

SITA1501	WIRELESS SENSOR NETWORKS AND ARCHITECTURE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To learn basics of Sensor and Network technology.
- Learn key routing protocols for sensor networks and main design issues.
- Learn transport layer protocols for sensor networks, and design requirements.
- Understand the medium access control protocols and address physical layer issues.
- To learn the security features in WSN.

UNIT 1 INTRODUCTION AND OVERVIEW OF WIRELESS SENSOR NETWORKS**9 Hrs.**

Introduction, Brief Historical Survey of Sensor Networks, and Background of Sensor Network Technology, Ad-Hoc Networks, Applications of Wireless Sensor Networks: Sensor and Robots, Reconfigurable Sensor Networks, Highway Monitoring, Military Applications, Civil and Environmental Engineering Applications, Wildfire Instrumentation, Habitat Monitoring, Another Taxonomy of WSN Technology, Basic Sensor Network Architectural Elements, Home Control, Medical Applications.

UNIT 2 ROUTING PROTOCOLS FOR AD HOC WIRELESS NETWORKS**9 Hrs.**

Designing issues, classification of routing protocols, table driven routing protocols, on demand routing protocol, Hybrid routing protocol, Hierarchical routing protocols. Multicast routing in Ad Hoc wireless networks: Operations and classification of multicast routing protocols, Tree based multicast routing protocol, Mesh based multicast routing protocol.

UNIT 3 SYSTEM ARCHITECTURE AND DESIGN ISSUES**9 Hrs.**

Design Constraints for Routing in Wireless Sensor Networks, Classification of Routing Protocols in Wireless Sensor Networks-Hierarchy Role of Nodes in the Network, Data Delivery Model, Optimization Techniques for Routing in Wireless Sensor Networks, Application of the Optimization Techniques: Routing Protocols.

UNIT 4 ROUTING PROTOCOLS FOR WIRELESS SENSOR NETWORKS**9 Hrs.**

Introduction, Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless Sensor Networks Network Scale and Time-Varying Characteristics, Resource Constraints, Sensor Applications Data Models, Routing Strategies in Wireless Sensor Networks: WSN Routing Techniques, Flooding and Its Variants, Sensor Protocols for Information via Negotiation, Low-Energy Adaptive Clustering Hierarchy, Power-Efficient Gathering in Sensor Information Systems, Directed Diffusion, Geographical Routing.

UNIT 5 TRANSPORT LAYER SECURITY PROTOCOLS FOR AD HOC WIRELESS NETWORKS**9 Hrs.**

Designing issues, classification of transport layer solutions, feedback based TCP, TCP bus, Ad Hoc TCP, Security in Ad hoc wireless networks, Issues and challenges in security provisioning, Key management, Secure routing in Ad hoc wireless networks. Quality of Service: Issues and challenges in providing QoS in Ad Hoc wireless networks, classification of QoS solutions.

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - An Ability to understand the concepts of sensors.
- CO2 - An Ability to analyse modelling and simulation of various communication networks.
- CO3 - Demonstrate knowledge of MAC protocols developed for WSN.
- CO4 - Demonstrate knowledge of routing protocols developed for WSN.
- CO5 - Understand and explain mobile data-centric networking principles.
- CO6 - An Ability to understand the security features in WSN.

TEXT / REFERENCE BOOKS

1. Ibrahim M.M. El Emary, Ramakrishnan.S, "Wireless Sensor Networks From Theory to Applications", CRC Press, 2013.
2. Fei Hu, Xiaojun Cao, "Wireless Sensor Networks Principles and Practice", CRC Press, 2010.
3. MounirFrikha, "Ad hoc Networks Routing, Qos and Optimization", Wiley, 2011.
4. Raheem, Beyah, Janise McNair, Cherita Corbett, Security in Ad hoc and Sensor Networks", World Scientific, 2010.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 10 Questions carrying 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SITA1502	CUSTOMER INTERFACE DESIGN AND DEVELOPMENT	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To effectively design with a range of technologies.
- To develop static websites & dynamic web applications.
- To learn new emerging web technologies.
- To gain knowledge and skills required for web development careers.
- To develop skills in the use and application of specific methods in user experience design.

UNIT 1 HTML, XML, CSS& RWD**9 Hrs.**

Introduction To HTML- DHTML , XML – Structuring XML document using DTD – Schemas – XML parsers – DOM – SAX presentation technologies – XSL – XFORMS – XHTML – Transformations – XSLT – XLINK – XPATH – XQuery. Responsive Web Design-Intro-Fluid Grid-Viewport-Media Queries-Images. Introduction To CSS-Syntax, Selectors-Types of style sheets.

UNIT 2 CLIENT SIDE SCRIPTING**9 Hrs.**

Java Script – Advantages – Data types – Variables – Operators – Control statements – Functions – Objects and arrays – Windows and frames – Forms. AJAX – XML Http Request (XHR) – Create Object – Request – Response – Ready state.

UNIT 3 SERVER SIDE SCRIPTING**9 Hrs.**

Introduction To PHP – Data Types – Control Structures – Arrays - Function – Html Form with PHP –Form Handling & Validation - File Handling – Cookies – Sessions – Filters – Exception Handling - Database Connectivity With MySQL.

UNIT4 ANGULAR JS & JQUERY**9 Hrs.**

Angular JS Expression – Modules – Directives – Data Binding – Controllers – Scopes – Filters – Services – Tables – Events – Form – Validation. Query Syntax – Selects – Events – jQuery Effects – jQuery – jQuery HTML – jQuery Traversing.

UNIT 5 UX & UI**9 Hrs.**

UX Introduction -Elements of UX Design- UX Design Process- Research Methods and Tools-Understanding User Needs and Goals. UX Design Process: Visual Design Principles-Information Design and Visualization-Interaction Design-Prototyping Tools-Usability Test.UI Introduction-User Interface Components -Tools and Processes.

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Able to work with XML technologies.
- CO2 - Design web page to perform form validation using client-side scripting language.
- CO3 - Implement new technologies such as Angular JS and JQuery.
- CO4 - Develop web applications using server-side scripting language.
- CO5 - Understand the differences between usability and user experience.
- CO6 - Effectively select and utilize design thinking processes and UX/UI tools.

TEXT / REFERENCE BOOKS

1. Jeffrey C. Jackson, Web Technologies: A Computer Science Perspective, Pearson Education, 2009.
2. Kogent Learning Solutions Inc., Web Technologies Black Book, Dreamtech Press, 2009.
3. Ken Williamson, Learning AngularJS: A Guide to AngularJS Development, O'Reilly, 2015.
4. Jon Duckett, JavaScript and JQuery: Interactive Front-End Web Development, John Wiley and Sons Inc., 2014.
5. CallumMacrae, Learning from JQuery, O'Reilly, 2013.
6. Steve Krug,Dont Make Me Think,2nd Edition, New Riders Publishing,USA,2006.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 10 Questions carrying 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SITA1503	FOG AND CLOUD COMPUTING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the basic concepts of cloud computing and cloud enables.
- To understand cloud services and Multi-tenancy computing.
- To study about various models of cloud environments and virtualization.
- To manage the cloud computing infrastructure with security.
- To gain knowledge of cloud and to understand about Fog, edge computing.

