

DISCRETE MATHEMATICAL STRUCTURES

Course Code: 21BS2115
B.Tech. II Year I Sem.

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Prerequisites: An understanding of Mathematics in general is sufficient.

Course Objectives: To Learn

- Propositional Calculus, Predicate Logic and various proof techniques for validation of arguments.
- Set theory, functions, Relations, ordering relations and Algebraic Structures.
- Discrete mathematics problems that involve Permutations, combinations, Binomial, Multinomial and Inclusion-Exclusion.
- Generating functions and Recurrence relations.
- Fundamental notions and applicability of graph theory.

Course Outcomes: On Successful completion of the course, students will be able to

- Apply rules of inference for Propositional and Predicate logic.
- Explain the use of Set Theory, relations, and functions in Real-world scenarios.
- Demonstrate the concept of permutations and combinations to problem solving.
- Solve problems involving recurrence relations and generating functions.
- Apply the properties of graphs and trees to solve problems arising in Real-world scenarios.

UNIT – I:

Propositional Calculus: Propositions and notations, Basic Connectives and Truth tables, Logical Equivalence: Laws of Logic, Logical Implication; Rules of Inference.

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, Cartesian Products, 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 the First Order Linear Recurrence Relations, Solving Second

order, third and higher order Linear Homogeneous and Non-Homogeneous Recurrence 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 of Kruskal's and Prim's.

TEXT BOOKS:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 8th Edition, Tata Mc Graw-Hill.
2. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", An Applied Introduction, 5th edition, Pearson Education.
3. J. P. Tremblay, R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TATA Mc Graw-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".

21CS211A: COMPUTER ORGANIZATION

B.Tech. II Year I Sem.

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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, Zvonko Vranesic, Safwat Zaky, 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

21CS211E: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year I Sem.

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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

- Demonstrate the basic elements of a relational database management system.
- Ability to design entity relationship model and convert in to relational model.
- Formulate SQL queries on the data and apply normalization for the development of application software.
- Analyze transaction processing, concurrency control and recovery management techniques.
- 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, functional dependencies, reasoning about FDs. Normal forms - 1NF, 2NF, 3NF, BCNF, properties of decomposition, normalization, schema refinement in database design, other kinds of dependencies- 4 NF,5NF.

UNIT - IV

Transaction Management: Transaction concept, transaction state, implementation of atomicity and 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, indexed sequential 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 1, 6th edition.(Part of UNIT-I, UNIT-IV)

REFERENCES:

1. Database Systems, 6th edition, R Elmasri, Shamkant B.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.

DATA STRUCTURES THROUGH C ++

Course Code: 21IT2111

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B.Tech. II Year I Sem.

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Course Objectives:

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose an appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To learn about Pattern Matching and Tries.

Course Outcomes:

- Able to learn basics of object oriented program concepts and able to analyze the time and space complexities of algorithms.
- Ability to design programs using a variety of linear data structures such as stacks, queues and various linked lists.
- Ability to design programs using a variety of non-linear data structures such as graphs, trees.
- Able to analyze and implement various kinds of searching and sorting techniques.
- Ability to learn different Pattern Matching algorithm and Tries.

UNIT – I

C++ Programming Concepts: Structure of a C++ program, input and output in C++, class and object, access specifiers, functions in C++, Parameter passing, arrays, pointers, new and delete operators, friend functions, constructors and destructor, class templates and function templates, function overloading, Operator overloading, Inheritance and Polymorphism, Exceptions-throwing an exception and handling an exception.

Basic Concepts - Data objects and Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance Analysis-Time complexity, Space Complexity, Introduction to Linear and Non Linear data structures.

UNIT - II

Representation of single, two dimensional arrays: Sparse matrices-array and Linked representations. Linear list ADT-array representation and linked representation, Singly Linked Lists-Operations Insertion, Deletion, Doubly Linked Lists- Operations- Insertion, Deletion and Circularly linked Lists-Operations for circularly linked lists.

Stack ADT-definition, array and linked implementations, applications-infix to postfix conversion, Postfix expression evaluation, and recursion implementation.

Queue ADT-definition, array and linked Implementations, Circular queues-Insertion and deletion operations.

UNIT - III

Trees – definition, terminology, Binary trees-definition, Properties of Binary Trees, Binary Tree ADT, representation of Binary Trees-array and linked representations, Binary Tree traversals, Threaded binary trees.

Priority Queues –Definition and applications, Max Priority Queue ADT implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

UNIT - IV

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

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Merge sort.

