

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech. SOFTWARE ENGINEERING

EFFECTIVE FROM ACADEMIC YEAR 2017- 18 ADMITTED BATCH

COURSE STRUCTURE AND SYLLABUS

I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Advanced Algorithms	25	75	4	0	0	4
PC-2	Software Development Methodologies	25	75	4	0	0	4
PC-3	Software Requirements and Estimation	25	75	4	0	0	4
PE-1	1. Cloud Computing 2. Database Internals 3. Cryptography and Network Security 4. Internet Technologies and Services	25	75	3	0	0	3
PE-2	1. Big Data Analytics 2. Web Mining 3. Machine Learning 4. Software Metrics and Quality Assurance	25	75	3	0	0	3
OE-1	*Open Elective – 1	25	75	3	0	0	3
Laboratory I	Software Development Methodologies Lab	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		275	525	21	0	6	25

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Software Architecture and Design Patterns	25	75	4	0	0	4
PC-5	Software Process and Project Management	25	75	4	0	0	4
PC-6	Software Quality Assurance and Testing	25	75	4	0	0	4
PE-3	1. Scripting Languages 2. Information Retrieval Systems 3. Semantic Web and Social Networks 4. E-Commerce	25	75	3	0	0	3
PE-4	1. Software Security Engineering 2. Cyber Security 3. Information Security and Audit 4. Systems Engineering	25	75	3	0	0	3
OE-2	*Open Elective – 2	25	75	3	0	0	3
Laboratory II	Software Testing Lab	25	75	0	0	3	2
Seminar II	Seminar -II	100	0	0	0	3	2
Total		275	525	21	0	6	25

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	200	100	0	3	22	14

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	100	100	0	0	24	24

*Open Elective subjects must be chosen from the list of open electives offered by **OTHER** departments.

For Project review I, please refer 7.10 in R17 Academic Regulations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

ADVANCED ALGORITHMS (PC -1)

Course 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 : Introduction - Role of algorithms in computing, Analyzing algorithms, Designing Algorithms, Growth of Functions, Divide and Conquer- The maximum-subarray problem, Strassen's algorithms for matrix multiplication, The substitution method for solving recurrences, The recurrence-tree method for solving recurrence, The master method for solving recursions, Probabilistic analysis and random analysis.

Unit - II: Review of Data Structures- Elementary Data Structures, Hash Tables, Binary Search Trees, Red-Black Trees.

Unit - III: Dynamic Programming - Matrix-chain multiplication, Elements of dynamic programming, Longest common subsequence, Greedy Algorithms - Elements of the greedy strategy, Huffman codes, Amortized Analysis - Aggregate analysis, The accounting method, The potential method, Dynamic tables.

Unit - IV: Graph Algorithms - Elementary Graph Algorithms, Minimal spanning trees, Single-Source Shortest Paths, Maximum flow.

Unit - V: NP-Complete & Approximate Algorithms-Polynomial time, Polynomial-time verification, NP-completeness and reducibility, NP-complete & approximation problems - Clique problem, Vertex-cover problem, formula satisfiability, 3 CNF Satisfiability, The vertex-cover problem, The traveling-salesman problem, The subset-sum problem.

TEXT BOOKS:

1. "Introduction to Algorithms", Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third *Edition*, PHI Publication.
2. "Data Structures and Algorithms in C++", M.T. Goodrich, R. Tamassia and D.Mount, Wiley India.

REFERENCES:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Second Edition, Galgotia Publication
2. Data structures with C++, J. Hubbard, Schaum's outlines, TMH.
3. Data structures and Algorithm Analysis in C++, 3rd edition, M. A. Weiss, Pearson.
4. Classic Data Structures, D. Samanta, 2nd edition, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

SOFTWARE DEVELOPMENT METHODOLOGIES (PC - 2)

Course 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, RP 2009
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 (PC - 3)

Course 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

M. Tech - I Year-I Sem (Software Engineering)

**CLOUD COMPUTING
(Professional Elective- 1)**

Course 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 Map Reduce.

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 Madiseti, 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, Kumara swamy 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)

DATABASE INTERNALS (Professional Elective- 1)

Course Objectives: By the end of the course, student 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)

**CRYPTOGRAPHY AND NETWORK SECURITY
(Professional Elective- 1)**

Course Objectives:

- Understand the basic categories of threats to computers and networks
- Understand various cryptographic algorithms.
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

Course Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security

UNIT – I

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT – III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512),

Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT – IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

UNIT – V

E-Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, Cengage Learning
6. Network Security and Cryptography: Bernard Menezes, Cengage Learning

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

INTERNET TECHNOLOGIES AND SERVICES (Professional Elective- 1)

Course 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 Java Scripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in Java Script, Dynamic HTML with Java Script and with CSS, form validation with Java Script, 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 and Javasever Pages VOLUME 1: Core Technologies, Marty Hall and Larry Brown Pearson.
3. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson.
4. Jakarta Struts Cookbook, Bill Siggelkow, S P D O'Reilly.
5. Professional Java Server Programming, S. Allamaraju & others Apress (dreamtech).
6. Java Server Programming, Ivan Bayross and others, The X Team, SPD
7. Web Warrior Guide to Web Programming - Bai/Ekedaw-Cengage Learning.
8. Beginning Web Programming-Jon Duckett , WROX.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

BIG DATA ANALYTICS (Professional Elective- 2)

Course Objectives:

- To understand about big data
- To learn the analytics of Big Data
- To Understand the Map Reduce 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, HDFS Files, File system types, commands, org.apache.hadoop.io package, 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; HDFS (Hadoop Distributed File System), HDFS 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™, Dream Tech 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, Shaku Atre, “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)

WEB MINING (Professional Elective- 2)

Course 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)

**MACHINE LEARNING
(Professional Elective - 2)**

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT - I

Introduction - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning

Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias

UNIT - II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition
Advanced topics in artificial neural networks

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms

UNIT - III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm

Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - **Instance-Based Learning**- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

UNIT - IV

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge

UNIT - V

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators,

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ. Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.
4. Machine Learning by Peter Flach , Cambridge.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

SOFTWARE METRICS AND QUALITY ASSURANCE (Professional Elective- 2)

Course Objectives:

- To gain basic knowledge about metrics, measurement theory and related terminologies
- To learn measure the quality level of internal and external attributes of the software product
- To introduce the basics of software reliability and to illustrate how to perform planning, executing and testing for software reliability
- To explore various metrics and models of software reliability
- To compare various models of software reliability based on its application

Course Outcomes: Upon completion of the course, students shall be able to

- Identify and apply various software metrics, which determines the quality level of software
- Identify and evaluate the quality level of internal and external attributes of the software product
- Compare and Pick out the right reliability model for evaluating the software
- Evaluate the reliability of any given software product
- Design new metrics and reliability models for evaluating the quality level of the software based on the requirement.

