# Course Structure (2012-2013)

## Department of Information Technology

### II B.Tech I Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Periods per week</th>
<th>Credits</th>
<th>Scheme of Examination Max. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>10BT3BS01</td>
<td>Probability and Statistics</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT30421</td>
<td>Electronic Devices and Circuits</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT30221</td>
<td>Basic Electrical Engineering</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT30422</td>
<td>Digital Logic Design</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT30501</td>
<td>Discrete Mathematical Structures</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT30502</td>
<td>Data Structures</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT30431</td>
<td>Analog and Digital Electronics Lab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10BT30511</td>
<td>Data Structures Lab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>24</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### II B.Tech II Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Periods per week</th>
<th>Credits</th>
<th>Scheme of Examination Max. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>10BT3BS02</td>
<td>Environmental Sciences</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT40501</td>
<td>Computer Architecture and Organization</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT40502</td>
<td>Object Oriented Programming</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT50504</td>
<td>Operating Systems</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT41201</td>
<td>Data Communications</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT60501</td>
<td>Theory of Computation</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10BT40521</td>
<td>Operating Systems Lab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10BT40511</td>
<td>Object Oriented Programming Lab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>24</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
II B.Tech. I Semester
10BT3BS01: PROBABILITY AND STATISTICS

UNIT-I: PROBABILITY AND MATHEMATICAL EXPECTATIONS
Introduction to Probability: Definition of Random Experiment, Events and Sample space, Definition of probability, Addition and Multiplication theorems, Conditional probability, Baye's Theorem, Simple Problems on Baye's theorem.

Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density functions, Mathematical expectation, Properties of mathematical expectations, Mean and Variance.

UNIT-II: PROBABILITY DISTRIBUTIONS
Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and standard Deviations of Poisson distribution, Applications.

Continuous Probability Distributions: Uniform distribution, Exponential distribution, Normal distribution, Properties of Normal Distribution, Importance of Normal Distribution, Area properties of Normal curve.

UNIT-III: CORRELATION AND REGRESSION
Correlation: Definition, measures of correlation, Correlation for bivariate distribution, Rank correlation coefficients.

Regression: Simple linear regression, regression lines and properties.

UNIT-IV: SAMPLING DISTRIBUTIONS
Population and sample, parameter and statistic, Sampling distribution of statistic, Standard Error of statistic, Null and alternative hypotheses, Type I and II errors, Level of Significance, Critical region, Degrees of freedom.

UNIT-V: LARGE SAMPLE TESTS OF SIGNIFICANCE
Test of significance for single proportion, Test of significance for difference of proportions, Test of significance for a single mean, test of significance for difference of means and test of significance for difference of standard deviations.

UNIT-VI: SMALL SAMPLE TESTS OF SIGNIFICANCE
Student's t-test, F-test for equality of population variance, chi-square test for goodness of test, contingency table, chi-square test for independence of attributes.

UNIT-VII: STATISTICAL QUALITY CONTROL

UNIT-VIII: QUEUING THEORY
Queuing Theory, Pure Birth and Death Process, M/M/1 Model, Problems.

TEXT BOOKS:
REFERENCE BOOKS:
UNIT-I: PN JUNCTION DIODE

UNIT-II: RECTIFIERS AND FILTERS
PN Junction as a Rectifier, Halfwave rectifier, ripple factor, Fullwave rectifier, Bridge Rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, pi-section filter, Use of Zener Diode as a Regulator.

UNIT-III: BIPOLAR JUNCTION TRANSISTOR (BJT)
Transistor construction, BJT Operation, BJT Symbol, Transistor as an Amplifier, Transistor currents and their relations, Input & Output Characteristics of a Transistor in CB, CE and CC Configurations, BJT specifications.

UNIT-IV: TRANSISTOR BIASING AND STABILIZATION
Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization against Variations in $V_{BE}$ and $\beta$.

