Veer Narmad South Gujarat University, Surat

Syllabus
M.Sc. (Computer Application)-1st Year
Semester -I
Effective from June 2012

Paper No. : 101
Paper Title : Advanced Data Structures
[L:4, P:0]

Aim: To provide a comprehensive knowledge of Data Structures concept and their implementation

Prerequisite: Preliminary knowledge of Data Structure and its classification.

1. Introduction to Data Structure
   - 1.1. Basic concepts
   - 1.2. Overview of Primitive & Non-primitive Data Structures

2. Trees
   - 2.1. Basic Concepts
   - 2.2. Binary Trees
   - 2.3. N-ary Trees
   - 2.4. Tree Traversals
     - 2.4.1. Inorder, Preorder and Postorder
     - 2.4.2. Breadth-First Traversal
     - 2.4.3. Depth-First Traversal
     - 2.4.4. Search Trees
       - 2.4.4.1. Algorithms like Binary, AVL, M-Way
       - 2.4.4.2. Average Case Analysis of algorithms of 3.4.4.1
   - 2.5. Huffman trees and Data compression including Huffman coding
   - 2.6. Recent Applications

3. Graphs
   - 3.1. Basics
   - 3.2. Traversals – Depth-First, Breadth-First,
   - 3.3. Applications
   - 3.4. Topological sort
   - 3.5. Shortest Path Algorithm
   - 3.6. Minimum Cost Spanning trees – Prim's and Kruskal's algorithm
   - 3.7. Critical Path Analysis

4. Sorting and Searching algorithms
   4.1. Binary search
   4.2. Depth-First search
   4.3. Breadth-First search
   4.4. Nearest Neighbor search
   4.5. Branch and Bound
   4.6. A* algorithm

5. Hashing
   5.1. Basic Idea – Keys and Hash Functions including Collision avoidance
   5.2. Hashing Methods
      5.2.1. Division Method
      5.2.2. Middle Square Method
      5.2.3. Multiplication Method
      5.2.4. Fibonacci Hashing
   5.3. Hash Function Implementations
      5.3.1. Integral Keys
      5.3.2. Floating Point Keys
      5.3.3. Character String Keys
      5.3.4. Hashing Containers
      5.3.5. Using Associations
   5.4. Hash Tables
      5.4.1. Abstract Hash Tables
      5.4.2. Average Case Analysis
   5.5. Scatter Tables
      5.5.1. Chained Scatter Table
      5.5.2. Scatter Table using Open Addressing

6. Heaps and Garbage Collection
   6.1. Basic Concepts Heaps
   6.2. Binary, Leftist, Binomial Queues
   6.3. Recent Applications
   6.4. Basic concepts of Garbage Collection
   6.5. Reference Counting Garbage Collections
   6.6. Mark-and-Sweep Garbage Collections
   6.7. Stop-and-Copy Garbage Collections
   6.8. Mark-and-Compact Garbage Collections

7. Algorithmic Patterns and Problem Solvers
   7.1. Brute-Force and Greedy Algorithms
   7.2. Backtracking algorithms – Depth-First, Branch-and-Bound

7.3. Top-Down Algorithms – Divide-and-Conquer
7.4. Bottom-Up Algorithms

References:

1. Data Structures and Algorithms, Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Addison-Wesley.
2. Data Structures and Algorithms with Object-Oriented Design Patterns in Java, Bruno R. Preiss, John Wiley & Sons
3. Handbook of Algorithms and Data Structures, Gaston H. Gonnet, Ricardo Baeza, Addison-Wesley Publishing Co. Inc.
4. An Introduction to Data Structures with Applications, J. Tremblay, P. Sorenson, Tata McGraw-Hill

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Semester -I
Effective from June 2012

Paper No. : 102:
Paper Title : Advanced Relational Database Management System
[L:4, P:0]

Aim: To provide a comprehensive knowledge of efficient database design approach, which includes normalization, indexing, hashing, transaction management and concurrency control.

Prerequisites: Basic concept of database management system.

1. Introduction to Relational Database Design
   1.1. Features of Good Relational Designs
   1.2. Atomic Domains and First Normal Form
   1.3. Decomposition Using Functional Dependencies
   1.4. Decomposition Using Multivalued Dependencies
   1.5. More Normal Forms
   1.6. Database-Design Process
2. Storage and File Structure
   2.1. Overview of Physical Storage Media
   2.2. File Organization
   2.3. Organization of Records in Files
   2.4. Data-Dictionary Storage

3. Indexing and Hashing
    3.1. Basic Concepts
    3.2. Ordered Indices
    3.3. B+-Tree Index Files
    3.4. B-Tree Index Files
    3.5. Multiple-Key Access
    3.6. Static Hashing
    3.7. Dynamic Hashing
    3.8. Comparison of Ordered Indexing and Hashing
    3.9. Bitmap Indices

4. Query Processing and Optimization
    4.1. SQL Overview
        4.1.1. Various SQL statements
        4.1.2. Various typed of joins, Nested Subqueries and Complex queries
        4.1.3. Views
        4.1.4. Integrity Constraints
        4.1.5. Authorization
        4.1.6. SQL Functions and Procedures
    4.2. Measures of Query Cost
        4.2.1. Selection Operation
        4.2.2. Sorting
        4.2.3. Join Operation
        4.2.4. Other Operations
    4.3. Evaluation of Expressions
    4.4. Transformation of Relational Expressions
    4.5. Estimating Statistics of Expression Results
    4.6. Choice of Evaluation Plans
    4.7. Materialized View

5. Transactions Management
    5.1. Transaction Concept & State
    5.2. Implementation of Atomicity and Durability
    5.3. Concurrent Executions
    5.4. Serializability
    5.5. Recoverability
    5.6. Implementation of Isolation
    5.7. Testing for Serializability

6. Concurrency Control
    6.1. Lock-Based Protocols

6.2. Timestamp-Based Protocols
6.3. Validation-Based Protocols
6.4. Multiple Granularity
6.5. Multiversion Schemes
6.6. Deadlock Handling
6.7. Insert and Delete Operations

7. Object-Based Databases & XML
   7.1. Introduction
   7.2. Complex Data Types
   7.3. Structured Types and Inheritance in SQL
   7.4. Table Inheritance
   7.5. Array and Multiset Types in SQL
   7.6. Object-Identity and Reference Types in SQL
   7.7. Implementing O-R Features
   7.8. Structure of XML Data
   7.9. XML Document Schema
   7.10. Querying and Transformation
   7.11. Application Program Interfaces XML
   7.12. Storage of XML Data
   7.13. XML Applications

References:

1. Database System Concepts, Silberschatz Henry F. Korth and S. Sudarshan, McGraw-Hill.
2. An Introduction to Database System, C.J. Date, Addision Wisley
3. An Introduction to Database System, Bipin C. Desai, Galgotia
4. Database Management Systems-Designing & Building Business Applications, Gerald V Post, Irwin Professional Publication
5. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw-Hill

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Syllabus
M.Sc. (Computer Application)-1st Year
Semester -I
Effective from June 2012

Paper No. : 103
Paper Title : Object Oriented System Design
[L:4, P:0]

Aim: To provide a comprehensive knowledge of Object Oriented concepts, tools, development life cycle, problem solving, modeling, analysis and design.

Prerequisite: Programming knowledge.

1. Object Oriented Design Fundamentals
    1.1. The Object Model
    1.2. Classes and Objects
    1.3. Complexity of Software
    1.4. Classification, Notation, Process
    1.5. Pragmatics
    1.6. Binary and Entity Relationship
    1.7. Object Types
    1.8. Object State
    1.9. OOSD Life Cycle.

