II SEM MTECH (IT)

Semester II Year: 2014-2015

<table>
<thead>
<tr>
<th>Course Title: Web Services</th>
<th>Course Code: 14SIT21</th>
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</thead>
<tbody>
<tr>
<td>Credits(L:T:P): 4:0:0</td>
<td>Core/Elective: Core</td>
</tr>
<tr>
<td>Type of Course: Lecture</td>
<td>Total Contact Hours: 50</td>
</tr>
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**COURSE OBJECTIVES:**
- To provide an in-depth knowledge of Web Services.
- To understand the fundamental concepts of Web services.
- To understand the fundamental concepts of WSDL Web Services.
- To design Web Service Architecture.
- To Study Building Blocks of Web services.
- Security issues in cloud.

**TOPICS**

**MODULE I**
Middleware: Understanding the middleware, RPC and Related Middleware, TP Monitors, Object Brokers, Message-Oriented Middleware.

**10 Hours**

**MODULE II**

**10 Hours**

**MODULE III**
Basic Web Services Technology: WSDL Web Services Description Language, UDDI Universal Description Discovery and Integration, Web Services at work interactions between the Specifications, Related Standards.

**10 Hours**

**MODULE IV**
Service Coordination Protocols: Infrastructure for Coordination Protocols, WS-Coordination, WS-Transaction, RosettaNet, Other Standards Related to Coordination Protocols.

**10 Hours**

**MODULE V**
Service Composition: Basic of Service Composition, A New Chance of Success for Composition, Services Composition Models, Dependencies between Coordination and Composition, BPEL: Business Process Execution Language for Web Services, Outlook, Applicability of the Web Services, Web services as a Problem and a Solution: AN Example.

**10 Hours**

**COURSE OUTCOMES**
Students should be able to:
- Bind and unbind services in UDDI.
- Develop WSDL document.
- Implement web service client to call public service.
- Implement a service and exposing it as public service.

**Text Books:**
II SEM MTECH (IT)

Course Title: CLOUD COMPUTING
Course Code: 14SIT22
Credits(L:T:P): 3:0:1
Type of Course: Lecture & Practical
Core/Elective: Core
Total Contact Hours: 50

COURSE OBJECTIVES
- To learn how to use Cloud Services.
- To implement Virtualization
- To implement Task Scheduling algorithms.
- Apply Map-Reduce concept to applications.
- To build Private Cloud.
- Security in cloud.

TOPICS

MODULE I
Introduction, Cloud Infrastructure
Cloud computing, Cloud computing delivery models and services, Ethical issues, Cloud vulnerabilities, Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Open-source software platforms for private clouds, Cloud storage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User experience and software licensing. Exercises and problems.

10 Hours

MODULE II

10 Hours

MODULE III
Cloud Resource Virtualization.

10 Hours

MODULE IV
Cloud Resource Management and Scheduling.
Policies and mechanisms for resource management, Application of control theory to task scheduling on a cloud, Stability of a two-level resource allocation architecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic performance managers, A utility-based model for cloud-based Web services, Resourcing bundling: Combinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, Fair queuing, Start-time fair queuing, Borrowed virtual time, Cloud scheduling subject to deadlines, Scheduling Map Reduce applications subject to deadlines, Resource management and dynamic scaling, Exercises and problems.

10 Hours
MODULE V
Cloud Security, Cloud Application Development.
Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Security risks posed by shared images, Security risks posed by a management OS, A trusted virtual machine monitor, Amazon web services: EC2 instances, Connecting clients to cloud instances through firewalls, Security rules for application and transport layer protocols in EC2, How to launch an EC2 Linux instance and connect to it, How to use S3 in java, Cloud-based simulation of a distributed trust algorithm, A trust management service, A cloud service for adaptive data streaming, Cloud based optimal FPGA synthesis.

Exercises and problems. 10 Hours

LAB EXPERIMENTS
NOTE: Simulate using object oriented programming, any available cloud environment (Eg; Amazon cloud) and VM ware for resource virtualization.
1. Create a Collaborative learning environment for a particular learning topic using Google Apps. Google Drive, Google Docs and Google Slides must be used for hosting e-books, important articles and presentations respectively. The instructor must use the Google Sheets to convey the timetable for different events and for analyzing the scores for individual assignment submission.