Graphs: Graph Implementation Methods. Graph Traversal Methods.

UNIT - V

Search Trees-Binary Search Tree ADT, Definition, Operations- Searching, Insertion and Deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees- Definition and Examples only, Red-Black Trees-Definitions and Examples only, Comparison of Search Trees.

Pattern Matching and Tries: Pattern matching algorithms-Brute force and Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXT BOOKS:

- [1] Data structures, Algorithms and Applications in C++, 2nd Edition, SartajSahni, Universities Press.
- [2] Data structures and Algorithms in C++, Adam Drozdek, 4th edition, Cengage learning.

REFERENCE BOOKS:

- [1] Data structures with C++, J. Hubbard, Schaum's outlines, TMH.
- [2] Data structures and Algorithms in C++, M.T. Goodrich, R. Tamassia and D. Mount, Wiley India.
- [3] Data structures and Algorithm Analysis in C++, 3rd edition, M. A. Weiss, Pearson. [4] Classic Data Structures, D. Samanta, 2nd edition, PHI.

ANALOG CIRCUITS AND DIGITAL DESIGN

Course Code: 21EC2117
B.Tech II Year I Sem.

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Course Objectives:

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

Course Outcomes:

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

UNIT - I

Diodes and Applications: Junction diode characteristics: Open circuited p-n junction, V-I characteristics, 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, CC configurations, 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, EXCLUSIVE OR 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, Canonical and 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.

TEXT BOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, Jaccob Millman, 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.

REFERENCE BOOKS:

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

DATA STRUCTURES THROUGH C++ LAB

Course Code: 21IT2151
B.Tech. II Year I Sem.

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Course Objectives:

- To write and execute programs in C++ to solve real world problems.
- Understand linear data structures such as arrays, linked lists, stacks, queues.
- Understand Non-linear data structures such as trees, graphs, hash tables and search trees.
- To learn to write C++ programs to implement various sorting algorithms.
- To learn to write C++ programs to implement various searching algorithms
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Course Outcomes:

- Able to identify the appropriate data structures and algorithms for solving the real world problem
- Able to implement linear data structures such as list, stack, and queues to solve various computing problems.
- Able to implement various kinds of searching and sorting techniques.
- Able to implement dictionary ADT using hashing.
- Able to implement Non-linear data structures such as graphs and search trees to solve various computing problems.

LIST OF EXPERIMENTS:

1. Write a C++ program to implement stack ADT using arrays?
2. Write a C++ program to implement queue ADT using arrays?
3. Write a C++ program to implement Stack ADT using Linked List?
4. Write a C++ program to implement queue ADT using Linked List?
5. Write a C++ program that uses functions to perform the following:-
 - a) Create a singly linked list of integers.
 - b) Delete a given integer from the above linked list.
 - c) Display the contents of the above list after deletion.
6. Write a template based C++ program that uses functions to perform the following:-
 - a) Create a doubly linked list of elements.
 - b) Delete a given element from the above doubly linked list.
 - c) Display the contents of the above list after deletion.
7. Write a C++ program that uses stack operations to convert a given infix expression into its postfix equivalent, Implement the stack using an array?
8. Write a C++ program that uses functions to perform the following:
 - a) Create a Binary search tree of characters.
 - b) Traverse the above Binary search tree recursively in preorder, in order and post order.
9. Write a C++ program that uses function templates to perform the following:
 - a) Search for a key element in a list of elements using linear search.
 - b) Search for a key element in a list of sorted elements using binary search.
10. Write a C++ program that to arrange a list of Integers in ascending order:-
 - a) Insertion sort algorithm
 - b) Selection sort algorithm.

11. Write a template based C++ program that implements Quick sort algorithm to arrange a list of elements in ascending order.
12. Write a C++ program that implements Heap sort algorithm for sorting a list of Integers in ascending order.
13. Write a C++ program that implements Merge sort algorithm for sorting a list of integers in ascending order.
14. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.
15. Write a C++ program that uses functions to perform the following:
 - a) Create a binary search tree of integers.
 - b) Search for an integer key in the above binary search tree non recursively.
 - c) Search for an integer key in the above binary search tree recursively.

REFERENCE BOOKS:

1. Data Structures using C++, D. S. Malik, 2nd edition, Cengage learning.
2. Data Structures using C++, V. Patil, Oxford University Press.
3. Fundamentals of Data structures in C++, 2nd edition, E. Horowitz, S. Sahni and D. Mehta, Universities Press.
4. C++ Plus Data Structures, 4th edition, Nell Dale, Jones and Bartlett student edition.