UNIT-V: BIPOLAR JUNCTION TRANSISTOR AMPLIFIERS
BJT Hybrid Modeling for CB, CE and CC Configurations, Determination of h-Parameters from Transistor Characteristics, Comparison of CB, CE and CC configurations, Simplified Hybrid Model.

UNIT-VI: FIELD EFFECT TRANSISTOR

FET AMPLIFIERS: Common Source, and Common Drain Amplifiers using FET, Generalized FET Amplifier, Biasing of FET, Comparison between BJT and FET.

UNIT-VII: FEEDBACK AMPLIFIERS AND OSCILLATORS (Qualitative Treatment)
Feedback Concepts, Types of Feedback Circuits (block diagram representation), General characteristics of negative feedback amplifier, Effect of Feedback on Amplifier characteristics, Barkhausen criterion, Hartley & Colpitts oscillators, Phase Shift Oscillators and Crystal Oscillator.

UNIT-VIII: SPECIAL PURPOSE ELECTRONIC DEVICES
Principle of Operation and Characteristics of Tunnel Diode, Uni-Junction Transistor (UJT), Varactor Diode, Silicon Control Rectifier (SCR) and applications.

TEXT BOOKS:

REFERENCE BOOKS:
3. Rober T. Paynter, Introduction to Electronic Devices and Circuits, Pearson Education.
UNIT-I: INTRODUCTION TO ELECTRICAL ENGINEERING


UNIT-II: NETWORK ANALYSIS


UNIT-III: ALTERNATING QUANTITIES

Principle of AC voltages - wave forms and basic definitions - RMS and average values of alternating currents and voltage - form factor and Peak factor - phasor representation of alternating quantities - the J operator and phasor algebra - analysis of AC circuits with single basic network element - single phase series and parallel RLC circuits - power factor.

UNIT-IV: THREE PHASE CIRCUITS

Introduction - polyphase systems - advantages - star and delta connection - voltages and currents in balanced star and delta connections - numerical problems - advantages of star and delta connections.

UNIT-V: DIRECT CURRENT MACHINES

Constructional details of a DC machine - principle of operation of a DC generator - types of DC generators - emf equation of a generator - Applications.

DC motors - Principle of operation - types of DC motors - Torque equation - losses and efficiency-Applications.

UNIT-VI: ALTERNATING CURRENT MACHINES

Transformers - principle of operation - constructional details - losses and efficiency - regulation of transformer - testing of Transformers: OC and SC test- Simple problems.

Three phase Induction motors: Constructional details- principle of operation - slip - rotor frequency.

UNIT-VII: SPECIAL MACHINES

Single phase induction motors - Principle of operation - Shaded pole motors - Capacitor motors - AC servomotor - AC tachometers - Synchros - Stepper Motors - Characteristics - voltage stabilizers, uninterruptible power supply (UPS).

UNIT-VIII: BASIC MEASURING INSTRUMENTS

Introduction - classification of instruments - operating principles - essential features of measuring instruments - Permanent Magnet Moving Coil (PMMC) and moving iron instruments (voltmeters and ammeters) - Digital multimeters.

TEXT BOOKS:
REFERENCE BOOKS:
II B.Tech. I Semester
10BT30422: DIGITAL LOGIC DESIGN
L T P C
4 1 - 4

UNIT-I: BINARY SYSTEMS
Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

UNIT-II: BOOLEAN ALGEBRA AND LOGIC GATES
Basic Definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, other logic operations, Digital logic gates, integrated circuits.

UNIT-III: GATE – LEVEL MINIMIZATION
The k-map method - Four-variable map, Five-Variable map, product of sums simplification Don’t-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function, Hardware Description language (HDL).

UNIT-IV: COMBINATIONAL LOGIC
Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor , Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT-V: SYNCHRONOUS SEQUENTIAL LOGIC
Sequential circuits, latches, Flip-Flops, Analysis of clocked sequential circuits, HDL for sequential circuits, State Reduction and Assignment, Design Procedure.