UNIT 1 UNDERSTANDING CLOUD COMPUTING**9 Hrs.**

Basic Concepts and Terminology - Cloud Computing Architectural Framework - Types of Clouds - pros and cons of cloud computing - Cloud Characteristics - difference between web 2.0 and cloud - key challenges in cloud computing - Major Cloud players - Virtualization in Cloud Computing - Parallelization in Cloud Computing - cloud resource management - Cloud Enabling Technology.

UNIT 2 CLOUD SERVICE MODELS**9 Hrs.**

Software as a Service (SaaS) - Infrastructure as a Service (IaaS)- Platform as a Service (PaaS)- Web services - Service Oriented Architecture (SoA) - Elastic Computing - On Demand Computing- Service Management in Cloud Computing - Multi-tenancy computing , architecture.

UNIT 3 CLOUD DEPLOYMENT MODELS AND VIRTUALIZATION**9 Hrs.**

Deployment models: Public cloud – Private Cloud –Hybrid cloud – Community cloud - Need for virtualization – Types of Virtualization – Virtualization OS – VMware, KVM – System VM – Process VM - Virtual Machine Monitor – Properties - Xen, Hyper V, Virtual Box, Eucalyptus .

UNIT 4 MANAGEMENT IN CLOUD COMPUTING & SECURITY**9 Hrs.**

Cloud data centres - Energy efficiency in data centre - Data Management in Cloud Computing - Mobile cloud computing service models – Open Source and Commercial Clouds, Cloud Simulator – sensor cloud- Fundamental Cloud security – Cloud security Threads – Additional considerations – Security solutions a case study.

UNIT 5 FOG COMPUTING**9 Hrs.**

From Cloud to Fog - Fog Computing architecture - fog networks - Principles of Edge/P2P networking - Security and privacy in Fog.

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
- CO2 - Implement and install the cloud tools to make enable the cloud computing infrastructures.
- CO3 - Apply and design suitable Virtualization concept, Cloud Resource Management and collaboration services.
- CO4 - Create combinatorial auctions for cloud resources and services for computing clouds Develop and make cloud services as commercial.
- CO5 - Assess cloud and cloud to Fog with IoT.
- CO6 - Ability to, understand fog computing architecture.

TEXT / REFERENCE BOOKS

1. Cloud computing concepts, technology and Architecture – Thomas Erl, Zaigham Mahmood, Ricardo Puttini , Pearson , 2017.
2. Instant Guide to Cloud Computing, Anand Nayar (Ed), Ashokkumar, sudeep Tanwar, BPB, 2019.
3. Cloud computing a practical approach - Anthony T.Velte, Toby J. Velte Robert Elsenpeter TATA McGraw - Hill, New Delhi – 2010.
4. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008.
5. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010.
6. Fog Computing Concepts, Frameworks and Technologies ,Mahmood, Zaigham (Ed.), Springer , 2018.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration:3 Hrs.****PART A:** 10 Questions carrying 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SITA1601	MOBILE APPLICATION DEVELOPMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand basic concepts of mobile technologies, different operating systems and how to work with Android.
- To develop applications for current and emerging mobile computing devices, performing tasks at all stages of the software development life-cycle.
- To learn how to code with objective C programming.
- To design, implement and deploy mobile applications for iOS.
- To design, implement and deploy mobile applications for windows OS.

UNIT 1 INTRODUCTION**9 Hrs.**

Introduction to mobile technologies, mobile operation systems - pros and cons, Introduction to Android, Features, Architecture, **UI Widgets and Events handling**, Layouts, Application structure, Android Manifest file, Creating Android applications.

UNIT 2 BUILDING BLOCKS AND DATABASES**9 Hrs.**

Introduction to Activities and Intents - Understanding Activity life cycle, Linking Activities, Passing Data, Toast, Displaying a Dialog Window and Notifications. Content Provider, Services, Broadcast receivers, accessing databases, Location and sensors, Multimedia audio, video and camera, Deploying and publishing application.

UNIT 3 OBJECTIVE C PROGRAMMING**9 Hrs.**

Objective C - Objects and Classes, Property, Messaging, Categories and Extensions, Fast Enumeration - NSArray, NS Dictionary, Methods and Selectors, Static & Dynamic objects, Exception handling, Memory management, Swift language essentials: Arrays, Dictionaries, functions.

UNIT 4 INTRODUCTION TO IOS**9 Hrs.**

Introduction to iPhone, MVC Architecture, View Controller - Building the UI and Event handling, Application life cycle, Tab Bars, Story Boards and Navigation Controllers, Table View, **Push Notification, Database handling**, Introduction to icloud, Webkit framework in iOS8, Deploying and publishing application.

UNIT 5 WINDOWS MOBILE APP DEVELOPMENT**9 Hrs.**

Introduction to Windows Phone 8, Application Life cycle, UI Designing and events, Building, Files and Storage, Network Communication, Push Notification, Background Agents, Maps and Locations, **Data Access and storage**, Introduction to silverlight and XAML, Data Binding, **Deploying and Publishing**.

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Understand the technologies and business trends impacting mobile applications.
- CO2 - Understand and remember the components of android, iOS and Windows mobile applications.
- CO3 - Learn the programming languages and techniques for developing mobile applications.
- CO4 - Develop mobile applications with compelling user interface and database connectivity for real time applications for iOS.
- CO5 - Deploy mobile applications with compelling user interface and database connectivity for real time applications for Windows OS.
- CO6 - Develop and deploy mobile applications using silverlight.

TEXT / REFERENCE BOOKS

1. Reto Meier, "Professional Android Application Development", Wrox, 2010.
2. <http://www.tutorialspoint.com/android/index.htm>
3. <http://developer.android.com/training/index.html>
4. Stephen G. Kochan, "Programming in Objective C", Dorling Kindersley India Pvt. Ltd, 2012.
5. David Mark, Jack Nutting and Jeff LaMarche, "Beginning iOS 6 Development Exploring the iOS SDK", Apress, 2013.
6. Henry Lee, Eugene Chuvyrov, "Beginning Windows Phone App Development", Apress 2012.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 10 Questions carrying 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SITA1602	CYBER SECURITY	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To explore the aspects of classic and public key cryptography.
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To become aware of system security components.
- To know the technological aspects of security.
- To explore the vulnerabilities in any computing system.

UNIT 1 INTRODUCTION**9 Hrs.**

Basic Concepts – Security Architecture, Attacks, Services, Mechanisms, Model - Cryptography Basics - Symmetric Ciphers – Transposition, Substitution, Rotor Machines – Block Cipher – Data Encryption Standard – Confidentiality using Symmetric Encryption

UNIT 2 PUBLIC KEY CRYPTOGRAPHY**9 Hrs.**

Principles – RSA algorithm – Key Management – Diffie Hellman Key Exchange – Message Authentication – Requirements, Functions, Message Authentication – Hash Functions – Digital Signatures – Authentication Protocols

UNIT 3 SYSTEM SECURITY**9 Hrs.**

Intruders – Detection – Password Management – Malicious Software – Virus – Countermeasures – Distributed Denial of Service Attacks – Firewalls – Design Principles – Trusted Systems

UNIT 4 OPERATIONS AND PHYSICAL SECURITY**9 Hrs.**

Origin – Process – Laws – Physical Security – Controls – Protecting People – Protecting Data – Protecting Equipment

UNIT 5 APPLICATION SECURITY**9 Hrs.**

Software Development Vulnerabilities – Buffer Overflow – Race Condition – Web Security – Database Security – Tools

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Identify the basics of cryptography.
- CO2 - Provide security of the data over the network.
- CO3 - Explore the aspects of system security.
- CO4 - Illustrate operations and physical security aspects.
- CO5 - Analyse the vulnerabilities in any computing system and hence be able to design a security solution.
- CO6 - Design and implement secure applications.

