Veer Narmad South Gujarat University, Surat

Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Paper: 201: 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

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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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Paper: 202: Web Programming

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

7. Web Engineering
    7.1. Web engineering process and best practices
    7.2. Formulation and Planning
    7.3. Analysis Modeling for Web Applications
    7.4. Design Modeling for Web Applications

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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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Paper: 203: Knowledge Management

[L:4, P:0]

Aim: To provide a comprehensive knowledge of knowledge representation, acquisition and reasoning concepts and techniques.

Prerequisite: Programming in high level language.

1. Knowledge
    1.1. Introduction to Knowledge Concepts
    1.2. Knowledge Types
    1.3. Categories of Knowledge
    1.4. Tacit and Explicit Knowledge

2. Knowledge Management
    2.1. Introduction
    2.2. The goals and objectives of Knowledge Management
    2.3. Conceptual Basis of Knowledge management
        2.3.1. The Knowledge repository
        2.3.2. Knowledge management activities
        2.3.3. Cycle model of Knowledge Management
    2.4. Organizational Impacts of Knowledge Management
    2.5. Knowledge Management Assessment of an Organization

3. Knowledge Representation
    3.1. Semantic Nets
    3.2. Frames
    3.3. Logic and sets
    3.4. Prepositional Logic
    3.5. The First- Order Predicate Logic
    3.6. Quantifiers and Sets
    3.7. Limitations of Predicate Logic

4. Knowledge Management Technologies
    4.1. Technologies to Manage Knowledge
        4.1.1. Artificial Intelligence, Digital Libraries, Repositories, etc.
    4.2. Knowledge-Based Systems
    4.3. Case-Based Systems
    4.4. Knowledge Elicitation: Converting Tacit Knowledge to Explicit

5. Knowledge Management Systems
    5.1. Knowledge Discovery

5.2. Knowledge Capture Systems
   5.2.1. Systems that Preserve and Formalize Knowledge;
   5.2.2. Concept Maps
   5.2.3. Process Modeling
   5.2.4. RSS
   5.2.5. Wikis
   5.2.6. Delphi Method, etc.
5.3. Knowledge Sharing Systems
   5.3.1. Ontology Development Systems
   5.3.2. Categorization and Classification Tools
   5.3.3. XML-Based Tools, etc.
5.4. Knowledge Application Systems

References:
1. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, Pearson
2. Decision Support Systems and Intelligent Systems: Efraim Turban, Jay E. Aronson, Pearson
3. Introduction to Artificial Intelligence and Expert Systems, Dan W. Patterson, PHI
4. Expert System: Principles and Programming, Joseph C. Giarratano, Gary D. Riley, Thomson

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Paper 204 and 205

[L:4, P:0]

Any two subjects from the following list of subjects.

Elective 1: Advanced Database Management System

Elective 2: Web Programming using JAVA

Elective 3: Data Communication

Elective 4: Expert System

Elective 5: Service Oriented Architecture and Web Services

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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
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Elective 1: Data Warehouse & Data Mining

[L:4, P:0]

1. Introduction
    1.1   Data Warehouse characteristics
    1.2   Data Marts

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. Data Mining
    4.1 Introduction
    4.2 Data Description
    4.3 Clustering
    4.4 Link Analysis
    4.5 Predictive Data Mining
    4.6 Classification
    4.7 Regression
    4.8 Time Series
    4.9 Models & Patterns
    4.10 Decision Trees
    4.11 Multivariate adaptive regression splines
    4.12 Rule Induction
    4.13 K-nearest neighbour and memory based reasoning
    4.14 Logistic regression
    4.15 Discriminant Analysis
    4.16 Generalized Adaptive models
    4.17 Genetic algorithms
    4.18 Pattern Structures
    4.19 Patterns in Data Matrices
    4.20 Patterns for Strings

