Veer Narmad South Gujarat University, Surat

Syllabus
M.Sc. (Computer Application), -1st Year
Semester -II
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:

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

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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

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

Syllabus

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

Semester -II

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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

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

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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

Syllabus
M.Sc. (Computer Application), -1st Year
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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
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Paper No : 207
Paper Title : Practical 2 **[L:0, P:3]**

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

Syllabus
M.Sc. (Computer Application), -1st Year
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Paper No : 208
Paper Title : Practical 3 **[L:0, P:3]**

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