TEXT / REFERENCE BOOKS

1. William Stallings, "Cryptography and Network Security", 4th Edition, Pearson, 2009.
2. Jason Andress, Steven Winterfeld, "The Basics of Information Security", 2nd Edition, Elsevier, 2014.
3. Harold F.Tipton, Micki Krause Nozaki, "Information Security Management Handbook", 6th Edition, Vol.5, CRC Press, 2012.
4. Behrouz A. Forouzan, "Cryptography and Network Security", Tata McGraw-Hill, 2008.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 10 Questions carrying 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SITA2501	CUSTOMER INTERFACE DESIGN AND DEVELOPMENT LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

COURSE OBJECTIVES

- To be familiar with mark-up languages and style sheets.
- To learn XML technologies and AJAX.
- To develop static websites and dynamic web applications.
- To gain knowledge and skills required for web development careers.
- To create web page using PHP.

SUGGESTED LIST OF EXPERIMENTS

1. Design a web page for your university using HTML.
2. Create an Internal and External Style sheet.
3. Working with XML and CSS.
4. Write a JavaScript code to perform form validation.
5. Working with AJAX.
6. Working with Angular JS Directives.
7. Working with Angular JS Expressions.
8. Working with jQuery Selectors.
9. Working with jQuery Events and Effects.
10. Program to perform PHP Form Validation.
11. Program to demonstrate PHP Form Handling.
12. Program to create PHP Database Application using MySQL.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Implement static web pages using mark-up languages and style sheets.
- CO2 - Implement form validation using client-side scripting language.
- CO3 - Implementation of new technologies: Angular JS and JQuery.
- CO4 - Develop web applications using server-side scripting language.
- CO5 - Develop web applications with database connectivity.
- CO6 - Create web page using PHP concepts.

SITA2601	MOBILE APPLICATION DEVELOPMENT LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

COURSE OBJECTIVES

- To develop applications for current and emerging mobile computing devices, performing tasks at all stages of the software development life-cycle.
- To learn how to utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
- To understand the programming languages and platform for developing mobile applications.
- To design, implement and deploy mobile applications using an appropriate software development environment.
- To upload the developed application into the Android play store.

SUGGESTED LIST OF EXPERIMENTS

1. To implement mobile application life cycle methods.
2. To implement simple calculator application.
3. To implement simple SMS application.
4. To implement authentication verification application without and with database.
5. To implement navigation application with multiple pages / activities.
6. To implement student placement registration form with database.
7. To implement a simple notification application.
8. To implement simple intent with data passing application.
9. To implement simple profile changer application through SMS.
10. To create mobile web browser application.
11. To create mobile e-mail application to sent a mail.
12. To add Google maps to an Android application.
13. To create photo show application.
14. To create app to upload a document.
15. Mini project.

NOTE

1. Above applications have to be created and deployed in Android OS.
2. Environment Required: Android SDK / Android Studio.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Understand how to set up Android Development Environment.
- CO2 - Design various Android UI components.
- CO3 - Develop Android applications using Java.
- CO4 - Develop Android applications by using Eclipse with ADT / Android Studio.
- CO5 - Create real time applications using Android database connectivity.
- CO6 - Deploy the Android App into play store.

SITA2602	BIG DATA ANALYTICS LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

COURSE OBJECTIVES

- To configure Big Data Ecosystem.
- To work with No SQL Databases.
- To process job scheduling.
- To Analyse and Interpret Data.
- To visualize the data insights.

TO LEARN, DEPLOY AND EXECUTE PROGRAMS ON THE FOLLOWING TECHNOLOGIES.

1. No SQL (using Cassandra/MongoDB/Spark).
2. Hadoop – Map Reduce Programs / Commands / Job Scheduling.
3. HDFS.
4. YARN.
5. Working with Pig and Hive.
6. Visualization (using Tableau Cloud).

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Able to setup Hadoop in a Cloud / Cluster environment.
- CO2 - Process and schedule the tasks in the Hadoop platform.
- CO3 - To configure nosql databases in the big data ecosystem.
- CO4 - Selection of right visualization method based on the intended audience.
- CO5 - Creates a dashboard and story based on the data analysis.
- CO6 - Test and evaluate the data models.

SITA3004	USER INTERFACE DESIGN AND IMPLEMENTATION	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To explain hypertext and style sheet languages.
- To apply Responsive Web Design Framework and features.
- To illustrate the basics of JavaScript, jQuery and allied scripting languages for Web design.
- To build Server side JS frameworks.
- To design client side JS frameworks.

UNIT 1 UI DESIGN**9 Hrs.**

HTML5: What is HTML5 - Features of HTML5 – Semantic Tags – New Input Elements and tags - Media tags (audio and video tags) – Designing Graphics using Canvas API - Drag and Drop features – Geolocation API - Web storage (Session and local storage). **CSS3:** What is CSS3 – Features of CSS3 – Implementation of border radius, box shadow, image border, custom web font, backgrounds - Advanced text effects (shadow) - 2D and 3D Transformations - Transitions to elements - Animations to text and elements.

UNIT 2 RESPONSIVE WEB DESIGN (RWD)**9 Hrs.**

Responsive Design: What is RWD – Introduction to RWD Techniques – Fluid Layout, Fluid Images and Media queries - Introduction to RWD Framework. Twitter Bootstrap – Bootstrap Background and Features - Getting Started with Bootstrap - Demystifying Grids – Off Canvas - Bootstrap Components - JS Plugins – Customization.

UNIT 3 INTRODUCTION TO JAVASCRIPT AND JQUERY**9 Hrs.**

Introduction - Core features - Data types and Variables - Operators, Expressions and Statements - Functions & Scope - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling – Browser Object Model - Windows and Documents - Form handling and validations. Object-Oriented Techniques in JavaScript - Classes – Constructors and Prototyping (Sub classes and Super classes) – JSON – Introduction to AJAX. Introduction – jQuery Selectors – jQuery HTML - Animations – Effects – Event Handling – DOM – jQuery DOM Traversing, DOM Manipulation – jQuery AJAX.

UNIT 4 INTRODUCTION TO SERVER-SIDE JS FRAMEWORK – NODE.JS**9 Hrs.**

Introduction - What is Node JS – Architecture – Feature of Node JS - Installation and Setup - Creating web servers with HTTP (Request & Response) – Event Handling - GET & POST implementation - Connect to SQL Database using Node JS – Implementation of CRUD operations.

UNIT 5 INTRODUCTION TO CLIENT-SIDE JS FRAMEWORK**9 Hrs.**

Introduction to Angular 4.0 - Needs & Evolution – Features – Setup and Configuration – Components and Modules – Templates – Change Detection – Directives – Data Binding - Pipes – Nested Components. Template - Model Driven Forms or Reactive Forms - Custom Validators. Introduction to ReactJS - React Components- Build a simple React component- React internals -Component inter communication- Component composition- Component styling.