DATABASE MANAGEMENT SYSTEMS LAB

Course Code:21CS215E
B.Tech. II Year I Sem.

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Course Objectives:

- Understand the practical applicability of Database Management System concepts.
- Learn how to create relational databases.
- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

Course Outcomes:

1. Ability to design and built a 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/DDDL/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.vander Lans, 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

ANALOG CIRCUITS AND DIGITAL DESIGN LAB

Course Code: 21EC2155

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B.Tech. II Year I Sem.

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Course Objectives:

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

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

- Know the characteristics of various components.
- Understand the utilization of components.
- Understand the Postulates of Boolean algebra and to minimize combinational functions.
- Known about the logic families and realization of logic gates.
- 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-flops.

TEXT BOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, Jaccob Millman, 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.

REFERENCE BOOKS:

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.

21HS2117: UNIVERSAL HUMAN VALUES-II

B. Tech II Year II Semester

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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 Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCE BOOKS

1. Jeevan Vidya: E k Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N.Tripathi, "Human Values", New Age Intl.Publishers, New Delhi, 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. Pandit Sunderlal "Bharat Mein Angreji Raj"
9. Dharampal, "Rediscovering India"
10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"
11. "India Wins Freedom"-Maulana Abdul Kalam Azad
12. Vivekananda-Romain Rolland(English)
13. Gandhi-Romain Rolland(English)

COMPUTER ORIENTED STATISTICAL METHODS

Course Code: 21BS2215

L T P C

B.Tech. II Year II Sem.

3 - - 3

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

Course Objectives: To learn

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

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

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

UNIT - I Probability (12L)

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 (12L)

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 (12L)

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 (10L)

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 (10L)

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, Maryless Miller, 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.

OPERATING SYSTEMS

Course Code: 21CS221D

B.Tech. II Year II Sem.

L T P C

3 - - 3

Course Objectives

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

Course Outcomes

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

UNIT - I

Overview-Introduction: Operating system objectives, User view, System view, Operating system 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, OS Structure.

UNIT - II

Process and CPU Scheduling: Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Operations on Processes, System calls-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.

Inter process communication: Background, IPC using ordinary pipes 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 and Windows.

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- open(), 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.

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.

JAVA PROGRAMMING

Course Code: 21IT2211
B.Tech. II Year II Sem.

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Prerequisites:

- Previous experience with at least one programming language.

Course Objectives:

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

Course Outcomes:

- Able to solve real world problems using OOP techniques.
- Able to understand the use of inheritance, abstract classes, interfaces.
- Able to solve problems using java collection framework and I/O classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications and to design GUI based applications by connecting to databases using JDBC.

UNIT I

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

UNIT II

Inheritance – Inheritance hierarchies super and sub classes, super keyword, preventing inheritance: final classes and methods.

Polymorphism- dynamic binding, static binding, method overriding, abstract classes and methods.

Interfaces – Interfaces vs. Abstract classes, defining an interface, Multiple Inheritance through interface, extending interface.

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

UNIT – III

I/O STREAM - Introduction, Byte-oriented streams, Character-oriented streams, File streams, Scanner class, exploring String and String Buffer class.

Exception handling -- Benefits of exception handling, classification of exceptions-exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catches, throw, throws and finally, built in exceptions and user defined exceptions.

UNIT IV

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

Collection framework in java: Introduction, Util Package interfaces, List, Set, Retrieving elements from collections, String Tokenizer and more utility classes.

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

REFERENCE BOOKS:

1. JAVA Fundamentals- A comprehensive introduction, Herbert Schildt and Dale Skrien, TMH
2. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson 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.

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Code: 21IT2212

L T P C

B.Tech. II Year II Sem.

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Course Objectives:

- To introduce the fundamental various types of computer networks.
- To introduce the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.
- Understand the basics of Cryptography and Network security.

Course Outcomes:

Students will be able:

- To explain the OSI Reference Model and TCP/IP Models and in particular have a good knowledge of Layers.
- To apply error correction and detection techniques of Data Link Layer.
- To identify the best routing techniques by applying algorithms of Network Layer.
- To explain the Transport Layer Protocols.
- To explain the Application Layer Protocols, Cryptography and Network security.

UNIT - I

Data Communications: Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies – Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN

Physical Layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT - II

Data Link Layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols.