UNIT-VI: Registers, shift Registers, Ripple counters, synchronous counters, other counters, HDL for Registers and counters.

UNIT-VII: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction, Read-only memory, Programmable logic Array, programmable Array logic, Sequential Programmable Devices.

UNIT-VIII: ASYNCHRONOUS SEQUENTIAL LOGIC

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. I Semester
10BT30501: DISCRETE MATHEMATICAL STRUCTURES

UNIT–I: MATHEMATICAL LOGIC
Statements and notations, Connectives, Well formed formulae, Truth Tables, Tautology, Equivalence of formulae, Normal forms.

UNIT–II: PREDICATES

UNIT–III: RELATIONS
Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications.
Functions: Inverse Functions, Composition of functions, Recursive functions, Lattice and its Properties.

UNIT–IV: ALGEBRAIC STRUCTURES
Algebraic System-Examples and General Properties Semi Groups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT–V: MATHEMATICAL REASONING
Methods of Proof, Mathematical Induction.

UNIT–VI: RECURRENCE RELATIONS
Generating Functions of Sequences, Calculating coefficients of Generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT–VII: GRAPHS
Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of graphs and graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring, 4-color theorem, 5-color theorem.

UNIT–VIII: GRAPH THEORY AND ITS APPLICATIONS

TEXT BOOKS:

REFERENCE BOOKS:
UNIT-I: INTRODUCTION TO DATA STRUCTURES
Definition, Classification, The Abstract Data Type (ADT), model for ADT, ADT implementation, Generic code for ADTs.

Sorting: Sort concepts, Merge sort, Shell sort, Quick sort, Heap sort.
Searching: Sequential search, variations on sequential search, Binary search, Fibonacci search.

UNIT-II: GENERAL LINEAR LISTS
Singly linked list, Basic Operations, Implementation, List ADT, Circularly linked lists, Doubly linked lists, Multi linked lists.

UNIT-III: STACKS AND QUEUES
Basic stack operations, Stack linked list, implementation, Stack ADT, Applications: Reversing data, Convert Decimal to binary, Postponement.
Queues: Queue operations, Queue linked list design, Queue ADT, Applications: Categorizing data, Queue simulations.

UNIT-IV: NON LINEAR LISTS
Basic tree concepts, Binary trees: properties, traversals, expression trees, Binary search trees: Basic concepts, Operations, Binary Search Tree ADT, Threaded trees.

UNIT-V: AVL TREES
Basic Concepts, Balance Factor, implementation, ADT, Algorithms, And Applications: Count words.
Heaps: Basic Concepts, Implementation, ADT, Heap Application.

UNIT-VI: MULTIWAY TREES

UNIT-VII: GRAPHS
Basic Operation, Review of traversals- Breadth First Traversal, Depth First Traversal, Graph storage structures, Graph ADT, Networks: Minimum spanning trees, Shortest path algorithm.

UNIT-VIII: HASH TABLES
Introduction, Hash Table structure, Hash functions, Linear open Addressing, Chaining, Applications.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. I Semester
10BT30431: ANALOG AND DIGITAL ELECTRONICS LAB

L T P C
- - 3 2

PART A

ELECTRONIC WORKSHOP PRACTICE (Only for Viva-Voce)
1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards. Identification, Specifications and Testing of Active Devices: Diodes, BJTs, Low-power JFETs, MOSFETs, LEDs, LCDs, SCR, UJT, Linear and Digital ICs.