Max. 45 Hrs.**COURSE OUTCOMES**

On Completion of the course, student will be able to

- CO1 - Develop web pages and style sheets using HTML and CSS3 respectively.
- CO2 - Design responsive websites with RWD techniques.
- CO3 - Apply JavaScript and allied scripting languages for implementing object models and functions.
- CO4 - Demonstrate Server Side JS Framework for application development.
- CO5 - Use Client Side JS Framework for redefining the application development.
- CO6 - Develop User Interface Designs using the frameworks

TEXT / REFERENCE BOOKS

1. Harvey and Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How to Program", 5th Edition, Pearson Education, 2011.
2. Achyut S Godbole and Atul Kahate, "Web Technologies", 2nd Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", 3rd Edition, Tata McGraw Hill, 2013.
4. David Flanagan, "JavaScript: The Definitive Guide, 6th Edition", O'Reilly Media, 2011.
5. Bear Bibeault and Yehuda Katz, "jQuery in Action", January 2008.
6. Web link for Responsive Web Design - <https://bradfrost.github.io/this-is-responsive/>.

7. Ebook link for JavaScript - https://github.com/jasonzhuang/tech_books/tree/master/js.
8. Krasimir Tsonev, "Node.js by Example Paperback", May 2015.
9. Web link for Node.js : <https://nodejs.org/en/>.
10. Artemij Fedosejev "React.js Essentials" (<http://pepa.holla.cz/wp-content/uploads/2016/12/React.js-Essentials.pdf>).

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100

PART A: 10 Question of 2 marks each – No choice

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

Exam Duration:3 Hrs.

20 Marks

80 Marks

SITA3005	SOCIAL NETWORK ANALYSIS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the concept of semantic web and related applications.
- To learn knowledge representation using ontology.
- To understand human behavior in social web and related communities.
- To learn mining in social network communities.
- To learn visualization of social networks.

UNIT 1 INTRODUCTION**9 Hrs.**

Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web
 Social Network Analysis: Social Networks Perspective - Analysis of Network Data –Key concepts and measurements in network analysis-Interpretation of Network Data - Social Network Analysis in the Social and Behavioral Sciences - Metrics in social network analysis.

UNIT 2 SOCIAL NETWORK ANALYSIS SOFTWARE, TOOLS AND LIBRARIES**9 Hrs.**

Modelling and aggregating social network data: Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data –(Advanced representations) Multi-Relational characterization of dynamic social network communities -Social network analysis software - Tools - Libraries.

UNIT 3 CLIQUES, CLUSTERS AND COMPONENTS**9 Hrs.**

Components and Sub graphs: Sub graphs - Ego Networks, Triads, and Cliques, Hierarchical Clustering, Triads, Network Density and conflict. Density: Egocentric and Sociocentric - Digression on Absolute Density - Community structure and Density, Centrality: Local and Global - Centralization and Graph Centres, Cliques and their intersections, Components and Citation Circles - Positions, Sets and Clusters.

UNIT 4 PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES**9 Hrs.**

Development of Social Network Analysis - Understanding and predicting human behavior for social communities - User data management - policy, legal, and technical challenges. Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT 5 VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS**9 Hrs.**

Graph theory – Centrality – Clustering – Node-Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations – Matrix and Node-Link Diagrams – Hybrid representations – Modeling and aggregating social network data -Applications – Cover networks – Community welfare – Collaboration networks – Co-Citation networks.

Max. 45 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - An ability to identify metrics used in network analysis.
- CO2 - An ability to classify the network related data's.
- CO3 - Identify the aim of graph in computational models.
- CO4 - Apply the knowledge in predicting the user behaviors.
- CO5 - Visualization of a social network using tools.
- CO6 - Ability to analyze metrics in social network analysis.

TEXT / REFERENCE BOOKS

1. Jeffrey C Johnson, Martin G Everett, Stephen P Borgatti - Analyzing Social Networks –sage publication-2013.
2. Guandong Xu ,Yanchun Zhang and Lin Li,-Web Mining and Social Networking – Techniques and applications, 1st Edition, Springer, 2011.
3. Dion Goh and Schubert Foo,-Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively, IGI Global Snippet, 2008.
4. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling, IGI Global Snippet, 2009.
5. John Scott, "Social Network Analysis", 3rd Edition, SAGE Publications Ltd 2013.

6. Peter Mika, Social Networks and the Semantic Web, 1st Edition, Springer 2007.
7. Maksim Tsvetovat, Alexander Kouznetsov, " Social Network Analysis for Startups", 1st Edition, O'Reilly Media, 2011.
8. John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100

PART A: 10 Question of 2 marks each – No choice

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

Exam Duration: 3 Hrs.

20 Marks

80 Marks

SITA3008	INTERNET OF THINGS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the concepts of Internet of Things
- To identify the various elements of an IoT System.
- To understand the various means of communication from Node / Gateway to Cloud Platforms.
- To identify types of data analytics and data visualization tools.
- To make students aware of security concerns and challenges while implementing IoT solutions.

UNIT 1 INTRODUCTION TO IOT**9 Hrs.**

Introduction to IoT, Current technological trends and future prospects, - Evolution of IoT , Business Scope, Relation with embedded system, - Basic Architecture of an IoT, From M2M to IoT, M2M towards IoT, IoT Value Chains, An emerging industrial structure for IoT.

UNIT 2 ELEMENTS OF IOT**9 Hrs.**

Application Sensors & Actuators - Edge Networking (WSN) – Gateways - IoT Communication Model – WPAN & LPWA, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards, Wearable Development Boards.

UNIT 3 COMMUNICATION AND CONNECTIVE TECHNOLOGIES**9 Hrs.**

IoT Communication Model, Cloud computing in IoT, IoT in cloud architecture, Logging on to cloud, Selecting and Creating cloud service , cloud based IoT platforms - IBM Watson, Google cloud.

UNIT 4 DATA ANALYTICS AND IOT PLATFORM**9 Hrs.**

Big Data Analytics , Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Storm, Data Visualization, Visualization tools for IoT.

UNIT 5 HANDS-ON PROJECTS**9 Hrs.**

Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino), DIY Kits – Soil moisture monitoring, Weather monitoring, Air quality Monitoring, Movement Detection.

Max. 45 Hrs.**COURSE OUTCOMES**

On Completion of the course, student will be able to

- CO1 - To learn and understand the technology and current trends in Internet of things.
- CO2 - To understand the various elements of IoT system and hardware devices.
- CO3 - To learn the programming languages and platforms for building IoT applications.
- CO4 - To understand the cloud computing and its relevance for developing IoT applications.
- CO5 - To design and implement IoT applications that manages big data with data analytics and visualization tools.
- CO6 - To implement hands-on projects using an appropriate software and hardware devices in various applications.

TEXT / REFERENCE BOOKS

1. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi.
2. Architecting the Internet of Things, Springer publications. Author(s): Dieter Uckelmann, Mark Harrison, Florian Michahelles.
3. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwatz.
4. Internet of Things and Data Analytics, Wiley Publications.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks:100****Exam Duration:3 Hrs.****Part A:** 10 Question of 2 marks each – No choice**20 Marks****Part B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

SIT4302	CLOUD COMPUTING LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

SUGGESTED LIST OF EXPERIMENTS

1. Study on Basics of Cloud computer and its Resources
2. Study about Google Apps and Microsoft Azure
3. Building a simple cloud application using Google App Engine and Microsoft Azure
4. Hosting cloud application using Google App Engine and Microsoft Azure
5. Setup a Private Cloud Using OpenStack or Eucalyptus. Develop simple applications and make it available to the intended user.
6. Install and configure OpenStack Object Storage - Swift in Ubuntu. Consider a huge storage requirements and store it in the cloud in a transparent manner.
7. Install and configure OpenStack Nova-Compute. Enable a connected user to get a virtual machine of a selected performance such as CPU, Memory.
8. Implementation of Map Reduce Job processing for clients request.
9. Designing SOA Application from System Description.
10. Exploring and trouble shooting a public cloud.
11. Implementation of virtual machines, and be able to list some of their configuration options in relation to the host server.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 : Comprehend cloud application and resources among the popular cloud platforms.
- CO2 : Make use of the available cloud infrastructures to host a cloud application and configure it on the cloud.
- CO3 : Develop a private cloud and store using open source cloud tools.
- CO4 : Build a computing infrastructure to handle huge data store using Map Reduce Job processing.
- CO5 : Design SOA applications on public cloud and troubleshoot the issues.
- CO6 : Create a virtual environment and list their configuration options and host.