UNIT-I

What Is Software Quality: Quality: Popular Views, Quality Professional Views, Software Quality, Total Quality Management, and Summary. Fundamentals Of Measurement Theory: Definition, Operational Definition, And Measurement, Level Of Measurement, Some Basic Measures, Reliability And Validity, Measurement Errors, Be Careful With Correlation, Criteria For Causality, Summary. Software Quality Metrics Overview: Product Quality Metrics, In Process Quality Metrics, Metrics for Software Maintenance, Examples for Metrics Programs, Collecting software Engineering Data.

UNIT-II

Applying The Seven Basic Quality Tools In Software Development: Ishikawa's Seven Basic Tools, Checklist, Pareo Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause, and Effect Diagram. The Rayleigh Model: Reliability Models, the Rayleigh Model Basic Assumptions, Implementation, Reliability and Predictive Validity.

UNIT-III

Complexity Metrics and Models: Lines of Code, Halstead's Software Science, Cyclomatic Complexity Syntactic Metrics, An Example of Module Design Metrics in Practice .Metric And Lessons Learned for Object Oriented Projects: Object Oriented Concepts And Constructs, Design And Complexity Metrics, Productivity Metrics, Quality And Quality Management Metrics, Lessons Learned For object oriented Projects.

UNIT-IV

Availability Metrics: Definition and Measurement of System Availability, Reliability Availability and Defect Rate, Collecting Customer Outage Data For Quality Improvement, In Process Metrics For Outage And Availability. Conducting Software Project Assessment: Audit Ad Assessment, Software Process Maturity Assessment And Software Project Assessment, Software Process Assessment A Proponed Software Project Assessment Method.

UNIT-V

Dos And Don'ts Of Software Process Improvement :Measuring Process Maturity, Measuring Process Capability, Staged Versus Continuous Debating Religion, Measuring Levels Is Not Enough, Establishing The Alignment Principle ,Take Time Getting Faster, Keep it Simple Or Face Decomplexification, Measuring The Value Of Process Improvement ,Measuring Process Compliance , Celebrate The Journey Not Just The Destination. Using Function Point Metrics to Measure Software Process Improvement: Software Process Improvement Sequences, Process Improvement Economies, Measuring Process Improvement at Activity Levels.

TEXT BOOK:

1. Norman E-Fentor and Share Lawrence Pflieger." Software Metrics". International Thomson Computer Press, 1997.
2. Stephen H Khan: Metrics and Models in Software Quality Engineering, Pearson 2nd edition 2013.

REFERENCES:

1. S.A. Kelkar, "Software quality and Testing, PHI Learning, Pvt., Ltd., New Delhi 2012.
2. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc, 2008.
3. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "CMMI", Pearson Education (Singapore) Pvt. Ltd., 2003
4. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", Mass Market, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

SOFTWARE DEVELOPMENT METHODOLOGIES LAB

Course 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 enrolls 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 one's 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 every day, 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 where in 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 of 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. I YEAR I SEMESTER

List of Open Electives Offered by Various Departments, Effective from AY 2017- 18

S. No	Name of the Department	Open Elective (S) Offered for Other Departments
1	Civil Engineering (Open Elective – I)	Computer Oriented Numerical Methods
2	Electronics and Communication Engineering (Open Elective – I)	Principles of Electronic Communications
3	Electrical and Electronics Engineering (Open Elective – I)	Renewable Energy Systems, Electrical Installation & Safety
4	Mechanical Engineering (Open Elective – I)	Optimization Techniques and Applications
5	Computer Science and Engineering (Open Elective – I)	Fundamentals of Cyber Security

CIVIL ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

COMPUTER ORIENTED NUMERICAL METHODS (Open Elective – 1)

Course Objectives: To impart knowledge about various methods of analysing linear equations and understand the different mathematical techniques.

Course Outcomes: The learner will be able to apply various mathematical techniques to Structural engineering problems.

Unit - I:

Solutions of linear equations: Direct method – Cramer's rule, Gauss – Elimination method- Gauss – Jordan elimination – Triangulation (LU Decomposition) method – Iterative methods Jacobi – Iteration method – Gauss – Siedel iteration, Successive over –relaxation method.

Eigen values and Eigen vectors: Jacobi method for symmetric matrices- Given's method for symmetric matrices-Householder's method for symmetric matrices-Rutishauser method of arbitrary matrices – Power method.

UNIT - II:

Interpolation: Linear Interpolation – Higher order Interpolation – Lagrange Interpolation – Interpolating polynomials using finites differences- Hermite Interpolation –piece-wise and spline Interpolation_

Unit - III

Finite Difference and their Applications: Introduction- Differentiation formulas by Interpolating parabolas – Backward and forward and central differences- Derivation of Differentiation formulae using Taylor series- Boundary conditions- Beam deflection – Solution of characteristic value problems- Richardson's extrapolation- Use of unevenly spaced pivotal points- Integration formulae by interpolating parabolas- Numerical solution to spatial differential equations – Applications to Simply Supported Beams, Columns and Rectangular Plates.

UNIT - IV

Numerical Differentiation: Difference methods based on undetermined coefficients- optimum choice of step length– Partial differentiation.

Numerical Integration: Method based on interpolation-method based on undetermined coefficient – Gauss – Lagrange interpolation method- Radaua integration method- composite integration method – Double integration using Trapezoidal and Simpson's method – New Marks Method and Application to Beams – Calculation of Slopes and Deflections.

UNIT - V

Ordinary Differential Equation: Euler's method – Backward Euler method – Midpoint method – single step method, Taylor's series method- Boundary value problems.

TEXT BOOKS:

1. Numerical methods for scientific and engineering computations. M.K. Jain-S.R.K. Iyengar – R.K. Jain Willey Eastern Limited
2. Numerical Methods for Engineering Problems, N. Krishna Raju, KU Muthu, Mac-Millan publishers

REFERENCES:

1. Introductory Numerical Methods by S.S. Shastry, PHI Learning Pvt. Ltd.
2. Applied numerical analysis by – Curtis I. Gerala- Addison Wasley – published campus.
3. Numerical methods for Engineers Stevan C. Chopra, Raymond P. Canal Mc. Graw Hill Book Company.
4. C Language and Numerical methods by C. Xavier – New age international publisher.
5. Computer based numerical analysis by Dr. M. Shanta Kumar, Khanna Book publishers, New Delhi.

ELECTRONICS AND COMMUNICATION ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

PRINCIPLES OF ELECTRONIC COMMUNICATIONS

(Open Elective -1)

UNIT - I

Introduction: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels.

UNIT - II

Simple description on Modulation: Analog Modulation-AM, FM, Pulse Modulation-PAM, PWM, PCM, Digital Modulation Techniques-ASK, FSK, PSK, QPSK modulation and demodulation schemes.

UNIT - III

Telecommunication Systems: Telephones Telephone system, Paging systems, Internet Telephony.
Networking and Local Area Networks: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

UNIT - IV

Satellite Communication: Satellite Orbits, satellite communication systems, satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems.

Optical Communication: Optical Principles, Optical Communication Systems, Fiber –Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

UNIT - V

Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA, WCDMA.

Wireless Technologies: Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.