5. Applications of Data Warehousing and Data Mining

REFRENCES

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

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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Elective 2 : 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
   1.5. 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. Intorduction to JSP
   3.1. JSP tags
   3.2. JSP directives
   3.3. Scripting elements
   3.4. Flow of control
   3.5. Conditionalization
   3.6. Actions and implicit objects
   3.7. JSP components
   3.8. JSP bean tags
   3.9. Working with databases
   3.10. Writing a Complete Application

4. Introduction to Beans and EJB 3.0 Architecture

[1] Web Development with JavaServer Pages, D. K. Fields, M. A. Kolb, S. Bayern, Manning Publications

[2] Java Cook Book, Ian Darwin, Orelley

[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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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Elective 3: Data Communication

[L:4, P:0]

Aim: To provide a comprehensive knowledge regarding Internets Protocol suite like TCP/IP

Prerequisites: Basic Computer Networks & Programming Language Java.

1. Networking Fundamentals
   1.1   Types of Network
   1.2   Wired Network Design & its Components
   1.3   Wireless Network Design & its Components
   1.4   Protocols --- Simplest protocol, Sliding Window Protocol, Go Back N Protocol, Stop & Wait Protocol

2. Introduction
   2.1   OSI reference model
   2.2   Introduction to TCP/IP protocols
   2.3   Internet address and port numbers
   2.4   Client Server Model
   2.5   RFCs
   2.6   Internet Service and APIs

3. Data Link Layer
   3.1   Ethernet Frame, encapsulation
   3.2   Protocols- SLIP, C-SLIP, PPP
   3.3   Loopback Interface
   3.4   Maximum Transfer Unit

4. Internet Protocol
   4.1   Introduction
   4.2   IP datagram Header, options
   4.3   IP datagram routing
   4.4   Subnet addressing
   4.5   Special case IP address
   4.6   Examples
   4.7   Commands: ipconfig, netstat

5. Address Resolution Protocol
   5.1   Introduction
   5.2   ARP, RARP packet formats
   5.3   ARP example
   5.4   Proxy ARP

6. Internet Control Message Protocol

References:

1. TCP/IP Illustrated Vol. – 1. W. Richard Stevents, ASW
2. TCP/IP Protocol Suite, Behrouz A. Forouzan, Tata McGraw Hill
3. TCP/IP Illustrated Vol. – 2. W. Richard Stevents, ASW
4. Data and Network Communication, M.A. Miller, Thomson Learning
5. Data Communication and Network, A.S. Godbole, Tata McGraw Hill.
6. Data Communications and Networking, Behrouz A. Forouzan
7. Computer networks – Andrew Tanenboum, TMH publication

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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Elective 4: Expert System

[L:4, P:0]

Aim: The aim of this subject is to understand the basic concepts and techniques of Expert System.
Prerequisites: Students should be familiar with basic computing and programming.

1. Expert System
    1.1. Overview of Expert System
    1.2. Characteristics of an Expert System
    1.3. Development of Expert System and Technology
    1.4. Expert System Application and Domain
    1.5. Elements of an Expert System
    1.6. Production system
    1.7. Artificial Neural System
2. Inference
    2.1. Introduction
    2.2. Trees, Lattices and Graphs
    2.3. Deductive logic
    2.4. Rules of Inference
    2.5. Resolutions
    2.6. Forward and backward chaining
3. Reasoning under Uncertainty
    3.1. Uncertainty
    3.2. Errors and Induction
    3.3. Probability
    3.4. Temporal Reasoning and Backward Induction
    3.5. Uncertainty in inference chain
    3.6. Uncertainty and Rules
    3.7. Approximate reasoning
4. Design of Expert System
    4.1. Stages in development of an Expert System
    4.2. Software Engineering and Expert System
    4.3. The Expert System Life Cycle
    4.4. Expert System Life Cycle Model
5. Expert System Architecture
    5.1. Overview of expert System Tools
    5.2. Expert System Shells
    5.3. Black Board Architecture
    5.4. Truth Maintenance Architecture System
    5.5. Rule Induction by Machine Learning

References:

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

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Proposed Syllabus
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Effective from July 2008
Elective 5: Service Oriented Architecture and Web Services

[L:4, P:0]

Aim: To provide a comprehensive knowledge of SOA and Web services technology.