SCS4401	HUMAN COMPUTER INTERACTION LAB	L	T	P	Credits	Total Marks
		0	0	4	2	100

SUGGESTED LIST OF EXPERIMENTS

1. Design a drop-down list or a menu in a GUI keeping in view the serial position effect
2. Design of a Mobile Keypad focusing on size, layout and devilling(a minimum of two different layouts)
3. Design of different icons in Graphical user Interface (a minimum of four different icons)
4. Design UI screens for the elderly people with unsteady hands keeping in view the mouse sensitivity
5. Design a menu structure for ordering house- hold items from a mall directly to your home through a mobile phone interface. Categorize the items into menus and submenus. (make use of Hick's Law)
6. Design a UI for ATM Interface
7. Design a prototype of a TV remote Control Panel
8. Design a UI prototype of an Automatic vending machine for Drinks
9. Design a Mobile Interface for a Mall Map
10. Design a Mobile Interface screens for railway enquiry system
11. Design a Web Interface for Online banking system
12. Design a Web Interface for a University website

COURSE OUTCOMES:

- CO1 Design interface using various design principles and guidelines.
- CO2 Create sample menus with GUI components used in their day-to-day activities.
- CO3 Design and implement user centric interfaces for various applications.
- CO4 Implement graphical user interfaces with modern software tools.
- CO5 Analyze human responses and develop guidelines for the best user experience.
- CO6 Apply the core concepts and implementation guidelines of Human Computer Interaction to improve them.

SIT1619	INTERNET OF THINGS	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1**9 Hrs.**

Introduction to IoT, Current technological trends and future prospects, - Evolution of IoT - IoT and related terms – Business Scope, Relation with embedded system, Introduction to Arduino and Raspberrypi, Overview of Elements of IoT - Basic Architecture of an IoT.

UNIT 2**9 Hrs.**

Application Sensors & Actuators - Edge Networking (WSN) – Gateways - IoT Communication Model – WPAN & LPWA, IoT platform for available applications, Hardware Devices: Arduino, Raspberry pi and Smartwifi, etc, Wearable Development Boards, Softwares, Programs and Stacks available for building IoT applications, Installation of various packages necessary for project and list of tools.

UNIT 3**9 Hrs.**

IoT Communication Model, Cloud computing in IoT, IoT in cloud architecture, Logging on to cloud, Selecting and Creating cloud service ,Managing Cloud Account Credentials and Generating Key Pair, Creating IoT Cloud Service.

UNIT 4**9 Hrs.**

Big Data Analytics – Data Exploration, Data Visualization, Visualization tools for IoT.

UNIT 5**9 Hrs.**

DIY Kits – Soil moisture monitoring, Weather monitoring, Air quality Monitoring, Movement Detection, etc, IFTTT and other apps.

Max. 45 Hrs.**COURSE OUTCOMES:**

On completion of the course, student will be able to

- CO1 : Illustrate the technology and current trends in Internet of things.
- CO2 : Understand the various elements of IoT system and hardware devices.
- CO3 : Learn the programming languages and platforms for building IoT applications
- CO4 : Demonstrate cloud computing and its relevance for developing IoT applications.
- CO5 : Implement IoT applications that manage big data with data analytics and visualization tools.
- CO6 : Implement hands-on projects using an appropriate software and hardware devices in various applications.

TEXT / REFERENCE BOOKS

1. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi.
2. Architecting the Internet of Things, Springer publications. Author(s):Dieter Uckelmann, Mark Harrison, Florian Michahelles.
3. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwatz.
4. Internet of Things and Data Analytics, Wiley Publications.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 2 Questions from each unit, each carrying 2 marks

20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks

80 Marks

SIT1612	CYBER FORENSICS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- Demonstrate a working knowledge of computers, storage devices, and digital data
- Plan and prepare for an incident requiring computer forensic skills
- Seize a computer from a crime scene without damaging it or risking it becoming inadmissible in a court of law

UNIT 1 INTRODUCTION TO COMPUTER FORENSICS**9 Hrs.**

Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement - Computer Forensic Technology - Types of Business Computer Forensic Technology Computer Forensics Evidence and Capture: Data Recovery Defined - Data Back-up and Recovery - The Role of Back-up in Data Recovery - The Data - Recovery Solution

UNIT 2 MOBILE AND SMART PHONE FORENSICS**9 Hrs.**

Introduction to Mobile Malware : Types of Attacks Taxonomy of Mobile Malware, Phishing, SMishing, and Vishing Malware Attack and Defense : Mobile Malware, Visual Payloads, Timeline of Mobile Malware, Hoaxes, and Threats, Overview of Mobile Malware Families, Taxonomy of Mobile Malware Threats, Hacking and Viruses in Mobile
:Introduction and Overview of Mobile Communication, Attacks in Mobile, Man in the Middle, Denial of Service, Wireless Spoofing, Prevention Techniques in Mobile System, Intrusion detection in wireless, Access Control and Authentication in Mobile

UNIT 3 NETWORK SECURITY**9 Hrs.**

IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec . Transport layer Security: SSL protocol, Cryptographic Computations - TLS Protocol.SIM Security, Security of Mobile Networks, Security of GSM Networks, Security of 3G Networks, Security of Wireless Local Area Networks, Security of Ad-hoc Networks, Security Techniques for Mobile Services, End-to-End Security Services in Mobile Communications, Inter- system Roaming and Internetworking Security, Securing Mobile E-Services, Security of Satellite Services, Security of Mobile Sensor Networks, Application Level Security, Security of IP Based Applications, Security of Mobile Payments, Security of Multimedia Communications, Security of Mobile Voice Communication

UNIT 4 EVIDENCE COLLECTION AND FORENSICS TOOLS**9 Hrs.**

Forensics - Investigating Dead Virtual Environments Install Files, Remnants, Registry, Microsoft Disk Image Formats, Data to Look for, Investigator Tips Forensics - Investigating Live Virtual Environments: Artifacts, Processes and Ports, Log Files, VM Memory Usage, Memory Analysis, ESXi Analysis, Microsoft Analysis Tools Processing Crime and Incident Scenes - Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

UNIT 5 ANALYSIS AND VALIDATION**9 Hrs.**

Current Computer Forensic tools: evaluating computer forensic tool needs, validating and testing forensics software computer forensics hardware tools, validating and testing forensics software Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

Max. 45 Hours

TEXT / REFERENCE BOOKS

1. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
2. Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008
3. John R.Vacca, "Computer Forensics", Cengage Learning, 2005.
4. Richard E.Smith, "Internet Cryptography", 3rd Edition Pearson Education, 2008.
5. Marjie T.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80

PART A: 10 questions of 2 marks each - No choice

PART B : 2 Questions from each unit with internal choice, each carrying 12 marks

Exam Duration: 3 Hrs.