Medium Access sub Layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

UNIT - III

Network Layer: Logical Addressing, Inter-networking, Tunnelling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT - IV

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT - V

Application Layer: Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

TEXT BOOKS:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH, 2006.
2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.

REFERENCE BOOKS:

1. Data communications and Computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education.
5. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000.

FORMAL LANGUAGES AND AUTOMATA THEORY

Course Code: 21CS221F

L T P C

B.Tech. II Year II Sem.

3 - - 3

Course Objectives

- To introduce Formal Languages, Automata Theory and Abstract models of Computation and Computability, Computational complexities and NP – Completeness.
- To acquire knowledge in computational theory.
- Explain the theoretical functions of computer science concerning the relationships between languages and machines, the inherent limits of what can be computed and inherent efficiency of solving problems.
- To realize the theoretical concepts and techniques involved in the software system development.
- Build the foundation for students to pursue research in the areas of Automata Theory, Formal Languages and Computational power of machines.

Course Outcomes

- Acquire a fundamental understanding of the core concepts in automata theory and formal languages.
- An ability to design grammars and automata (recognizers) for different language classes.
- Apply the theoretical concepts and techniques in designing the software systems.
- An ability to identify formal language classes and prove language membership properties.
- An ability to prove and disprove theorems establishing key properties of formal languages and automata.

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), Decision Properties of Regular Languages, regular grammars, right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion between RE and RG.

UNIT - III

Context Free Grammars: Context free Grammars, Derivation trees, Left Most Derivations, 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-Free Grammars.

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, recursive enumerable language, Church's Hypothesis, Counter machine, types of TM's(Proofs not 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 Chandrashekar, 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.

JAVA PROGRAMMING LAB

Course Code: 21IT2251
B.Tech. II Year II Sem.

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Prerequisites:

- Previous experience with at least one programming language

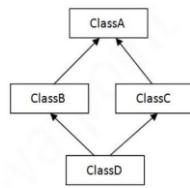
Course Objectives:

- To introduce Java compiler and platform.
- To make the student illustrate the concepts of Inheritance, Polymorphism, abstract classes and interfaces.
- To make the students to write programs using multithreading concepts and handle exceptions.
- To make the students to write programs that connects to a database and be able to perform various operations.
- To make the students to create the Graphical User Interface using Applets, AWT Components & Swing Components.

Course Outcomes:

- Able to understand object oriented way of solving problems using java.
 - Able to understand the use of inheritance, Polymorphism, abstract classes, interfaces.
 - Able to create packages and develop multithreaded applications with synchronization.
 - Able to solve problems using java collection framework.
 - Able to develop applets for web applications and design GUI based applications.
- 1) a) The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the n^{th} value of the Fibonacci sequence?
b) Write a java program that prompts the user for an integer and then prints out all the prime numbers up to that integer?
 - 2) a) Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions?
b) Write a Java program that checks whether a given number is a palindrome or not?
 - 3) a) Write a java program to multiply two given matrices.
b) Write a Java program for sorting a given list of names in ascending order?

- 4) a) Write a program to demonstrate single inheritance.
 b) Write a program in java to implement the following hybrid inheritance?



- 5) a) Write a program to demonstrate method overloading.
 b) Write a program to demonstrate constructor overloading.
- 6) a) Write a java program using runtime polymorphism to solve the following scenario:
 Consider a scenario where Bank is a class that provides a method to get the rate of interest. However, the rate of interest may differ according to banks. For example, SBI, ICICI, and AXIS banks are providing 8.4%, 7.3%, and 9.7% rate of interest.
 b) Write a program to demonstrate multiple inheritance using interfaces.
- 7) a) Write a program to create user defined packages in java.
 b) Write a java program to create an abstract class and abstract methods
- 8) a) Write a java program to demonstrate multi-threading by implementing Runnable Interface.
 b) Write a java program to demonstrate multi-threading by extending Thread class
- 9) 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.
- 10) a) Write a Java Program to demonstrates how to create, initialize, add and remove elements from Array List.
 b) Write a Java Program to demonstrate how to create, initialize, add and remove elements from Hash Set.
- 11) 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.
- 12) 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.

- 13) 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.
- 14) 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.
- 15) Write a Java program that handles all mouse events and shows the event name at the centre of the window when a mouse event is fired.

TEXT BOOKS:

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

DATA COMMUNICATION AND COMPUTER NETWORKS LAB

Course Code: 21IT2252

L T P C

B.Tech. II Year II Sem.

- - 2 1

Prerequisites:

- Basic Knowledge of C and networking concepts.