PART B

ANALOG DEVICES AND CIRCUITS (Minimum seven experiments to be conducted)
1. PN Junction and Zener diodes characteristics
2. Ripple Factor and Load Regulations of Rectifier with and without filters (Full wave or Half wave)
3. Input and Output characteristics of Transistor in CE configuration
4. Drain and Transfer Characteristics of JFET
5. Gain and Frequency response of CE Amplifier
6. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
7. Frequency of oscillations of Hartley and Colpitts Oscillator
8. UJT relaxation oscillator
9. SCR characteristics

PART C

DIGITAL CIRCUITS

Realization of
1. Flip Flops using Logic Gates
2. Two Problems on Combinational Circuits
3. Asynchronous Counter
4. Synchronous Counter

Demonstration of
5. VHDL Programme
1. a. Implement Quick sort algorithm on the list \( L=\{67, 78, 34, 11, 99, 42, 56, 23\} \) and display the output list at the end of each pass.

   b. Implement Merge sort algorithm on the lists \( L_1=\{123, 678, 345, 225, 890, 650,111\} \), \( L_2=\{654, 789, 912, 144, 255, 666\} \)

2. a. Implement Heap sort for the list \( L=\{H, V, A, T, L, M, K, U\} \)

   b. Implement Heap sort for the list \( L \) of Week1 (a).

3. Implement binary search and Fibonacci search algorithms on an order list \( L=\{2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20\} \) Undertake search for the elements in the list \( \{3, 18,1,25\} \). Compare the number of keys comparisons made during the searches.

4. Write a program to implement the following operations on singly linked list
   i) Creation
   ii) Insertion
   iii) Deletion
   iv) Display

5. Write a menu driven program which will maintain a list of car models, their price, name of the manufacturer, engine capacity etc., as a doubly linked list. The menu should make provisions for inserting information pertaining to new car models, delete obsolete models, update data such as price besides answering queries such as listing all car models with in a price range specified by the client and listing all details given a car model.

6. Write a C program to implement the following using an array.
   i) Stack ADT ii) Queue ADT

7. Write a C program to implement the following using a single linked list.
   i) Stack ADT ii) Queue ADT

8. Write a C program to perform the following operations:
   i) Insert an element into a binary search tree.
   ii) Delete an element from a binary search tree.
   iii) Search for a key element in a binary search tree.

9. Write a C program that uses recursive functions to traverse the given binary tree in
   i) Preorder ii) Inorder iii) Postorder (Non recursive)

10. Write a C program to perform the following operation.
    i) Insertion into an AVL - tree
    ii) Deletion from an AVL - tree

11. Write a C program to perform the following operations
    i) Insertion into a B - tree
    ii) Deletion from a B - tree

12. Write a C program for the implementation of BFS (Breadth First Search) and DFS (Depth First Search) for a given adjacency matrix.
Adjacency Matrix for a Simple Graph:

Example: Given a graph G as follows

From the chart above, the adjacency matrix for the graph G is:

\[
\begin{bmatrix}
0 & 1 & 0 & 1 & 0 \\
1 & 0 & 1 & 0 & 1 \\
0 & 1 & 0 & 0 & 1 \\
1 & 0 & 0 & 0 & 1 \\
0 & 1 & 1 & 1 & 0
\end{bmatrix}
\]

13. a. Implement a hash table using an array data structure. Design functions to handle overflows using i) linear probing ii) quadratic probing iii) rehashing for a set of keys.

b. Implement a hash table for a given set of keys using chaining method of handling overflows. Maintain the chains in the ascending order of keys. Design a menu driven front end to perform the insert, delete, and search operations on the hash table.

TEXT BOOKS:

REFERENCE BOOKS:
UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES
Definition and concept of the term environment - Various components of environment - Abiotic and biotic - Atmosphere - Hydrosphere - Lithosphere - Biosphere - Inter relationships - Need for public awareness - Role of important national and international individuals and organizations in promoting environmentalism.

UNIT-II: NATURAL RESOURCES, CONSERVATION AND MANAGEMENT
Renewable and Non renewable resources and associated problems - Forests: Deforestation, Causes, effects and remedies - Effects of mining, dams and river valley projects - case studies; Water resources: Water use and over exploitation - Conflicts over water - Large dams - benefits and problems; Food resources : World food problems - Adverse effects of modern agriculture - Fertilizer and pesticide problems; Land resources: Land degradation - Land slides- Soil erosion - desertification-water logging - salinity - Causes, effects and remedies; Mineral resources: Mining - Adverse effects; Energy resources: Growing needs - Renewable and Non renewable resources - Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear energy, Hydrogen fuel and Solar energy - Impact on environment - Sustainable life styles.

