

Gujarat Arts & Science College, Ahmedabad
Computer Science Department[Self Finance]
M.Sc. (Computer Science)(1st Year-Semester-I)

Paper: 102 **Subject:** Advanced Java Technology

Unit-1: Java Web Architecture

- The Java Advantage for Web
- Java EE Web Architecture
- Java Web Application Server

Unit-2: Java Database Programming

- The 2-Tier Client Server Architecture
- Java Database Connectivity (JDBC) – API for Accessing Databases
- Database Drivers, Loading a Driver Class
- Connecting the Database Server
- CRUD operations with Statement Object, PreparedStatement Object, callable statement object
- The ResultSet Object

Unit-3: Java Servlets

- Server side programming with Java Servlet,
- HTTP and Servlet,
- Servlet API, life cycle, configuration and context,
- Request and Response objects,
- Getting Values from Forms and QueryStrings,
- Working with Databases, Working with HTTP Headers ,
- Using Hidden Fields,
- Session handling and event handling,
- ServletContext and ServletConfig,
- Initialization Parameters, Inter-Servlet Communication with Request
- Introduction to filters with writing simple filter application

Unit-4: Java Server Pages

- Overview of Java Server Pages (JSP)
- JSP Architecture

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- JSP page life cycle
- JSP elements
- JSP components
- JSP bean tags
- Working with databases
- Writing a complete application

Unit-5: Enterprise Java Beans and Java Application Framework

- What is a java bean?
- Advantages of Java Beans
- Stateless Session Bean , Statefull Session Bean,
- Binding and looking up objects
- Singleton Beans, Overview of Message Driven Beans
- Local and Remote Lookups,
- Asynchronous EJB Methods
- Web Services
- The Java Web Application Frameworks
 - ✓ Action Based Framework – Overview of SPRING
 - ✓ Component Based Framework - JAVA SERVER FACES

Reference Books:

1. Professional Java Server Programming, a! Apress
2. Core Servlets and Javasever Pages: Author Marty Hall , Larry Brown , Sun Micro System
3. Java Servlet & JSP Cookbook by Bruce W. Perry O;reilly
4. Mastering Enterprise JavaBeans and the Java 2 Platform, Enterprise Edition, by Ed Roman
5. Core Java, Volume II – Advanced Features, Eight Edition, Pearson
6. Unleashed Java 2 Platform, Sams Techmedia
7. Advanced Java , jambu Krishnamurthi, Comp-U Learn Inc
8. Mastering Enterprise Java Beans 3.0 , Rima patel , Wiely Publication
9. Java Server Pages for Beginners, Bayross and Shah, SPD
10. Java Servlet Programming, Jason Hunter, SPD (O'Reilly)

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Paper: 101 **Subject:** Enterprise Data Management & ERP

Unit-1: Data Management and Information System

- Data Management
 - ✓ Hierarchy of Data
 - ✓ Data Modelling
 - ✓ Data Integrity
 - ✓ Data Quality
 - ✓ Metadata
 - ✓ Legacy System and Data Migration
- Information System
 - ✓ Overview of Information System
 - ✓ Overview of different types of information Systems : MIS,DSS, GDSS,ESS , GIS KSS
 - ✓ Impact of Information System on an organisation
 - ✓ An Introduction to Electronic Commerce and Mobile Commerce
 - ✓ Threats and security to e-commerce and m-commerce

Unit-2: Introduction to ERP

- Evolution of ERP and Reasons for the growth of ERP
- Scenario and Justification of ERP in India
- Various Modules Of ERP
- Advantage of ERP
- ERP for Small Business
- ERP for make to order companies
- Business Process Mapping for ERP Module Design
- Hardware Environment and its Selection for ERP Implementation

Unit-3: ERP Manufacturing Perspective

- MRP - Material Requirement Planning
- BOM - Bill Of Material
- MRP - Manufacturing Resource Planning
- DRP - Distributed Requirement Planning
- PDM - Product Data Management

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Unit-4: ERP Products and Modules

- Introduction to ERP Products and modules
- Finance
- Plant Maintenance
- Quality Management
- Materials Management

Unit-5: Benefits of ERP

- Reduction of Lead-Time
- On-time Shipment
- Reduction in Cycle Time
- Improved Resource Utilization
- Better Customer Satisfaction
- Improved Supplier Performance
- Increased Flexibility
- Reduced Quality Costs
- Improved Information Accuracy and Design-making Capability

Unit-6: ERP Implementation Lifecycle

- Pre-evaluation Screening
- Package Evaluation
- Project Planning Phase
- Gap Analysis
- Reengineering
- Configuration
- Implementation Team Training
- Testing
- Going Live
- End-user Training
- Post-implementation (Maintenance mode)

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Unit-7: Business Intelligence

- Introduction to BI
- Types of Business Rule
- Implementing Business Rule
- Business Re-engineering
- Overview of Data Warehousing and Data Mining
- Business Intelligence using Data Warehousing and Data Mining
- Business Intelligence Applications: Customer Relationship Management, Supply Chain Management.