2. Object Oriented Methodologies and UML
    2.1. Object Oriented Methodology: Rumbaugh, Booch, Jacobson, Shaler/Mellor, Coad/Yardon
    2.2. Patterns
    2.3. Frame Works
    2.4. The Unified Approach – UML

3. Object Oriented Analysis
    3.1. Identify Use Cases
    3.2. Use Case Model
    3.3. Documentation
    3.4. Classification
    3.5. Identifying Classes
    3.6. Noun Phrases Approach
    3.7. Common Class Pattern Approach
    3.8. Use Case Driven Approach
    3.9. Identifying Object Relationship

3.10. Attributes And Models.

4. Object Oriented Design
    4.1. Design Process
    4.2. Design Axioms
    4.3. Designing Classes
    4.4. Access Layer Design
    4.5. View Layer Design.

5. Object Oriented Development
    5.1. Managing Analysis and Design
    5.2. Evaluation Testing
    5.3. Coding
    5.4. Maintenance
    5.5. Metrics
    5.6. Case Study: Foundation Class Library – Client/Server Computing.

References:

1. Ali Bahrami, Object Oriented System Development, Mc Graw Hill.
2. Larman, Applying UML & Patterns: An Introduction to Object Oriented Analysis and Design, Pearson Education
3. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson Education.
4. J. Rambaugh, M. Blaha et al, Object Oriented Modeling and Design, PHI
5. Ivar Jacobson, Object Oriented Software Engineering

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Semester -I
Effective from June 2012

Paper No. : 104
Paper Title : Enterprise Data Management and ERP
[L:4, P:0]

Aim: To provide a comprehensive knowledge of the concepts related to Information Systems and modeling of data in these systems.

Prerequisites: Nil

1. Data Management
   - 1.1. Hierarchy of Data
   - 1.2. Data Modeling
   - 1.3. Data Integrity
   - 1.4. Data Quality
   - 1.5. Metadata
   - 1.6. Legacy Systems and Data Migration

2. Information System
   - 2.1. Overview of Information System
   - 2.2. Overview of different types of Information Systems: MIS, DSS, GDSS, ESS, GIS, KBS etc.
   - 2.3. Impact of Information System on an organization
   - 2.4. An Introduction to Electronic Commerce
   - 2.5. An Introduction to Mobile Commerce
   - 2.6. Threats and security to e-commerce and m-commerce

3. Introduction To ERP
   - 3.1 Evolution of ERP and Reasons for the growth of ERP
   - 3.2 Scenario and Justification of ERP in India
   - 3.3 Various Modules Of ERP,
   - 3.4 Advantage of ERP.
   - 3.5 ERP for Small Business
   - 3.6 ERP for make to order companies
   - 3.7 Business Process Mapping for ERP Module Design
   - 3.8 Hardware Environment and its Selection for ERP Implementation.

4. ERP Modules

4.1 Introduction to ERP modules
4.2 Finance module
4.3. Plant Maintainance module
4.4 Quality Management module
4.5 Materials Management

5. Overview of ERP Products
   5.1 Introduction to SAP, People Soft, BaaN, Oracle, Microsoft Dynamics ERP solutions
   5.2 Comparative Assessment and Selection of ERP Packages and Modules.

6. ERP implementation lifecycle
   6.1 Issues in implementing ERP packages
   6.2 Pre-evaluation screening
   6.3 Package evaluation
   6.4 Project planning phase, gap analysis, reengineering,
   6.5 Configuration, implementation, team training, testing, going live
   6.6 End-user training, post implementation (Maintainance mode).
   6.7 Vendors, Consultants and users, In-House Implementation - pors and cons, consultants, end user.

7. Business Intelligence
   7.1. Introduction
   7.2. Types of Business Rule
   7.3. Implementing Business Rule
   7.4. Business Re-engineering
   7.5. Overview of Data Warehousing and Data Mining
   7.6. Business Intelligence using Data Warehousing and Data Mining
   7.7. Business Intelligence Applications: Customer Relationship Management, Supply Chain
   Management.

References:

1. Principles on Information Systems: A Managerial Approach, Ralph Stair and Gearge Reynolds, Thomson Course Technology.
2. Management Information System: Managing the Digital Firm, Kenneth Laudon and Jane Laudon, Prentice Hall of India.
3. Content Management Bible, Bob Boiko, Wiley Publishing Inc.
4. Management Information System: Text & Applications , C.S. V. Murthy,Himalaya Publishing House
5. Management Information System , W.S. Jawadekar, Tata McGraw Hill.

6. Information System for Modern Management, Murdick Ross and Claget, Prentice Hall.
7. Maximizing your ERP System: A practical guide for Managers By Scott Hamilton McGrow Hill Company ISBN : 007-140611-5
8. ERP : Making It Happen By Thomas F. Wallace, Michale H. Kremzar. Wiley Publication
9. ERP: Tools, Techniques, and Applications for Integrating the Supply Chain, Second Edition
   By Carol A. Ptak, Eli Schragenheim.Wiley Publication.
10. Enterprise Sales and Operations Planning By George E. Palmatier, Colleen Crum, J.Ross publishing
11. SAP MM Questions and Answers By Kogent Learning Solutions Publicattion:Jones & Bartlett Learning ,
12. ERP 100 Success Secrets By Godfrey Glenn
13. Management Information Systems By Gordon B davis and Margethe H Olson. TMGH, New Delhi
14. Management Information Systems By Sadagopan Prentice hall of India.

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Paper No. : 105
Paper Title : Web Programming using JAVA
[L:4, P:0]

1. Java Database Connectivity
   - 1.1. JDBC API
   - 1.2. JDBC Drivers and Components
   - 1.3. Basic Steps to JDBC
     - 1.3.1. Using Joins, Transactions, Stored Procedures
   - 1.4. Executing SQL Queries
     - 1.4.1. Handling null fields
     - 1.4.2. The ResultSet Object
   - 1.5. Handle Exception
     - 1.5.1. BatchUpdateException, DataTruncation
     - 1.5.2. SQLException, SQLWarning
   - 1.6. Writing a Complete Application

2. Servlet
   - 2.1. Servlet in the Middle Tier
   - 2.2. The Servlet Life Cycle
   - 2.3. Java Servlet Development Kit
     - 2.3.1. The javax.servlet Package
     - 2.3.2. The Javax.servlet.http Package
   - 2.4. Handling HTTP Get/Post Request
   - 2.5. Using Cookies
   - 2.6. Session Tracking
   - 2.7. Sharing Connection Pools
   - 2.8. Writing a Complete Application

3. Introduction to JSP
   - 3.1. JSP tags
   - 3.2. JSP directives
   - 3.3. Scripting elements
   - 3.4. Flow of control
   - 3.5. Conditionalization

4. MVC Architecture & Struts
   4.1. MVC Architecture
   4.2. Struts Architecture
   4.3. How Struts Works?
   4.4. Introduction to the Struts Controller
   4.5. Introduction to the Struts classes - ActionForward, ActionForm, ActionServlet, Action classes
   4.6. Understanding struts-config.xml
   4.7. Understanding Action Mappings
   4.8. Using Struts HTML Tags
   4.9. Introduction to Struts Validator Framework
   4.10. Client Side Address Validation in Struts
   4.11. Custom Validators Example
   4.12. Developing Application with Struts Tiles
   4.13. Internationalizing Struts Application

5. Introduction to Beans and EJB 3.0 Architecture
   5.1. Session Bean
   5.2. Entity Bean
   5.3. Statefull and Stateless Entity Beans with Examples
   5.4. Various Application Servers (WebLogic, Jrun, Tomcat, WebSphere)
   5.5. Bean Deployment

6. J2ME Architecture
   6.1. Downloading and Installing J2ME Toolkit
   6.2. Building Application for MIDP
   6.3. Developing Simple J2ME Applications
   6.4. Working with Ktoolbar

References:

[1] Web Development with Java Server Pages, D. K. Fields, M. A. Kolb, S. Bayern, Manning Pub.
[2] Java Cook Book, Ian Darwin, O'relley
[3] Advanced Java, Jambu Krishnamurthi, Comp-U Learn Inc,
[4] Beginning J2ME: From Novice to Professional, S. LI and J. Knudsen, Apress
[5] Mastering Enterprise Java Beans 3.0, Rima Patel, Wiely Publication

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Paper No : 106
Paper Title : Practical 1 [
L:0, P:4]

Practical shall be based Paper No. : 105 Paper Title : Web Programming using JAVA.