20 Marks

80 Marks

SIT1606	BIG DATA	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION**9 Hrs.**

Introduction to Big Data - Challenges of Conventional Systems - Nature of Data - Small data - Medium data -BigData - Small data vs Big data - Sources of Big Data - Big Data Characteristics - Big Data Analytics - Importance of Big Data, Big Data in the Enterprise - Big Data Enterprise Model - Building a Big Data Platform - Big data in Social and Behavioral sciences.

UNIT 2 HDFS, HADOOP AND HADOOP INFRASTRUCTURE**9 Hrs.**

Hadoop and Databases - Typical Datacenter Architecture - Adding Hadoop to the Mix - Key Benefit - Flexibility:Complex Data Processing - HDFS - Hadoop Infrastructure - Architecture - Different in Data Model and Computing Model - HDFS Files and Blocks, Components of HDFS - Hadoop framework - HDFS - Map Reduce Framework - Data Loading techniques - Hadoop Cluster Architecture - Hadoop Configuration files - Hadoop Cluster modes - Single Node - Multi Node - Fully distributed node.

UNIT 3 HADOOP MAP REDUCE FRAMEWORK**9 Hrs.**

Relationship between MapReduce and HDFS - Relationship between MapReduce and HDFS - Clients, Data Nodes, and HDFS Storage - MapReduce workloads.Hadoop framework - Hadoop data types - Hadoop map reduce Paradigm - Map and Reduce Tasks - Map reduce Execution framework - Partitioners and Combiners - Input formats (Input Splits and Records, Text Input, Binary Input, Multiple Inputs)- Output Formats (TextOutput, BinaryOutPut, Multiple Output)- Hadoop Mapreduce programming - Advanced Map reduce concepts - Counters, Custom Writables - Unit testing framework - Error Handling - Tuning - Advanced Map reduce.

UNIT 4 HADOOP IMPLEMENTATION AND HADOOP ECO SYSTEM TOOLS**9 Hrs.**

Hadoop Implementation - Job Execution - Hadoop Data Types - Job Configurations - Input and Output Formats -ECO system tools - Pig's Data Model, Pig Latin, Developing & Testing Pig Latin Scripts - Writing Evaluation, Filter, Load & Store Functions - Hive - Hive Architecture - Comparison with Traditional Database - HiveQL: Data Types, Operators and Functions - Hive Tables - Querying Data - Advance Hive, NoSQL Databases - HBase - Loading Data in Hbase - Querying Data in Hbase

UNIT 5 HADOOP PROJECT ENVIRONMENT**9 Hrs.**

HBase: Introduction to HBase, Client API's and their features, Available Client, HBase Architecture, MapReduce - Integration. HBase: Advanced Usage, Schema Design, Advance Indexing, Coprocessors, Hadoop 2.0 -MRv2 - YARN - NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN, Upgrade your existing MRv1 code to MRv2, Programming in YARN framework-cover Apache Oozie Workflow Scheduler for Hadoop

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to–

1. Comprehend Enterprise Data to make Business Decisions
2. Analyse methods of loading voluminous data into Big Data framework using Flume and Sqoop.
3. Demonstrate the functions of Map Reduce Framework on any huge amount of Data
4. Apply Ecosystem tools for querying structured and unstructured Data.
5. Manage Data using HBase Framework.

6. Develop an application using Big Data tools.

TEXT / REFERENCES BOOKS

1. WA Gmob, "Big Data and Hadoop", Kindle Edition, 2013
2. Eric Miller, "A Overview of Map Reduce and its impact on Distributed Data", Kindle Edition, 2012.
3. Strata, " Big Data Now", O'Reily Media Inc., Kindle Edition, 2012.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration: 3 Hrs.**

PART A: 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 Questions from each unit with internal choice, each carrying 12 marks

80 Marks

SIT1402	MOBILE APPLICATION DEVELOPMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION AND UI INTERFACE

9 Hrs.

Introduction to mobile technologies, mobile operation systems, Mobile devices - pros and cons, Introduction to Android, Versions, Features, Architecture, UI Widgets and Events handling, Layouts, Required tools - Eclipse, ADT, AVD, Application structure, AndroidManifest file, Android design philosophy, Creating Android applications.

UNIT 2 BUILDING BLOCKS AND DATABASES

9 Hrs.

Introduction to Activities and Intents - Understanding Activity life cycle, Linking Activities, Passing Data, Toast, Displaying a Dialog Window and Notifications. Content Provider, Services, Broadcast receivers, accessing databases, sample applications, debugging and deploying app, publish in Playstore.

UNIT 3 OBJECTIVE C PROGRAMMING

9 Hrs.

Objective C - Data Types and Expressions, Decision Making and Looping, Objects and Classes, Property, Messaging, Categories and Extensions, Fast Enumeration - NSArray, NSDictionary, Methods and Selectors, Static & Dynamic objects, Exception handling, Memory management, Required Tools - Xcode, iOS Simulator, Instruments, ARC, frameworks.

UNIT 4 INTRODUCTION TO iOS

9 Hrs.

Introduction to iPhone, History, Versions, Features, MVC Architecture, View Controller - Building the UI and Event handling, Application life cycle, Tab Bars, Story Boards and Navigation Controllers, Table View, Push Notification, Database handling, Debugging and Deployment, Publishing app in Appstore, sample applications.

UNIT 5 WINDOWS MOBILE APP DEVELOPMENT

9 Hrs.

Introduction to Windows Phone 8, Application Life cycle, UI Designing and events, Building, Files and Storage, Network Communication, Push Notification, Background Agents, Maps and Locations, Data Access and storage, Introduction to silverlight and XAML, Running and Debugging the App, Deploying and Publishing.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Comprehend various mobile technology and business trends in mobile applications.

CO2 : Develop the mobile applications using various controls.

CO3 : Explore Objective C and sketch out the different built in blocks

CO4 : Assess and deploy Iphone OS and apps

CO5 : Design mobile applications using emulators.

CO6 : Create applications to hand-held devices

TEXT / REFERENCE BOOKS

1.Reto Meier, "Professional Android Application Development", Wrox Edition.

2.<http://www.tutorialspoint.com/android/index.htm>

3.<http://developer.android.com/training/index.html>

4.Stephen G. Kochan, "Programming in Objective C", Addition Wesley, 4th Edition.

5.David Mark, Jack Nutting and Jeff LaMarche, "Beginning iOS 5 Development", Apress Edition.

6.Baijian Yang, Pei Zheng, Lionel M. Ni, "Professional Microsoft Smartphone Programming", Wrox Edition.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 questions of 2 marks each - No choice

PART B : 2 questions from each unit of internal choice, each carrying 16 marks

Exam Duration : 3 Hrs.

20 Marks

80 Marks

SIT1608	GREEN COMPUTING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To study about existing green computing strategies
- Fundamental challenges in achieving green operations of computing units
- Assess enterprise-wide and personal computing and computing related energy consumption.

UNIT 1 GREEN COMPUTING FUNDAMENTALS**9 Hrs.**

Green IT fundamentals: Business, IT, and the environment - Green computing: Carbon foot print - scoop on power - Green IT strategies: Drivers, Dimensions, and Goals - Environmentally responsible business: Policies, Practices and Metrics.