Course Objectives:

- To introduce the working principle of various communication protocols.
- To introduce the network simulator environment.
- Able to visualize a network topology and observe its performance.
- To analyze the traffic flow and the contents of protocol frames.
- Understand the usage of different networking tools.

Course Outcomes:

- To implement data link layer framing methods.
- To analyze error detection and error correction codes.
- To implement and analyze routing and congestion issues in network design.
- To implement encoding and decoding techniques used in presentation layer.
- To be able to work with different network tools.

List of Experiments:

Part - A

1. Identifying various Network Devices & Demonstration of Assigning MAC address.
2. Write a program to implement data link layer framing method bit stuffing.
3. Write a program to implement data link layer framing method character stuffing.
4. Write a program to implement data link layer framing method character count.
5. Write a program to implement Cyclic Redundancy Check(CRC 12 ,CRC 16 and CRC CCIR) on a data set of characters.
6. Implement Dijkstra's algorithm to compute the shortest path through a network.
7. Implement distance vector routing algorithm for obtaining routing tables at each node.
8. Write a program to implement encryption and decryption.

Part - B.

All the Experiments may be Conducted using Network Simulation software like NS-2, NSG-2.1 and Wire SHARK/equivalent software.

Note: Experiments Performance may be evaluated through simulation by using the Parameters Throughput, Packet Delivery Ratio, Delay etc.

9. Evaluate the performance of various LAN Topologies.
10. Evaluate the performance of TCP and UDP Protocols.
11. Evaluate the performance of IEEE 802.11 and IEEE 802.15.4.
12. Capturing and Analysis of TCP and IP Packets.
13. Simulation and Analysis of ICMP and IGMP Packets.
14. Analysis of HTTP, DNS and DHCP Protocols.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCE BOOK:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.

OPERATING SYSTEMS LAB

Course Code: 21IT2253
B.Tech. II Year II Sem.

L T P C
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Course Objectives:

- To implement the scheduling algorithms.
- To implement page replacement algorithms.
- To implement file allocation methods.
- To develop solutions for Memory management techniques.
- To implement the solutions for deadlock management and file management.

Course Outcomes:

- Ability to design and solve synchronization problems.
- Ability to simulate and implement operating system concepts such as scheduling algorithms.
- Ability to simulate and implement memory management concepts.
- Ability to simulate and implement operating system concepts such as deadlock management.
- Ability to simulate and implement operating system concepts such as file management.

List of Programs:

1. Write C programs to simulate the following CPU scheduling algorithms:
i) FCFS ii) SJF
2. Write C programs to simulate the following CPU scheduling algorithms:
i) Round Robin ii) Priority
3. Write a C program to solve the Dining- Philosopher problem using semaphores.
4. Write a C program to solve the Producer Consumer problem using semaphores.
5. Write C programs to simulate the following techniques of memory management:
a) Paging b) Segmentation
6. Write C programs to simulate the following page replacement algorithms:
a) FIFO b) LRU c) LFU
7. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance.
8. Write C programs to simulate the following File allocation methods:
a) Contiguous b) Linked c) Indexed

9. 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 - Abraham Silchatz, 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.

SOFT SKILLS FOR PROFESSIONAL SUCCESS

Course Code: 21HS2254

L T P C

B.Tech. II Year II Sem.

- - 2 1

Objectives of the Course

- To enable students understand the nature and the scope of communication, and overcome the barriers for effective communication.
- To empower students understand the correlation between communication and building social relations.
- To enhance the team building and leadership qualities.
- To make the students realize the significance of goal setting.
- 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:

- Communicate effectively in academic and social contexts.
- Understand about themselves with reference to self-discovery and self-awareness.
- Nurture social behaviour, responsibility and accountability leading to the ability to work in teams with diverse groups of people.
- Apply their creative and critical thinking skills for problem solving and decision making.
- 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.

GENDER SENSITIZATION

(An Activity-based Course)

Course Code: 21MC0004

B.Tech. II Year II Sem.

L	T	P	C
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Course Objectives

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

Course Outcomes

By the end of the course, students

- Will have developed a better understanding of important issues related to gender such as gender discrimination in our society and how to counter it.
- 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.
- 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.
- Will develop a sense of appreciation of women in all walks of life.
- 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 and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, 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 and Relations-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 and Sustainable 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 Harassment - 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 Mary Kom 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, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas 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. Abdulali Sohaila. “I Fought For My Life...and Won.”Available online at:
3. <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal>.