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Paper No : 107
Paper Title : Practical 2 [
L:0, P:3]

Practical shall be based Paper No. : 101 Paper Title : Advanced Data Structures.

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Paper No : 108
Paper Title : Practical 3 [
L:0, P:3]

Practical shall be based Paper No. : 102 Paper Title : Advanced RDBMS.

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Effective from June 2012

Paper No : 201
Paper Title : Advanced Concepts of Operating System
[L:4, P:0]

1. Operating System Concepts
   1.1. Overview of Operating System and its Services
   1.2. OS Structure
   1.3. APIs / System Call
   1.4. Interrupts and signals

2. Process Management
   2.1. Process Concepts
   2.2. Process state and transition
   2.3. Process creation and termination
   2.4. Process scheduling algorithms

3. Process Synchronization and Deadlock
   3.1. Semaphore
   3.2. Signal
   3.3. Message Queue
   3.4. Atomic Transactions
   3.5. Deadlock

3.6. Methods for Handling Deadlocks
3.7. Recovery from Deadlock

4. Memory Management
   4.1. Swapping
   4.2. Paging
   4.3. Segmentation
   4.4. Virtual Memory
   4.5. Demand Paging
   4.6. Page Allocation & Replacement algorithms

5. Distributed Operating System
   5.1. Introduction
   5.2. Design issues
   5.3. Process Management - Migration
   5.4. File Management
   5.5. Device Management
   5.6. Memory Management
   5.7. Deadlock handling in distributed system

6. Networked Operating System
   6.1. Introduction
   6.2. Resource Sharing

7. Real Time Operating System
   7.1. Introduction
   7.2. System Characteristics
   7.3. Features of Real-Time Kernels
   7.4. Scheduling

References:

6. Operating System Concepts by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, John Wiley & Sons.
7. Operating Systems A Concept Based Approach by D. M. Dhamdhere, McGraw-Hill
8. Operating Systems: Internals and Design Principles by William Stallings, Prentice Hall
9. Operating Systems A Design Oriented Approach By Charles Chowley, TMH
10. Operating Systems Design And Implementation by Andrew S. Tanenbaum, Albert S. Woodhull, Prentice Hall

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Semester -II
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Paper No. : 202
Paper Title : Web Programming using C#.Net
[L:4, P:0]

Aim: To provide an in-depth knowledge of most recent server side programming technology.

Prerequisites: Basic understanding of Web, HTTP, HTML, JavaScript, C#.

1. ASP.NET using C#
   1.1. Web Forms
   1.2. Server Controls
   1.3. State Management

2. Working with Data
   2.1. ADO.NET
   2.2. Data Binding
   2.3. Rich Data Controls
   2.4. Caching and Asynchronous Pages
   2.5. LINQ
   2.6. XML

3. Better Web Forms
   3.1. User Controls
   3.2. Themes and Master Pages
   3.3. Website navigation

4. ASP.NET Security Model
   4.1. Forms Authentication
   4.2. Windows Authentication
   4.3. Authorization and Roles

5. Profiles
   5.1. Cryptography
   5.2. Custom membership provider

6. Advanced ASP.NET

6.1. Web Services
6.2. Custom Server Controls
6.3. Email, SMS
6.4. Portals with Web Part Pages
6.5. ASP.NET AJAX
6.6. Silverlight

References:

1. Pro ASP.NET 3.5 in C# 2008 by Matthew MacDonald, Apress
2. ASP.NET 3.5 Unleashed by Stephen Walther, Sams
3. Professional ASP.NET 3.5: In C# and VB (Programmer to Programmer) by Bill Evjen, Wrox
4. Beginning ASP.NET 3.5 in VB 2008 by Matthew MacDonald, Apress

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M.Sc. (Computer Application), -1st Year

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Effective from June 2012

Paper No. : 203

Paper Title : Advanced Software Engineering

[L:4, P:0]

1. Advanced Software Process Models
- 1.1 Component-Based Process Model
  - 1.1.1 The CBSE Process
  - 1.1.2 Domain Engineering
  - 1.1.3 Component-based development
  - 1.1.4 Component classification, retrieval and reuse
  - 1.1.5 Economics of CBSE
- 1.2 Agile Process Models
  - 1.2.1 Xtreame Programming(XP)
  - 1.2.2 Adaptive Software Development
  - 1.2.3 Dynamic System development Model(DSDM)
  - 1.2.4 Scrum
  - 1.2.5 Crystal
  - 1.2.6 Feature Driven development(FDD)
  - 1.2.7 Agile Modelling(AM)

2. Client/Server Software engineering.
- 2.1 The structure of client/server systems,
- 2.2 Software engineering for c/s system,
- 2.3 Analysis modeling issues,
- 2.4 Design for c/s system,
- 2.5 Testing issues.

3. Web Engineering
- 3.1 Introduction web engineering
- 3.2 Formulation and Planning for Web Engineering
- 3.3 Analysis Modeling for Web Applications
- 3.4 Design Modeling for Web Applications
- 3.5 Testing Web Applications

4. Reengineering
- 4.1 Business process reengineering,
- 4.2 Software reengineering,
- 4.3 Reverse engineering,
- 4.4 Restructuring,
- 4.5 Forward engineering,
- 4.6 Economics of reengineering.

5. Software Quality Management
   5.1 Basic Concepts of Software Quality
      5.1.1 Defining Quality
      5.1.2 Software Quality Factors,
      5.1.3 Software Quality Metrics

5.2 Software Quality Assurance:
- 5.2.1 What is SQA?
- 5.2.2 Payoffs and Tradeoffs of SQA,
- 5.2.3 Quality through the Software Process
- 5.2.4 Components of an SQA Plan
- 5.2.5 Software Reviews

5.3 Formal Technical Reviews:
- 5.3.1 The Review Meetings
- 5.3.2 Review Reporting and Recordkeeping
- 5.3.3 Review Guidelines

5.4 Six Sigma, ISO 9000 software quality Standards, CMM

References:

1. Software Engineering: A Practitioner's Approach, 6/e By Roger S Pressman, Tata McGrawHill Publication.
2. Software Engineering: A Practitioner's Approach, 7/e By Roger S Pressman, Tata McGrawHill Publication.
3. Web Engineering: A Practitioner's Approach 1/e By Roger Pressman, David Lowe, Tata-McGrawHill Publication.
4. Software Engineering By Ian Sommerville, Pearson Education (Addison-Wesley)
5. Web Engineering By Emila Mendes, Nile Mosley, New Age Information (Springer) Publication
6. Client / Server Computing By Patrick Smith, Steve, PHI publication Guengerich
7. ISO 9001:2000 for Software Organizations By Swapna Kishore, Rajesh Naik, TATA McGrawHill Publication.
8. CMM in Practice By Pankaj Jalote, Pearson Education Publication

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Paper No. : 204

Paper Title : Data Warehousing & Data Mining

[L:4, P:0]

1. Introduction to Datawarehousing
   - 1.1 Data Warehouse characteristics
   - 1.2 Data Marts
   - 1.3 Applications of Data Warehousing

2. Online Analytical Processing
   - 2.1 OLTP and OLAP systems
   - 2.2 Star schema for multidimensional view
   - 2.3 Multifact star schema or snow flake schema
   - 2.4 OLAP Tools

3. Developing A Data Warehouse
   - 3.1 Building a Data Warehouse
   - 3.2 Architectural strategies & Design issues
   - 3.3 Data Content
   - 3.4 Metadata
   - 3.5 Distribution of data
   - 3.6 Tools for Data Warehousing
   - 3.7 Performance considerations

4. Introduction to Data Mining
   - 4.1 Importance of and Motivation behind data mining
   - 4.2 Data Mining process and knowledge discovery
   - 4.3 Introduction to Data Mining techniques
   - 4.4 Data Preprocessing-Cleaning, Integration and Transformation, Reduction, Dicretization etc.
   - 4.4 Major issues in Data Mining