Reference Books:

1. Enterprise Resource Planning - Alexis Leon, Tata McGraw Hill.
2. Enterprise Resource Planning – Diversified by Alexis Leon, TMH.
3. Enterprise Resource Planning - Ravi Shankar & S. Jaiswal , Galgotia.
4. Principles of Information Systems Managerial Approach By Ralph stair and George Reynolds Thomson Course Technology
5. Management Information System by W.S Jawadekar by TMH
6. Management Information System Text & Application by C.V.S Murthy by Himalaya Publishing House
7. Guide to Planning ERP Application, Annetta Clewto and Dane Franklin, McGraw-Hill, 1997
8. ERP: Make it Happen By Thomas wakace, Willey Publication
9. ERP : Tools ,Technioques and applications for Integrating the Supply Chain Second Edition by Carl a Ptak, Schragenheim by Wiley
10. Management Information Systems Managing the Digital Firm by Kenneth Laudon and Jane Laudon by PHI

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Paper: 105 **Subject:** Advanced Data Structure

Unit-1: Graphs

- Basics
- Traversals and search – Depth-First, Breadth-First, Branch and Bound
- Applications- Topological Sort
- Shortest Path Algorithm
- Minimum Cost Spanning trees – Prim's and Kruskal's algorithm
- Dijkstra's algorithm
- Critical Path Analysis

Unit-2: Trees

- Basic Concepts
- Binary Trees
- N-ary Trees
- Tree Traversals
- Search Trees
- Algorithms like Binary, AVL, B-Tree, B+ Tree
- Huffman trees and Data compression including Huffman coding

Unit-3: Hashing

- Basic Idea – Keys and Hash Functions including Collision avoidance
- Hashing Methods
- Division Method
 - ✓ Division Method
 - ✓ Middle Square Method
 - ✓ Multiplication Method
- Fibonacci Hashing
- Hash Function Implementations
 - ✓ Integral Keys
 - ✓ Floating Point Keys
 - ✓ Character String Keys
 - ✓ Hashing Containers
 - ✓ Using Associations
- Abstract Hash Tables

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Unit-4: Heaps and Garbage Collection

- Basic Concepts
- Binary, Leftist, Binomial Queues
- Recent Applications
- Basic concepts of Garbage Collection
- Reference Counting Garbage Collections
- Mark-and-Sweep Garbage Collections
- Stop-and-Copy Garbage Collections
- Mark-and-Compact Garbage Collections

Unit-5: Algorithmic Patterns and Problem Solves

- Brute-Force and Greedy Algorithms
- Divide and Conquer Algorithm
- Backtracking Algorithm- Depth-First, Branch & Bound
- Bottom-Up Algorithms

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI.
2. Data Structures & Algorithms , Alfred V.Aho., Jeffery D. Ullman, Addison-Wesley, Oracle Press
3. An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.

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Paper: 104 **Subject:** Advanced Relational Database
Management System

Unit-1: Transaction Management

- Transaction concepts, properties of transactions,
- Serializability of transactions, testing for Serializability,
- System recovery, Two- Phase Commit protocol,
- Recovery and Atomicity, Log-based recovery,
- Concurrent executions of transactions and related problems,

Unit-2: Concurrency Control

- Locking mechanism,
- solution to concurrency related problems,
- Multiple Granularity
- Deadlock Handling

Unit-3: Recovery System

- Failure Classification
- Recovery and Atomicity
- Logbased Recovery
- Buffer Management
- Deferred Database Modification
- Immediate Database Modification
- Checkpoints
- Shadow Paging

Unit-4: Storage and File Structure

- RAID
- Storage Access
- File Organization
- Organization of Records in Files

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Unit-5: Indexing & Hashing

- Basic Concepts
- Ordered Indices
- B+-Tree Index Files
- B-Tree Index Files
- Overview of Static & Dynamic Hashing
- Comparison of Ordered Indexing & Hashing

Unit-6: SQL Concepts

- Basics of SQL, DDL,DML,DCL, structure – creation, alteration,
- Defining constraints – Primary key, foreign key, unique, notnull, check, IN operator,
- aggregate functions, Built-in functions –numeric, date, string functions, set operations
- Sub-queries, correlated sub-queries, join, Exist, Any, All , view and its types.,
- Transaction control commands.

Unit-7: PL/SQL Concepts

- Cursors,
- Stored Procedures,
- Stored Function,
- Database Triggers

Reference Books:

1. An introduction to Database Systems, C J Date, Addition-Wesley.
2. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill.
3. Understanding SQL by Martin Gruber, BPB
4. SQL- PL/SQL by Ivan bayross

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Paper: 103 **Subject:** Object Oriented Analysis Design &
UML

Unit-1: Introduction

- About Object Orientated Technology,
- Development and OO Modeling History.

Unit-2: Modeling Concepts

- Modeling design Technique,
- Three models, Class Model, State model and Interaction model.

Unit-3: Class Modeling

- Object and class concepts, link and association
- Generalization and Inheritance
- Advanced class modeling- aggregation, Abstract class metadata, constraints.

Unit-4: State Modeling

- Event, state, Transition and conditions,
- state diagram, state diagram behavior,
- concurrency,
- Relation of Class and State models.

Unit-5: Interaction Modeling

- Use case Models,
- sequence models,
- activity models

Unit-6: Analysis and Design

- Development Life cycle, Development stages,
- Domain Analysis-Domain class model, domain state model, domain interaction model,
- Iterating and analysis.
- Application Interaction model, Application class model, Application state Model

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Unit-7: System Design

- Estimating Performance, Making a reuse plan, breaking system into subsystem, identifying concurrency, allocation of subsystems,
- management of data storage, Handling Global resources,
- choosing a software control strategy, Handling boundary condition,
- Common Architectural style.

Unit-8: Class Design

- Overview of class design ,
- Designing algorithms,
- Refactoring, design optimization, Adjustment of Inheritance, Reification of Behavior.

Reference Books:

1. Oriented Modeling and Design with UML ,second edition by Michael Blaha and James Rumbaugh
2. Object Oriented Modeling and Design, J. Rumbaugh, M. Blaha et al, William Premerlani, Fredrick Eddy, William Lorensen, PHI
3. Applying UML & Patterns: An Introduction to Object Oriented Analysis and Design, Larman, Pearson Education,