UNIT 2 GREEN ASSETS AND MODELING**9 Hrs.**

Green Assets: Buildings, data centers, networks and devices - Green business process management: Modeling, optimization and collaboration - Green enterprise architecture - Environmental intelligence - Green supply chains - Green information systems: Design and development models.

UNIT 3 GRID FRAMEWORK**9 Hrs.**

Virtualizing of IT systems - Role of electric utilities, telecommuting, teleconferencing and teleporting - Materials recycling - Best ways for green PC - Green data center - Green grid framework

UNIT 4 GREEN COMPLIANCE**9 Hrs.**

Socio-cultural aspects of green IT - Green enterprise transformation roadmap - Green Compliance: protocols, standards and audits - Emergent carbon issues: technologies and future. The Way Climate Savers Computing Initiative Do - The Climate Savers Computing Initiative - What Green Computing Impact Organization Supplies - Green Computers Initiatives - Green Computing Impact Organization Overview - Green Electronics Council - Going Green Can Be Truly Challenging - The Green Grid Framework - The CSCI Top Secrets Revealed - The EPEAT Standards - To Have a Green Computer - Green Computing Means to Save Your Money and Your Business - Finances - Green Computing Initiative Platforms.

UNIT 5 CASE STUDIES**9 Hrs.**

The Environmentally Responsible Business Strategies (ERBS) - Case study scenarios for trial runs - Case studies - Applying green IT strategies and applications to a home, hospital, packaging industry and telecom sector.

Max.45 Hours**TEXT / REFERENCE BOOKS**

1. Bhuvan Unhelkar, "Green IT Strategies and Applications - Using Environmental Intelligence", CRC Press, June 2011.
2. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", August 2009. Warland & Pravin Varaiya, "High Performance Communication Networks", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
3. Jason Harris, "Green Computing and Green IT - Best Practices on regulations & industry", Lulu.com, 2008.
4. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM rebook, 2011.
5. John Lamb, "The Greening of IT", Pearson Education, 2009.

**END SEMESTER EXAM QUESTION
PAPER PATTERN**

Max Marks : 80

Exam Duration: 3 Hrs.

PART A : 10 questions of 2 marks each - No choice -

20 Marks

PART B : 2 questions from each unit with internal choice, each carrying 12 marks

80 Marks

SIT1401	HUMAN COMPUTER INTERACTION	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 FOUNDATIONS OF HCI

9 Hrs.

The Human: I/O channels - Memory - Reasoning and problem solving; The computer: Devices - Memory - processing and networks; Interaction: Models - Frameworks - Ergonomics - Styles - Elements - Interactivity - Paradigms.

UNIT 2 DESIGN & SOFTWARE PROCESS

9 Hrs.

Interactive Design basics - process - scenarios - navigation - screen design - Iteration and prototyping. HCI in software process - software life cycle - usability engineering - Prototyping in practice - design rationale. Design rules - principles, standards, guidelines, rules. Evaluation Techniques - Universal Design.

UNIT 3 MODELS AND THEORIES

9 Hrs.

Cognitive models - Socio-Organizational issues and stake holder requirements - Communication and collaboration models - Hypertext, Multimedia and WWW.

UNIT 4 MOBILE HCI

9 Hrs.

Mobile Ecosystem: Platforms, Application frameworks - Types of Mobile Applications: Widgets, Applications, Games - Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT 5 WEB INTERFACE DESIGN

9 Hrs.

Designing Web Interfaces - Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to:

- CO1 : Identify various interaction models and styles for designing a web application.
- CO2 : Design a web application based on design rules.
- CO3 : Relate the web application with the cognitive models.
- CO4 : Construct a mobile application based on mobile design and development framework.
- CO5 : Prototype any web application using web interface design guidelines.
- CO6 : Create custom design for any web and mobile applications.

TEXT / REFERENCE BOOKS

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I, II & III).
2. Brian Fling, "Mobile Design and Development", First Edition, O'Reilly Media Inc., 2009 (UNIT IV).
3. Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O'Reilly, 2009 (UNIT V).

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A: 2 Questions from each unit, each carrying 2 marks

PARTB: 2 Questions from each unit with internal choice, each carrying 16 marks

Exam Duration: 3 Hrs.

20 Marks

80 Marks

SIT1303	DATA ANALYTICS	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION TO DATA ANALYTICS 10 Hrs.

Introduction-Data Analytics, Data mining and Knowledge discovery-Data and Relations-Dissimilarity measures - similarity measures - sequence relations - sampling and quantization - Analysis vs Reporting - Modern data analytic tools - Statistical Concepts - Probability - Sampling and Sampling distribution - statistical Inference - Prediction and prediction error – Resampling.

UNIT 2 DATA ANALYSIS 10 Hrs

Linear Correlation - Regression Modeling - Multivariate analysis - Bayesian modeling - Inference and Bayesian networks - Support vector and Kernel Methods - Analysis of time series: Linear system analysis, nonlinear dynamics - Rule induction - Basics of Fuzzy and Neural networks.

UNIT 3 CLASSIFICATION AND CLUSTERING METHODS 10 Hrs.

Classification criteria - Naive Bayes classifier - Linear Discriminant Analysis - Support Vector Machine - Nearest neighbor classifier - Learning vector Quantization - Decision Tress - Cluster Partitions - Sequential clustering - Prototype Based Clustering - Fuzzy Clustering - Relational Clustering - Self Organizing Map.

UNIT 4 DATA VISUALIZATION 8 Hrs.

Introduction - Classification of Visual data analysis techniques - Data type to be visualized - Visualization techniques - Interaction techniques - Principle Component Analysis, Multi dimensional Scaling, Sammon Sampling, Histograms - Spectral analysis

UNIT 5 FRAMEWORKS 7 Hrs.

Distributed File system - Physical organization of Computer nodes - Large scale file system organization - Map Reduce - The map task - Grouping and Aggregation - The reduce task - Combiners - Details of map reduce Execution - Coping with Node failures.

Max. 45 Hours

COURSE OUTCOMES:

On completion of the course, student will be able to

- CO1:Comprehend the fundamental concepts of data analytics
- CO2:Analyze classification algorithms and choose the suitable algorithm for application under consideration
- CO3:Explore different clustering techniques
- CO4:Acquire an appreciation for the data analytics and present them using visualization techniques
- CO5:Develop frame works for data analytics
- CO6:Generate new ideas and innovations in Data analysis.

TEXT / REFERENCE BOOKS

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007
2. Thomas A. Runkler, Data Analytics, Models and Algorithms for Intelligent data Analysis, Springer 2012
3. Anand Rajaraman and Jeffery David Ullman, Mining of massive data sets, Cambridge University press, 2012
4. Bill Franks, Taming the Big data tidal wave: Finding opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012
5. Thomas H. Davenport, Jinho Kim Keeping up with the Quants: Your Guide to understanding and using Analytics, Harvard Business Press books, 2013

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A: 2 Questions from each unit, each carrying 2 marks

PARTB: 2 Questions from each unit with internal choice, each carrying 16 marks

Exam Duration: 3 Hrs.

20 Marks

80 Marks

SIT1305	MACHINE LEARNING	L	T	P	Credits	Total Marks
		3	1	0	4	100

UNIT 1 INTRODUCTION TO MACHINE LEARNING**12 Hrs.**

Machine learning - examples of machine learning applications - Learning associations - Classification - Regression - Unsupervised learning - Supervised Learning - Learning class from examples - PAC learning - Noise, model selection and generalization - Dimension of supervised machine learning algorithm.