5. Association Rule Mining
   - 5.1 Basic concepts and Roadmap for association rule mining, Applications
   - 5.2 Apriori Algorithm, its limitations and improvements
   - 5.3 FP - growth Algorithm
   - 5.4 Multilevel Association Rule Mining
   - 5.5 Multi Dimensional Association Rule Mining
   - 5.6 Correlation analysis
   - 5.7 Guided Association Rule Mining

6. Classification and Prediction

6.1 Introduction, Applications of classification

6.2 Data Preparation for classification and prediction

6.3 Decision tree Model based classifier

6.4 Decision tree Induction-based classifier, Advantages and Limitations, Hunts Algorithm, Tree pruning

6.5 Introduction to Other algorithms - ID3,C4.5,SLIQ,SPRINT, Interval classifier(IC)

6.6 Measures for Attribute selection -Info.Gain, GINI Index, Entropy, Classification error

6.7 Rule based classification, its coverage and accuracy, Advantages and limitations

6.8 Building Classification rules, Direct and Indirect Methods

6.9 Comparisons between C4.5 based rule generation, RIPPER, CN2

6.10 Rule simplification, rule ordering schemes, Instance elimination, Rule evaluation, stopping criteria and rule pruning

6.11 Overview of other classification Methods- K-nearest neighbor, Case based reasoning, Genetic Algorithms, Rough Set approach, Fuzzy Set Approach

6.12 Estimation and improving classifier accuracy, Criteria for evaluating/comparing classification methods

7. Clustering

7.1 Introduction, Applications of clustering

7.2 Types of Data Variables in clustering-Interval scaled, Binary, Nomonal, Ordinal, Ratio Scaled

7.3 Categorization of Major clustering Methods

7.4 Partitioning Methods - *k*-Means algorithm and *k*-Medoids, Other methods-CLARANS

7.5 Hierarchical Clustering Methods-BIRCH, CURE

7.6 Density based Clustering Methods-DBSCAN, Other methods-OPTICS, DENCLUE

7.7 Overview of Grid-Based Clustering Methods-STING, WaveCluster, CLIQUE

7.8 Overview of Model Based Clustering Methods-Statistical Approach, Neural Network Approach

8. Other Data Mining Techniques

8.1 Data Prediction-Linear regression based prediction

8.2 Outlier Analysis- Statistical based, Distance based, Deviation based

8.3 Conceptual Techniques- Data characterization and Generalization, Data Comparison or Discrimination

9. Mining Complex DataTypes

9.1 Mining Time-Series and Sequence Data – Trend Analysis, Similarity Search, Sequential Pattern Mining, Periodicity Analysis.

9.2 Mining Text Databases- Text Data Analysis and Information Retrieval, Keyword-based Association and Document Classification

9.3 Mining Spatial Databases-Construction of DataCube and OLAP, Clustering Methods, Association Analysis, Classification and Trend Analysis, Mining Raster Databases.

9.4 Mining Multimedia Databases-Similarity Search, Multidimensional Analysis, Classification and
Prediction Analysis, Association Mining
9.5 Web Mining-Web Structure Mining, Web Usage Mining, Web Content Mining

References:

1. R. Kinball: Data Warehouse Toolkit – John Wiley & Sons
2. Efrem G. Mallach : Decision Support and Data Warehouse Systems – TMH
3. Paulraj Pulliah : Data Warehousing Fundamentals – Wiley
4. S. Anahory & D. Murray: Data Warehousing in the real world – Addison Wesley
5. R. Kinball, L.Reeves : The Data Warehouse Lifecycle Toolkit – John Wiley & Sons
6. David Hand, Heikki Mannila,Padhraic Smyth : Principles of Data Mining- PHI
7. C.S.R.Prabhu : Data Warehousing – PHI
8. Hillol Kargupta, Anupam Joshi, Yelena Yesha, Krishnamoorthy Sivakumar : Data Mining Next Generation Challenges & Future Directions – PHI
9. Jiawei Han, Micheline Kamber : Data Mining Concepts & Techniques
10. Dunham : Data Mining Introductory and Advanced Topics – Pearson
11. N.P Gopalan, B. Sivasalvan: Data Minig Techniques and Trends-PHI

Veer Narmad South Gujarat University, Surat

Syllabus
M.Sc. (Computer Application), -1st Year
Semester -II
Effective from June 2012

Paper No : 205
Paper Title : Information Security
[L:4, P:0]

Aim: To provide a comprehensive knowledge of security issues and cryptography.
Prerequisites: Programming in C# and Java.

1. Security Basics
   1.1. Computer Security
   1.2. Information Security
   1.3. Threat and Attacks
   1.4. Malicious Logic
   1.5. Countermeasures
   1.6. Security Policies
   1.7. Confidentiality Polices
   1.8. Integrity Policies
   1.9. Backup and Audit Overview

2. Operating System Security
   2.1. Security Risks
   2.2. Common Ports and Services
   2.3. Operating System Hardening
   2.4. File Systems and Resources
   2.5. User Accounts

3. Network Security
   3.1. Security Incidents and Attacks
   3.2. Boundary Devices
   3.3. Firewalls - Concept, Types, Applications, Limitation and Implementation
   3.4. VPN - Concept, Applications, Limitation and Implementation
   3.5. Intrusion Detection and Prevention- Concept, Applications, Limitation and Implementation

4. Other Security Areas
   4.1. Web threats and attacks
   4.2. Database threats and attacks
   4.3. Security in wireless network-issues and solutions
   4.4. Security in e-commerce, m-commerce-issues and solutions

5. Symmetric Ciphers
   5.1. Classical Encryption-
   5.2. Block Cipher
   5.3. DES, Triple DES, AES
   5.4. Contemporary Symmetric Cipher

6. Key Management
   6.1. Asymmetric encryption
   6.2. Use of Number Theory
   6.3. Public-key Cryptography
   6.4. RSA
   6.5. Message Authentication and Hash Functions
   6.6. Hash Algorithms
   6.7. Digital Signatures
   6.8. Authentication Protocols

7. Cryptography in .NET
   7.1. Basic Cryptography
   7.2. Hashing
   7.3. Symmetric Encryption
   7.4. Asymmetric Encryption
   7.5. Digital Signatures
   7.6. Keys

8. Java Cryptography
   8.1. Symmetric Encryption
   8.2. Asymmetric Encryption
   8.3. SSL

9. Overview of Security Engineering

References:

1. Computer Security: Art and Science by Matt Bishop, Addison-Wesley
2. Introduction to Computer Security by Matt Bishop, Addison-Wesley
3. Cryptography and Public Key Infrastructure on the Internet by Klaus Schmeh, Willey
4. Pro ASP.NET 3.5 in C# 2008 by Matthew MacDonald, Apress
5. Programming .NET Security by Adam Freeman, Allen Jones, Oreilly
6. Beginning Cryptography with Java by David Hook, Wrox
7. Information Security-Theory and Practices by Dhiren Patel , PHI

Veer Narmad South Gujarat University, Surat

Syllabus
M.Sc. (Computer Application), -1st Year
Semester -II
Effective from June 2012

Paper No : 206
Paper Title : Practical 1 [
L:0, P:4]

Practical shall be based Paper No. : 202 Paper Title : Web Programming using C#.Net.

Veer Narmad South Gujarat University, Surat

Syllabus
M.Sc. (Computer Application), -1st Year
Semester -II
Effective from June 2012

Paper No : 207
Paper Title : Practical 2 [
L:0, P:3]

Practical shall be based Paper No. : 204 Paper Title : DataWarehousing and Data Mining.