2. Modeling and simulation Cloud computing environments, including Data Centers, Hosts and Cloudlets and perform VM provisioning using CloudSim: Design a host with two CPU cores, which receives request for hosting two VMs, such that each one requires two cores and plans to host four tasks units. More specifically, tasks t1, t2, t3 and t4 to be hosted in VM1, while t5, t6, t7, and t8 to be hosted in VM2. Implement space-shared allocation policy and time-shared allocation policy. Compare the results.

3. Model a Cloud computing environment having Data center that had 100 hosts. The hosts are to be modeled to have a CPU core (1000 MIPS), 2 GB of RAM and 1 TB of storage. Consider the workload model for this evaluation included provisioning requests for 400 VMs, with each request demanding 1 CPU core (250 MIPS), 256 MB of RAM and 1 GB of storage. Each VM hosts a web-hosting application service, whose CPU utilization distribution was generated according to the uniform distribution. Each instance of a webhosting service required 150,000 MIPS or about 10 minutes to complete execution assuming 100% utilization. Simulate Energy-conscious model for power consumption and power management techniques such as Dynamic Voltage and Frequency Scaling (DVFS). Initially, VMs are to be allocated according to requested parameters (4 VMs on each host). The Cloud computing architecture that is to be considered for studying energy conscious resource management techniques/policies included a data center, CloudCoordinator, and Sensor component. The CloudCoordinator and Sensor perform their usual roles. Via the attached Sensors (which are connected with every host), CloudCoordinator must periodically monitor the performance status of active VMs such as load conditions, and processing share. This real time information is to be passed to VMM, which can use it for performing appropriate resizing of VMs and application of DVFS and soft scaling. CloudCoordinator continuously has to adapt allocation of VMs by issuing VM migration commands and changing power states of nodes according to its policy and current utilization of resources.

4. Model and simulate the environment consisting of a data center with 10,000 hosts where each host was modeled to have a single CPU core (1200MIPS), 4GB of RAM memory and 2TB of storage. Consider the provisioning policy for VMs as space-shared, which allows one VM to be active in a host at a given instance of time. Make a request from the end-user (through the Datacenter Broker) for creation and instantiation of 50 VMs that had following constraints: 1024MB of physical memory, 1 CPU core and 1GB of storage. The application granularity was modeled to be composed of 300 task units, with each task unit requiring 1,440,000 million instructions (20 minutes in the simulated hosts) to be executed on a
host. Minimal data transfer (300 KB) overhead can be considered for the task units (to and from the data center). After the creation of VMs, task units were submitted in small groups of 50 (one for each VM) at inter-arrival delay of 10 minutes.

5. Implement Map Reduce concept for
a. Strassen’s Matrix Multiplication for a huge matrix.
b. Computing the average number of citation index a researcher has according to age among some 1 billion journal articles. Consider a network of entities and relationships between them. It is required to calculate a state of each entity on the basis of properties of the other entities in its neighborhood. This state can represent a distance to other nodes, indication that there is a neighbor with the certain properties, characteristic of neighborhood density and so on. A network is stored as a set of nodes and each node contains a list of adjacent node IDs. Mapper emits messages for each node using ID of the adjacent node as a key. Reducer must recompute state and rewrite node with the new state. Implement this scenario.

Course Outcomes:

- Demonstrate and experiment simple Cloud Applications
- Apply resource allocation, scheduling algorithms.
- Implement Map-Reduce concept.
- Create virtual machines from available physical resources.
- Setup a private cloud.
- Familiarize with Open Stack.

Text Book:

REFERENCES:
II SEM MTECH (IT)

Semester II         Year: 2014-2015

Course Title: Mobile Application Development
Course Code: 14SIT23
Credits(L:T:P): 3:0:1
Core/Elective: Core
Type of Course: Lecture & Practical
Total Contact Hours: 50

Course Objectives:
- To understand system requirements for mobile applications.
- To learn basics of mobile development frameworks.
- To generate mobile application design.
- To learn & implement mobile application.