UNIT-III: ECOLOGY AND ECOSYSTEMS

UNIT-IV: BIO DIVERSITY, CONSERVATION AND MANAGEMENT
Introduction - Definition and concept of biodiversity - Value of biodiversity - Role of biodiversity in addressing new millennium challenges - Global, national biodiversity - Hot spots of biodiversity Threats to biodiversity - Man and wild life conflicts - Remedial measures - Endemic, endangered and extinct species - In-situ and ex-situ conservation of biodiversity.

UNIT-V: ENVIRONMENTAL POLLUTION AND CONTROL
Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution - Solid waste management - Causes, effects, control and disposal methods - Role of individuals in the prevention of pollution - Hazards and disaster management - Floods - Earthquakes - Tsunamis - Cyclones - Land slides - Case studies.

UNIT-VI: SOCIAL ISSUES AND THE ENVIRONMENT

UNIT-VII: HUMAN POPULATION AND ENVIRONMENT
UNIT-VIII:
FIELD WORK/ENVIRONMENTALIST'S DIARY/ASSIGNMENTS/SEMINARS

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech. II Semester  
10BT40501: COMPUTER ARCHITECTURE AND ORGANIZATION  

UNIT-I: STRUCTURE OF COMPUTERS  
Computer Types, Functional Units, Basic Operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputers.


UNIT-II: REGISTER TRANSFER AND MICRO-OPERATIONS  

Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC). Comparison of RISC and CISC.

UNIT-III: MICROPROGRAMMED CONTROL  
Control Memory, Address Sequencing, Micro-program Example, Design of Control Unit, Hardwired Control, Micro-programmed Control, Nanoprogramming.

UNIT-IV: PIPELINE AND VECTOR PROCESSING  
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path & Control Consideration, Superscalar Operations, Vector Processing, Array Processors.

UNIT-V: THE MEMORY SYSTEM  
Basic Concepts, Semiconductor RAM Types of Read-only Memory (ROM), Cache Memory, Performance Considerations, Virtual Memory, Secondary Storage, and Introduction to Redundant Array of Inexpensive Disks (RAID).


UNIT-VI: INPUT-OUTPUT ORGANIZATION (ADVANCED)  
Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols Like RS232, USB, and IEEE1394.

UNIT-VII: MULTIPROCESSORS  

UNIT-VIII: CASE STUDIES  
CISC Architecture - PentiumIV, RISC Architecture - PowerPC.

TEXT BOOKS:  
REFERENCE BOOKS:
UNIT-I: OBJECT ORIENTED THINKING
Need for OOP paradigm, OOP concepts, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions. C++ class overview-class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation.

UNIT-II: POLYMORPHISM AND INHERITANCE
Function overloading, operator overloading, generic programming-function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, abstract classes, Streams.

UNIT-III: BASICS OF JAVA
History of Java, Java buzzwords, datatypes, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects - concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-IV: INHERITANCE AND INTERFACES
Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism-method overriding, abstract classes.
Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V: EXCEPTION HANDLING
Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-VI: MULTITHREADING
Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads.
Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets, Graphics class.

UNIT-VII: EVENT HANDLING
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components-labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scrollpane, dialogs, menubar, graphics, layout manager - boarder, grid, flow, card and grid bag.
UNIT-VIII: SWINGS

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing - Japplet, JFrame and JComponent, Icons and labels, text fields, The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed panes, Scroll Panes, Trees and Tables.

TEXT BOOKS:
2. Herbert schildt, Java the complete reference, 7th edition, TMH.