Veer Narmad South Gujarat University, Surat

Syllabus
M.Sc. (Computer Application), -1st Year
Semester -II
Effective from June 2012

Paper No : 208
Paper Title : Practical 3 [
L:0, P:3]

Practical shall be based Paper No. : 205 Paper Title : Information Security.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))
2nd Year - Semester III
Proposed syllabus for

Paper No. : 301
Paper Title: Advance PHP Programming **[Lect:4 Hrs. / Week]**

Aim: The Air of this course is to provide an in-depth knowledge of most recent Open Source based server side programming technology.

Prerequisites: Basic understanding of Web, HTTP, HTML, Database systems, Networks and Open Source Concepts.

Expected Outcome: After completion of this course, the student will be capable to develop professional web applications using PHP. implementing the concepts, methods and tools

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1 PHP Programming
- 1.1 Code structure and documentation
- 1.2 Array, Reference and Functions
- 1.3 Site structure and basics of web site development using PHP
- 1.4 PHP and OOP templates
- 1.5 Error Handling

2 Accessing Database
- 2.1 Accessing MySQL Database
  - 2.1.1 Connecting to MySQL DB Engine and database
  - 2.1.2 Executing queries and retrieving resultsets
- 2.2 Database access with PEAR:DB

2.2.1 Connecting to various types of databases with DB
2.2.2 Sending Queries and retrieving results
2.2.3 Using Quotes, Placeholders, Sequences
2.3 Database access with PEAR:ADODB
2.3.1 Connecting to various types of databases with ADODB
2.3.2 Record Sets Management
2.3.3 Generating HTML from record set
2.3.4 ADODB_Pager class, PivotTableSQL and ADODB caching
2.3.5 Exporting data to CSV and Tab Delimited files

3 Networking with PHP

3.1 Browser detection
3.2 Accessing other web sites with php
3.3 Using fsockopen()
3.4 Sending Plain Text Mail Message with PEAR Mail
3.5 Sending MIME Mail Message with Mail_mime

4 PHP Authentication, Cookies and session Management

4.1 Using the AUTH module and different storage containers for AUTH
4.2 Accessing Session Data
4.3 Using Auth_HTTP
4.4 Creating and Managing cookies
4.5 Session management in PHP

5 Image generation (5)

5.1 Creating and Manipulating images
5.2 Using Text in Images
5.3 Creating database driven graph
5.4 Saving and building on existing image.

6 Understanding PHP Internals (6)

7.1 Logging with configuration options
7.2 Outputting Debugging Information using various functions
(echo, var_dump, highlight_string, get_class, get_object_vars, get_class_methods, get_class_vars, debug_backtrace, debug_print_backtrace, exit)
7.3 Profiling and debugging with XDebug
7.3.1 Tracing,
7.3.2 Profilling,
7.3.3 Using remote debugging
7.4 Working with Code Caches
7.4.1 Alternative PHP Cache(APC)
7.4.2 ionCube PHP accelerator(PHPA)
7.4.3 Truck MMCache

8 Extending php (6)

8.1 CackPhp
8.2 Zend
8.3 Smarty

Main Readings:

1) Essential PHP Tools-modules, extensions and Accelarators By David Sklar
Publisher : APRESS (SPD) ISBN: 81-8128-170-5

2) PHP advanced for the World Wide Web By Larry Edward Ullman
Publisher: Peachpit Press ISBN: 0-20177597-2

3) Advanced PHP for Web professionals By Christopher Cosentino
Publisher: Pearson education ISBN: 0-13-008539-1

4) Expert PHP 5 Tools By Dirk Merkel, Publisher:PACKT (SPD) ISBN 13 :978-93-5023-152-4

Supplementary Readings :

1) PHP – a Beginners Guide By : Ashok Appu'
Publisher: Wiley Dreamtech India Pvt. Ltd. ISBN : 81-265-0311-4

2) Learning PHP 5 By :- David Sklar , :Publisher: O'Reilly (SPD) ISBN : 81-7366-732-2

3) Beginning PHP 5.1 FOR BEGGINERS By: Ivan Byross, Sharanam Shah
Publisher: The Team (SPD) ISBN 10: 81-8404-075-X

4) Beginning PHP 5, By : Dave W. Mercer, Allent Kent, Steven D. Nowicki, David Mercer, Dan Squire, Wankyu Choi , Publisher: WROX (Wiley dreamTech), ISBN : 81-265-0539-

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus For

Paper No : 302

Paper Title: Mobile Application Development [**Lect: 4 Hrs]**

Aim: The aim of this course is to provide an in-depth knowledge of most recent Mobile Devices Application Development technology.

Prerequisites: Basic understanding of Programming, Object Oriented Concepts and Networks

Expected Outcome: After completion of this course, the student will be capable of implementing the concepts, methods and tools of mobile applications using Android.

---

1. Introduction to Mobile Devices

1.1 Pervasive computing,
1.2 Definition, Evolution of Mobile Devices,
1.3 Categories and Features of Mobile Devices,

2. Smart Identification of mobile devices

2.1 Smart cards-its hardware and software
2.2 Communication between On-card and Off-card Parts
2.3 Smart Labels and Tokens
2.4 Smart Sensors and Actuators

3. Introduction to Android

3.1 Open standards for mobile devices (OHA)
3.2 Introduction to various mobile device OS
3.3 Architecture of Android OS
3.4 Introduction to Android SDK
3.5 Embedded Browsers
3.6 Types of Android Applications-Foreground Applications, Background Services and Intent Receivers, Intermittent Applications, Widgets and Containers

4. Mobile Application Development Using Android

4.1 Android Development tools (3)
    4.1.1 The Android Virtual Device and SDK Manager
    4.1.2 The Android Emulator
    4.1.3 Delvik Debug Monitor Service (DDMS)
    4.1.4 The Android Debug Bridge (ADB)
4.2 Creating Applications and Activities (5)
    4.2.1 Application Manifest and Application Life cycle, Application Priority and Process States

4.2.2 Creating and Using Resources
4.2.3 Working with Android Application Class
4.2.4 Working with android activities-Activity Life cycle, Activity stakes, Activity States, Activity Lifetimes, Android Activity Classes

4.3 Creating User Interface (4)
4.3.1 Fundamental Android UI Design
4.3.2 Working with Views and Layouts, Drawable Resources
4.3.2 Resolution and Density Independence
4.3.4 Working with Menus and Messages
4.3.5 Building Rich User Interfaces-Animations, Canvas, Surface View and Interactive controls

4.4 Working with Intents, Broadcast Receivers, Adapters and The Internet (4)
4.4.1 Intents, Intent filters, Linkify, Event broadcasting, Pending Events
4.4.2 Native Adapters and their usage
4.4.3 Connecting and using Internet Resources
4.4.4 Dialog classes-Alert Dialog, specialist Input dialogs, Using Activities as Dialogs, Managing and displaying Dialogs

4.5 Files, Saving States and Preferences (4)
4.5.1 Saving Simple application Data
4.5.2 Creating and saving preferences, Retrieving Shared Preferences
4.5.3 Preference activity and Preferences Frmework
4.5.4 Saving Activity State, Saving and Loading Files, Including Static Files as Resources
4.5.5 File Management tools

4.6 Database and Content Providers (3)
4.6.1 Android Databases-Working with SQLite Databases
4.6.2 Content Providers- Creating and using Content Providers

4.7 Audio, Video and Using the Camera (4)
4.7.1 Playing and recording Audio and Video
4.7.2 Working with the Camera
4.7.3 Working with Media and MediaStore

4.8 Deploying Android Application

4. Development tool

8.1 Self Study - PhoneGap

Main Readings:

1. Principles of Mobile computing, 2nd Ed, Uwe Hansmann, Lother Merk, M?artin S. Nicklous, Thomas Stober, Springer Publication, 2004
2. Professional Android 2 Application Development by Reto Meier, WROX Publication-Wiley-India, 2009
3. J2ME: The Complete Reference by James Edward Keogh Osborne Publication, 2009
4. Inside Microsoft Windows CE, John Murray, Microsoft Press 2007
5. "The Symbian OS Architecture Sourcebook: Design and Evolution of a Mobile Phone OS", Ben Morris, Wiley Publications, ISBN 978-0-470-01846-0, 2007

Supplementary Readings :

Beginning Java ME Platform (Beginning from Novice to Professional) 3rd Edition by Ray Rischpater Apress Publication 2008

Android Essentials, Chris Haseman, Apress Publication, 2009

"Beginning Android", Mark L Murphy, Wiley India Pvt Ltd, 2009

"Pro Android", Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd, 2009

"Android Wireless Application Development", 2nd ed., Lauren Darcey and Shane Conder, Pearson Education,2011

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed Syllabus for

Paper No : 303

Paper Title : Software Testing **[Lect:4 Hrs]**

Aim: To provide an in-depth knowledge of Software Testing and Industrial practices in it.