TEXT BOOKS

1. Louis E. Frenzel, "Principles of Electronic Communication Systems", 3rd Ed., McGraw Hill publications, 2008.
2. Kennady, Davis, "Electronic Communications systems", 4Ed., TMH, 1999

REFERENCE BOOKS

1. Tarmo Anttalainen, "Introduction to Telecommunications Network Engineering", Artech House Telecommunications Library.
2. Theodore Rappaport, "Wireless Communications-Principles and practice", Prentice Hall, 2002.
3. Roger L. Freeman, "Fundamentals of Telecommunications", 2 Ed. Wiley publications.
4. Wayne Tomasi, "Introduction to data communications and networking", Pearson Education, 2005.

ELECTRICAL AND ELECTRONICS ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

RENEWABLE ENERGY SYSTEMS

(Open Elective - I)

Course Objectives:

- To recognize the awareness of energy conservation in students
- To identify the use of renewable energy sources for electrical power generation
- To collect different energy storage methods
- To detect about environmental effects of energy conversion

Course Outcomes: Upon the completion of this course, the student will be able to

- find different renewable energy sources to produce electrical power
- estimate the use of conventional energy sources to produce electrical energy
- role-play the fact that the conventional energy resources are depleted
- arrange Store energy and to avoid the environmental pollution

Unit-I:

Photo voltaic power generation ,spectral distribution of energy in solar radiation, solar cell configurations, voltage developed by solar cell, photo current and load current, practical solar cell performance, commercial photo voltaic systems, test specifications for PV systems, applications of super conducting materials in electrical equipment systems.

Unit-II:

Principles of MHD power generation, ideal MHD generator performance, practical MHD generator, MHD technology.

Wind Energy conversion: Power from wind, properties of air and wind, types of wind Turbines, operating characteristics.

Unit-III:

Tides and tidal power stations, modes of operation, tidal project examples, turbines and generators for tidal power generation.

Wave energy conversion: properties of waves and power content, vertex motion of Waves, device applications. Types of ocean thermal energy conversion systems Application of OTEC systems examples,

Unit-IV:

Miscellaneous energy conversion systems: coal gasification and liquefaction, biomass conversion, geothermal energy, thermo electric energy conversion, principles of EMF generation, description of fuel cells, Co-generation and energy storage, combined cycle co-generation, energy storage.

Global energy position and environmental effects: energy units, global energy position.

Unit-V:

Types of fuel cells, H₂-O₂ Fuel cells, Application of fuel cells – Batteries, Description of batteries, Battery application for large power. Environmental effects of energy conversion systems, pollution from coal and preventive measures steam stations and pollution, pollution free energy systems.

TEXT BOOKS:

1. "Energy conversion systems" by Rakosh das Begamudre, New age International publishers, New Delhi - 2000.

2. "Renewable Energy Resources" by John Twidell and Tony Weir, 2nd Edition, Fapon & Co.

REFERENCES:

1. "Understanding Renewable Energy Systems" by Volker Quaschnig, 2005, UK.
2. "Renewable Energy Systems-Advanced Conversion, Technologies & Applications" by Faner Lin Luo Honer Ye, CRC press, Taylor & Francis group.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

ELECTRICAL INSTALLATION & SAFETY (Open Elective - I)

Course Objectives: The course should enable the students to:

- Understand Electrical Wiring with IE rules. Residential Building Electrification, Electrification of commercial Installation, Electrification of factory unit Installation
- Protection against electric shocks, Safety Measures & Prevention of Accidents

Course Outcomes: The students will be able to:

- Acquire the knowledge of different types wires and wiring systems, I.E. rules and Electric supply act.
- Explain the importance of earthing, rating of wires & cables, procedures for residential, commercial electrification.
- Able to estimate the length of wire, cable, conduit, earth wire, and earthing and also cost of residential, commercial electrification.

Unit-I: Electrical Wiring with IE rules.

Introduction, Define types of wires; Different types of wiring system; Comparison of different types of wiring; Different types and specifications of wiring materials; Accessories and wiring tools; Prepare I.E. rules for wiring, including Electricity supply act 2003& 2005;

Unit-II : Residential Building Electrification

General rules guidelines for wiring of Residential Installation and positioning of equipment's; Principles of circuit design in lighting and power circuits.; Procedures for designing the circuits and deciding the number of circuits.; Method of drawing single line diagram.; Selection of type of wiring and rating of wires &cables.; Load calculations and selection of size of conductor.; Selection of rating of main switch, distributions board, protective switchgear ELCB and MCB and wiring accessories.; Earthing of Residential Installation.

Unit-III: Electrification of commercial Installation

Concept of commercial Installation.; Differentiate between electrification of Residential and commercial Installation.; Fundamental considerations for planning of an electrical Installation system for commercial building.; Design considerations of electrical Installation system for commercial building.; Load calculations & selection of size of service connection and nature of supply.; Deciding the size of cables, bus bar and bus bar chambers.; Mounting arrangements and positioning of switch boards, distribution boards main switch etc.; Earthing of the electrical Installation; Selection of type wire, wiring system & layout.

Unit-IV: Electrification of factory unit Installation

Concept of Industrial load; Concept of Motor wiring circuit and single line diagram. Important guidelines about power wiring and Motor wiring.; Design consideration of Electrical Installation in small Industry/Factory/workshop.; Motor current calculations.; Selection and rating of wire, cable size & conduct.; Deciding fuse rating, starter, distribution boards main switch etc.; Deciding the cable route, determination of length of wire, cable, conduit, earth wire, and earthing.

Unit-V: Protection against electric shocks

Electric shock- General , Protection against direct contact, Protection against indirect contact, Protection of goods in case of insulation fault, Implementation of the TT system, Implementation of the TN system, Implementation of the IT system. Protection provided for enclosed equipment: codes IP

and IK, IP code definition, Elements of the IP Code and their meanings, IK Code definition, IP and IK code specifications for distribution switchboards

Safety Measures & Prevention of Accidents- Concept of electrical safety, electrical accidents, its causes & preventions.; Safety signs and symbols used in industry.; Electrical shocks and factors affecting the severity of it, method of rescuing electrocuted person & different methods of artificial respiration.; Electrical safety as per I.E. Rules 1956.; Do's & don'ts regarding safety while working on electrical installations.; Concept of Permit system, its preparation & regulation for attending to electrical work.; Precautions to be taken to avoid fire due to electrical reasons, operation of fire extinguishers, types of fire extinguishers.

TEXT BOOKS:

1. Dr. S.L. Uppal of Electrical Wiring, Estimating and Costing, New Age International (p) Limited, New Delhi.
2. Electrical Design Estimating and Costing, K.B. Raina & S.K. Battacharya, new age international (p) limited. Publishers
3. Electrical estimating & costing 2nd addition By Surjit singh
4. Electrical Installation Estimating & Costing, Gupta, J.B., S. K. Kataria & Sons, New Delhi

MECHANICAL ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech. I Year - I Sem.

OPTIMIZATION TECHNIQUES AND APPLICATIONS (Open Elective – 1)

UNIT- I

Single Variable Non-Linear Unconstrained Optimization: One dimensional Optimization methods:- Uni-modal function, elimination methods, ,, Fibonacci method, golden section method, interpolation methods – quadratic & cubic interpolation methods.

UNIT-II

Multi variable non-linear unconstrained optimization: Direct search method – Univariate method - pattern search methods – Powell's- Hook -Jeeves, Rosenbrock search methods- gradient methods, gradient of function, steepest decent method, Fletcher Reeves method, variable metric method.

UNIT- III

Linear Programming: Formulation – Sensitivity analysis. Change in the constraints, cost coefficients, coefficients of the constraints, addition and deletion of variable, constraints.

Simulation – Introduction – Types- steps – application – inventory – queuing systems

UNIT -IV

Integer Programming: Introduction – formulation – Gomory cutting plane algorithm – Zero or one algorithm, branch and bound method

Stochastic programming:

Basic concepts of probability theory, random variables- distributions-mean, variance, correlation, co variance, joint probability distribution- stochastic linear, dynamic programming.

UNIT- V

Geometric Programming: Polynomials – arithmetic - geometric inequality – unconstrained G.P- constrained G.P (<= TYPE ONLY)

Non-traditional optimization Techniques: Genetic Algorithms-Steps-Solving simple problems- Comparisons of similarities and dissimilarities between traditional and non-traditional techniques- Particle Swarm Optimization (PSO)- Steps(Just understanding)-Simulated Annealing-Steps-Simple problems.

REFERENCES:

1. Optimization theory & Applications / S.S. Rao / New Age International.
2. Engineering Optimization-Kalyan Deb/ PHI
3. Introductory to operation Research / Kasan & Kumar / Springer
4. Optimization Techniques theory and practice / M.C.Joshi, K.M. Moudgalya/ Narosa
5. Publications
6. Operation Research / H.A. Taha /TMH
7. Optimization in operations research / R.L Rardin
8. Optimization Techniques /Benugundu & Chandraputla / Pearson Asia

COMPUTER SCIENCE AND ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

FUNDAMENTALS OF CYBER SECURITY

(Open Elective - I)

Course Objective:

This course is aimed to generate interest and awareness in cyber security field, which is important in the world of information security due to the wide variety of computer crimes that take place in cyber space. The course deals with various types of attacks framed by an attacker, and the security which need to be implemented at various levels along with latest trends in cyber security.

UNIT-I:

Cyber Security Basics – Sphere, Terminology, Vulnerability in the Cyber Structure and Infrastructure, Cyber threats and Weaponry, Cyber Defense, Cyber Attack Detection and Prevention, Information Security Testing, Cyber Security Investigation/assessment, Cyber-Deterrence.

UNIT-II:

Cyber Crimes and Cyber Laws – Introduction, IT laws & Cyber Crimes – Internet, Hacking, Password Cracking, Viruses, Virus Attacks, Pornography, Software Privacy, Intellectual Property, Legal System of Information Technology, Social Engineering, Phishing, Denial of Service attack, Malicious Code, Mail Bombs, Worms, Logic Bombs, Botnet, Trojan, Bug Exploits.

UNIT-III:

End point Security: Desktop and Laptop Security, Cell Phone and PDA Security, Bluetooth Security, Patch and Vulnerability Management, Password Management, Security for Full Virtualization Technologies, Media Sanitization, Security Radio Frequency Identification (RFID) Systems. **Network Security:** Intrusion Detection & Prevention Systems, Firewalls and Firewall Policy, Computer Security Log Management, Enterprise Tele work and Remote Access Security, Securing WiMAX Wireless Communication. **Web Security:** Server Security, Web authentication, SSL and SET, Securing Public Web Servers, Secure Deployment of IPv6, Secure Domain name System (DNS) Deployment, SSL VPNs, Unified Threat Management (UTM).;

UNIT-IV:

Application Security: Active Content and Mobile Code, E-commerce Security, Email Security (PGP, S/MIME), Web Security, Web Application Security, OWASP; **Data Security:** Data Management, Database Security, Data Encryption, Data Leakage Prevention (DLP), Data Destruction; **Software Security:** Software Flaws, Malware, Software based Attacks; Insecurity in Software: SRE, Software Tamper Resistance, DRM, Software Development.

Operating System Security: Security Functions, Software Updates and Patches, OS Integrity Checks, Account management, Antivirus Software, Security in Ordinary Operating Systems, Design of Secure OS, OS hardening, Configuring the OS for security, Security kernels, Secure Virtual machine Systems, Trusted Operating System, NGSCB.

UNIT-V:

Recent Trends in Cyber Security – Zero – day Malware, Trojan Wars, New Ways to Monetize Non-Financial Data, Fraud-as-a-service, Out-of-band Methods forcing Cybercriminals to Innovate, The Rise of Hactivism, Attacks in mobile devices, social media and cloud computing; Insider threats, Increased regulatory security, Cyber-Terrorism, Cyber –War and Cyber-Peace. Topological Vulnerability Analysis, Cyber Situational Awareness, Secure Composition of Systems, Autonomic Recovery, Secure Data Centers, Cloud Computing Security, Privacy in location-Based Applications.

TEXT BOOKS:

1. Cyber Security, Edward Amoroso, kindle Edition, 2007
2. Cyber Security ,Understanding Cyber crimes, Computer Forensics and Legal Perspectives, Sunita Belapure and Nina Godbole, Wiley India Pvt Ltd. 2011

REFERENCES:

1. Computer Security, Dirter Gollmann, John Wiley & Sons Publication, 2011
2. Cyber Security Essentials, James Graham, Richard Howrad, Ryan Olson, CRC Press, 2011

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech- I Year – II Semester (Software Engineering)

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS (PC – 4)

Course 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 (PC – 5)

Course 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
4. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
5. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.

6. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
7. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
8. The Art of Project Management, Scott Berkun, SPD, O'Reilly, 2011.
9. Applied Software Project Management, Andrew Stellman & Jennifer Greene, SPD, O'Reilly, rp 2011.
10. 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 (PC – 6)

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech- I Year – II Semester (Software Engineering)

SCRIPTING LANGUAGES (PE - 3)

Course Objectives:

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand the high-performance programs designed to strengthen the practical expertise.

UNIT - I:

Introduction to Python, Installing Python. How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations (Operators. Type conversions, Expressions), More about Data Output. Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Data types and Expressions: Strings, Assignment and Comments, Numeric Data Types and Character Sets, Expressions, Functions and Modules.

UNIT - II:

Control Statements: Definite Iteration, Formatting Text for Output, Selection, Conditional Iteration.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions-Generating Random Numbers, The math Module, Storing Functions in Modules.

UNIT - III:

Strings and Text Files : Accessing Characters and Substrings in a String, Strings and Number System, String Methods, Basic String Operations, String Slicing, Testing, Searching, and Manipulating Strings. Text Files, Data Encryption, Lists, Introduction to Lists, List slicing, Finding Items in Lists with the in Operator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists, Tuples Sequences, Tuples. Dictionaries and Sets: Dictionaries, Sets, Serializing Objects. Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

UNIT - IV:

Design with Classes: Classes and Objects, Classes and Functions, Classes and Methods, Working with Instances, Inheritance and Polymorphism. Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, techniques for Designing Classes.

UNIT - V:

Graphical User Interfaces: Behavior of terminal based programs and GUI-based programs, Coding simple GUI-based programs, other useful GUI resources. GUI Programming: Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Simple Graphics and Image Processing: Overview of Turtle Graphics, Two dimensional Shapes, Colors and RGB System, Image Processing.

TEXT BOOKS:

1. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning.
2. Think Python First Edition, **by Allen B. Downey, Orielly publishing**

REFERENCE BOOKS:

1. Introduction to Computation and Programming Using Python. , John V. Guttag, The MIT Press James Payne, Beginning Python using Python 2.6 and Python 3, Wrox publishing
2. Paul Gries, Practical Programming: An Introduction to Computer Science using Python 3 The Pragmatic Bookshelf, 2nd edition (4 Oct. 2013)
3. Charles Dierach, Introduction to Computer Science using Python

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech - I Year – II Semester (Software Engineering)

INFORMATION RETRIEVAL SYSTEMS (PE - 3)

Course 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)

SEMANTIC WEB AND SOCIAL NETWORKS (PE - 3)

Course 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)

E-COMMERCE (PE - 3)

Course 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)

SOFTWARE SECURITY ENGINEERING (PE - 4)

Course 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 throughout 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

REFERENCE 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)

CYBER SECURITY (PE - 4)

Course 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 and 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)

INFORMATION SECURITY AND AUDIT (PE - 4)

Course 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)

SYSTEMS ENGINEERING (PE - 4)

UNIT – I

Introduction: Introduction to Systems Engineering, System life cycle, System Vee model, Decision making during system design. Six functions of design process, System architectures, System requirements analysis, specifications, documentation, Overview of the Systems Engineering Design Process

UNIT-II

Modeling: System modeling through IDEF0 models, Modeling and SysML Modeling, Higraphs, N2 charts, Decision analysis for design tradeoffs, Decision making under uncertainty, System Failure Analysis

UNIT – III

System Architecture Development: Functional Architecture Development, Physical Architecture Development

UNIT- IV

Interface Design: Interface Design, Integration, and Qualification

UNIT- V

Supplementary Topics: Graphical Modeling Techniques, IDEF0 Model of the Engineering of a System

TEXTBOOKS:

1. Dennis M Beude, The engineering Design of Systems: Models and Methods, Wiley India, 2006.
2. Alexander Kossakoff, William N Sweet, Systems Engineering: Principles and Practice, Wiley India, 2010

REFERENCES:

1. E K Antonsson and J Cagan (Ed) Formal Engineering Design Synthesis, Cambridge University press, NY, 2001.
2. A Ertas & J C Jones, The Engineering Design Process, John Wiley and Sons, 1993.
3. A Chakrabarti (Ed.), Engineering Design & Synthesis, Springer, 2002

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech- I Year – II Semester (Software Engineering)

SOFTWARE TESTING LAB

Course 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. Load Runner for Load/Stress testing.
- c. Test Director for test management.
- d. JUnit, HTML Unit, 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, Dorothy Graham) for the described scenario and observe the given
 - i. Equivalence Partitioning /Boundary Value Analysis
 - ii. Decision Tables
 - iii. 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, Dorothy 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 CPP Unit:
 - 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, Dorothy Graham
3. Software Testing Concepts and Tools by Nageshwara Rao Pusuluri, Dream 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.
6. Software Automation Testing Tools for Beginners, *Rahul Shende*, Shroff Publishers and Distributors, 2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. TECH. I YEAR II SEMESTER

List of Open Electives Offered by Various Departments, Effective from AY 2017 - 18

S. No	Name of the Department	Open Elective (S) Offered for Other Departments
1	Civil Engineering (Open Elective – II)	1. Finite Element Method 2. Optimization Techniques
2	Electronics and Communication Engineering (Open Elective – II)	1. Industrial Instrumentation 2. Principles of Computer Communications and Networks
3	Electrical and Electronics Engineering (Open Elective – II)	1. Energy From Waste 2. Distributed Generation and Microgrid 3. Reliability Engineering
4	Mechanical Engineering (Open Elective – II)	1. Engineering Research Methodology
5	Computer Science and Engineering (Open Elective – II)	1. Machine Learning

***Open Elective subject must be chosen from the list of open electives offered by **OTHER** departments.**

Ex: A M.Tech ECE student cannot take Open Elective – II offered by ECE Dept, but can select from open electives offered by **OTHER departments.**

CIVIL ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

FINITE ELEMENT METHOD (Open Elective – II)

Course Objectives: To impart knowledge about various finite element techniques and development of finite element code.

Course Outcome: The learner will be able to solve continuum problems using finite element analysis.

UNIT - I

Introduction: Concepts of FEM - steps involved - merits and demerits - energy principles – Discretization - Raleigh - Ritz method of functional approximation.

Principles of Elasticity: Stress equations - strain displacement relationships in matrix form plane stress, plane strain and axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT - II

One dimensional FEM: Stiffness matrix for beam and bar elements - shape functions for 1-D elements.

Two dimensional FEM: Different types of elements for plane stress and plane strain analysis - displacement models - generalized coordinates - shape functions - convergent and compatibility requirements - geometric invariance - natural coordinate system - area and volume coordinates - generation of element stiffness and nodal load matrices

UNIT - III

Isoparametric formulation: Concept - different isoparametric elements for 2D analysis - formulation of 4-noded and 8-noded isoparametric quadrilateral elements - Lagrange elements - serendipity elements.

Axi Symmetric Analysis: bodies of revolution - axi symmetric modeling - strain displacement relationship - formulation of axi symmetric elements.

Three dimensional FEM: Different 3-D elements - strain-displacement relationship – formulation of hexahedral and isoparametric solid element.

UNIT - IV

Introduction to Finite Element Analysis of Plates: Basic theory of plate bending - thin plate theory - stress resultants - Mindlin's approximations - formulation of 4-noded isoperimetric quadrilateral plate element – Shell Element.

UNIT - V

Introduction to non – linear finite analysis – basic methods – application to Special structures.

TEXT BOOKS:

1. A First Course in a Finite Element by Daryl L .Logan, CL Engineers.
2. Concepts and Applications of Finite Element Analysis by Robert D.Cook, DavidS. Malkus and Michael E. Plesha, John Wiley & Sons.

REFERENCES:

1. Introduction to Finite element Method by Tirupathi Chandra Patla and Belugunudu
2. Finite element Methods by OC Zienkiewicz
3. Finite element analysis, theory and programming by GS Krishna Murthy.
4. Introduction to Finite element Method by JN Reddy.

CIVIL ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

OPTIMIZATION TECHNIQUES (Open Elective – II)

Course Objectives: To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems

Course Outcomes: The student will be able to understand the basic principles of optimization, and in a position to formulate optimization models for a wide range of civil engineering problems and able to solve them.

Unit-I

Linear Programming: Introduction and need for optimization in engineering design, formulating linear programs, graphical solution of linear programs, special cases of linear programming.

UNIT - II

The Simplex Method: Converting a problem to standard form, the theory of the simplex method, the simplex algorithm, special situations in the simplex algorithm, obtaining initial feasible solution.

UNIT - III

Duality and Sensitivity Analysis: Sensitivity analysis, shadow prices, dual of a normal linear program, duality theorems, dual simplex method. Integer Programming: Formulating integer programming problems, the branch-and-bound algorithm for pure integer programs, the branch-and-bound algorithm for mixed integer programs.

UNIT - IV

Non-linear Programming: Introduction to non-linear programming (NLP), Convex and concave functions, NLP with one variable, Line search algorithms, Multivariable unconstrained problems, constrained problems, Lagrange Multiplier, The Karush-Kuhn-Tucker (KKT) conditions, the method of steepest ascent, convex combination method, penalty function, Quadratic programming,

UNIT - V

Dynamic programming: Evolutionary algorithms: Genetic Algorithm, concepts of multiobjective optimization, Markov Process, Queuing Models.

TEXT BOOK:

1. S.S. Rao, Engineering Optimization: Theory and Practice, Wiley & Sons, New Jersey, 2009.

REFERENCES:

1. F.H. Hiller and G.J. Liberman, Introduction to Operations Research, Tata-McGraw-Hill, 2010.
2. W.L. Winston, Operations Research: Applications and Algorithm, 4th Edition, Cengage Learning, 1994.
3. K. Deb, Optimization for Engineering Design, Prentice Hall, 2013.
4. M.C. Joshi and K.M. Moudgalay, Optimization: Theory and Practice, Narosa, 2004.
5. K. Deb, Multi-Objective Optimization using evolutionary algorithms, John Wiley and Sons, 2009.

ELECTRONICS AND COMMUNICATION ENGINEERING
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
INDUSTRIAL INSTRUMENTATION (Open Elective – II)

UNIT - I

METROLOGY, VELOCITY AND ACCELERATION MEASUREMENT: Measurement of length - Gauge blocks – Plainness – Area using Simpson’s rule, Plain meter – Diameter – Roughness – Angle using Bevel protractor, sine bars and Clinometer – Mechanical, Electrical, Optical and Pneumatic Comparators. Optical Methods for length and distance measurements using Optical flats and Michelson Interferometer.

Relative velocity – Translational and Rotational velocity measurements – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods. Accelerometers-different types, Gyroscopes-applications.

UNIT - II

FORCE AND PRESSURE MEASUREMENT: Force measurement – Different methods –Gyroscopic Force Measurement – Vibrating wire Force transducer. Basics of Pressure measurement –Manometer types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement – McLeod Gauge, Knudsen Gauge, Momentum Transfer Gauge, Thermal Conductivity Gauge, Ionization Gauge, Dual Gauge Techniques, Deadweight Gauges, Hydrostatic Pressure Measurement

UNIT - III

FLOW MEASUREMENT AND LEVEL MEASUREMENT: Flow Meters- Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type, vortex shedding type, Hotwire anemometer type, Laser Doppler Velocity-meter. Basic Level measurements – Direct, Indirect, Pressure, Buoyancy, Weight, Capacitive Probe methods

UNIT - IV

DENSITY, VISCOSITY AND OTHER MEASUREMENTS: Density measurements – Strain Gauge load cell method – Buoyancy method - Air pressure balance method – Gamma ray method – Vibrating probe method. Units of Viscosity, specific gravity scales used in Petroleum Industries, Different Methods of measuring consistency and Viscosity –Two float viscorator –Industrial consistency meter. Sound-Level Meters, Microphones, Humidity Measurement

UNIT - V

CALIBRATION AND INTERFACING: Calibration using Master Sensors, Interfacing of Force, Pressure, Velocity, Acceleration, Flow, Density and Viscosity Sensors, Variable Frequency Drive

TEXT BOOKS:

1. Doebelin E.O., “Measurement Systems – Applications and Design”, 4th Edition, McGraw Hill International, 1990.
2. Patranabis D, “Principles of Industrial Instrumentation”, TMH. End edition 1997

REFERENCES:

1. Considine D. M., “Process Instruments and Control Handbook”, 4th Edition, McGraw Hill International, 1993
2. Jain R.K., “Mechanical and Industrial Measurements”, Khanna Publications.

ELECTRONICS AND COMMUNICATION ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

PRINCIPLES OF COMPUTER COMMUNICATIONS AND NETWORKS (Open Elective – II)

Prerequisite: Nil

Course Objectives:

- To understand the concept of computer communication.
- To learn about the networking concept, layered protocols.
- To understand various communications concepts.
- To get the knowledge of various networking equipment.

Course Outcomes: The student:

- Can get the knowledge of networking of computers, data transmission between computers.
- Will have the exposure about the various communication concepts.
- Will get awareness about the structure and equipment of computer network structures.

UNIT - I

Overview of Computer Communications and Networking: Introduction to Computer Communications and Networking, Introduction to Computer Network, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT - II

Essential Terms and Concepts: Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications , Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT - III

Analog and Digital Communication Concepts: Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction , Digital Carrier Systems.

UNIT - IV

Physical and data link layer Concepts: The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer , the logical link control and medium access control sub-layers.

UNIT - V

Network Hardware Components: Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, switches Vs Routers.

TEXT BOOKS:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H. Hancock, Thomson Brooks / Cole.

REFERENCE BOOKS:

1. Principles of Computer Networks and Communications, M. Barry Dumas, Morris Schwartz, Pearson.

ELECTRICAL AND ELECTRONICS ENGINEERING
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

ENERGY FROM WASTE (Open Elective – II)

Prerequisite: Renewable Energy Sources, Physics, Environmental Studies

Course Objectives:

- To classify solid waste sources
- To identify methods of solid waste disposal
- To study various energy generation methods
- To analyse biogas production methods and recycling of e-waste

Course Outcomes: Upon the completion of the subject, the student will be able to

- Understand technologies for generation of energy from solid waste
- Compare methods of solid waste disposal
- Identify sources of energy from bio-chemical conversion
- Analyze methods for management of e-waste

UNIT - I

Solid Waste Sources Solid Waste Sources, types, composition, Properties, Global warming, Municipal Solid Waste: Physical, chemical and biological properties , Waste Collection and, Transfer stations, Waste minimization and recycling of municipal waste, Segregation of waste, Size Reduction , Managing Waste. Status of technologies for generation of Energy from Waste Treatment and Disposal Aerobic composting, incineration, Furnace type and design, Medical waste /Pharmaceutical waste treatment Technologies, incineration, Environmental impacts, Measures to mitigate environmental effects due to incineration .

UNIT - II

Land Fill method of Solid waste disposal Land fill classification, Types, methods and Siting consideration, Layout and preliminary design of landfills: Composition, characteristics, generation, Movement and control of landfill leach ate and gases, Environmental monitoring system for land fill gases.

UNIT - III

Energy Generation from Waste Bio-chemical Conversion: Sources of energy generation, anaerobic digestion of sewage and municipal wastes, direct combustion of MSW-refuse derived solid fuel, Industrial waste, agro residues, Anaerobic Digestion.

UNIT - IV

Biogas production, Land fill gas generation and utilization, Thermo-chemical conversion: Sources of energy generation, Gasification of waste using Gasifiers, Briquetting, Utilization and advantages of briquetting, Environmental benefits of Bio-chemical and Thermo- chemical conversion.

UNIT - V

E-waste: e-waste in the global context – Growth of Electrical and Electronics Industry in India – Environmental concerns and health hazards – Recycling e-waste: a thriving economy of the unorganized sector – Global trade in hazardous waste – impact of hazardous e-waste in India. Management of e-waste: e-waste legislation, Government regulations on e-waste management – International experience – need for stringent health safeguards and environmental protection laws of India.

TEXT BOOKS:

1. Nicholas P. Cheremisinoff. Handbook of Solid Waste Management and Waste Minimization Technologies. An Imprint of Elsevier, New Delhi (2003).
2. P. Aarne Vesilind, William A. Worrell and Debra R. Reinhart. Solid Waste Engineering. Thomson Asia Pte Ltd. Singapore (2002)
3. M. Dutta , B. P. Parida, B. K. Guha and T. R. Surkrishnan. Industrial Solid Waste Management and Landfilling practice. Narosa Publishing House, New Delhi (1999).

4. "E-waste in India: Research unit, Rajya Sabha Secretariat, New Delhi, June 2011"
5. Amalendu Bagchi. Design, construction and Monitoring of Landfills. John Wiley and Sons. New York. (1994)
6. M. L. Davis and D. A. Cornwell. Introduction to environmental engineering. Mc Graw Hill International Edition, Singapore (2008)
7. C. S. Rao. Environmental Pollution Control Engineering. Wiley Eastern Ltd. New Delhi (1995)
8. S. K. Agarwal. Industrial Environment Assessment and Strategy. APH Publishing Corporation. New Delhi (1996)
9. Sofer, Samir S. (ed.), Zaborsky, R. (ed.), "Biomass Conversion Processes for Energy and Fuels", New York, Plenum Press, 1981
10. Hagerty, D. Joseph; Pavoni, Joseph L; Heer, John E., "Solid Waste Management", New York, Van Nostrand, 1973
11. George Tchobanoglous, Hilary Theisen and Samuel Vigil Prsl: Tchobanoglous, George Theisen, Hillary Vigil, Samuel, "Integrated Solid Waste management: Engineering Principles and Management issues", New York, McGraw Hill, 1993.

REFERENCES:

1. C Parker and T Roberts (Ed), Energy from Waste - An Evaluation of Conversion Technologies, Elsevier Applied Science, London, 1985
2. KL Shah, Basics of Solid and Hazardous Waste Management Technology, Prentice Hall, 2000
3. M Datta, Waste Disposal in Engineered Landfills, Narosa Publishing House, 1997
3. G Rich et.al, Hazardous Waste Management Technology, Podvan Publishers, 1987
4. AD Bhide, BB Sundaresan, Solid Waste Management in Developing Countries, INSDOC, New Delhi, 1983
4. FUEL CELL AND
5. **Google books:**
 - (i) e-waste Management: From waste to Resource Klaus Hieronymi, Ramzy Kahnat, Eric williams
Tech. & Engg.-2013(Publisher: Earthscan 2013).
 - (ii) What is the impact of E-waste: Tamara Thompson
 - (iii) E-waste poses a Health Hazard: Sairudeen Pattazhy
6. **Weblinks :**
 - www.unep.org
 - www.routledge.com
 - www.amazon.com
 - www.bookdepository.com
 - www.ecoactiv.com

ELECTRICAL AND ELECTRONICS ENGINEERING
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
DISTRIBUTED GENERATION AND MICROGRID (Open Elective – II)

Course Objectives

- To illustrate the concept of distributed generation
- To analyze the impact of grid integration.
- To study concept of Micro grid and its configuration
- To find optimal size, placement and control aspects of DGs

Course Outcomes: Upon the Completion of the course student will be able to

- Find the size and optimal placement DG
- Analyze the impact of grid integration and control aspects of DGs
- Model and analyze a micro grid taking into consideration the planning and operational issues of the DGs to be connected in the system
- Describe the technical impacts of DGs in power systems

UNIT - I

Need for distributed generation - Renewable sources in distributed generation - Current scenario in distributed generation - Planning of DGs – Siting and sizing of DGs – Optimal placement of DG sources in distribution systems.

UNIT - II

Grid integration of DGs – Different types of interfaces - Inverter based DGs and rotating machine based interfaces - Aggregation of multiple DG units - Energy storage elements - Batteries, ultra-capacitors, flywheels.

UNIT - III

Technical impacts of DGs – Transmission systems, Distribution systems, De-regulation – Impact of DGs upon protective relaying – Impact of DGs upon transient and dynamic stability of existing distribution systems.

UNIT-IV

Economic and control aspects of DGs – Market facts, issues and challenges - Limitations of DGs - Voltage control techniques, Reactive power control, Harmonics, Power quality issues - Reliability of DG based systems – Steady state and Dynamic analysis.

UNIT - V

Introduction to micro-grids – Types of micro-grids – Autonomous and non-autonomous grids – Sizing of micro-grids - Modeling & analysis - Micro-grids with multiple DGs – Micro-grids with power electronic interfacing units - Transients in micro-grids - Protection of micro-grids – Case studies.

TEXT BOOKS:

1. H. Lee Willis, Walter G. Scott , 'Distributed Power Generation – Planning and Evaluation', Marcel Decker Press, 2000.
2. M.Godoy Simoes, Felix A.Farret, 'Renewable Energy Systems – Design and Analysis with Induction Generators', CRC press.
3. Robert Lasseter, Paolo Piagi, ' Micro-grid: A Conceptual Solution', PESC 2004, June 2004.
4. F. Katiraei, M.R. Iravani, 'Transients of a Micro-Grid System with Multiple Distributed Energy Resources', International Conference on Power Systems Transients (IPST'05) in Montreal, Canada on June 19-23, 2005.
5. Z. Ye, R. Walling, N. Miller, P. Du, K. Nelson, 'Facility Microgrids', General Electric Global Research Center, Niskayuna, New York, Subcontract report, May 2005.

ELECTRICAL AND ELECTRONICS ENGINEERING
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
RELIABILITY ENGINEERING (Open Elective – II)

Course Objectives:

- To comprehend the concept of Reliability and Unreliability
- Derive the expressions for probability of failure, Expected value and standard deviation of Binominal distribution, Poisson distribution, normal distribution and weibull distributions.
- Formulating expressions for Reliability analysis of series-parallel and Non-series parallel systems
- Deriving expressions for Time dependent and Limiting State Probabilities using Markov models.

Course Outcomes: Upon the completion of this course, the student will be able to

- Apply fundamental knowledge of Reliability to modeling and analysis of series-parallel and Non-series parallel systems.
- Solve some practical problems related with Generation, Transmission and Utilization of Electrical Energy.
- Understand or become aware of various failures, causes of failures and remedies for failures in practical systems.

UNIT – I

Rules for combining probabilities of events, Definition of Reliability. Significance of the terms appearing in the definition. Probability distributions: Random variables, probability density and distribution functions. Mathematical expectation, Binominal distribution, Poisson distribution, normal distribution, weibull distribution.

