I SEM MTECH (IT)

Semester I

Year: 2014-2015

Course Title: Enterprise Application Programming

Credits(L:T:P): 3:0:1

Type of Course: Lecture & Practical

Course Code: 14SIT11

Core/Elective: Core

Total Contact Hours: 50

COURSE OBJECTIVES:

- To gain knowledge about metrics Web Application Development and related terminologies
- To gain knowledge about persistent framework and other ORM tools.
- To learn to build solutions using Design Patterns
- To get introduced to latest WEB frameworks

TOPICS

MODULE I

Web application and java EE 6: Exploring the HTTP Protocol, Introducing web applications, describing web containers, exploring web architecture models, exploring the MVC architecture. Working with servlet 3.0 Exploring the features of java servlet, Exploring new features in servlet 3.0, Exploring the servlet API, explain the servlet life cycle, creating a sample servlet, creating a servlet by using annotation, working with servletconfig and servlet context objects, working with the Httpservlet request and Httpservlert response interfaces, Exploring request delegation and request scope, implementing servlet collaboration.

10 hours

MODULE II

Handling sessions in servlet 3.0: Describing a session, introducing session tracking, Exploring the session tracking, mechanisms, using the java servlet API for session tracking, creating login application using session tracking. Implementing event handling Introducing events, Introducing event handling, working with the servlet events, is developing the online shop web application. Working with java server pages: Introducing JSP technology, Exploring new features of JSP2.1, listing advantages of JSP over java servlet, Exploring the architecture of a JSP page, Describing the life cycle of a JSP page, working with JSP basic tags and implicit objects, working with the action tags in JSP, exploring the JSP unified EL, using functions with EL.

10 hours

MODULE III

Implementing JSP tag extensions: Exploring the elements of tag extensions, working with classic tag handlers, exploring the tag extensions, working with simple tag handlers. Implementing java server pages standard tag library 1.2: Introducing JSTL, Exploring the tag libraries JSTL, working with the core tag library. Implementing filters: Exploring the need of filters, exploring the working of filters, exploring filters API, configuring a filter, creating a web application using filters, using initializing parameter in filters.

10 hours

MODULE IV

Persistence Management and Design Patterns: Implementing java persistence using hibernates Introducing hibernate, exploring the architecture of hibernate, downloading hibernate, exploring HQL, understanding hibernate O/R mapping, working with hibernate, Implementing O/R mapping with hibernate. Java EE design patterns: Describing the java EE application architecture, Introducing a design patterns, discussing the role of design patterns, exploring types of patterns.

10 hours
MODULE V

10 hours

LABORATORY WORK

Tools to be used / equivalent : JDK 1.6  apache tomcat server 6.x Mysql 5.x IDE Net Beans , eclipse

1. Developing the profile management module
   - Implementing logic with servlet.
   - creating the people_ employee servlet.
   - creating the employeeobj class.
   - creating the employeeDbmethods class.
   - creating the generated class, creating views.
   - creating the people_ insert JSP page.
   - creating the people_ search JSP page.
   - creating the people_ edit JSP page.
   - creating the people_ list JSP page.
   - creating the people_ profile JSP page.

2. Developing the recruitment module
   - Registering a new applicant.
   - creating the people_ applicant servlet.
   - creating the applicantDBObj class.
   - creating the applicantDBmethods class.
   - creating the generated class.
   - creating an interface for applicant registration.
   - conducting rounds of test.
   - creating the applicant_test_dtl servlet.
   - Designing JSP views.
   - Working of the recruitment module.

3. Developing the payroll module
   - Updating salary statement.
   - creating the people_ payroll servlet.
   - creating the empsal class.
   - creating the employee agreement class.
   - creating the payrollbean methods class.
   - designing JSP views.
   - creating the people_ agreement JSP page.
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- Creating the people_agreement_edit JSP page.
- Creating the salary_search.jsp file.
- Creating the salary_slip JSP page.

COURSE OUTCOMES:
Upon Completion of the course, the students should be able to:
- Implement a WEB application.
- Manage deployment configurations
- Implement Security mechanisms

Text Book:
1. Kogent learning solution: JAVA SERVER PROGRAMMING JAVA EE6(J2EE 1.6), Dreamtech press 2014
Course Title: Data Compression
Course Code: 14SIT12
Credits(L:T:P): 4:0:0
Type of Course: Lecture
Core/Elective: Core
Total Contact Hours:50

Course Objectives:
- To provide students with contemporary knowledge in Data Compression and Coding.
- To equip students with skills to analyze and evaluate different Data Compression and Coding methods.

TOPICS

MODULE I
Introduction: Compression techniques, modeling and coding mathematical preliminaries for lossless compression: A brief introduction to information theory, models, coding, algorithmic information theory, minimum description length principle.
10 hours

MODULE II
Huffman Coding: The Huffman coding algorithm, non binary Huffman codes, adaptive Huffman coding, golomb codes, rice codes, Tunstall codes, application of Huffman coding.
10 hours

MODULE III
10 hours

MODULE IV
Wavelet Based Compression: Introduction, wavelets, multi resolution analysis and scaling function, implementation using filters, image compression, embedded zero tree coder, set partitioning in hierarchical trees, JPEG zero. Audio Coding: Introduction , MPEG coding, MPEG advanced audio coding, Dolby AC3(DOLBY DIGITAL) other standards.
10 hours

MODULE V
10 hours

COURSE OUTCOME:
Upon the successful completion of this module a student should be able to:
- Explain the evolution and fundamental concepts will Data Compression and Coding techniques.
- Analyze the operation of a range of commonly used Coding and Compression techniques
- Identify the basic software and hardware tools used for data compression.
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- Identify what new trends and what new possibilities of data compression are available.

**TEXT BOOK**


Reference:

Semester I  

<table>
<thead>
<tr>
<th>Course Title:</th>
<th>Advances in DBMS</th>
<th>Course Code: 14SIT13</th>
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<td>Type of Course:</td>
<td>Lecture &amp; Practical.</td>
<td>Total Contact Hours: 50</td>
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COURSE OBJECTIVES:
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the usage and applications of Object Oriented database
- To understand the basic concepts, principles of intelligent databases.
- To understand the advanced topics data warehousing and mining.
- To learn emerging and advanced data models
- To acquire inquisitive attitude towards research topics in databases.

TOPICS

MODULE I
Review of Relational Data Model and Relational Database Constraints: Relational model concepts; Relational model constraints and relational database schemas; Update operations, transactions and dealing with constraint violations.  
04 Hours

MODULE II
Object and Object-Relational Databases: Overview of Object-Oriented Concepts – Objects, Encapsulation, Type and class hierarchies, complex objects; Object model of ODMG, Object definition Language ODL; Object Query Language OQL; Overview of C++ language binding; Conceptual design of Object database. Overview of object relational features of SQL; Object-relational features of Oracle; Implementation and related issues for extended type systems; The nested relational model.  
12 Hours

MODULE III
Parallel and Distributed Databases: Architectures for parallel databases; Parallel query evaluation; Parallelizing individual operations; Parallel query optimizations; Introduction to distributed databases; Distributed DBMS architectures; Storing data in a Distributed DBMS; Distributed catalog management; Distributed Query processing; Updating distributed data; Distributed transactions; Distributed Concurrency control and Recovery.  
12 Hours

MODULE IV
Data Warehousing, Decision Support and Data Mining: Introduction to decision support; OLAP, multidimensional model; Window queries in SQL; Finding answers quickly; Implementation techniques for OLAP; Data Warehousing; Views and Decision support, View materialization, Maintaining materialized views. Introduction to Data Mining; Counting co-occurrences; Mining for rules; Tree-structured rules; Clustering; Similarity search over sequences; Incremental mining and data streams; Additional data mining tasks.  
14 Hours

MODULE V
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Enhanced Data Models for Some Advanced Applications: Active database concepts and triggers; Temporal, Spatial, and Deductive Databases – Basic concepts. More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

LABORATORY WORK

(The following tasks can be implemented on Oracle or any other suitable RDBMS with support for Object features)

1. Develop a database application to demonstrate storing and retrieving of BLOB and CLOB objects.

2. Develop a database application to demonstrate the representation of multivalued attributes, and the use of nested tables to represent complex objects. Write suitable queries to demonstrate their use.

3. Design and develop a suitable Student Database application. One of the attributes to be maintained is the attendance of a student in each subject for which he/she has enrolled. Using TRIGGERS, write active rules to do the following:
   a. Whenever the attendance is updated, check if the attendance is less than 85%; if so, notify the Head of the Department concerned.
   b. Whenever, the marks in an Internal Assessment Test are entered, check if the marks are less than 40%; if so, notify the Head of the Department concerned.

4. Design, develop, and execute a program in a language of your choice to implement any one algorithm for mining association rules. Run the program against any large database available in the public domain and discuss the results.

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
   • Select the appropriate high performance database like parallel and distributed database
   • Model and represent the real world data using object oriented database
   • Embed the rule set in the database to implement data warehousing of mining
   • Choose and design database for recent applications database for better interoperability

TEXT BOOKS:

REFERENCE BOOKS:
Course Title: Information Storage Management  
Course Code: 14SIT14  
Credits(L:T:P): 4:0:0  
Type of Course: Lecture  
Core/Elective: Core  
Total Contact Hours: 50

Course Objectives:
- To outline basic terminology and components in information storage and retrieval systems
- To compare and contrast information retrieval models and internal mechanisms such as Boolean, Probability, and Vector Space Models
- To describe current trends in information retrieval such as information visualization.
- To understand a backup process and securing and managing storage infrastructure

TOPICS:

MODULE I
Introduction to Information Storage: Information Storage, Evolution of Storage Architecture, Data center Infrastructure, Virtualization and cloud computing. Data Center Environment: Application, Database Management System(DBMS), Host(compute), Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host Access to Data, Direct-Attached Storage, Storage Design Based On Application, Disk Native Command Queuing, Introduction to Flash Drives, Concept in Practice: VMware ESXi. Data Protection: RAID Implementation Methods, RAID Array Components, RAID Techniques, RAID levels, RAID Impact on Disk Performance, RAID Comparison, Hot Spares

MODULE II

MODULE III
MODULE IV

10 hours

MODULE V

10 hours

COURSE OUTCOMES
After completion of this course, the students would be able to
- Recognize the role and use of technology in business systems and operations
- Identify and describe organizational structure and business processes within these
- Implement information systems in industry.
- Choose backup method and replication method.
- Provide securing of management storage infrastructure.

Text Book:
1. EMC²: Information Storage and Management, Willey India 2013.

REFERENCES:
1. EMC Corporation, Information Storage and Management, Wiley, India.
Course Objectives:

- To understand Client-Server software, Context Switching and Protocol Software, I/o.
- To understand System Calls, Basic I/O Functions available in UNIX
- To understand the Socket interface, TCP, UDP in detail.
- To understand various Client Software.
- To understand the various algorithms issue related to server software design.

TOPICS

MODULE I

The Client Server Model and Software Design: Introduction, Motivation, Terminology and Concepts


10 hours

MODULE II


Algorithms and Issues in Client Software Design: Introduction, Learning Algorithms instead of Details, Client Architecture, Identifying the Location of a Server, Parsing an Address Argument, Looking up a Domain Name, Looking up a well-known Port by Name, Port Numbers and Network Byte Order, Looking up a Protocol by Name, The TCP Client Algorithm, Allocating a Socket, Choosing a Local Protocol Port Number, A fundamental Problem in choosing a Local IP Address, Connecting a TCP Socket to a Server, Communicating with the Server using TCP, Reading a response from a TCP Connection, Closing a TCP Connection, Programming a UDP Client, Connected and Unconnected UDP Socket, Using Connect with UDP, Communicating with a Server using UDP, Closing a Socket that uses UDP, Partial Close for UDP, A Warning about UDP Unreliability.

10 hours

MODULE III


10 hours
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MODULE IV

10 hours

MODULE V

10 hours

Course Outcomes:
The student will be able to:
- In depth knowledge about Client-Server software, Context Switching and Protocol Software, I/o.
- Programming System Calls, Basic I/O Functions available in UNIX
- The Socket interface, TCP, UDP in detail.
- Pros and cons of Client Software Various applications and their issues.

TEXT BOOK:
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Semester I

Course Title: Advances in Operating Systems
Course Code: 14SIT152
Credits(L:T:P): 4:0:0
Type of Course: Lecture
Total Contact Hours: 50

Course Objectives:

- To learn the fundamentals of Operating Systems
- To gain knowledge on Distributed operating system concepts that include architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols
- To gain insight in to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols
- To know the components and management aspects of Real time & Mobile operating Systems.

TOPICS

MODULE I
Operating System Overview, Process description & control

10 Hours

MODULE II
Threads, SMP, and Microkernel, Virtual Memory.

10 Hours

MODULE III
Multiprocessor and Real-Time Scheduling
Multiprocessor Scheduling, Real-Time Scheduling, Linux Scheduling, UNIX PreclsSl) Scheduling, Windows Vista Scheduling, Process Migration, Distributed Global States, Distributed Mutual Exclusion, Distributed Deadlock.

10 Hours

MODULE IV
Embedded Operating Systems

10 Hours

Year: 2014-2015
MODULE V
Kernel Organization

COURSE OUTCOMES
-Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Learn the various resource management techniques for distributed systems
- Identify the different features of real time and mobile operating systems
-Modify existing open source kernels in terms of functionality or features used.

Text Books:

Reference Books:
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Semester I

Course Title: Service Oriented Architecture
Course Code: 14SIT153
Credits(L:T:P): 4:0:0
Type of Course: Lecture
Total Contact Hours: 50

COURSE OBJECTIVES:
- To understand various architecture for application development
- To understand the importance of SOA in Application Integration
- To learn web service and SOA related tools
- To learn implementation details of SOA
- To understand various case studies

TOPICS

MODULE I

MODULE II

MODULE III

MODULE IV
SOA IMPLEMENTATION: SOA based integration – integrating existing application – development of web services – Integration - SOA using REST – RESTful services – RESTful services with and without JWS – Role of WSDL, SOAP and Java/XML mapping in SOA – JAXB Data binding. 10 hours

MODULE V
COURSE OUTCOMES
Students should be able to work with
- Comparison of different IT architecture
- Analysis and design of SOA based applications
- Implementation of web service and realization of SOA
- Implementation of RESTful services
- Design and implementation of SOA based Application Integration using BPEL

Text Book:

REFERENCES:
Semester I
Year: 2014-2015

<table>
<thead>
<tr>
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<th>Distributed Computing</th>
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<tr>
<td>Course Code:</td>
<td>14SIT154</td>
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<tr>
<td>Credits(L:T:P):</td>
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**Course Objectives**
- To learn the basic concepts of DSM & Hardware DSM.
- To understand File Sharing, DFS Implementation & Replication in DFS,
- To understand the concepts of Cryptography, Secure channels & Access control

**TOPICS:**

**MODULE I**
10 hours

**MODULE II**
**Distributed Shared Memory:** Introduction, Basic Concepts of DSM, Hardware DSM, Design Issue in DSM Systems, Issue in Implementing DSM Systems, Heterogeneous and Other DSM Systems, Case Studies.  
10 hours

**MODULE III**
**Distributed File System:** Introduction to DFS, File Models, Distributed File System Design, Semantics of File Sharing, DFS Implementation, File Caching in DFS, Replication in DFS, Case studies. **Naming:** Introduction, Desirable features of a good naming system, Basic concepts, System-oriented names, Object-locating mechanisms, Issues in designing human-oriented names, Name caches, Naming and security, Case study: Domain name service.  
10 hours

**MODULE IV**
**Security in distributed systems:** Introduction, Cryptography, Secure channels, Access control, Security Management, Case studies.  
10 hours

**MODULE V**
**Real-Time Distributed operating Systems:** Introduction, Design issues in real-time distributed systems, Real-time communication, Real-time scheduling, Case study: Real-time communication in MARS. **Emerging Trends in distributed Computing:** Introduction to emerging trends, Grid Computing, SOA, Cloud computing, The future of emerging Trends.  
10 hours

**COURSE OUTCOMES:**
The student should be able to
- Realize shared memory concept.
- Advantages of DFS.
- Mechanisms to manage security in DS

**Text Book:**

Course Title: Distributed Computing  
Course Code: 14SIT154  
Credits(L:T:P): 4:0:0  
Type of Course: Lecture  
Total Contact Hours: 50
Course Objectives:

- To provide students with contemporary knowledge in Data Compression and Coding.
- To equip students with skills to analyze and evaluate different Data Compression and Coding methods.
- To be instrumental to handle multi-dimension data compression.

LABORATORY WORK

NOTE: Use appropriate tool/language or package to implement and for programs 5 and 6, MATLAB or any equivalent tools can be used.

1. Write a program to compress a source Text file using Run-length encoding Compression algorithm save the output in a destination file. Decompress the destination file to get the original source file.

2. Write a program to compress a source image file using Run-length encoding Compression algorithm save the output in a destination file. Decompress the destination file to get the original source file.

3. Using a text file compute the probabilities of each letter \( P_i \) assume that we need a code word of length \( \log_2 \frac{1}{P_i} \) to encode the letter \( i \). Determine the number of bits needed to encode the file. Compute the conditional probabilities \( P_i/j \) of a letter given that the previous letter is \( j \) assume that we need \( \log_2 \frac{1}{P_i/j} \) to represent a letter \( i \) that follows a letter \( j \). Determine the number of bits needed to encode the file.

4. Write a program to Read the string to generate Huffman code and display the code along with the input string (program should be case sensitive). Show all the calculation manually. Verify the results.

5. Write a program to read Huffman codes & compressed string (contains Huffman codes) codes and replaces the code with character (decompression). Display the input string (compressed) and output string (Decompressed).

6. Implement H.264 video compression technique.

7. For a seven level decomposition to a suitable data set find the bit-stream generated by the EZW coder and decodes the same. Verify that you get the original coefficient values.

8. Write a program to Read the string of numbers to generate Rice codes and display the code along with the input string. Verify the results manually.

COURSE OUTCOME:

Upon the successful completion of this module a student should be able to:

- Explain the evolution and fundamental concepts will Data Compression and Coding techniques.
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- Analyze the operation of a range of commonly used Coding and Compression techniques
- Identify the basic software and hardware tools used for data compression.
- Identify all possibilities of data compression that are available.