Prerequisites: Basic understanding of Programming and Software Engineering

Expected Outcome: After completion of this course, the student will be capable of implementing the concepts, methods and tools of software testing

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1. Software Testing

1.1 Role of Testing
1.2 Failure, Error, Fault, and Defect
1.3 Precision and Accuracy
1.4 Verification and Validation
1.5 Objectives of Testing
1.6. Concept of Complete Testing
1.7 Central Issue in Testing
1.8 Testing Activities

2. Testing Techniques

2.1. White-Box and Black-Box Testing
2.2 Static Black-Box Testing-Testing the specification
2.4.1 High Level Specification Review
2.4.2 Specification attributes Checklist
2.4.3 Specification Terminology Checklist
2.3 Dynamic Black-box Testing
2.3.1 Test-to-Pass and Test-to-Fail
2.3.2 Equivalence Partitioning
2.3.3 Data Testing-Testing for Boundary conditions, Sub-Boundary conditions, Default, Empty, Null, Zero, None, Invalid, Wrong, Incorrect, Garbage Data
2.3.4 State Testing-Testing Software's Logic flow, Testing states to Fail
2.3.5 Orthogonal Array Testing
2.4 Static White-Box Testing – Code Examination
2.4.1 Formal Code Reviews –Peer Reviews, Walkthroughs, Inspections
2.4.2 Examining adherence to coding standards and guidelines
2.4.3 Generic Code Review Checklist-Data Reference errors, Data Declaration Errors, Computation Errors, Control Flow Errors, Comparison errors, Subroutine Parameter Errors, Input/Output Errors, Other checks
2.5 Dynamic White-Box Testing
2.5.1 Data coverage-data flow, Sub-boundaries, Formulas and Equations, Error forcing

2.5.2 Code coverage-program statement and Line coverage, Branch coverage, condition Coverage, Control Flow

2.5.3 Unit and Integration Testing

2.6 Debugging- Process, Considerations, Debugging Approaches

2.7 Functional Testing, Ad-hoc Testing

2.8 System Testing - Stress, Load, Performance, Security, etc.

2.9 Acceptance Testing

3. Other Testing

3.1 Usability Testing

3.3.1 User Interface Testing - user interface standards and guidelines, intuitiveness, consistency, Flexibility, Comfort, Correctness, Usefulness

3.3.2 Testing for the Disabled: Accessibility Testing

3.2 Testing the Documentation

4 Testing of Web Application

4.1. Testing Concepts for WebApps

4.2. The Testing process

4.3. Content Testing

4.4. User Interface Testing

4.5. Component Level Testing

4.6. Navigation Testing

4.7. Configuration Testing

4.8. Security Testing

4.9. Performance Testing

5 Testing Tools

5.1 Automation of Test Execution, Requirement tracking, High Level Review

5.2 Types of Test Tools

5.2.1 Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Non functional testing

5.3 Selection and Introduction of Test Tools

5.3.1 Tool Selection and Introduction, Cost Effectiveness of Tool Introduction

6. Test Design

6.1. Test Design Factors

6.2. Characteristics of Testable Requirements

6.3. Test Design Preparedness Metrics

6.4. Test Case Design Effectiveness

7. Test Recording and Reporting

7.1 A Bug's Lifecycle

7.2 Bug Reporting guidelines

7.3 Reporting for reproducibility

7.4 Reporting Severity and Priority of each bug.

7.5 Test Incident Report

7.6 Bug Tracking System- Manual and Automated

8 Self Study : Open Source & Proprietary/Commercial Tools for

8.1 Test Management

8.2 Functional Testing

8.3 Load & Performance Testing

Main Readings :

1. Software Testing- Ron Patton, Techmedia Publication, 2000
2. Software Testing and Quality Assurance - Kshirasagar Naik and Priyadarshi Tripathy - WILEY.
3. Software Engineering A practitioner's approach - Roger S Pressman - McGraw Hill
4. Effective Methods for Software Testing - William E. Perry- WILEY.
5. Software Testing Tools, Dr. K.V.K.K Prasad, dreamtech,2006
6. Software Testing Foundations, Andreas Spillner, Tilo Linz, Hans Schaefer, Shoff Publishers and Distributors
7. Software Testing: Principles and Practices by Srinivasan D and Gopalswamy R, Pearson Education, 2006
8. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000

Supplementary Readings :

1. Software Engineering Concepts - Fairley R E - Mc-Graw Hill
2. Software Engineering - Lewis T G - Mc-Graw Hill
3. Fundamentals of Software Engineering – Carlo Ghezzi
4. IEEE standard for software user documentation, std 1063-1987
5. Software Engineering- A programming approach - D. Bell, I. Morrey - PHI
6. Pragmatic Software Testing – Rex Black – WILLEY.
7. Software Testing Concepts and Practices – K. Mustana and R.A. Khan – Narosa Pub.
8. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996
9. The art of software testing by GJ Myers, Wiley.
10. Software Quality Asurance-Milind Limaye, McGrawHill Publication, 2011

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus for

Paper No: 304 - Elective 1 **[Lect: 4 Hrs.]**

Paper No: 305 - Elective 2 **[Lect: 4 Hrs.]**

NOTE : Any two papers from the following papers to be selected as paper :304 and paper:305.

A) Cloud Computing
B) Distributed Databases
C) Multimedia Systems
D) Expert Systems

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus for

Elective A : Cloud Computing **[Lect: 4 Hrs]**

Aim: To provide comprehensive knowledge of Cloud based systems and aspects related to it.

Prerequisites: Basic understanding of Types and Categories of Information Systems, Web and Web based Application Development.

Expected Outcome : After completion of this course, the student will gain comprehensive knowledge of of Cloud based systems and aspects related to it.

---

1. **Evolution of Cloud Computing**
   - 1.1 Introduction to Web Services-SOAP, WDL, UDDI, characteristics, benefits and impact on EDI
   - 1.2 Introduction to Web 2.0 and Web 3.0
   - 1.3 SOA Fundamentals - Evolution, characteristics of SOA, Basic SOA architecture, infrastructure services, SOA Enterprise Software models
   - 1.4 Evolution of Cloud Computing
   - 1.5 Virtualization

2. Fundamentals of Cloud
   - 2.1 Cloud characteristics-On Demand Service, Ubiquitous Network Access, Location Independent Resource Pooling, Rapid Elasticity.
   - 2.2 Cloud Benefits and Barriers
   - 2.3 Cloud Types-Public, Private, Hybrid, Community, Shared Private, Dedicated Private
   - 2.4 Security in public cloud - Multi-tenancy, Security Assessment, Shard Risk, Staff Security Screening, Distributed Data Centers, Physical Security, Policies, Coding, Data Leakage.