REFERENCE BOOKS:
UNIT-I: OPERATING SYSTEMS OVERVIEW
Introduction, Operating system operations, Process management, Memory management, Storage management, Protection and Security, Distributed Systems, Special purpose systems. Operating systems structures: Operating system services and Systems calls, System programs, Operating system structure, Operating systems generations.

UNIT-II: PROCESS MANAGEMENT

UNIT-III: CONCURRENCY AND SYNCHRONIZATION
Process synchronization, Critical-section problem, Peterson’s Solution, Synchronization Hardware, semaphores, Classic problems of synchronization, Readers and Writers problem, Dining-philosophers problem, Monitors, Synchronization examples(Solaris), atomic transactions. Comparison of UNIX and Windows.

UNIT-IV: DEADLOCKS
System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock- bankers algorithm.

UNIT-V: MEMORY MANAGEMENT
Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, Allocation of frames, Thrashing, case study-UNIX.

UNIT-VI: FILE SYSTEM

UNIT-VII: I/O SYSTEM

UNIT-VIII: PROTECTION AND SECURITY
TEXT BOOK:

REFERENCE BOOKS:
UNIT-I: FUNDAMENTALS OF DATA COMMUNICATION

Data communication Network Architecture, Protocols and Standards, Standards Organizations for Data Communications, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks.


UNIT-II: METALLIC CABLE TRANSMISSION MEDIA


UNIT-III: DIGITAL TRANSMISSION

Pulse Modulation, Pulse Code Modulation (PCM), Dynamic Range, Signal Voltage -to-Quantization Noise Voltage Ratio, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed.

Multiplexing and T Carriers: Time- Division Multiplexing, T1 Digital Carrier System, Digital Line Encoding, T Carrier systems, Statistical Time - Division Multiplexing, Frame Synchronization, Frequency- Division Multiplexing, Wavelength- Division Multiplexing.

UNIT-IV: WIRELESS COMMUNICATIONS SYSTEMS


UNIT-V: TELEPHONE INSTRUMENTS AND SIGNALS

The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.


UNIT-VI: CELLULAR TELEPHONE CONCEPTS AND SYSTEMS


UNIT-VII: DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.
UNIT-VIII: DATA COMMUNICATIONS EQUIPMENT


TEXT BOOK:

REFERENCE BOOKS:
UNIT-I: INTRODUCTION TO THEORY OF AUTOMATA
Strings, Alphabets, Language, Operations on sets, Definition of an automaton, Description of a Finite Automaton (FA), Transition systems, Properties of transition functions, Acceptability of a string by a finite automaton.

UNIT-II: FINITE AUTOMATA
Deterministic finite automata(DFA), Nondeterministic finite automata(NFA), The language of a DFA, The Language of an NFA, NFA with \(\epsilon\)-transitions, Equivalence between NFA with and without \(\epsilon\)-transitions, NFA to DFA conversion, Equivalence between two finite state machines, Finite automata with output-Mealy and Moore machines, Minimization of finite automata.

UNIT-III: REGULAR EXPRESSIONS
Regular expressions, Regular sets, Identity rules, Constructing finite automata for a given regular expressions, Conversion of finite automata to regular expressions, Pumping lemma for regular sets, Applications of pumping lemma, Closure properties of regular sets.

UNIT-IV: FORMAL LANGUAGES
Basic definitions and examples, Chomsky classification of languages, Languages and their relation, Languages and automata, Regular grammars- Right linear and Left linear grammars, Equivalence between regular linear grammar and FA.
Context Free Grammars: Definition of context free grammars(CFG), Leftmost and rightmost derivations, The language of a grammar, Sentential forms, Constructing parse trees, The yield of a parse tree, Ambiguous grammars, Removing ambiguity from grammars.

UNIT-V: CONTEXT FREE LANGUAGES
Simplification of CFG, Eliminating useless symbols, Elimination of NULL productions, Elimination of unit productions, Chomsky Normal Form (CNF), Greibach Normal Form(GNF), Pumping lemma for context free languages(CFL).

