IT 302 Discrete Structure

Unit-I
Set Theory, Relation, Function, Theorem Proving Techniques : Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction.

Unit-II
Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Unit-III
Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

Unit-IV
Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

Unit V
Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices. Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimonial Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms , Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions , Generating functions , Solution by method of generating functions,

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

IT 303 OOPS Methodology

Unit I

Introduction, Object Oriented Programming Concepts, Flow chart, Objects, Objects as software modules, Objects interaction, Classes, Method lookup, Hierarchies of classes, Inheritance, Polymorphism, Abstract classes.

Unit II

Identifying objects and classes, Representation of objects, Modeling, objects and classes, Relationships. Association between objects, aggregate components of objects. Storage Management :Memory allocation, Dynamic allocation.

Unit III

Object oriented programming languages, Class declarations, Object declarations, Mandatory profiles, Message sending, Association, Recursive association, Many to many association, Argument passing.

Unit IV

Inherited methods, Redefined methods, The protected interface, Abstract base classes, Public and protected properties, Private operations, Disinheritance, Multiple inheritance.

Unit V

Study of C++ as object oriented programming language.

References:
1. Object oriented programming in C++ by Robert Lafore.
2. J. Rumbaugh, Object-Oriented Modeling and Design using UML, Pearson Education.
3. Balagurusamy; Object oriented programming with C++; TMH
4. Rajesh K Shukla, Object Oriented Programming by C++, Wiley, India
5. Kahate A; Object oriented analysis and design; TMH
6. Ken Barclay, Object oriented design with C++.
7. Kamthane,"Object Oriented Programming using Turbo C++", Pearson Education
8. Josuttis, Object Oriented Programming With C++, Wiley, India

List of experiments (Expandable):

Programming assignments may be given to students so that they can better understand the concepts of object oriented programming such as objects, classes, inheritance, polymorphism etc.

IT 304 Electronics Devices & Circuits

Unit I
Semiconductor device, theory of P-N junction, temperature dependence and break down characteristics, junction capacitances. Zener diode, Varactor diode, PIN diode, LED, Photo diode, Transistors BJT, FET, MOSFET, types, working principal, characteristics, and region of operation, load line biasing method. Transistor as an amplifier, gain, bandwidth, frequency response, h-parameters equivalent, type of amplifier.

Unit II
Feedback amplifier, negative feedback, voltage-series, voltage shunt, current series and current shunt feedback, Sinusoidal oscillators, L-C (Hartley-Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers, their efficiency and power Dissipation.

Unit III
Switching characteristics of diode and transistor, turn ON, OFF time, reverse recovery time, transistor as switch, Multivibrators, Bistable, Monostable, Astable multivibarators. Cllipers and clampers, Differential amplifier, calculation of differential, common mode gain and CMRR using hparameters, Darlington pair, Boot strapping technique. Cascade and cascode amplifier.

Unit IV
Operational amplifier characteristics, slew rate, full power bandwidth, offset voltage, bias
current, application ,inverting , non inverting amplifier , summer , averager , differentiator, integrator, differential amplifier , instrumentation amplifier , log and antilog amplifier , voltage to current and current to voltage converters , comparators Schmitt trigger , active filters, 555 timer and its application.

Unit V
Regulated power supplies., Series and shunt regulators, current limiting circuits, Introduction to IC voltage regulators, fixed and adjustable switching regulators, SMPS ,UPS

References:
1. Milliman Hallkias - Integrated Electronics; TMH Pub.
2. Gayakwad; OP-amp and linear Integrated Circuits; Pearson Education
3. Salivahanan; Electronic devices and circuits; TMH
4. Salivahanan; Linear Integrated Circuits; TMH-
5. Miliman Grabel; Micro electronics , TMH
6. RobertBoylestad & Nashetsky; Electronics Devices and circuit Theory; Pearson Ed.

List of Experiments (Expandable):
1. Diode and Transistor characteristics
2. Transistor Applications (Amplifier and switching)
3. OP-Amp and its Applications
4. 555 timer and its Applications

IT 305 Data Structure & Algorithem

Unit I

Introduction: Basic Terminology, Data types and its classification, Algorithm complexity notations like big Oh,$\Box$,$\Box$. Array Definition, Representation and Analysis of Arrays, Single and Multidimensional Arrays, Address calculation, Array as Parameters, Ordered List and operations, Sparse Matrices, Storage pools, Garbage collection. Recursion-definition and processes, simulating recursion, Backtracking, Recursive algorithms, Tail recursion, Removal of recursion. Tower of Hanoi Problem.

UNIT II

Stack, Array Implementation of stack, Linked Representation of Stack, Application of stack: Conversion of Infix to Prefix and Postfix Expressions and Expression evaluation, Queue, Array and linked implementation of queues, Circular queues, D-queues and Priority Queues. Linked list, Implementation of Singly Linked List, Two-way Header List, Doubly linked list, Linked List in Array. Generalized linked list, Application: Garbage collection and compaction, Polynomial Arithmetic.

UNIT III

Trees: Basic terminology, Binary Trees, , algebraic Expressions, Complete Binary Tree,Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Binary Search Tree (BST), AVL Trees, B-trees. Application: Algebraic Expression, Huffman coding Algorithm.

UNIT IV

Internal and External sorting ,Insertion Sort, Bubble Sort, selection sort Quick Sort, Merge Sort, Heap Sort, Radix sort, Searching & Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. Symbol Table, Static tree table, Dynamic Tree table.

Unit V

Graphs: Introduction, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

Reference:

1. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002ISRD Group; Data structures using C; TMH
2. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., N Delhi.
3. A M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
4. Data Structures Trembley and Sorenson, TMH Publications
5. Pai; Data structure and algorithm; TMH
6. Introduction to Algorithm- Corman, AWL
7. Lipschutz; Data structure (Schaum); TMH

List of Experiments (expandable):

Programs in C relating to different theory units.

IT 306 Java Technology

UNIT-I

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT–II

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT–III

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT–IV

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT–V

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall
6. Cay Horstmann, Big JAVA, Wiely India.

List of Program to be perform (Expandable)

1. Installation of J2SDK

2. Write a program to show Scope of Variables

3. Write a program to show Concept of CLASS in JAVA

4. Write a program to show Type Casting in JAVA

5. Write a program to show How Exception Handling is in JAVA

6. Write a Program to show Inheritance

7. Write a program to show Polymorphism

8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA

9. Write a program to show use and Advantages of CONTRUCTOR

10. Write a program to show Interfacing between two classes

11. Write a program to Add a Class to a Package

12. Write a program to show Life Cycle of a Thread

13. Write a program to demonstrate AWT.

14. Write a program to Hide a Class

15. Write a Program to show Data Base Connectivity Using JAVA

16. Write a Program to show "HELLO JAVA " in Explorer using Applet

17. Write a Program to show Connectivity using JDBC

18. Write a program to demonstrate multithreading using Java.

19. Write a program to demonstrate applet life cycle.

20. Write a program to demonstrate concept of servlet.

IT-307 Self Study (Internal Assessment)

Objective of Self Study: is to induce the student to explore and read technical aspects of his area of interest / hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

IT-308 Seminar / Group Discussion(Internal Assessment)

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.