programming algorithm for the 0/1Knapsack problem.

Week 10: Write a java program to implement Dynamic Programming algorithm for the OptimalBinary Search Tree Problem.

Week 11: Write a java program to implement Floyd's algorithm for theall pairs shortest pathproblem.

Week 12: Write a java programs to implement backtracking algorithm for the N-queens problem.

Week 13: Write a java program to implement the backtracking algorithm for the sum of subsetsproblem.

Week 14: Write a java program to implement the backtracking algorithm for the HamiltonianCircuits problem.

Week 15: Write a java program to Implement Graph Coloring using Back Tracking.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in java, 2nd Edition, S. Sahani, Universities Press.
2. Data structures and Algorithms in java, 3rd edition, A. Drozdek, Cengage Learning.
3. Data structures with Java, J. R. Hubbard, 2nd edition, Schaum's Outlines, TMH.

REFERENCES:

1. Data structures and algorithms in Java, 2nd Edition, R. Lafore, Pearson Education.
2. Data Structures using Java, D. S. Malik and P.S. Nair, Cengage Learning

21CS225E -- DATABASE MANAGEMENT SYSTEMS LAB

B.Tech II Year II Semester **L T P C**
- - 3 1.5

Course Objectives:

1. This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for any case study like example named "Banking Enterprise".
2. The student is expected to practice the designing, developing and querying a database in the context of example database "Banking Enterprise". Students are expected to use "Mysql" database.

Course Outcomes:

1. Ability to design and built an database model for a given case study.
2. Ability to implement a database schema for a given problem domain
3. Apply the normalization techniques for development of application software to realistic problems.
4. Ability to formulate queries using SQL DML/DDL/DCL commands.
5. Ability to Practice various triggers, procedures, and cursors using PL/SQL.

Experiment 1:
Student should decide on a case study and formulate the problem statement.
Experiment 2:
Conceptual Designing using ER Diagrams (Identifying entities, attributes, keys and relationships between entities, cardinalities, generalization, specialization etc.)
Note: Student is required to submit a document by drawing an ER Diagram for a given problem.
Experiment 3
Converting the above ER Model in to Relational Model (Represent entities and relationships in Tabular form, represent attributes as columns, identifying keys)
Note: Student is required to submit a document showing the database tables created for a given problem domain.
Experiment 4
Normalization -To remove the redundancies and anomalies in the above relational tables, Normalize up to Third Normal Form
Experiment 5
Creation of Tables using SQL- Overview of using SQL tool, Data types in SQL, Creating Tables (along with Primary and Foreign keys), Altering Tables and Dropping Tables
Experiment 6
Practicing DML commands- Insert, Select, Update, Delete.
Experiment 7
Practicing Queries using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, CONSTRAINTS etc.
Experiment 8
Formulate Sub queries (Nested, Correlated) and Joins (Inner, Outer and Equi).

Experiment 9
Queries using COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING, Creating and Dropping views.
Experiment 10:

PL/SQL programs using conditional statements and loops.

Experiment 11

Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updating using trigger

Experiment 12

PL/SQL programs using procedures.

Experiment 13

PL/SQL programs on Cursors- Declaring Cursor, Opening Cursor, Fetching the data, closing the cursor.

TEXT BOOKS:

1. Introduction to SQL, Rick F.vanderLans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova, Pearson education.
3. Oracle PL/SQL Programming, Steven Feuerstein, SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr. P.S. Deshpande, Dream Tech.

REFERENCES:

1. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
2. SQL Fundamentals, J.J. Patrick, Pearson Education

21CS225D: OPERATING SYSTEMS LAB

B.Tech. II Year II Sem. **L T PC**
- -3 1.5

Course Objectives

1. To write programs in a Linux environment using system calls.
2. To implement the scheduling algorithms.
3. To implement page replacement algorithms
4. To implement file allocation methods.
5. To understand and implement IPC mechanisms using named and unnamed pipes.
6. To develop solutions for synchronization problems using semaphores.

Course Outcomes

1. Ability to develop application programs using system calls in Unix.
2. Ability to implement inter process communication between two processes.
3. Ability to design and solve synchronization problems.
4. Ability to simulate and implement operating system concepts such as scheduling, deadlock management, file management, and memory management.

Use Linux operating system and GNU C compiler.

List of Programs:

1 a) Implement the following LINUX commands in C using system call.

i) cat ii) mv

b) Write a C program that makes a copy of a file using standard I/O and system calls.

c) Write a C program to implement various system calls.

(i) fork() (ii) exec() (iii) wait() (iv)exit()

2 a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

b) Write a shell script to find factorial of a given number.

c) Write a shell script to list all directory files in a directory.

3 Write C programs to simulate the following CPU scheduling algorithms:

i) FCFS ii) SJF

4 Write C programs to simulate the following CPU scheduling algorithms:

i) Round Robin ii) Priority

5 (a) Write a C program to implement the ls| sort command (Use unnamed Pipe).

(b)Write C programs to implement IPC between two unrelated processes using named pipe.

(c) Write a C program to solve the Dining- Philosopher problem using semaphores.

6. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance.

7. Write C programs to simulate the following techniques of memory management:

a) Paging b) Segmentation

8. Write C programs to simulate the following page replacement algorithms:

a) FIFO b) LRU c) LFU

9. Write C programs to simulate the following File allocation methods:

a) Contiguous b) Linked c) Indexed

10. Write C programs to simulate the following File organization techniques:

a) Single level directory b) Two level c) Hierarchical

TEXT BOOKS:

1. Operating System Principles - AbrahamSilchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Advanced Programming in the UNIX Environment by W. Richard Stevens Pearson Education.

REFERENCES:

1. An Introduction to Operating Systems, P.C.P Bhatt, 2nd edition, PHI.
2. UNIX System Programming Using C++, Terrence Chan, PHI/Pearson.
3. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI.

21MC0004: GENDER SENSITIZATION

Course category:	Mandatory Course	Credits	0
Course type:	-	Lecture-Tutorial-practice	3-0-0

Course Objectives

1. To develop students sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work and help them reflect critically on gender violence.
5. To expose students to more egalitarian interactions between men and women.

Course Outcomes

By the end of the course, students

1. Will have developed a better understanding of important issues related to gender such as gender discrimination in our society and how to counter it.
2. Will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Will acquire insight into the gendered division of labour and its relation to politics and economics enabling students and professionals to work and live together as equals.
4. Will develop a sense of appreciation of women in all walks of life.
5. Will be empowered to understand and respond to gender violence by familiarizing them with the studies and movements as well as the new laws that provide protection and relief to women, the textbook.

UNIT - I

Understanding Gender: Introduction- Definition of Gender-Basic Gender Concepts andTerminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: MakingWomen, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT - II

Gender Roles and Relations: Two or Many? -Struggles with Discrimination-Gender Roles andRelations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex election and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary.

UNIT - III

Gender and Labour: Division and Valuation of Labour-Housework: The Invisible Labor-"My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and unaccounted work-Gender Development Issues-Gender, Governance andSustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT - IV

Gender Based Violence: The Concept of Violence- Types of Gender- based Violence - Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! - Sexual Harassment, not Eve-teasing - Coping with Everyday Harassmen t - Further Reading: "*Chupulu".*

Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT - V

Gender and Culture: Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues- Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals MaryKom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

TEXT BOOKS:

1. All the five Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, VasudhaNagaraj, Asma Rasheed, GoguShyamala, DeepaSreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

REFERENCES:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. AbdulaliSohaila. "I Fought For My Life…and Won."Available online at:
3. http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal.