JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech. (

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course I	Data Structures and Algorithms	**25**	**75**	**4**	**--**	**4**
Core Course II	Software Development Methodologies	25	75	4	--	4
Core Course III	Software Requirements and Estimation	25	75	4	--	4
Core Elective I	1. Cloud Computing 2. Database Internals 3. Component Based Software Engineering 4. Internet Technologies and Services	25	75	4	--	4
Core Elective II	1. Big Data Analytics 2. Web Mining 3. Object Oriented Modelling 4. Information Theory and Coding	25	75	4	--	4
Open Elective I	**Open Elective – 1**	25	75	4	--	4
Laboratory I	Software Development Methodologies Lab	25	75	--	4	2
Seminar I		50	--	--	4	2
Total Credits				**24**	**8**	**28**

I Year – II Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Software Architecture and Design Patterns	25	75	4	--	4
Core Course V	Software Process and Project Management	25	75	4	--	4
Core Course VI	Software Quality Assurance and Testing	25	75	4	--	4
Core Elective III	1. Scripting Languages 2. Information Retrieval Systems 3. Semantic Web and Social Networks 4. E-Commerce	25	75	4	--	4
Core Elective IV	1. Software Security Engineering 2. Cyber Security 3. Information Security And Audit 4. Business Process Management	25	75	4	--	4
Open Elective II	**Open Elective – 2**	25	75	4	--	4
Laboratory II	Software Testing Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits			**24**	**8**	**28**	

II Year - I Semester

Course Title	marks	Ext. marks	L	P	C
Comprehensive Viva-Voce	--	100	--	--	4
Project work Review I	50	--	--	24	12
Total Credits			--	24	**16**

II Year - II Semester

Course Title	marks	Ext. marks	L	P	C
Project work Review II	50	--	--	8	4
Project Evaluation (Viva-Voce)	--	150	--	16	12
Total Credits			**--**	**24**	**16**

Open Electives

1. Basic Computer Programming skills are required for all open electives. Additionally, knowledge on the specified area mentioned in prerequisites is required for opting the open elective
2. Note: A student can register for any open elective subject provided that he has not already registered for the same subject

S.NO	Open Electives	Prerequisites
1.	"R" Programming	Maths, Statistics
2.	Android Application Development	Java
3.	Algorithmics	-----
4.	Big Data Analytics	Data Bases , Maths
5.	Bioinformatics	Data Structures
6.	Biometrics	----
7.	Computer Forensics	Maths, Data Structures
8.	Cyber Security	Internet Technologies
9.	Database Internals	---
10.	Distributed Systems Security	Information Security
11.	E-Commerce	Internet Technologies
12.	Embedded Systems	Digital logic
13.	Information Security and Audit	----
14.	Intellectual Property Rights	---
15.	Internet of Things	Java
16.	Internet Technologies and Services	Java
17.	Java Programming	---
18.	Linux Programming	---
19.	Mobile Computing	Java
20.	Mobile Application Security	Mobile Application Development
21.	OpenStack Cloud Computing	Linux Programming
22.	Operations Research	Maths, Data Structures
23.	Principles of Information Security	---
24.	Scripting Languages	---
25.	Social Media Intelligence	---
26.	Storage Area Networks	Computer Networks
27.	Web Usability	------

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech- I Year – I Semester (Software Engineering)

DATA STRUCTURES AND ALGORITHMS

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.
- Significance of algorithms in the computer field
- Various aspects of algorithm development
- Qualities of a good solution

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic, Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples. Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, LinkedList, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching–Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable. Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, threaded binary trees. Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-DFS and BFS, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT V

Search trees- Binary search tree-Binary search tree ADT ,insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees –Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util-TreeSet, TreeMap Classes, Tries(examples only),Comparison of Search trees. Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage learning.
3 Data structures and Algorithm Analysis in Java, M. A. Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2 Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th edition, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M. T. Goodrich, R. Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work, W. J. Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech- I Year – I Semester (Software Engineering)

SOFTWARE DEVELOPMENT METHODOLOGIES

Objectives:

Your studies will enable you to develop:

- a broad and critical understanding of all the processes for engineering high quality software and the principles, concepts and techniques associated with software development
- an ability to analyze and evaluate problems and draw on the theoretical and technical knowledge to develop solutions and systems
- a range of skills focused on the analysis of requirements, design and implementation of reliable and maintainable software, with strong emphasis on engineering principles applied over the whole development lifecycle
- an awareness of current research in software development, the analytical skills and research techniques for their critical and independent evaluation and their application to new problems.

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering - A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process.

UNIT II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioural models, Data models, Object models, structured methods.

UNIT III

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into software architecture.

Software Design Approaches, Structured Analysis, Structured Design.

UNIT IV

Object Oriented Concepts and Principles, Object Oriented Analysis, Object Oriented Design,

Modelling component-level design: Designing class-based components, conducting component-level design, object constraint language, designing conventional components.

UNIT V

User Interface Design, Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation. **Coding and Documentation**.

TEXT BOOKS:

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGraw Hill International Edition, 2005 (Unit 1, 2, 3, 5)
2. Software Engineering by Jibitesh Mishra, Ashok Mohanty. Pearson.(Unit 4,5)

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering 3: Domains, Requirements and Software Design, D.Bjorner, Springer, International Edition.
9. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, Wiley India edition.
10. Introduction to Software Engineering, R.J.Leach,CRC Press.
11. Software Engineering Fundamentals, Ali Behforooz and Frederick J.Hudson, Oxford University Press, rp2009
12. Software Engineering Handbook, Jessica Keyes, Auerbach, 2003.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech- I Year – I Semester (Software Engineering)

SOFTWARE REQUIREMENTS AND ESTIMATION

Objectives:

- Students will demonstrate knowledge of the distinction between critical and non- critical systems.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- Students will author a software requirements document.
- Students will demonstrate an understanding of the proper contents of a software requirements document.
- Students will author a formal specification for a software system.
- Students will demonstrate an understanding of distributed system architectures and application architectures.
- Students will demonstrate an understanding of the differences between real-time and non-real time systems.
- Students will demonstrate proficiency in rapid software development techniques.
- Students will demonstrate proficiency in software development cost estimation
- Students will author a software testing plan.

UNIT I

Software Requirements: What and Why

Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

Software Requirements Engineering

Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality,

UNIT II

Software Requirements Management

Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain

Software Requirements Modeling

Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

UNIT III

Software Estimation: Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation

Size Estimation: Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

UNIT IV

Effort, Schedule and Cost Estimation: What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation

UNIT V

Tools for Requirements Management and Estimation

Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation, **Software Estimation Tools:** Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools

TEXT BOOK:

1. Software Requirements and Estimation by *Rajesh Naik and Swapna Kishore*, Tata Mc Graw Hill.

REFERENCE BOOKS:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
4. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.
5. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.
6. Measuring the software process, William A. Florac & Anita D. Carleton, Pearson Education, 1999.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) (Core Elective-I)

CLOUD COMPUTING

Objectives:

To learn the new computing model which enables shared resources on demand over the network.
To learn about the pay-per-use scenarios.
To learn about the new kind of service models and deployment models.
To learn about the virtualization technology.
To learn the python programming or various services and models.
To develop cloud applications in Python

UNIT-I

Principles of Parallel and Distributed Computing, Introduction to cloud computing, Cloud computing Architecture, cloud concepts and technologies, cloud services and platforms, Cloud models, cloud as a service, cloud solutions, cloud offerings, introduction to Hadoop and MapReduce.

UNIT –II

Cloud Platforms for Industry, Healthcare and education, Cloud Platforms in the Industry, cloud applications.

Virtualization, cloud virtualization technology, deep dive: cloud virtualization,

Migrating in to cloud computing, Virtual Machines Provisioning and Virtual Machine Migration Services, On the Management of Virtual Machines for cloud Infrastructure, Comet cloud, T-Systems,

UNIT-III

Cloud computing Applications: Industry, Health, Education, Scientific Applications, Business and Consumer Applications, Understanding Scientific Applications for Cloud Environments, Impact of Cloud computing on the role of corporate IT.

Enterprise cloud computing Paradigm, Federated cloud computing Architecture, SLA Management in Cloud Computing, Developing the cloud: cloud application Design.

UNIT-IV

Python Basics, Python for cloud, cloud application development in python, Cloud Application Development in Python.

Programming Google App Engine with Python: A first real cloud Application, Managing Data in the cloud, Google app engine Services for Login Authentication, Optimizing UI and Logic, Making the UI Pretty: Templates and CSS, Getting Interactive. Map Reduce Programming Model and Implementations.

UNIT-V

Cloud management, Organizational Readiness and change management in the cloud age ,Cloud Security, Data security in the cloud, Legal Issues in the Cloud , Achieving Production Readiness for the cloud Services

Text Books:

1. Cloud Computing : Raj Kumar Buyya , James Broberg, andrzej Goscinski, 2013 Wiley
2. Mastering Cloud Computing: Raj Kumar buyya, Christian Vecchiola,selvi-2013.
3. Cloud Computing: Arshdeep Bahga, Vijay Madisetti, 2014, University Press.
4. Cloud computing: Dr Kumar Saurab Wiley India 2011.

References:

1. Code in the Cloud: Mark C.Chu-Carroll 2011, SPD.(Second part of IV UNIT)
2. Essentials of cloud computing : K Chandrasekharan CRC Press.
3. Cloud Computing: John W. Rittinghouse, James Ransome, CRC Press.
4. Cloud Security and Privacy: Mather, Kumaraswamy and Latif.2011. SPD, OREILLY.
5. Virtualization Security: Dave shackleford 2013. SYBEX a wiley Brand.
6. Cloud Computing Bible: Sosinsky 2012. Wiley India .
7. Cloud Computing: Dan C. Marinescu-2013, Morgan Kaufmann.
8. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.
9 . Fundamentals of Python Kenneth A.Lambert | B.L.Juneja

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) **(Core Elective-I)**

DATABASE INTERNALS

Objectives:

By the end of the course, you will know:

- History and Structure of databases
- How to design a database
- How to convert the design into the appropriate tables
- Handling Keys appropriately
- Enforcing Integrity Constraints to keep the database consistent
- Normalizing the tables to eliminate redundancies
- Querying relational data
- and processing the queries
- Storage Optimizing Strategies for easy retrieval of data through index
- Triggers, Procedures and Cursors ,Transaction Management
- Distributed databases management system concepts and Implementation

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL,DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER diagrams,. Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers

UNIT II

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT III

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques – Concurrency Control without Locking.

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT IV

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM)

B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable Vs Linear Hashing.

UNIT V

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date, Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database-Principles, Programming and Performance, P.O'Neil & E.O'Neil, 2nd ed, ELSEVIER
6. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.
10. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.
11. Distributed Database Systems, Chhanda Ray, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) (Core Elective-I)

COMPONENT BASED SOFTWARE ENGINEERING

Objectives:

- To understand the essentials of component-based software engineering
- To know the main characteristics of components and component models
- To be aware of software development processes for component-based systems
- To be aware of the mutual relations between software architecture and component models

UNIT I

Component definition - Definition of a Software Component and its elements, The Component Industry Metaphor, Component Models and Component Services, An example specification for implementing a temperature regulator Software Component.

The Case for Components- The Business Case for components, COTS Myths and Other Lessons Learned in Component-Based Software Development.

UNIT II

Planning Team Roles for CBD, Common High-Risk Mistakes, CBSE Success Factors: Integrating Architecture, Process, and Organization.

Software Engineering Practices - Practices of Software Engineering, From Subroutines to Subsystems: Component-Based Software Development, Status of CBSE in Europe.

UNIT III

The Design of Software Component Infrastructures - Software Components and the UML, Component Infrastructures, Business Components, Components and Connectors, An OPEN process for CBD, Designing Models of Modularity and Integration.

Software Architecture, Software Architecture Design Principles, Product-Line Architectures.

UNIT IV

The Management of Component-Based Software Systems - Measurement and Metrics for Software Components, Implementing a Practical Reuse Program for Software Components, Selecting the Right COTS Software, Building instead of Buying, Software Component Project Management, The Trouble with Testing Components, Configuration Management and Component Libraries, The Evolution, Maintenance, and Management of CBS.

UNIT V

Component Technologies - Overview of the CORBA Component Model, Overview of COM+, Overview of the EJB Component Model, Bonobo and Free Software GNOME Components, Choosing between COM+, EJB, and CCM, Software Agents as Next Generation Software Components.

TEXT BOOKS:

1. Component - Based Software Engineering, G.T. Heineman and W.T. Councill, Addison- Wesley, Pearson Education.

REFERENCE BOOKS:

1. Component Software, C.Szyperski, D.Gruntz and S.Murer, Pearson Education.
2. Software Engineering, Roger S. Pressman, 6th edition, Tata McGraw-Hill.
3. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.
4. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, Wiley India edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) (Core Elective-I)

INTERNET TECHNOLOGIES AND SERVICES

Objective:

- The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. S/he should have good understanding of different technologies on client and server side components as Follows:
- Client Side: HTML5, CSS3, Javascript, Ajax, JQuery and JSON
- Server Side: Servlets, JSP
- Database: MySQL with Hibernate and Connection Pooling
- Framework: Struts with validation framework, Internationalization (I18N)
- SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT I

Client Side Technologies:

Overview of HTML - Common tags, XHTML, capabilities of HTML5

Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS

Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript

Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events

Simplifying scripting with JQuery, JASON for Information exchange.

UNIT II

Introduction to Java Servlets:

Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions

Steps involved in Deploying an application

Database Access with JDBC and Connection Pooling

Introduction to XML, XML Parsing with DOM and SAX Parsers in Java

Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it.

Introduction to Hibernate

UNIT III

Introduction to JSP:

JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP

UNIT IV

Introduction to Struts Framework:

Introduction to MVC architecture, Anatomy of a simple struts2 application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT V

Service Oriented Architecture and Web Services

Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA

Introduction to Web Services– The definition of web services, basic operational model of web services, basic steps of implementing web services.

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models,

Describing Web Services –Web Services life cycle, anatomy of WSDL

Introduction to Axis– Installing axis web service framework, deploying a java web service on axis.

Web Services Interoperability **–** Creating java and .Net client applications for an Axis Web Service

(Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis)

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .
2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009
7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).
7. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett ,WROX.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) **(Core Elective-II)**

BIG DATA ANALYTICS

Objectives:

To understand about big data
To learn the analytics of Big Data
To Understand the MapReduce fundamentals

Unit I

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

Unit- II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

Unit III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop: Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS;

Unit IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

Unit V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;

Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book™, DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, " Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, " Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) **(Core Elective-II)**

WEB MINING

Objectives:

- To describe web mining and understand the need for web mining
- To differentiate between Web mining and data mining
- To understand the different application areas for web mining
- To understand the different methods to introduce structure to web-based data
- To describe Web mining, its objectives, and its benefits
- To understand the methods of Web usage mining

UNIT I

Introduction to Web Data Mining and Data Mining Foundations

Introduction – World Wide Web(WWW), A Brief History of the Web and the Internet, Web Data Mining-Data Mining, Web Mining.

Data Mining Foundations – Association Rules and Sequential Patterns – Basic Concepts of Association Rules, Apriori Algorithm- Frequent Itemset Generation, Association Rule Generation, Data Formats for Association Rule Mining, Mining with multiple minimum supports – Extended Model, Mining Algorithm, Rule Generation, Mining Class Association Rules, Basic Concepts of Sequential Patterns, Mining Sequential Patterns on GSP, Mining Sequential Patterns on PrefixSpan, Generating Rules from Sequential Patterns.

UNIT II

Supervised and Unsupervised Learning

Supervised Learning - Basic Concepts, Decision Tree Induction – Learning Algorithm, Impurity Function, Handling of Continuous Attributes, Classifier Evaluation, Rule Induction – Sequential Covering, Rule Learning, Classification Based on Associations, Naïve Bayesian Classification , Naïve Bayesian Text Classification - Probabilistic Framework, Naïve Bayesian Model .

Unsupervised Learning – Basic Concepts , K-means Clustering – K-means Algorithm, Representation of Clusters, Hierarchical Clustering – Single link method, Complete link Method, Average link method, Strength and Weakness.

UNIT III

Information Retrieval and Web Search

Basic Concepts of Information Retrieval, Information Retrieval Methods - Boolean Model, Vector Space Model and Statistical Language Model, Relevance Feedback, Evaluation Measures, Text and Web Page Preprocessing – Stopword Removal, Stemming, Web Page Preprocessing, Duplicate Detection, Inverted Index and Its Compression – Inverted Index, Search using Inverted Index, Index Construction, Index Compression, Latent Semantic Indexing – Singular Value Decomposition, Query and Retrieval, Web Search, Meta Search, Web Spamming.

UNIT IV

Link Analysis and Web Crawling

Link Analysis - Social Network Analysis, Co-Citation and Bibliographic Coupling, Page Rank Algorithm, HITS Algorithm, Community Discovery-Problem Definition, Bipartite Core Communities, Maximum Flow Communities, Email Communities.

Web Crawling – A Basic Crawler Algorithm- Breadth First Crawlers, Preferential Crawlers, Implementation Issues – Fetching, Parsing, Stopword Removal, Link Extraction, Spider Traps, Page Repository, Universal Crawlers, Focused Crawlers, Topical Crawlers, Crawler Ethics and Conflicts.

UNIT V

Opinion Mining and Web Usage Mining

Opinion Mining - Sentiment Classification – Classification based on Sentiment Phrases, Classification Using Text Classification Methods, Feature based Opinion Mining and Summarization – Problem Definition, Object feature extraction, Feature Extraction from Pros and Cons of Format1, Feature Extraction from Reviews of Format 2 and 3, Comparative Sentence and Relation Mining, Opinion Search and Opinion Spam.

Web Usage Mining - Data Collection and Preprocessing- Sources and Types of Data, Key Elements of Web usage Data Preprocessing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web usage Patterns -Session and Visitor Analysis, Cluster Analysis and Visitor Segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigation Patterns.

TEXT BOOK:

1. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by Bing Liu (Springer Publications)

REFERENCES BOOKS:

1. Data Mining: Concepts and Techniques, Second Edition Jiawei Han, Micheline Kamber (Elsevier Publications)
2. Web Mining:: Applications and Techniques by Anthony Scime
3. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) (Core Elective-II)

OBJECT ORIENTED MODELING

Objectives:

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.
- To describe the activities in the different phases of the object-oriented development life cycle.
- State the advantages of object-oriented modeling vis-à-vis structured approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

UNIT I

Introduction to UML: The meaning of Object Orientation, object identity, Encapsulation, information hiding, polymorphism, generosity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, callback mechanism, broadcast messages.

UNIT II

Basic Behavioral Modeling: Use cases, Use case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT III

The Unified process: use case driven, architecture centric, iterative, and incremental

The Four Ps: people, project, product, and process

Use case driven process: why use case, capturing use cases, analysis, design, and implementation to realize the use cases, testing the use cases

Architecture-centric process: architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

UNIT IV

Iterative incremental process: iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.

The Generic Iteration workflow: phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed, assess the iteration and phases

Inception phase: early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, requirements to test.

UNIT V

Elaboration Phase: elaboration phase in brief, early in the elaboration phase, the architectural elaboration iteration workflow, execute the core workflows-Requirements to test.

Construction phase: early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.

Transition phase: early in the transition phase, activities in transition phase

Case Studies: Automation of a Library, Software Simulator application (2-floor elevator simulator)

TEXT BOOKS:

1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson 2nd Edition, Pearson Education.
2. UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado WILEY-Dreamtech India Pvt. Ltd.
3. The Unified Software Development Process by Ivar Jacobson, Grady Booch, James Rumbaugh, Pearson Education

REFERENCE BOOKS:

1. Fundamentals of Object Oriented Design in UML By Meilir Page-Jones, Pearson Education
2. Object Oriented Analysis & Design By Atul Kahate, The McGraw-Hill.
3. Practical Object-Oriented Design with UML By Mark Priestley, TATA Mc Graw Hill
4. Object Oriented Analysis & Design By Brett D McLaughlin, Gary Pollice and David West, O'REILY.
5. Object-Oriented Analysis and Design using UML by Simon Bennet, Steve McRobb and Ray Farmer, 2nd Edition, TATA Mc Graw Hill.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++,R.C.Lee, and W.M.Tepfenhart, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering) (Core Elective-II)

INFORMATION THEORY AND CODING

Objectives:

- To learn various coding techniques of information
- To learn probability theories related to information

Unit -I

RANDOM VARIABLES AND PROCESSES: Events - Random variables - Distribution and density functions Operations on random variables - Covariance - Correlation functions - Random process - Stationarity - Spectral decomposition - Response of linear system to random inputs, Relation between information and probability

Unit- II

INFORMATION ENTROPY FUNDAMENTALS: Self information measure - mutual and self information - Entropy function - Characteristics of Entropy function - Conditional Entropies - Derivation of the noise characteristics of a channel - Redundancy - Efficiency and channel capacity - capacities of channels with symmetric noise structure. Huffman coding: Implementation of Huffman code, Shannon's theorem, Code design, Shannon - Fano coding

Unit-III

ERROR CONTROL CODING : Backward error correction linear block codes, BCH codes, Golay codes, efficiency of LBC, forward correction codes-Convolution coding decoding algorithms, Viterbi decoding optimum decoding performance **measures**

Unit- IV

DATA AND VOICE CODING: Context dependent coding, arithmetic codes, overall efficiency consideration. Voice coding, Delta Modulation and adaptive delta modulation, linear predictive coding, silence coding, sub-band coding

Unit -V

COMPRESSION TECHNIQUES: Principles – Text compression –Static Huffman Coding - Dynamic Huffman coding. Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

REFERENCES:

1. Reza F M, "An Introduction to Information Theory", McGraw Hill, 2000.
2. Viterbi A and Omura J K, "Principles of Digital Communication and Coding", McGraw Hill, 1979.
3. Cover T M and Thomas J A, “Elements of Information theory”, 2nd edition, John Wiley & Sons, 2006.
4. Sheldon M Ross, “Introduction to Probability Models”, Academic Press, 2003
5. Roth R, “Introduction to Coding theory”, Cambridge University Press, 2006.
6. Peter Sweeney, “Error Control Coding: From Theory to Practice”, John Wiley & Sons, 2002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – I Semester (Software Engineering)

SOFTWARE DEVELOPMENT METHODOLOGIES LAB

Objectives:

- To understand the software engineering methodologies involved in the phases for project development.
- To gain knowledge about open source tools used for implementing software engineering methods.
- To exercise developing product-startups implementing software engineering methods.

Open source Tools: StarUML / UMLGraph / Topcased

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

1. Problem Analysis and Project Planning -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.
2. Software Requirement Analysis – Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
3. Data Modeling – Use work products – data dictionary.
4. Software Designing - Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
5. Prototype model – Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination.

List of Sample Experiments:

1. **Student Enrolment System.**

   A University has contracted you to develop their new student records system.
   The normal tasks that the system performs are as follows:
   Enrol a student at the university: A student provides his or her personal details (name, address, sex, date of birth), along with the code of the course (e.g. Bachelor of Computer Science) in which he or she wishes to enrol. A student record is created, and a unique student ID number is assigned to the student. The system automatically enrols the student in any core first-year subjects for the course.
   Enrol a student in a subject: A student provides his or her student ID number and the subject code of the subject in which he or she wish to enrol. The system checks that the subject requested by the student is allowed for the course in which the student is enrolled. If not, the enrolment request is rejected. The system checks what subjects (if any) are specified as prerequisites for the subject in which the student wishes to enrol. If the student has passed all the prerequisite subjects, he or she is enrolled in the desired subject. Otherwise, the enrolment request is rejected.
   Record a mark for a student: A staff member accesses the system by giving a subject code and a password for that subject. If the password is correct, the system displays the list of students enrolled in the subject to the staff member. The staff member can then specify a mark for any student on the list.
   Create a new subject: An administrator accesses the system using a password. The administrator then chooses a subject code for the new subject. The system checks that this code is not already in use in the system, and if not, creates a new subject record. The administrator then gives the subject name, the course to which it belongs, the year of the course in which it may first be taken, a flag indicating whether or not it is a core subject and the codes of any prerequisite subjects.
   Print a transcript of a student's results: An administrator accesses the system using a password. The administrator then gives the student ID number of the student for whom the transcript is to be generated. The system contacts the finance system to check whether or not the student has paid all fees. If fees have been paid, the system creates a transcript showing all the subjects in which the student has been enrolled in each year, and the mark for that subject. The header of the transcript shows the student's personal details and the course in which he or she is enrolled.
   Assign a staff member to a subject: An administrator accesses the system using a password. The administrator then gives the subject code for the subject to which the staff member is to be assigned, and the staff ID number of the staff member.

2. **Online Bookshop.**

   A major book retailer is planning to develop a computer system to handle their new online bookshop: Booky.com. You have been chosen to do the analysis and design.
   The following requirements have been identified:
   Customers can search for books on the Booky.com website, either by author name, or words in the title. A list of all matching books is returned to the customer. A customer does not need to be logged-in in order to search. The system records all the customers of the Booky.com who have ever logged in. A

customer may be an individual customer or a business customer. · Each customer has a username and password. Business customers may have several usernames and passwords, corresponding to different divisions within the business.

When a customer has selected a book to buy at the Booky.com website.

The system prompts for the customer's username and password. The customer enters these details. The system verifies the customer's identity and retrieves the customer's name and address, then prompts for credit card details. The customer enters these details. The system checks the credit card details. The system shows the customer the book and delivery price. The customer confirms the transaction.

The system records all books available at Booky.com. For each book, the author, title and ISBN number are recorded. The number of each book in stock is also stored, along with the number on order by customers and the number on order from publishers. Books may be temporarily unavailable.

All books are stored in the Booky.com warehouse. The warehouse can be contacted via a secure internet connection.

For each customer, a permanent record of books bought by that customer is maintained. Likewise, for each book, a record of customers who have bought that book is kept.

A customer order consists of one or more order lines, each corresponding to a particular book. A customer may choose to defer the shipment of an order until all the order lines have been filled.

When the warehouse fills all or part of customer order, an email is sent to the customer informing them of what has been shipped.

If a book ordered by a customer turns out to be unavailable, the corresponding order line is flagged and an email is sent to the customer informing them of the problem. At this stage the customer can cancel this order line.

When a book corresponding to a previously-unavailable order line becomes available, an email is sent to the customer and a copy of the book is held for seven days, after which it is returned to normal stock if the customer has not confirmed the order.

The shop keeps track of which publishers produce particular book titles. Some books may be available from more than one publisher.

Although Booky.com will initially sell only books, it is envisaged that in future it will offer further products, such as CDs. The list of possible future products has not yet been finalized.

3. **Course management system** (CMS)

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- An area for faculty posting of class materials such as course syllabus and handouts
- An area for student posting of papers and other assignments
- A gradebook where faculty can record grades and each student can view his or her grades
- An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
- A chat tool allowing synchronous communication among class participants
- A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper. Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

4. **Easy Leave**

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The **Easy Leave** is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system:

1. A person should be able to
    - login to the system through the first page of the application
    - change the password after logging into the system
    - see his/her eligibility details (like how many days of leave he/she is eligible for etc)
    - query the leave balance
    - see his/her leave history since the time he/she joined the company/college
    - apply for leave, specifying the from and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
    - see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
    - approve/reject the leave applications that are submitted to him/her
    - withdraw his/her leave application (which has not been approved yet)
    - Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior
    - get help about the leave system on how to use the different features of the system
2. As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
3. The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically

An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

5. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent- the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of ones own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response everyday, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area wherein a question can be raised as to how safe Auction Patrols.

Proposed system

1. To generate the quick reports
2. To make accuracy and efficient calculations
3. To provide proper information briefly
4. To provide data security
5. To provide huge maintenance of records
6. Flexibility of transactions can be completed in time

6. Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.

It provides high level of security with different level of authentication

7. Enterprise Security Services

Verification and Validation is a part of S/W Quality Assurance. Verification refers to the set of activities that ensure correctly implements a specific function. Validation refers to a different set of activities that ensure that the software that has been built is traceable to customer requirements.

Verification:" Are we building the product right"

Validation: "Are we building the right product"

The project entitled Independent Project Metrics is an effort, to develop a tool to manage the Verification and Validation process.

The specific purpose of the Independent Verification and Validation Process o f Project Metrics Tool is to bring out the various Verification and validation tasks to be performed. The scope of the Project Metrics is to cover the developed for system.

The goals of the V&V effort is to ensure that the software and the documents are developed are of high quality as expected from any mission critical software. This project generates the plan for Verification and validation process. This project maintain the document names, source code module names, version number, released date, receiving date size of document and source code modules of receiving projects for Verification and validation.

Using this application we assign the tasks/activities to different persons and also calculate the expected efforts and actual efforts. The V&V co-coordinator does this work.

Proposed System:

The general description gives an "executive overview" and is very client-oriented. It expounds on the functional and data requirements of the application. It also lists the limitations, assumptions and dependencies of the application. It also touches on the performance and quality requirements of the application and provides a solid definition of the interface

The computerization of this system would avoid the wrong interpretation and bad calculation of data .The system help the user to see any documents, source code, tasks, activities, team information with

details at the click of a button. The record data is maintained and backed up such a way that data is not loss. The speed of the system could also increased

8.ERP

ERP is a powerful human resource tool for maintaining employee and company information. More than a data storage program, ERP helps you manage your employees. ERP offers a wide variety of reports that give you exactly the information you need. View payroll information by department, or find everyone who is receiving company

Module Description:
1. Payroll
2. Employee
3. Employee payslip
4. Selection process
5. Reports
6. Mailing System
7. Training
8. Add Company Information

PROPOSED SYSTEM

The proposed system is designed to eliminate all the drawbacks of the existing system. The system is part of a large HRMS Application and shall be responsible for maintaining information about employees,

- positions,
- company benefits,
- departments,
- new recruit checklists,
- employee achievements,
- warnings,
- evaluation reports,
- education & training,
- administration,
- work changes and several ad hoc reports.

The major advantage of the proposed system is,

- It's online, so that information is available anytime.
- High integrity and security.
- Ability to incorporate newly available data.
- It is user friendly
- Speed and accuracy is increased
- Fully automated.
- Security is associated with user authentication
- Duplication of information is curbed

8. **Examination Branch System**

The project **"Examination Branch System** " is to reduce the overhead involved in the process of maintains the data and the transaction in the Examination branch **.** Examination branch is an intranet application for an organization. It is software which is used to perform all the examination activities like adding employees, search employees, delete employees and assign examination duties etc.

The basic framework of the project can be developed in .NET. Making use of this application the administrator can perform their activities through it.

Proposed System: can be extend to assign duties to faculty, can implement edit, update operations and develop a user friendly type.

9.Exam Experts

The system would be providing a number of services, automating the processes that are being done manually. The services include communication services such as mailing facility, chat service, electronic file transfer etc and office automation packages such as leave letter processing, admission management, teaching evaluation, counseling automation etc.

The aim of the project is to design a comprehensive web enabled application for management of the Examination Process. Examination system is categorized into various sections. Among those sections, this system concentrates on the work being done in section (E-X).

The section (E-X) deals with the confidential work, i.e., Coding-Decoding of answer scripts, Processing of results, Computerization of certificates etc. This is an automated section and it plays a pivotal role in the Examination Process starting from the Application Processing to the final announcement of results

This project is aimed to solve many of the problems that are in the existing system and also provide a hassle free system that is efficient and easy to use. This project concentrates mainly on Application Processing, Marks Processing and Results Processing with an easy to use interface. The system also provides a means to generate and print various types of reports.

This project can include an **Application Processing System:**

This phase involves the storing of the application information and generating the required reports.

- Entry of Application forms according to center ,course order and batch
- Generating Application Id for further transactions
- Capturing of photographs of students for hall ticket processing
- Reports involving the information about students who are appearing for supplementary exams
- Generating nominal roles

Reports describing the college, course, subjects and the students appearing

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech. (

COURSE STRUCTURE AND SYLLABUS

I Year – II Semester

	Course Title	Int. marks	Ext. marks	L	P	C
Core Course IV	Software Architecture and Design Patterns	25	75	4	--	4
Core Course V	Software Process and Project Management	25	75	4	--	4
Core Course VI	Software Quality Assurance and Testing	25	75	4	--	4
Core Elective III	1. Scripting Languages 2. Information Retrieval Systems 3. Semantic Web and Social Networks 4. E-Commerce	25	75	4	--	4
Core Elective IV	1. Software Security Engineering 2. Cyber Security 3. Information Security And Audit 4. Business Process Management	25	75	4	--	4
Open Elective II	**Open Elective – 2**	25	75	4	--	4
Laboratory II	Software Testing Lab	25	75	--	4	2
Seminar II	Seminar	50	--	--	4	2
Total Credits			**24**	**8**	**28**	

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering)

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

Objectives:

After completing this course, the student should be able to:

- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.
- To highlight the evolution of patterns.
- To learn how to add functionality to designs while minimizing complexity
- To learn what design patterns really are, and are not
- To know about specific design patterns.
- To learn how to use design patterns to keep code quality high without over design.

UNIT I

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT II

Analyzing Architectures: Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

Moving from one system to many: Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT III

Patterns: Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage.

Creational and Structural patterns: Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight.

UNIT IV

Behavioural patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy. template method, visitor.

UNIT V

Case Studies: A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development,

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.
8. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering)

SOFTWARE PROCESS AND PROJECT MANAGEMENT

Objectives:

At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

UNIT I

Software Process Maturity : Software maturity Framework**,** Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

Process Reference Models Capability Maturity Model (CMM)**,** CMMi, PCMM, PSP, TSP.

UNIT II

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT III

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments.

Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT IV

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation.

Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT V

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
2. Software Project Management, *Walker Royce,* Pearson Education.

REFERENCE BOOKS:

1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
3. Process Improvement essentials, James R. Persse, O'Reilly, 2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
6. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
7. The Art of Project Management, Scott Berkun, SPD, O'Reilly, 2011.
8. Applied Software Project Management, Andrew Stellman & Jennifer Greene, SPD, O'Reilly, rp2011.
9. Agile Project Management, Jim Highsmith, Pearson education, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering)

SOFTWARE QUALITY ASSURANCE AND TESTING

Objectives:

The student should be able to:

- To understand software testing and quality assurance as a fundamental component of software life cycle
- To define the scope of SW T&QA projects
- To efficiently perform T&QA activities using modern software tools
- To estimate cost of a T&QA project and manage budgets
- To prepare test plans and schedules for a T&QA project
- To develop T&QA project staffing requirements
- To effectively manage a T&QA project

UNIT I

Software Quality Assurance and Standards: The Software Quality challenge, What is Software Quality, Software Quality factors, The components of Software Quality Assurance system, Software Quality Metrics, Costs of Software Quality, Quality Management Standards, Management and its role in Software Quality Assurance, SQA unit and other actors in SQA system. - **(Chapters: 1-4, 21-23, 25, 26) of T3**

Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma and other latest quality standards **(Refer Internet and R11, R12, R13).**

UNIT II

Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy

Building Software Testing Process: Software Testing Guidelines, workbench concept, Customizing the Software Testing Process, Process Preparation checklist - **(Chapters: 2,3) of T1**

Software Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing -**(Chapters: 4, 5, 6, 7, 8) of T2**

UNIT III

Software Testing Tools: Selecting and Installing Software Testing tools – **(Chapter 4) of T1.**

Automation and Testing Tools **- (Chapter 15) of T2** Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus. **(Refer Internet and R9, R10)**

UNIT IV

Testing Process

Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing. **(Chapters 6, 7, 8, 9, 10) of T1**

UNIT V

Seven Step Testing Process – II: Analyzing and Reporting Test results, Acceptance and Operational Testing, Post-Implementation Analysis

Specialized Testing Responsibilities: Software Development Methodologies, Testing Client/Server Systems **(Chapters 12, 13, 14, 15) of T1.**

TEXT BOOKS:

1. Effective Methods for Software Testing, Third edition, *William E. Perry*, Wiley India, 2009
2. Software Testing – Principles and Practices, *Naresh Chauhan,* Oxford University Press, 2010.
3. Software Quality Assurance – From Theory to Implementation, *Daniel Galin,* Pearson Education, 2009.

REFERENCE BOOKS:

1. Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India, rp2012.
2. Software Testing – Principles, Techniques and Tools, *M.G.Limaye*, Tata McGraw-Hill, 2009.
3. Software Testing - A Craftsman's approach, *Paul C. Jorgensen*, Third edition, Auerbach Publications, 2010.
4. Foundations of Software Testing, *Aditya P. Mathur*, Pearson Education, 2008.

5. Software Testing and Quality Assurance – Theory and Practice, *Kshirasagar Naik, Priyadashi Tripathy*, Wiley India, 2010.
6. Software Testing, *Ron Patton*, Second edition, Pearson Education, 2006.
7. Software Testing and Analysis – Process, Principles and Techniques, *Mauro Pezze, Michal Young,* Wiley India, 2008.
7. Software Testing Techniques, Boris Beizer, Second edition, Wiley India, 2006
8. Foundations of Software Testing, Dorothy Graham, et al., Cengage learning, 2007, rp 2010.
9. Software Testing - Effective Methods, Tools and Techniques, *Renu Rajani, Pradeep Oak*, Tata McGraw-Hill, rp2011.
10. Software Automation Testing Tools for Beginners, *Rahul Shende*, Shroff Publishers and Distributors, 2012.
11. Software Testing Tools, *K.V.K.K. Prasad*, Dream Tech Press, 2008.
12. Software Testing Concepts and Tools, *Nageswara Rao Pusuluri*, Dream Tech press, 2007.
13. Software Quality Assurance, *Milind Limaye*, Tata McGraw-Hill, 2011.
14. Software Quality – Theory and Management, *Alan C. Gillies*, Second edition, Cengage Learning, 2009.
15. Software Quality – A Practitioner's approach, *Kamna Malik, Praveen Choudhary,* Tata McGraw-Hill, 2008.
16. Software Quality Models and Project Management in a Nutshell, *Shailesh Mehta*, Shroff Publishers and Distributors, 2010.
17. Software Quality Engineering – Testing, Quality Assurance and Quantifiable Improvement, *Jeff Tian*, Wiley India, 2006.
18. Software Quality, *Mordechai Ben-Menachem/Garry S. Marliss,* Cengage Learning, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-III)**

SCRIPTING LANGUAGES

Objectives:

- The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT I

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL-Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance perl - finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics: PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming: Php and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL – Tk: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT V

Python: Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems ,Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-III)**

INFORMATION RETRIEVAL SYSTEMS

Objectives:

On completion of this course you should have gained a good understanding of the foundation concepts of information retrieval techniques and be able to apply these concepts into practice. Specifically, you should be able to:

- To use different information retrieval techniques in various application areas
- To apply IR principles to locate relevant information large collections of data
- To analyse performance of retrieval systems when dealing with unmanaged data sources
- To implement retrieval systems for web search tasks.

UNIT I

Boolean retrieval. The term vocabulary and postings lists. Dictionaries and tolerant retrieval. Index construction. Index compression.

UNIT II

Scoring, term weighting and the vector space model. Computing scores in a complete search system. Evaluation in information retrieval. Relevance feedback and query expansion.

UNIT III

XML retrieval. Probabilistic information retrieval. Language models for information retrieval. Text classification. Vector space classification.

UNIT IV

Support vector machines and machine learning on documents, flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic indexing.

UNIT V

Web search basics, Web crawling and indexes, Link analysis.

TEXT BOOKS:

1. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press, 2008.

REFERENCE BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.
4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
5. Information Storage & Retrieval, Robert Korfhage , John Wiley & Sons.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-III)**

SEMANTIC WEB AND SOCIAL NETWORKS

Objectives:

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

Unit –I:

Web Intelligence: Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Unit -II:

Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

Unit-III:

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

Unit-IV:

Semantic Web Applications, Services and Technology: Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

Unit-V:.

Social Network Analysis and semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience,2008.
2. Social Networks and the Semantic Web, Peter Mika,Springer,2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, R.Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web,T.Segaran,C.Evans,J.Taylor,O'Reilly,SPD.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-III)**

E-COMMERCE

Objectives:

- To identify the major categories and trends of e-commerce applications.
- To identify the essential processes of an e-commerce system.
- To identify several factors and web store requirements needed to succeed in e-commerce.
- To discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- To understand the main technologies behind e-commerce systems and how these technologies interact.
- To discuss the various marketing strategies for an online business.
- To define various electronic payment types and associated security risks and the ways to protect against them.

UNIT - I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT - III

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

UNIT- IV

Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

Consumer Search and Resource Discovery-Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT - V

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

TEXT BOOK:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-IV)**

SOFTWARE SECURITY ENGINEERING

Objectives:

- Students will demonstrate knowledge of the distinction between critical and non-critical systems.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- Students will author a software requirements document.
- Students will demonstrate an understanding of the proper contents of a software requirements document.
- Students will author a formal specification for a software system.
- Students will demonstrate an understanding of distributed system architectures and application architectures.
- Students will demonstrate an understanding of the differences between real-time and non-real time systems.
- Students will demonstrate proficiency in rapid software development techniques.
- Students will be able to identify specific components of a software design that can be targeted for reuse.
- Students will demonstrate proficiency in software development cost estimation.
- Students will author a software testing plan.

UNIT – I

Security a software Issue: introduction, the problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security

What Makes Software Secure: Properties of Secure Software, Influencing the security properties of software, Asserting and specifying the desired security properties?

UNIT – II

Requirements Engineering for secure software: Introduction, the SQUARE process Model, Requirements elicitation and prioritization

UNIT – III

Secure Software Architecture and Design: Introduction, software security practices for architecture and design: architectural risk analysis, software security knowledge for architecture and design: security principles, security guidelines and attack patterns

Secure coding and Testing: Code analysis, Software Security testing, Security testing considerations throughput the SDLC

UNIT – IV

Security and Complexity: System Assembly Challenges: introduction, security failures, functional and attacker perspectives for security analysis, system complexity drivers and security

UNIT – V

Governance and Managing for More Secure Software: Governance and security, Adopting an enterprise software security framework, How much security is enough?, Security and project management, Maturity of Practice

TEXT BOOK:

1. Software Security Engineering: Julia H. Allen, Pearson Education

REFERNCE BOOKS:

1. Developing Secure Software: Jason Grembi, Cengage Learning
2. Software Security : Richard Sinn, Cengage Learning

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-IV)**

CYBER SECURITY

Objectives:

To learn about cyber crimes and how they are planned
To learn the vulnerabilities of mobile and wireless devices
To learn about the crimes in mobile and wireless devices

UNIT-I

Introduction to Cybercrime:

Introduction, Cybercrime and Information security, who are cybercriminals, Classifications of Cybercrimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

Cyber offenses: How criminals Plan Them

Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT-II

Cybercrime: Mobile and Wireless Devices

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT III

Cybercrimes and Cyber security: the Legal Perspectives

Introduction

Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment

Cyber law, Technology and Students: Indian Scenario.

UNIT IV

Understanding Computer Forensics

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques

Forensics Auditing

UNIT V

Cyber Security: Organizational Implications

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text book:

1. **Cyber Security**: *Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. **Introduction to Cyber Security** , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group

Reference book:

1. **Cyber Security Essentials**, James Graham, Richard Howard and Ryan Otson, CRC Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-IV)**

INFORMATION SECURITY AND AUDIT

Objectives:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC),public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service,

Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security:

Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security:

Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering) **(Core Elective-IV)**

BUSINESS PROCESS MANAGEMENT

Objectives:

- To recognize the role of business processes within an Infinity based application
- To understand the importance of parameter sets to a business process
- To learn common patterns and best practices for formatting and restricting the output from a business process
- To understand the difference between a business process and a business process instance
- To learn how data processing occurs within a business process
- To list the Infinity SDK software developer responsibilities for building and supporting the functionality required for a business process
- To describe the database tables used by Blackbaud Enterprise CRM to manage business processes
- To describe how a QueryViewSpec can be used to define the output format for a business process
- To describe how a selection can be used to limit the rows processed by a business process

UNIT I

UNDERSTANDING BPM - I:

How can we demystify business process management?

What is business process management?

Why is it important to improve business process before automating them?

When should you do BPM – what are the main drivers and triggers?

Who should be involved in BPM?

UNIT II

UNDERSTANDING BPM - II:

Why are organizational strategy and process architecture important in BPM implementation?

How do you sell BPM technology to the organization?

What are the critical success factors in a BPM project?

What are the critical implementation aspects for a BPM solution?

UNIT III

FRAMEWORK - I:

Framework overview, Guidelines on how to use the framework, Organization strategy phase, Process architecture phase, Launch pad phase, Understand phase, Innovate phase.

UNIT IV

FRAMEWORK – II:

People phase, Develop phase, Implement phase, Realize value phase, Sustainable performance phase, Essentials introduction, Project management, People change management, Leadership.

UNIT V

BPM AND THE ORGANIZATION:

BPM maturity, Embedding BPM within the organization.

TEXT BOOKS:

1. Business Process Management, Practical guidelines to successful implementations, John Jeston and Johan Nelis, Second edition, Elsevier, 2009.
2. Management by Process, A roadmap to sustainable Business Process Management, John Jeston and Johan Nelis, Elsevier, 2009.

REFERENCE BOOK:

1. Business Process Management Systems, Strategy and Implementation, James F. Chang, Auerbach Publications, Taylor and Francis group, 2005

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech- I Year – II Semester (Software Engineering)

SOFTWARE TESTING LAB

Objectives:

The student should be able to:

- To understand software testing and quality assurance as a fundamental component of software life cycle
- To define the scope of SW T&QA projects
- To efficiently perform T&QA activities using modern software tools
- To estimate cost of a T&QA project and manage budgets
- To prepare test plans and schedules for a T&QA project
- To develop T&QA project staffing requirements
- To effectively manage a T&QA project

Software Testing Objectives:

To learn to use the following (or similar) automated testing tools to automate testing:

a. Win Runner/QTP for functional testing.
b. LoadRunner for Load/Stress testing.
c. Test Director for test management.
d. JUnit,HTMLUnit,CPPUnit.

Sample problems on testing:

1. Write programs in 'C' Language to demonstrate the working of the following constructs:
   i) do...while ii) while….do iii) if…else iv) switch v) for
2. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Refer Page no 115 in Text book 2(Foundations of software testing by Rex Black,Erik Van Veenendaal, Dorthy Graham) for the described scenario and observe the given
   i. Equivalence Partioning /Boundary Value Analysis ii. Decision Tables
   ii. State transition iv. Statement and decision testing. consider any other scenario of your choice and do the same.
7. Refer Page no 158 in Text book 2(Foundations of software testing by Rex Black,Erik Van Veenendaal, Dorthy Graham) for the described scenario and observe the given **Incident Report** and consider any other scenario of your choice and do the same.
2. Study of any testing tool (e.g. Win runner)
3. Study of any web testing tool (e.g. Selenium)
4. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
5. Study of any test management tool (e.g. Test Director)
6. Study of any open source-testing tool (e.g. Test Link)
7. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

Additional problems on testing:

1. Test the following using JUnit and CPPUnit:
   i) Sorting problems ii) Searching problems
   iii) Finding gcd of two integers iv) Finding factorial of a number.
2. Test web based forms using HTMLUnit.
3. Test database stored procedures using SQLUnit.

(Use sufficient number of test cases in solving above Problems)

***Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry"**

TEXT BOOKS:

1. Software Testing Concepts and Tools, P.Nageswara Rao, Dream Tech Press, 2007.
2. Foundations of software testing by Rex Black,Erik Van Veenendaal,Dorthy Graham
3 Software Testing Concepts and Tools by Nageshwara Rao Pusuluri, Drean Tech Press
4. Software Testing Tools, *K.V.K.K. Prasad*, Dream Tech Press, 2008.

5. Software Testing with Visual Studio Team System 2008, S.Subashini, N.Satheesh kumar, Shroff Publishers Distributors.
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