TOPICS

MODULE I
Introduction to mobile communication and computing, Introduction to mobile computing, Novel applications, limitations and GSM architecture, Mobile services, System architecture, Radio interface, protocols, Handover and security, Smart phone operating systems and smart phones applications.

10 Hours

MODULE II

10 Hours

MODULE III
The Android Debug Bridge (ADB), Basic Widgets, Understanding the Role of Android Application Components, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the EditText Control, Building Blocks for Android Application Design, Laying Out Controls in Containers, Utilizing Resources and Media, Using Selection Widgets and Debugging Displaying and Fetching Information Using Dialogs and Fragments.

10 Hours

MODULE IV

10 Hours

MODULE V
Displaying web pages and maps, communicating with SMS and emails, Creating and using content providers: Creating and consuming services, publishing android applications.

10 Hours

LABORATORY EXPERIMENTS:

Using Wireless Markup language develop the APP using Android OS
1. Design and develop an Mobile App for smart phones The Easy Unit Converter using Android. This application should have approximately 20 categories to be used in your daily life.
It includes following units: Acceleration, Angle, Area, Circle, Capacitor , Cooking, Data Size, Density, Data Transfer rate, Electric Current, Energy, Flow Rate , Force
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2. Design and develop an Mobile App for smart phones Currency Converter. This applications should synchronize online as you run it and sends you back the latest and most reliable exchange rates possible. This application should support following conversions:
   - EUR->Euro
   - GBP->British Pound
   - USD->United States Dollar
   - AUD->Australian Dollar
   - CAD->Canadian Dollar
   - CHF->Swiss Franc
   - CNY->Chinese Yuan
   - HKD->Hong Kong Dollar
   - IDR->Indonesian Rupiah
   - INR->Indian Rupee
   - JPY->Japanese Yen
   - THB->Thai Baht

3. Design and develop an Mobile App game for smart phones The Tic Tac Toe using Android.

4. Design and develop an Mobile App for smart phones The Health Monitoring System using Android. This App should record Biochemistry Lab Parameters and if abnormal should send an SMS to doctor for Medications.

5. Design and develop an Mobile App for smart phones The Expense Manager using Android. This is an application for managing your expenses and incomes: Tracking expenses and incomes by week, month and year as well as by categories. Multiple accounts in multiple currencies, Schedule the payments and recurring payments, Take a picture of receipt, Payment alerts, Budget by day, week, month and year, Search and reports, Import and export account activities in CSV for desktop software, Customize expense categories, payer/payer, payment methods, date format, white or black background, button style etc, Account transfer, Convenient tools such calculator, currency converter, tip calculator, sales and tax calculator and credit card calculator.

Course Outcomes: On completion of this course students are able
- Describe the requirements for mobile applications
- Explain the challenges in mobile application design and development
- Develop design for mobile applications for specific requirements
- Implement the design using Android SDK
- Implement the design using Objective C and iOS
- Deploy mobile applications in Android and iPhone marketplace for distribution

Text Books:
1. Mobile Computing: (technologies and Applications- N. N. Jani S chand
2. B.M.Hirwani- Android programming Pearson publications-2013
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Semester II         Year: 2014-2015

<table>
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<tr>
<th>Course Title:</th>
<th>Agile Technologies</th>
<th>Course Code: 14SIT24</th>
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<td>Lecture</td>
<td>Total Contact Hours: 50</td>
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**COURSE OBJECTIVES**
- To understand how an iterative, incremental development process leads to faster delivery of more useful software
- To understand the essence of agile development methods
- To understand the principles and practices of extreme programming
- To understand the roles of prototyping in the software process
- To understand the concept of Mastering Agility

**TOPICS**

**MODULE I**
**Why Agile?:** Understanding Success, Beyond Deadlines, The Importance of Organizational Success, Enter Agility. **How to Be Agile?:** Agile Methods, Don’t Make Your Own Method, The Road to Mastery, Find a Mentor. **10 hours**

**MODULE II**
**Understanding XP:** The XP Lifecycle, The XP Team, XP Concepts, **Adopting XP:** Is XP Right for Us?, Go!, Assess Your Agility. **10 hours**

**MODULE III**

**MODULE IV**
**Mastering Agility:** Values and Principles: Commonalities, About Values, Principles, and Practices, Further Reading, **Improve the Process:** Understand Your Project, Tune and Adapt, Break the Rules, **Rely on People:** Build Effective Relationships, Let the Right People Do the Right Things, Build the Process for the People, **Eliminate Waste:** Work in Small, Reversible Steps, Fail Fast, Maximize Work Not Done, Pursue Throughput. **10 hours**

**MODULE V**
**Deliver Value:** Exploit Your Agility, Only Releasable Code Has Value, Deliver Business Results, Deliver Frequently, **Seek Technical Excellence:** Software Doesn’t Exist, Design Is for Understanding,
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Design Trade-offs, Quality with a Name, Great Design, Universal Design Principles, Principles in Practice, Pursue Mastery.

10 hours

COURSE OUTCOMES
Students should be able to

- Understand The XP Lifecycle, XP Concepts, Adopting XP
- Work on Pair Programming, Root-Cause Analysis, Retrospectives, Planning, Incremental Requirements, Customer Tests
- Implement Concepts to Eliminate Waste

Text Books:
1. The Art of Agile Development (Pragmatic guide to agile software development), James shore, Chromatic, O’Reilly Media, Shroff Publishers & Distributors, 2013

Reference Book:
Course Title: Cybercrime And Digital Forensic
Course Code: 14SIT251
Credits(L:T:P): 4:0:0
Type of Course: Lecture
Total Contact Hours:50

Course Objectives
• To understand Accounting Forensics
• To analyze the nature and effect of cyber crime in society.
• To understand Sarbanes-Oxley Financial and Accounting Disclosure Information
• To understand Computer Crime and Criminals
• To understand Liturgical Procedures

TOPICS

MODULE I

10 Hours

MODULE II

10 Hours

MODULE III

10 Hours

MODULE IV

10 Hours

MODULE V

10 Hours

COURSE OUTCOMES
The student will be able to:
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- Understand financial and accounting forensics, and explain their role in preventing various forms of fraud.
- Distinguish various types of computer crime, and use computer forensic techniques to identify the digital fingerprints associated with criminal activities.
- Know how to apply forensic analysis tools to recover important evidence for identifying computer crime.
- Develop a custom computer forensic analysis tool.

Text Books:

Reference Books:
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Semester II         Year: 2014-2015

Course Title: MULTIMEDIA COMMUNICATIONS   Course Code: 14SIT252
Credits(L:T:P): 4:0:0   Core/Elective: Elective
Type of Course: Lecture   Total Contact Hours: 50

Course Objectives:
• To understand the Multimedia Communication Models
• To study the Multimedia Transport in Wireless Networks
• To solve the Security issues in multimedia networks
• To explore real-time multimedia network applications

TOPICS

MODULE I
Introduction to Multimedia Communications: Introduction, Human communication model, Evolution and convergence, Technology framework, Standardization framework. 10 Hours

MODULE II
Framework for Multimedia Standardization: Introduction, Standardization activities, Standards to build a new global information infrastructure, Standardization processes on multimedia communications, ITU-T mediacom2004 framework for multimedia, ISO/IEC MPEG-21 multimedia framework, IETF multimedia Internet standards. 10 Hours

MODULE III
Application Layer: Introduction, ITU applications, MPEG applications, Mobile servers and applications, Universal multimedia access. 10 Hours

MODULE IV
Middleware Layer: Introduction to middleware for multimedia, Media coding, Media Streaming, Infrastructure for multimedia content distribution. 10 Hours

MODULE V
Network Layer: Introduction, QoS in Network Multimedia Systems. 10 Hours

COURSE OUTCOMES: The student will be able to:
• Deploy the right multimedia communication models.
• Apply QoS to multimedia network applications with efficient routing techniques.
• Solve the security threats in the multimedia networks.
• Develop the real-time multimedia network applications.

TEXT BOOKS:
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REFERENCE BOOKS:


COURSE OBJECTIVES:
- To expose the students to the concepts of Data warehousing Architecture and Implementation
- To understand Data mining principles and techniques and introduce DM as a cutting edge business intelligence
- To learn to use association rule mining for handling large data
- To understand the concept of classification for the retrieval purposes
- To know the clustering techniques in detail for better organization and retrieval of data

TOPICS

MODULE I
Introduction: What is a Data Warehouse?, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data cube Technology, From Data warehousing to Data Mining, Data Mining Functionalities, Data cleaning, Data integration and Transformation, Data Reduction.