3. Cloud Service Models
   - 3.1 Infrastructure as a Service
     - 3.1.1. Server virtualization
     - 3.1.2. Storage virtualization
     - 3.1.3. Network virtualization
   - 3.2 Platform as a Service (PaaS)
     - 3.2.1. Azure
     - 3.2.2. Goole AppEng
     - 3.2.3. Hadoop
     - 3.2.4. SalesForce
   - 3.3 Software as a Service (SaaS)-Characteristics, Open SaaS and SOA
     - 3.3.1. Cloud services

3.3.2. Web portal
3.3.3. Web OS
3.4 Identity as a Service(IDaaS)
3.4.1. Network Identity Service Classes
3.4.2. IDaaS Interoperability-user authentication, Aothorization MarkUp Languages
3.5 Compliance as a Service(CaaS)

4. **Cloud Computing Essentials**
4.1 Cloud Computing Architectural Framework
4.2 Cloud Deployment Models
4.3 Virtualization in Cloud Computing
4.4 Parallelization in Cloud Computing
4.5 Security for Cloud Computing

5. Cloud Based Systems
5.1 Cloud Based Storage
5.1.1. Provisioning Cloud Storage – Unmanaged and Managed cloud storage, creating cloud storage systems, virtual storage containers.
5.1.2. Cloud Backup solutions-types, features, cloud attached backups.
5.1.3. Cloud storage Interoperability-Cloud Data Management Interface(CDMI), Open cloud Computing Interface(OCCI)
5.2 Cloud Based Productivity Software
5.2.1. Productivity applications and Characteristics
5.2.2. Online Office systems-Acrobat.com, Google Docs, Microsoft Office Web apps etc.
5.3 Cloud based Webmail Services
5.3.1. Cloud Mail Services-Google Gmail, Windows Live Hotmail, Yahoo! Mail, Mail2Web.
5.3.2. Syndication services- RSS an Atom protocols, NewsReaders, News Aggregators
5.4 Cloud based Communicating systems
5.4.1. Instant Messaging clients, Interoperability, Micro-blogs or Short Message Services
5.4.2. Collaboration Technologies
5.4.3. Social Networks for communication
5.5 Cloud based Media and Streaming
5.5.1. Introduction to Streaming Process and Protocols
5.5.2. Audio Streaming , VoIP applications-Skype, Google Voice, Google Talk
5.5.3. Video Streaming formats, Television based streaming, Youtube.

6. **Mobile Cloud**
6.1 Using Smartphones with the cloud-Android, Apple iPhone, BlackBerry
6.2 Mobile Interoperability
6.3 Performing Service Discovery
6.3.1. Context Aware Services
6.3.2. MEMS

6.3.3. Location awareness
6.3.4. Push services
6.4 Short Message Service(SMS)
6.5 WAP and Other Protocols
6.6 Performance synchronization

Main Readings :

1.“Cloud Computing: Principles and Paradigms,” R. Buyya et al. (eds.), Wiley, 2010.
2.“Cloud Computing: Principles, Systems and Applications,” L. Gillam et al. (eds.) Springer, 2010.
3. “Cloud Computing Bible”, Sosinsky, Wiley-India,2011
4. “Cloud Computing-second edition”, Dr. Kumar Saurabh, Wiley-India, 2012
5. “Service-Oriented Architecture: Concepts, Technology, and Design”, Thomas Erl, Prentice Hall Publication, 2005.
6. “Understanding Enterprise SOA-Enterprise Service Oriented Architecture”, Eric Pulier, Hugh Taylor, dreamtech Press, 2008

Supplementary Readings :

1. “Cloud Computing-Insight into New-Era Infrastructure”, Dr. Kumar Saurabh, Wiley-India, 2012
2. “Understanding SOA with Web Services”, Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F.Ferguson, .Eric Newcomer, Greg Lomow, Addison Wesley Publicatio, 2004
3. Dave Chappell, “Enterprise Service Bus”,O'Reilly Publications, 2004

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed Syllabus for

Elective B : Distributed Database Management System **[Lect : 4 Hr.]**

Aim: To provide comprehensive knowledge of Distributed Database Systems and aspects related to it.

Prerequisites: Deep understanding of Database Management System concepts, Database Design, Database Management, Database Storage, Querying and Query Processing, Query Evaluation and Optimization and Object Oriented Concepts

Expected Outcome : After completion of this course, the student will gain comprehensive knowledge of Distributed Database Systems and aspects related to it..

---

1. Introduction

1.1 Distributed data processing, What is a DDBMS?
1.2 Advantages and disadvantages of DDBMS.
1.3 Problem areas, Overview of database and computer network concepts

2. Distributed database Management System

2.1 Architecture
2.2 Transparencies in a distributed DBMS,
2.3 Distributed DBMS architecture Global directory issues

3. Distributed Database Design

3.1 Alternative design strategies
3.2 Distributed design issues
3.3 Fragmentation, Data allocation

4. Query Processing Issues

4.1 Objectives of query processing, Characterization of query processors
4.2 Layers of query processing, Query decomposition
4.3 Localization of distributed data

5. Optimizing Distributed Queries

5.1 Factors governing query optimization
5.2 Centralized query optimization, Ordering of fragment queries
5.3 Distributed query optimization algorithms

6. Distributed Object Management

6.1 Object model features
6.2 Fundamental object management issues

6.3 DOM architectures
6.4 Object caching, Object clustering, Object migration
6.5 Distributed object base systems

7. Query Processing In Distributed Object base Systems

7.1 Problems in accessing distributed objects
7.2 Distributed object assembly problem
7.3 Strategies for distributed object assembly

8. Transaction Management

8.1 The concept of 'transaction'
8.2 Goals of transaction management, Characteristics of transactions
8.3 Taxonomy of transaction models

Main Readings :

1. Principles of Distributed Database Systems**.** By M.T. Özsu and P. Valduriez.

Prentice-Hall [ISBN 978-0-470-40745-5]

2 M. T. Özsu and P. Valduriez, *Principles of Distributed Database Systems, 3rd edition*, Springer, 2011; ISBN 978-1-4419-8833-1

3. Distributed Object Management. By Morgan-Kaufmann. M.T. Özsu, U. Dayal and P. Valduriez (editors) [ISBN: 9781558602564]

4. Distributed Databases Principles and Systems By S. Ceri and G. Pelagatti

McGraw Hill Book Company [ISBN:0-07-010829-3]

5. Oracle 9i Distributed Database Replication Manual.

6. Modern Database Systems - The Object Model, Interoperability, and Beyond. By W. Kim (editor). ACM Press.

7. Advances in Object-Oriented Database Systems. By A. Dogac, M.T. Özsu, A. Billiris, and T. Sellis (editors) Springer-Verlag.

Supplementary Readings :

1. Object Oriented Database System – Approaches & Architectures By C.S.R. Prabhu

(PHE Pub.)

2. Fundamentals of Database System 3rd edition By Eliniskv & Navathe

Addison Welsey

3. Database Management Systems By Raghu Ramakrishnan & Johannes Gehrke
McGraw Pub.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed Syllabus for

Elective C: Multimedia Systems **[Lect : 4Hr]**

Aim: The aim of this course is to provide knowledge of the basic concepts and techniques related to Multimedia System.

Prerequisites: Students should be familiar with basics of computer graphics and multimedia.

Expected Outcome : After completion of this course, the student will gain knowledge of basic concepts and techniques related to Multimedia System.

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1. Computer graphics

- 1.1 Fundamentals
- 1.2 Vector graphics
- 1.3 Shapes
- 1.4 Transformations and Filters
- 1.5 3-D Graphics
- 1.6 Bitmapped graphics
- 1.7 Resolution
- 1.8 Image Compression
- 1.9 Image Manipulation
- 1.10 Geometrical Transformation
- 1.11 Combining Vectors and Bitmaps
- 1.12 File Formats

2. Video

- 2.1 Digitizing Video
- 2.2 Video Standards
- 2.3 Video Compression techniques
- 2.4 Digital Video Editing and Post-Production
- 2.5 Streamed Video and Video Conferencing

3. Animation

- 3.1 Captured Animation and Image Sequences
- 3.2 'Digital Cel' and Sprite Animation
- 3.3 Key Frame Animation
- 3.4 3-D Animation

4. Sound

- 4.1 The Nature of Sound
- 4.2 Digitizing Sound
- 4.3 Processing Sound
- 4.4 Compression
- 4.5 Formats

4.6 MIDI
4.7 Combining Sound and Picture

5. Distributed Multimedia System

5.1 Introduction to DMS
5.2 Main Features of DMS
5.3 Resources Management of DMS
5.4 Networking
5.5 Multimedia Operating System
5.6 Distributed Multimedia Servers
5.7 Distributed Multimedia Application

6. Multimedia Data Compression

6.1 Data Compression Terminology
6.2 A Classification of Data Compression Terminology
6.3 Data Compression Technology
6.4 Compression Standards

Main Readings:

1) Digital multimedia 3/e illustrated By Chapman, Nigel P. Chapman, Jenny Chapman
Publisher - Wiley, 2009 ISBN : 0470512164, 9780470512166

2) Multimedia – making it work By Tay Vaughan
Publisher : Tata McGraw – Hill ISBN : 0-07-463953-6

3) Streaming Multimedia – Bible By Steve Mack
Publisher: John Wiley ISBN : 81-265-0290-8

4). Multimedia Communication System By LPE Pearon Education Publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus for

Elective D: Expert System [Lect : 4Hr]

Aim: The aim of this course is to provide knowledge of the basic concepts and techniques of Expert System.

