

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**Syllabi for Ph.D Credit Courses**  
**Computer Science &**  
**Computer Science Engineering**

**Subject Code: 1453    DATA STRUCTURES AND ALGORITHM ANALYSIS**

**UNIT I:**

Introduction to Data Structures, Singly Linked Lists, Doubly Linked Lists, Circular Lists- Algorithms. Stacks and Queues: Algorithm Implementation using Linked Lists. Algorithms- Performance analysis-Time Complexity and Space Complexity.

**UNIT II:**

Searching-Linear and Binary Search Methods. Sorting-Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort.

**UNIT III:**

Trees- Binary trees, Properties, Representation and Traversals (DFT,BFT),Expression Trees(Infix,prefix,postfix). Graphs-Basic Concepts , Storage Structures and Traversals. Search Trees- AVL Trees, Definition, Height of AVL Tree, Operations-, Insertion, Deletion and Searching.

**UNIT IV:**

Dictionaries,Hash Table Representation, Hash Functions, Collision Resolution-Separate Chaining, Open Addressing-Linear Probing, Double Hashing.

**UNIT V:**

Search Trees- Binary Search Trees, Definition, Operations-Searching, Insertion, Deletion B-Trees, , Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

**REFERENCES BOOKS:**

1. Data Structures: A PseudoCode Approach, 2/e, Richard F.Gilberg,Behrouz A.Forouzon, Cengage.
2. Data Structures, Algorithms and Applications in java, 2/e, Sartaj Sahni, University Press.
3. Data Structures And Algorithm Analysis, 2/e, Mark Allen Weiss, Pearson.
4. Data Structures And Algorithms, 3/e, Adam Drozdek, Cenage.
5. C and DataStructures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B.Venkateswarulu, E.V.Prasad, S Chand & Co, 2009.
6. Data Structures, Algorithm and OOP,Heilman, TMH.
7. Inroductions to Algorithms, 2/e, Cormen, PHI,2001.
8. Fundamentals of Computer Algorithms, 2/e, Horowitz,Sahni,Rajasekaran, University Press.
9. Design and Analysis, Dave, Pearson, 2008.
10. Design and Analysis Algorithms, Panneerselvam, PHI,2007.
11. Data Structures, Seymour Lipschutz, Schaum's Outlines, TMH.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**Syllabi for Ph.D Credit Courses**  
**Computer Science &**  
**Computer Science Engineering**

**Subject Code: 1451      DATABASE MANAGEMENT SYSTEMS**

**UNIT I:**

Database System Applications, Database VS File System, View Of Data, Data Abstraction, Instances and Schemas, Data Models, ER Model, Relational Model, Other Models, Database Languages-DDL,DML, Database Access For Application Programs, Database Users and Administrator, Transaction Management, Database System Structure, Storage Manager, The Query Processor, History of Database Systems, Database Design and ER diagrams, Attributes and Entity Sets, Relationships and Relationship sets, Additional Features Of ER Model

**UNIT II:**

Relational Model: Introduction to the Relational Model, Integrity Constraint Over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design, Introduction to Views, Destroying/Altering Tables and Views.

Relational Algebra and Calculus: Relational Algebra, Selection and Projection Set Operations, Renaming, Joins, Division, Examples of Algebra Overviews, Relational Calculus, Tuple Relational Calculus, Domain Relational Calculus, Expressive Power of Algebra and Calculus.

**UNIT III:**

Schema Refinement, Problems Caused by Redundancy, Decompositions, Problems related to Decomposition, Reasoning about FDS, FIRST,SECOND,THIRD Normal Forms, BCNF, Lossless join Decomposition, Dependency Preserving Decomposition, Schema Refinement in Database Design, Multivalued Dependencies, FOURTH Normal Form.

**UNIT IV:**

Over View of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution Of Transaction, Lock Based Concurrency Control, Performance Locking, Introduction to Crash Recovery.

**UNIT V:**

Overview of Storage and Indexing: Data on External Storage, File Organisation and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index Data Structures, Hash Based Indexing, Tree Based Indexing, Comparison of File Organisations, Indexes and performance Tuning.

Tree Structured Indexing: Intuitions for Tree Indexes, Indexed Sequential Access Methods (ISAM). B+ Trees: A Dynamic Indexed Structure.Hash Based Indexing: Stactic Hashing, Extendable Hashing, Linear Hashing, Extendable VS Linear Hashing.