10 hours

MODULE II
Data Mining Primitives, Languages And System Architectures: Data Mining primitives, Presentation and Visualization of Discovered patterns, A Data Mining Query Language. MINING ASSOCIATION RULES IN LARGE DATA BASES: Association Rule Mining Single –Dimensional Boolean Association Rules From Transactional Databases, Mining Multilevel Association Rules from Transactional Databases.

10 hours

MODULE III
Classification And Prediction: Issues regarding Classification and Prediction, classification by Decision tree induction, Bayesian classification, Classification by back propagation, Classification based on the concepts from association rule mining. Other classification methods, prediction.

10 hours

MODULE IV

10 hours

MODULE V
Applications And Trends In Data Mining: Data mining application, Data mining system Products research Prototypes, Additional Themes on Data Mining, Data Mining and Intelligent Query Answering, Tends in Data Mining.

10 hours

COURSE OUTCOMES:
Upon completion of the course, the students will be able to
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- Store voluminous data for online processing
- Preprocess the data for mining applications
- Apply the association rules for mining the data
- Design and deploy appropriate classification techniques
- Cluster the high dimensional data for better organization of the data
- Discover the knowledge imbibed in the high dimensional system

Text Books:

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Semester II

<table>
<thead>
<tr>
<th>Course Title: Bio-Informatics</th>
<th>Course Code: 14SIT254</th>
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<tr>
<td>Credits(L:T:P): 4:0:0</td>
<td>Core/Elective: Elective</td>
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<tr>
<td>Type of Course: Lecture</td>
<td>Total Contact Hours:50</td>
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COURSE OBJECTIVES

- To get exposed to the domain of bioinformatics
- To understand the role of data warehousing and data mining for bioinformatics
- To learn to model bioinformatics based applications
- To understand how to deploy the pattern matching and visualization techniques in bioinformatics
- To study the Microarray technologies for genome expression

TOPICS

MODULE I
INTRODUCTION : Need for Bioinformatics technologies – Overview of Bioinformatics technologies – Structural bioinformatics – Data format and processing – secondary resources- Applications – Role of Structural bioinformatics - Biological Data Integration System. 10 Hours

MODULE II
DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS : Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture- Applications in bioinformatics 10 Hours

MODULE III
MODELING FOR BIOINFORMATICS : Hidden Markov modeling for biological data analysis – Sequence identification – Sequence classification – multiple alignment generation – Comparative modeling – Protein modeling – genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling. 10 Hours

MODULE IV

MODULE V
MICROARRAY ANALYSIS : Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding, spot extraction, normalization, filtering – cluster analysis – gene network analysis. 10 Hours

COURSE OUTCOMES

On completion of this course, Students should be able to
- Deploy the data warehousing and data mining techniques in Bioinformatics
- Model bioinformatics based applications
- Deploy the pattern matching and visualization techniques in bioinformatics
- Work on the protein sequences
- Use the Microarray technologies for genome expression
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Text Books:


REFERENCES:

COURSE OBJECTIVES:
- To implement the fundamental concepts of Web services.
- To understand the fundamental concepts of WSDL Web Services.
- To design Web service Architecture.
- To implement Building Blocks of Web services.

Note: Use appropriate tools/language to implement the following experiment:

1. Develop a client to collect a real number as input and call a service to square the input numbers.

2. Development of a java client application for consuming the Microsoft free service from web looking into WSDL and UDDI registry.

3. Development of a HELLO WORLD web service with C# on Microsoft Visual Studio. Develop a client in C# to call a C# service to display HELLO WORLD.

4. Development of a JAVA web client application to consume the .NET web service to display WELCOME.

5. Implement Marshalling and Unmarshalling technique that is convert an java object data into XML and XML data into java object, Use DOM, SAX, JAXB. Java class containing name, email and address.

COURSE OUTCOMES
Students should be able to:
- Bind and unbind services in UDDI.
- Develop WSDL document
- Implement web service client to call public service.
- Implement a service and exposing it as public service.