Prerequisites: Students should be familiar with Advance computing, algorithms and data structures

Expected Outcome : After completion of this course, the student will gain knowledge of basic concepts and techniques of Expert System.

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1. Introduction to AI
    - 1.1. Overview of AI and its application area
    - 1.2. Automated reasoning & Theorem proving, Natural Language, Understanding & Semantic modeling, Modeling Human performance
    - 1.3 AI problem characteristics
2. Knowledge Overview
    - 2.1. Definition and importance of knowledge
    - 2.2. Overview knowledge representation
        - 2.2.1 Structured Knowledge- Associative networks, Frame structures , Conceptual dependencies and Scripts
    - 2.3. Overview of knowledge organization
    - 2.4. Overview of knowledge search and manipulation
        - 2.4.1 Search techniques - Uninformed search, Informed search
        - 2.4.2 Introduction to matching Techniques
    - 2.5. Overview of Knowledge acquisition
    - 2.6 Knowledge learning types
    - 2.7 General learning models
3. Inference
    - 3.1 Introduction
    - 3.2 Trees, Lattices and Graphs
    - 3.3 Deductive logic
    - 3.4 Rules of Inference
    - 3.5 Resolutions
    - 3.6 Forward and backward chaining
4. Reasoning under Uncertainty
    - 4.1 Uncertainty
    - 4.2 Errors and Induction
    - 4.3 Probability
    - 4.4 Temporal Reasoning and Backward Induction
    - 4.5 Uncertainty in inference chain

4.6 Uncertainty and Rules
4.7 Approximate reasoning

5. Expert System
   5.1 Overview of Expert System
   5.2 Characteristics of an Expert System
   5.3 Development of Expert System and Technology
   5.4 Expert System Application and Domain
   5.5 Elements of an Expert System
   5.6 Production system
   5.7 Artificial Neural System
6 Design of Expert System
   6.1 Stages in development of an Expert System
   6.2 Software Engineering and Expert System
   6.3 The Expert System Life Cycle
   6.4 Expert System Life Cycle Model
7 Expert System Architecture
   7.1 Overview of expert System Tools
   7.2 Expert System Shells
   7.3 Black Board Architecture
   7.4 Truth Maintenance Architecture System
   7.5 Rule Induction by Machine Learning

Main Readings::

1. Expert Systems: Principles and Programming by Joseph C. Giarratano, Gary D. Riley, Course Technology
2. Introduction to Expert Systems by Peter Jackson, Addison Wesley Publishing Company
3. Artificial Intelligence: A Modern Approach (Second Edition) by Stuart Russell and Peter Norvig,
4. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, PHI
5. Foundation of Artificial Intelligence and Expert Systems, V.S. Janakiraman, K. Sarukesi, P. Gopalakrishnan, MacMillan, (2002)
6. Introduction of Artificial Intelligence, Charniak, E. - Narosa Publishing House.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus for

Paper No : 306

Paper Title : Practical on Advanced PHP Programming **[Pract:4 Hrs]**

Aim: The aim of this course is to enable students to develop web applications in PHP.

Prerequisites: Programming Skill in Structured and Object Oriented Programming, Scripting Skills in HTML, Basics of Operating Systems, Networks and Database systems, Concepts of Web, HTTP etc.

Expected Outcome : After completion of this course, the student will be capable of developing professional web applications using PHP.

The students will be required to carry out practical in Web Application Development on the topics covered in Paper 301: "Advanced PHP Programming" using the methods and tools discussed there in.

A Journal must be prepared for the practical work done.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus for

Paper No : 307

Paper Title : Practical on Mobile Programming **[Pract:3 Hrs]**

Aim: The aim of this course is to enable students to develop applications for Mobile devices.

Prerequisites: Programming Skill in Structured and Object Oriented Programming, Scripting Skills in HTML, Basics of Operating Systems and Database systems, Concepts of Networks, Web, HTTP etc.

Expected Outcome: After completion of this course, the student will be capable of developing professional mobile applications using Android.

The students will be required to carry out practical in Mobile Application Development on the topics covered in Paper 302: "Mobile Application Development" using the methods and tools discussed there in.

A Journal must be prepared for the practical work done.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester III

Proposed syllabus for

Paper No : 308

Paper Title : Practical on software Testing **[Pract:3 Hrs]**

Aim: The aim of this course is to enable students to Test desktop and Web Applications.

Prerequisites: Basic understanding of Programming and Software Engineering

Expected Outcome: After completion of this course, the student will be capable of performing various types of testing on Software and Web Applications.

The students will be required to carry out practical on software testing on the topics covered in Paper 303: "Software Testing" using the testing methods and tools discussed there in.

A Journal must be prepared for the practical work done.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

M.Sc. Computer Application (M.Sc.(CA))

2nd Year - Semester IV

Proposed syllabus for

Paper No. : 401

Paper Title: Project **[Pract: 2 students / hour / week]**

Aim: To expose students to industrial practices and activities of software engineering and train them about the same.

Prerequisites: Knowledge of Advanced Programming, Latest Technologies and Tools and Software Engineering

Expected Outcome: After completion of this course, the student will be capable to start professional career and/or research work in the field of Information Technology.

Entire semester is allocated for a full-time project work. All the students have to undergo a project preferably in an industry or any reputed institute. The students must prepare documentation of the project work done as per the software Engineering Guidelines. At the end of the semester, the students have to submit their project report in bounded form to the respective institution. The project presentation and viva – voice will be conducted on the basis of it.

The students have to submit the following reports to their respective institution:

1. **Project Joining Report**
2. **Appropriate name of the project**
3. **Monthly Progress Report duly sign by the concern external guide**
4. **Project Completion Certificate**
5. **Institution/College Certificate**
6. **Software Coding declaration…(if industry/organization doesn't permit students to submit the source code)**

   Without such reports student will not be allowed to appear in his/her final Project Presentation and Viva-Voice.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
M.Sc. Computer Application (M.Sc.(CA))
2nd Year - Semester IV
Proposed syllabus for

Paper No. : 402
Paper Title: Seminar [Pract: 4 students / hour / week]

Aim: Additional knowledge building in the field of Information Technology using self-learning practice.

Prerequisites: Basic Knowledge of Software Engineering theories, activities , methods, techniques & tools

Expected Outcome: After completion of this course, the student will have gained some additional knowledge in the field of information technology by self learning practice.

In this paper students will have to select any topic related to information technology field– preferably based on the current trends and technologies for the seminar. Individual student is required to prepare a seminar report. At the end of the semester student has to submit seminar report with satisfactory detail study in the bounded form to the respective institution. The seminar presentation and viva voice will be conducted on the basis of selected topic at the end of the semester.

The students have to submit the following documents to their respective institution:

1. **Name and abstract of the Topic selected.**
2. **Monthly Progress Report duly signed by the concern internal guide**
3. **Work Completion Certificate by internal guide**
4. **Institution/College Certificate**