**REFERENCE BOOKS:**

1. Database Mangement Systems, 3/e,Raghurama Krishnan, Johannes Gehre, TMH.
2. Database System Concepts, 4/e, Silberschatz, Korth, TMH.
3. Introduction to Database Systems, 8/e, C.J. Date, Pearson.
4. Database System Design, Implementation and Management, 5/e, Rob, Coronel, Thomson.
5. Database Management System, 5/e, Elamasri Navathe, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
Syllabi for Ph.D Credit Courses  
Computer Science &  
Computer Science Engineering

**Subject Code: 1452**

**COMPUTER NETWORKS**

**UNIT I: Introduction:**

OSI, TCP/IP and other networks models, Examples of networks: Novel Networks, Arpanet, Internet, Network topologies WAN, LAN, MAN.

**UNIT II: Physical Layer:**

Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications, Narrow band, broad band ISDN and ATM.

**Data link layer:**

Design issues, framing error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

**UNIT III : Medium Access Sub layer:**

ALOHA, MAC addresses, carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANs, Bridges.

**UNIT IV: Network Layer:**

Virtual Circuit and Datagram subnets- Routing algorithm – Shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing.

Dynamic routing, Broadcast routing, Rotary for mobility, Congestion control algorithms, General Principles of Congestion Prevention policies.

**UNIT V: Transport Layer:**

Transport services, Connection management, TCP and UDP protocols, ATM AAL layer protocol

**Application Layer:**

Network Security, Domain Name System, SNMP, Electronic Mail, the World Wide Web, Multimedia.

**REFERENCE BOOKS:**

1. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networking, Behourz A. Forouzan. 3<sup>rd</sup> Edition THM.
3. An Engineering Approach to Computer Networks, S.Keshav, 2<sup>nd</sup> Edition, Pearson Education.
4. Understanding Communications and Networks, 3<sup>rd</sup> Edition, W.A.Shay, Thomson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
Syllabi for Ph.D Credit Courses  
Computer Science &  
Computer Science Engineering

**Subject Code: 1454 OBJECT ORIENTED PROGRAMMING**

**(\*\*\*)**

**UNIT I: Basics Of Object Oriented Programming (Oop)& Java Basics**

Need for OOP paradigm, Summary of OOP Concepts, Java Basics: Data Types, Variables, Scope and Life Time of Variables, Arrays, Operators, Expressions, Control Statements, Type Conversion and casting, 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 II: Inheritance**

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, Abstract Classes.

**UNIT III: Packages , Interfaces, Exceptions and Threads**

Defining, Creating and Accessing A Package, Understanding CLASSPATH, Importing Packages, Differences between Classes and Interfaces, Defining an Interface, Implementing Interface, Applying Interfaces, Variables in Interface and Extending Interfaces.

Concepts of Exception Handling, Benefits of Exception Handling, Termination or Presumptive Models, Exception Hierarchy, Usage of try, catch, throw, throws and finally, Built in Exceptions, Creating Own Exception Sub Classes, Difference between Multi Threading and Multi Tasking, Thread Life Cycle, Creating Threads, Synchronising Threads, Daemon Threads, Thread Groups.

**UNIT IV: Event Handling**

Events, Event Sources, Event Classes, Event Listeners, Delegation Event Model, Handling Mouse and Key Board Events, Adapter Classes, Inner Classes, AWT Class Hierarchy, User Interface Components-Labels, Buttons, Canvas, Scrollbars, Text Components, Check Box, Check Box Groups, Choices, Lists Panels- Scroll pane, Dialogs, Menubar, Graphics, Layout Manager, Layout Manager Types-Border, Grid, Flow, Card and GridBag.

**UNIT V: Applets And Swing**

Applets: Concepts of Applets, Differences between applets and applications, Life Cycle of an applet, Types of applets, Creating applets, Passing Parameters to applets. Swing: Introduction, Limitations of AWT, MVC architecture, Components, Containers, Exploring Swing- JApplet, JFrame and JComponent, Icons and Labels, Text fields, Buttons- The JButtons Class, Check Boxes, Radio Buttons, Combo Boxes, Tabbed Panes, Scroll Panes, Trees, Tables.

**REFERENCES BOOKS:**

1. Java- The Complete Reference, 7/e, Herbert Schildt, TMH.
2. Java: How to Program, 8/e, Dietel, PHI.
3. Introduction to Java Programming, 6/e, Y. Daniel Liang, Pearson.
4. Core Java 2, Vol 1, Fundamentals, 7/e, Cay.S.Horstmann, Gary Cornell, Pearson.
5. Core Java 2, Vol 2, Advanced Features, 7/e, Cay.S.Horstmann, Gary Cornell, Pearson.
6. Object Oriented Programming through Java, P.Radha Krishnan, University Press.