UNIT - II

Hazard rate, derivation of the reliability function in terms of the hazard rate. Failures: Causes of failures, types of failures (early failures, chance failures and wear-out failures). Bath tub curve. Preventive and corrective maintenance. Modes of failure. Measures of reliability: mean time to failure and mean time between failures.

UNIT - III

Classification of engineering systems: series, parallel and series-parallel systems- Expressions for the reliability of the basic configurations.
Reliability evaluation of Non-series-parallel configurations: Decomposition, Path based and cutest based methods, Deduction of the Paths and cutsets from Event tree.

UNIT - IV

Discrete Markov Chains: General modeling concepts, stochastic transitional probability matrix, time dependent probability evaluation and limiting state probability evaluation of one component repairable model. Absorbing states.

Continuous Markov Processes: Modeling concepts, State space diagrams, Stochastic Transitional Probability Matrix, Evaluating time dependent and limiting state Probabilities of one component repairable model. Evaluation of Limiting state probabilities of two component repairable model.

UNIT - V

Approximate system Reliability analysis of Series systems, parallel systems with two and more than two components, Network reduction techniques. Minimal cutest/failure mode approach.

TEXT BOOKS:

1. "Reliability evaluation of Engineering systems", Roy Billinton and Ronald N Allan, BS Publications.
2. "Reliability Engineering", Elsayed A. Elsayed, Prentice Hall Publications.

REFERENCES:

1. "Reliability Engineering: Theory and Practice", By Alessandro Biorolini, Springer Publications.
2. "An Introduction to Reliability and Maintainability Engineering", Charles Ebeling, TMH Publications.
3. "Reliability Engineering", E. Balaguruswamy, TMH Publications.

MECHANICAL ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

ENGINEERING RESEARCH METHODOLOGY (Open Elective – II)

UNIT - I

Research Methodology: Objectives and Motivation of Research, Types of Research, Research Approaches, Significance of Research, Research Methods verses Methodology, Research and Scientific Method, Important of Research Methodology, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India, Benefits to the society in general.

Defining the Research Problem: Definition of Research Problem, Problem Formulation, Necessity of Defining the Problem, Technique involved in Defining a Problem.

UNIT - II

Literature Survey: Importance of Literature Survey, Sources of Information, Assessment of Quality of Journals and Articles, Information through Internet. **Literature Review:** Need of Review, Guidelines for Review, Record of Research Review.

UNIT - III

Research Design: Meaning of Research Design, Need of Research Design, Feature of a Good Design Important Concepts Related to Research Design, Different Research Designs, Basic Principles of Experimental Design, Developing a Research Plan, Design of Experimental Set-up, Use of Standards and Codes.

UNIT - IV

Data Collection: Collection of primary data, Secondary data, Data organization, Methods of data grouping, Diagrammatic representation of data, Graphic representation of data. Sample Design, Need for sampling, some important sampling definitions, Estimation of population, Role of Statistics for Data Analysis, Parametric V/s Non Parametric methods, Descriptive Statistics, Measures of central tendency and Dispersion, Hypothesis testing, Use of Statistical software.

Data Analysis: Deterministic and random data, Uncertainty analysis, Tests for significance: Chi-square, student's t-test, Regression modeling, Direct and Interaction effects, ANOVA, F-test, Time Series analysis, Autocorrelation and Autoregressive modeling.

UNIT - V

Research Report Writing: Format of the Research report, Synopsis, Dissertation, Thesis its Differentiation, References/Bibliography/Webliography, Technical paper writing/Journal report writing, making presentation, Use of visual aids. **Research Proposal Preparation:** Writing a Research Proposal and Research Report, Writing Research Grant Proposal.

REFERENCES:

1. C.R Kothari, Research Methodology, Methods & Technique; New Age International Publishers, 2004
2. R. Ganesan, Research Methodology for Engineers, MJP Publishers, 2011
3. Ratan Khananabis and Suvasis Saha, Research Methodology, Universities Press, Hyderabad, 2015.
4. Y. P. Agarwal, Statistical Methods: Concepts, Application and Computation, Sterling Publs., Pvt., Ltd., New Delhi, 2004
5. Vijay Upagade and Aravind Shende, Research Methodology, S. Chand & Company Ltd., New Delhi, 2009
6. G. Nageswara Rao, Research Methodology and Quantitative methods, BS Publications, Hyderabad, 2012.
7. Naval Bajjai "Business Research Methods" Pearson 2011.
8. Prahalad Mishra " Business Research Methods " Oxford 2016

COMPUTER SCIENCE AND ENGINEERING
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MACHINE LEARNING (Open Elective - II)

Prerequisites:

- Data Structures
- Knowledge on statistical methods

Course Objectives:

- This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
- To understand computational learning theory.
- To study the pattern comparison techniques.

Course Outcomes:

- Understand the concepts of computational intelligence like machine learning
- Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
- Understand the Neural Networks and its usage in machine learning application.

UNIT - I

Introduction - Well-posed learning problems, designing a learning system Perspectives and issues in machine learning

Concept learning and the general to specific ordering – Introduction, A concept learning task, concept learning as search, Find-S: Finding a Maximally Specific Hypothesis, Version Spaces and the Candidate Elimination algorithm, Remarks on Version Spaces and Candidate Elimination, Inductive Bias.

Decision Tree Learning – Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning, The Basic Decision Tree Learning Algorithm Hypothesis Space Search in Decision Tree Learning, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning.

UNIT - II

Artificial Neural Networks Introduction, Neural Network Representation, Appropriate Problems for Neural Network Learning, Perceptions, Multilayer Networks and the Back propagation Algorithm.

Discussion on the Back Propagation Algorithm, An illustrative Example: Face Recognition

Evaluation Hypotheses – Motivation, Estimation Hypothesis Accuracy, Basics of Sampling Theory, A General Approach for Deriving Confidence Intervals, Difference in Error of Two Hypotheses, Comparing Learning Algorithms.

UNIT - III

Bayesian learning - Introduction, Bayes Theorem, Bayes Theorem and Concept Learning Maximum Likelihood and Least Squared Error Hypotheses, Maximum Likelihood Hypotheses for Predicting Probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, An Example: Learning to Classify Text, Bayesian Belief Networks, EM Algorithm.

Computational Learning Theory – Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Space, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning.

Instance-Based Learning – Introduction, k-Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

UNIT - IV

Pattern Comparison Techniques, Temporal patterns, Dynamic Time Warping Methods, Clustering, Codebook Generation, Vector Quantization

Pattern Classification: Introduction to HMMS, Training and Testing of Discrete Hidden Markov Models and Continuous Hidden Markov Models, Viterbi Algorithm, Different Case Studies in Speech recognition and Image Processing

UNIT - V

Analytical Learning – Introduction, Learning with Perfect Domain Theories : PROLOG-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operations.

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell,- MGH
2. Fundamentals of Speech Recognition By Lawrence Rabiner and Biing – Hwang Juang.

REFERENCE BOOK:

1. Machine Learning : An Algorithmic Perspective, Stephen Marsland, Taylor & Francis