UNIT-VI: PUSHDOWN AUTOMATA
Definition of pushdown automaton(PDA), The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic pushdown automaton.

UNIT-VII: TURING MACHINES AND LINEAR BOUNDED AUTOMATA
Turing Machine model, Representation of Turing Machines(TM), Languages acceptability by Turing Machines, Design of Turing Machines, Computable functions, Recursively enumerable languages, Church's hypothesis, Counter machine, Types of Turing Machines, The model of linear bounded automaton(LBA), Turing Machines and type 0 grammar, Linear bounded automata and Languages.

UNIT-VIII: COMPUTABILITY THEORY
LR(k) grammar, Universal Turing Machines, Undecidable problems about Turing Machines, Post's Correspondence Problem, The Classes P and NP, An NP-Complete and NP-Hard Problems.

TEXT BOOK:
REFERENCE BOOKS:
1. Simulate the following CPU Scheduling algorithms and calculate waiting time, turnaround time.
   a. First Come First Served (FCFS)
   b. Shortest Job First (SJF)
2. Simulate the following CPU Scheduling algorithms and calculate waiting time, turnaround time.
   a. Round Robin
   b. Priority
3. Simulate the following Page Replacement algorithms and calculate the page faults.
   a. First in First Out (FIFO)
   b. Optimal
4. Simulate the following Page Replacement algorithms and calculate the page faults.
   a. Least Frequently Used (LFU)
   b. Least Recently Used (LRU)
5. Simulate the following Disk Scheduling algorithms and calculate total head movements
   a. First Come First Served (FCFS)
   b. Shortest Seek Time First (SSTF)
6. Simulate the following Disk Scheduling algorithms and calculate total head movements.
   a. SCAN
   b. Circular SCAN (CSCAN)
7. Simulate the following Disk Scheduling algorithms and calculate total head movements.
   a. LOOK
   b. Circular LOOK (CLOOK)
8. Implement Bankers Algorithm for Deadlock Avoidance.
9. Implement Bankers Algorithm for Deadlock Prevention
10. Implement the Bounded Buffer Producer - Consumer problem using Semaphores.
12. Implement the Bounded Buffer Producer - Consumer problem using Monitors.
13. Implement the Dining Philosopher problem using Semaphores.
14. Simulate the following Disk Scheduling algorithms and calculate total head movements.
    a. Multiprogramming with a fixed number of tasks (MFT)
    b. Multiprogramming with a variable number of tasks (MVT)
1. a. Write a C++ program that prints Student Name, Roll No., Branch, Marks and display the Total and Division in the following format after reading the necessary input (Use \n \t etc..).

   Name : *******
   Roll No : *******
   Branch : *******
   Marks : *******
   Total : *******
   Division : *******

   b. Write a C++ program to perform complex operations addition, Subtraction, Multiplication and Division using friend function.

2. a. Write a program in C++ to perform the following using the function template concepts.
   i. To read a set of integers
   ii. To read a set of floating point numbers
   iii. To read a set of double numbers

   Write function for finding average of non-negative numbers and also calculate the deviation of the numbers.

   b. Write a class Fraction that defines methods addition, subtraction, multiplication and division of fractions by overloading basic arithmetic operators.

3. a. Write a C++ program to implement the given hierarchy, using the appropriate methods.

   **Class Relations**

   - Staff
     - Code name
     - Office
     - Grade

   - Teacher
     - Subject
     - Publication

   - Typist
     - Speed

   - Regular
     - Salary

   - Casual
     - Dailywages

   - Ad hoc / Consolidated
     - Pay

Salary – DA, HRA, PF, Dailywages – 200/- per day, Consolidated pay – Fixed Amount
b) Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get data() to initialize base class data members and another member function display area() to compute and display the area of figures. Make display area() as a virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively, and display the area.

Remember the two values given as input will be treated as length of two sides in the case of rectangles, and as base and height in the case of triangles, and used as follows:

Area of rectangle = \text{x} \cdot \text{y}
Area of triangle = \frac{1}{2} \cdot \text{x} \cdot \text{y}

WEEK 4:

a) Create a class called Date that includes three pieces of information as instance variables-a month (type int), a day (type int). Your class should have a constructor that initializes the three values provided are correct.

Provide set and get method for each instance variable. Provide a method display date that displays the month, day, year separated by forward slashes (/).

Write a test application named DateTest that demonstrates Class Date's capabilities.

b) Create a class huge Integer which uses a 40-element array of digits to store integers as large as 40 digits each. Provide Methods: isEqualTo, isNotEqualTo, isGreaterThan, isLessThan, isGreaterThanorEqual and isLessThanorEqualTo. Each method returns a boolean value if the relationship holds true.

WEEK 5:

a) Write a program that reads a line of integers (maximum limit 6 digits), and then displays each integers and sum of all the integers.

(Hint: Use StringTokenizer class)

b) Write a program to do the following
   a) To print a question "Who is inventor of Java"?
   b) To accept the answer
   c) To print out "Good" and then stop, if the answer is correct.
   d) To output the message "try again", if the answer is wrong.
   e) To display the correct answer when the answer is wrong even at the third attempt and stop.

WEEK 6:

a) Assume that a bank maintains two kinds of account for its customers, one called saving account and the other current account.

The savings account provides compound interest and with drawl facilities but no chequebook facility. The current account provides chequebook facility but no interest.

Current account holders should also maintain a minimum balance and if the balance falls below this level a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes Curr_Acct and Sav_Acct to make them more specific to their requirements.

Include the necessary methods in order to achieve the following tasks:

a) Accept deposit from a customer and update the balance
b) Display the balance.
c) Compute and deposit interest.
d) Permit with drawl and update the balance.
e) Check for the minimum balance, impose penalty, if necessary and update the balance.
b) Write an inheritance hierarchy for classes Quadrilateral, Trapezoid, Parallelogram, Rectangle and Square. Use Quadrilateral as the super class of the hierarchy. Make the hierarchy as deep as possible. Specify the instance variables and methods for each class. The private instance variables of Quadrilateral. Write a program that instantiates objects of your classes and outputs the object’s area (except Quadrilateral).

WEEK 7:

a) Write a program to illustrate an inner class by creating an anonymous object in the main class.
b) Design an interface ‘Moveable Shape’ that can be used as a generic mechanism for animating a shape. A movable shape must have two methods: move and draw. Write a ‘Animation Panel’ class that paints and moves any ‘Moveable Shape’ supply movable rectangle and car shapes.

WEEK 8:

a) Write a package called Math that implements class exactly java.lang.math, with a distinguished set of mathematical functions and also Date manipulation functions.
b) Implement Stack ADT using Packages.

WEEK 9:

a) Write a program that converts from 24-hour time to 12-hour time. Define an exception class IllegalTimeFormat, if the user enters an illegal time like 11:65 or even gibberish like &*& 68, throw and catch the exception.
b) Write a program that calls a method that throws an exception of type Arithmetic Exception at a random iteration in a for loop. Catch the Exception in the method and pass the iteration count when the exception occurred to the calling method by using an object of an exception class you define. Add a finally block to the method to output the iteration count when the method exists.

WEEK 10:

a) Write a program that correctly implements producer consumer problem using the concept of inter thread communication.
b) Write a program that demonstrates time slicing among equal priority threads, show that a lower priority thread’s execution is deferred by the time slicing of higher-priority threads.

WEEK 11:

a) Develop an applet that displays a simple message.
b) Develop an applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named “Compute” is clicked.

WEEK 12:

a) Write a Java program for handling Mouse Events.
b) Write a Java program for handling Keyboard Events.

WEEK 13:

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.

TEXT BOOKS:

2. H.M.Dietel and P.J.Dietel, Java How to Program, 6th edition, Pearson Education/PHI.