Prerequisites: Object oriented concepts and Programming.

1. Fundamentals of SOA
    1.1.   Role of XML – XML and The Web – XML Language Basics
    1.2.   SOAP, Web Services
    1.3.   Revolutions of XML – Service Oriented Architecture (SOA)
    1.4.   Defining SOA, Business Value of SOA, Evolution of SOA
    1.5.   SOA Characteristics
    1.6.   Concept of a Service in SOA & Misperceptions about SOA
    1.7.   Basic SOA architecture
        1.7.1.   Infrastructure Services
        1.7.2.   Enterprise Service Bus (ESB)
    1.8.   SOA Enterprise Software models
    1.9.   IBM On Demand operating environment

2. XML & Web Services
    2.1.   XML & XML Infrastructure
    2.2.   Name Spaces
    2.3.   Structuring With Schemas and DTD
    2.4.   Presentation Techniques
    2.5.   Transformation
    2.6.   Architecture
    2.7.   Key Technologies
    2.8.   UDDI, WSDL, ebXML, SOAP
    2.9.   Web Services in E-Commerce
    2.10. WS Standards (WS-*)
    2.11. Web services and Service-oriented enterprise (SOE)
    2.12. WS-Coordination and WS-Transaction
    2.13. Business Process Execution Language for Web Services (BPEL4WS)
    2.14. WS-Security and the Web services security specifications
    2.15. WS-Reliable Messaging
    2.16. WS-Policy
    2.17. WS-Attachments

3. SOA Planning and Analysis
    3.1.   Stages of the SOA lifecycle

3.2. SOA Delivery Strategies

3.3. Service-Oriented Analysis

3.4. Capture and assess business and IT issues and drivers

3.5. Determining non-functional requirements (e.g., technical constraints, business constraints, runtime qualities, non-runtime qualities)

3.6. Business centric SOA and its benefits

3.7. Service Modeling

3.8. Basic Modeling Building Blocks

3.9. Service Models for legacy application integration and Enterprise Integration

3.10. Enterprise Solution Assets (ESA)

4. SOA Design and Implementation
    4.1. Service-Oriented Design Process
    4.2. Design Activities
    4.3. Determine services and tasks based on business process model
    4.4. Choosing appropriate standards
    4.5. Articulate architecture
    4.6. Mapping business processes to technology
    4.7. Designing service integration environment (e.g., ESB, registry)
    4.8. Tools available for appropriate designing
    4.9. Implementing SOA
    4.10. Security Implementation
    4.11. Implementation of integration patterns
    4.12. Services Enablement
    4.13. Quality Assurance.

5. Managing SOA Environment
    5.1. Distributing Service Management and Monitoring Concepts
    5.2. Operational Management Challenges
    5.3. Service-Level Agreement considerations
    5.4. SOA Governance (SLA, roles and responsibilities, policies, critical success factors, and metrics)
    5.5. QoS Compliance in SOA governance
    5.6. Role of ESB in SOA Governance
    5.7. Impact of changes to services in the SOA lifecycle.

6. Overview of Service Oriented Software Engineering

References:
1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education.
2. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education.
4. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers.
5. Service-Oriented Architecture: Concepts, Technology, and Design, by Thomas Erl, Prentice Hall Publication.
6. Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WS-Addressing, WS-BPEL, WS-Reliable Messaging, and Moreby Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F. Ferguson, Prentice Hall Publication.
7. Service-Oriented Architecture Compass: Business Value, Planning, and Enterprise Roadmap, by Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, IBM Press Publication.
8. The New Language of Business: SOA & Web 2.0 By Sandy Carter, IBM Press.
9. Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services by Thomas Erl, Prentice Hall Publication.

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Proposed Syllabus
M.Sc. (Computer Application), 2nd Semester
Effective from July 2008
Paper: 206: Practical

[L:0, P:10]

Practical shall be based on abode subjects and should be implemented using programming languages

VC++, Java, C# and Prolog