UNIT 2 DECISION THEORY**12 Hrs.**

Bayesian Decision Theory - Introduction - Classification - Discriminant function - Bayesian networks - Association rule - Parametric Methods - Introduction - Estimation - Classification - Regression - Multivariate Methods - Data Parameter estimation - Classification - Complexity - Features - Dimensionality Reduction - Analysis - Multidimensional scaling - Linear discriminant analysis.

UNIT 3 CLUSTERING & REGRESSION**12 Hrs.**

Clustering - Mixture densities - k-means clustering - Supervised Learning after clustering - Hierarchical clustering - Nonparametric Methods - Density estimation - Generalization of multivariate data - Classification - Regression - Smoothing models - Decision Trees - Univariate trees - Multivariate trees - Learning rules from data - Linear Discrimination.

UNIT 4 MULTILAYER PERCEPTRONS**12Hrs.**

Structure of brain - Neural networks as a parallel processing - Perceptron - Multilayer perceptron - Backpropagation - Training procedures - Tuning the network size - Learning time.

UNIT 5 LOCAL MODELS**12 Hrs.**

Competitive learning - Adaptive resonance theory - Self organizing map - Basis functions - Learning vector quantization - Assessing and Comparing Classification Algorithms - Combining Multiple Learners - Reinforcement Learning.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 : Comprehend machine learning solutions to classification, regression and clustering problems
- CO2 : Understand the strengths and weaknesses of many popular machine learning approaches.
- CO3 : Interpret the results of the algorithms.
- CO4 : Select suitable model parameters for different machine learning techniques.
- CO5 : Design algorithms for real world problems using machine learning algorithm.
- CO6 : Gain experience of doing independent study and research.

Max. 60 Hours**TEXT / REFERENCE BOOKS**

1. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, 2004
2. Tom Mitchell, "Machine Learning", McGraw Hill, 1997.
3. <http://mitpress.mit.edu/catalog/item/default.asp? ttype=2&tid=1 0341 &mode=toc>.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100 Exam Duration : 3 Hrs.****PART A :** 10 questions of 2 marks each - No choice 20 Marks**PART B :** 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks

SIT1301	DATA MINING AND DATAWAREHOUSING	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 DATA WAREHOUSING

9 Hrs.

Data warehousing components - Building a data warehouse - Multi Dimensional Data Model - OLAP Operation in the Multi-Dimensional Model - Three Tier Data Warehouse Architecture - Schemas for Multi-dimensional data Model - Online Analytical Processing (OLAP) - OLAP Vs OLTP Integrated OLAM and OLAP Architecture.

UNIT 2 DATA MINING

9 Hrs.

Introduction - Data - Types of data - Steps in KDD - System Architecture - Data mining functionalities - Classification of data mining systems - Data mining task primitives - Integration of a data mining system with a data warehouse - Issues - Data pre-processing - Data Mining Application

UNIT 3 ASSOCIATION RULE MINING

9 Hrs.

Mining frequent patterns - Associations and correlations - Mining methods - Finding Frequent itemset using Candidate Generation - Generating Association Rules from Frequent Itemsets - Mining Frequent itemset without Candidate Generation - Mining various kinds of association rules - Mining Multi-Level Association Rule-Mining Multi-Dimensional Association Rule-Mining Correlation analysis - Constraint based association mining.

UNIT 4 CLASSIFICATION AND PREDICTION

9 Hrs.

Classification and prediction - Issues Regarding Classification and Prediction - Classification by Decision Tree Induction - Bayesian classification - Baye's Theorem - Naïve Bayesian Classification - Bayesian Belief Network - Rule based classification - Classification by Backpropagation - Support vector machines - Prediction - Linear Regression - Non Linear Regression.

UNIT 5 CLUSTERING, APPLICATIONS AND TRENDS IN DATA MINING

9 Hrs.

Cluster analysis - Types of data in Cluster Analysis - Categorization of major clustering methods -- Partitioning methods - K Means - K Medoids - Hierarchical methods - Density-based methods - Grid-based methods - Model based clustering methods -- Constraint Based cluster analysis - Outlier analysis - Data mining applications.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 : Comprehend knowledge about the transactional processing & analytical processing concepts
- CO2 : Analyze the characteristics of data and pre-process to make it ready for analysis.
- CO3 : Build a model for analysis by identifying the correlation between the attributes.
- CO4 : Estimate the future trends by relating the past trends and present scenario..
- CO5 : Evaluate various supervised learning algorithms.
- CO6 : Compare and contrast Supervised and unsupervised learning approaches.

TEXT / REFERENCE BOOKS

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", 2nd Edition, Elsevier, 2007
2. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw Hill, 2007.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction To Data Mining", Person Education, 2007.
4. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
5. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
6. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks

80 Marks

SIT1304	CLOUD COMPUTING	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 UNDERSTANDING CLOUD COMPUTING

9 Hrs.

History of Cloud computing - Cloud Computing Architectural Framework - Types of Clouds - pros and cons of cloud computing - difference between web 2.0 and cloud - key challenges in cloud computing - Major Cloud players - Cloud Deployment Models - Virtualization in Cloud Computing - types of virtualization - Parallelization in Cloud Computing - cloud resource management - dynamic resource allocation - Optimal allocation of cloud models.

UNIT 2 CLOUD SERVICE MODELS

9Hrs.

Software as a Service (SaaS) - Infrastructure as a Service (IaaS)- Platform as a Service (PaaS)- Service Oriented Architecture (SoA) - Elastic Computing - On Demand Computing.

UNIT 3 CLOUD DEPLOYMENT MODELS

9Hrs.

Deployment of applications on the cloud - Hypervisor - Case studies - Xen, VMware, Eucalyptus, Amazon EC2, KVM, Virtual Box, Hyper-V.

UNIT 4 CLOUD COMPUTING FOR EVERYONE

9 Hrs.

Cloud data centers - Energy efficiency in data centre - Mobile cloud computing service models - Collaboration with services and applications: CRM management - Project management - Email - on line database - calendar - schedules - Word Processing - Presentation - Spreadsheet - Databases - Desktop - Social Networks and Groupware.

UNIT 5 CLOUD SECURITY

9 Hrs.

Cloud security - Security threats and solutions in clouds - Auditing protocols - dynamic auditing - storage security - Privacy preserving -- Fully Homomorphic Encryption - big data security - Cloud availability - DoS attacks - Fault tolerance management in cloud computing - Cloud computing in India.

Max. 45 Hours

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 : Comprehend the type, architecture and features of a given Cloud setup with its suitability for a given application.
- CO2 : Compare the types of cloud services and connect to the service requirements of an application.
- CO3 : Deploy an application on suitable cloud and make use of the suitable virtualization tool to create cloud infrastructure.
- CO4 : Evaluate a cloud data centre and measure its energy efficiency.
- CO5 : Appraise the Cloud security and the associated risks to protect the online and cloud infrastructure from external threats and third party attacks.
- CO6 : Manage and collaborate cloud services with dynamic auditing.

TEXT / REFERENCE BOOKS

1. Cloud computing a practical approach - Anthony T.Velte, Toby J. Velte Robert Elsenpeter TATA McGraw - Hill, New Delhi - 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks

80 Marks