## M.TECH.(SE) – COURSE STRUCTURES

### I SEMESTER

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Name of the Subject</th>
<th>Contact Hours/Week</th>
<th>Credits</th>
<th>Scheme of Evaluation</th>
<th>Total</th>
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<tbody>
<tr>
<td>MTIT101</td>
<td>Advanced Problem Solving</td>
<td>4+1</td>
<td>3</td>
<td>40 60</td>
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<td>Service Oriented Architecture</td>
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<td>Mobile Computing</td>
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<td>Advanced Databases</td>
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<td>Software Reliability Engineering</td>
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<td>Formal Methods</td>
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<td>Digital Image Processing</td>
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<td>Natural Language Processing</td>
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<td>MTIT151</td>
<td>Advanced Problem Solving and OOAD Lab</td>
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## II SEMESTER

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<th>Subject Code</th>
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<td>MTIT2061</td>
<td>Information Storage &amp; Management</td>
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<td>Human Computer Interfacing</td>
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<td>Biometrics</td>
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<td>MTIT251</td>
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## III & IV SEMESTERS

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<th>Subject code</th>
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</table>

Head of the Department
Department of Information Technology
Lakireddy Bali Reddy College of Engineering
1YLAVARAM-521 230, Krishna Dt., A.P., INDIA.
I SEMESTER
MTIT101 - ADVANCED PROBLEM SOLVING

Lecture : 4 Periods/week
Tutorial : 1 Period/Week
Credits : 3

Internal Marks : 40
External Marks : 60
External Examination : 3 Hrs

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

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

UNIT III

UNIT IV

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

TEXT BOOKS:
1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
3. Data structures and Algorithm Analysis in Java, M.A.Wessex, 2nd edition, Addison-Wesley (Pearson Education).

Head of the Department
Department of Information Technology
Lakireddy Bali Reddy College of Engineering
Vylavaram-521230, Krishna Dist., A.P., INDIA.
REFERENCES:
1. Java for Programmers, Deitel and Deitel, Pearson education.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
UNIT I
Software Architecture
Introduction-Architectural Styles, Pipes and Filters, Data Abstraction and Object Oriented Organization, Event based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Process control Paradigms, Software Paradigm for Process Control, Distributed processes, Main program / subroutine organizations, Domain, specific software architecture, heterogeneous architectures

UNIT II
Shared Information Systems

UNIT III
Architectural Design
Guidelines for Architectural design, Design space and rules, Applying design space with an example, study of Quantified design space, Architectural formalism and its applications, Formalizing Architectural design Space.

UNIT IV
Architectural Description Languages
Requirements of an Architectural Description Language, First-Class Connectors, Adding implicit invocation to traditional programming Languages

UNIT V
Architectural Design Tools
UniCon – A Universal Connecting Language, Exploiting styles in Architectural design, Architectural interconnection

TEXT BOOKS:

REFERENCES:
MTIT103 - SOFTWARE PROCESS MANAGEMENT

Lecture: 4 Periods/week Internal Marks: 40
Tutorial: 1 External Marks: 60
Credits: 3 External Examination: 3 Hrs

UNIT I
A Software maturity framework
Software Improvement, process maturity level, people in the optimizing level, need for the optimizing process.

UNIT II
The Repeatable Process
Managing software organizations: commitment discipline, the management system, establishing a project management system.
The Project plan: project planning principles, contents, size measures, estimating, productivity factors, scheduling, project tracking, the developing plan, planning models, final considerations.
Software configuration management: Need for configuration management, software product nomenclature, basic configuration management function, baselines, configuration management responsibilities, need for automated tools, software quality management.

UNIT III
Defined process
Software standards: definitions, reasons, benefits, examples of major standards, establishing software standard, standards versus guidelines.
Software inspections: Types of reviews, objectives, basic inspection principles, the conduct of inspections, inspection training, reports and tracking, other considerations, initiating and inspection program, future directions.
Software configuration management: the Software configuration management plan, Software configuration management questioners, scm support functions, the requirement phase, design control, the implementation phase, operational data, the test phase, scm for tools, configuration accounting, the software configurations audit.

UNIT IV
Managed Process
Data gathering and analysis: the principles of data gathering, data gathering process, software measures, data analysis, other considerations.
Managing software quality: The quality management paradigm, quality motivation, quality goals, quality plans, tracking and controlling software quality.

UNIT V
The Optimizing Process
Defect Prevention: Defect prevention not a idea, the principles of SDP, process changes for defect prevention, defect prevention consideration, management role.
Automating the software process: The need for software automation, What to automate?, Development environments, organizational plans to automate, technology transitions, productivity.
TEXT BOOKS:
1. Managing the software process by Watts S. Humphrey, published by Pearson Education.

REFERENCES:
2. Software project management reading and cases by Chris Kemerertions, David Hilman, Galgotia
MTIT104 - OBJECT ORIENTED SOFTWARE ENGINEERING

Lecture: 4 Periods/week  Internal Marks : 40
Tutorial: 1  External Marks : 60
Credits : 3  External Examination : 3 Hrs

UNIT I
INTRODUCTION

UNIT II
ANALYSIS
Requirements Elicitation – Concepts – Activities – Management – Arena Case Study - Analysis Object Model – Analysis – Concepts – activities - Managing analysis – Case Study

UNIT III
SYSTEM DESIGN

UNIT IV
OBJECT DESIGN AND IMPLEMENTATION ISSUES

UNIT V
MANAGING CHANGE

TEXT BOOKS:

Head of the Department
Department of Information Technology
Lakireddy Bali Reddy College of Engineering
IYLA VARAM-521 230, Krishna DL, A.P., INDIA.
MTIT1051 - SERVICE ORIENTED ARCHITECTURE

Lecture : 4 Periods/week  
Tutorial : 1  
Credits : 3  

Internal Marks : 40  
External Marks : 60  
External Examination : 3 Hrs

UNIT I
SOA and Web Services Fundamentals

UNIT II
SOA and WS- Extensions

UNIT III
SOA and Services Orientation: Principles of Service Orientation Service

UNIT IV

UNIT V
Building SOA (Technology and Design) Service Oriented Design (Part I
-Introduction) Introduction to Service Oriented design, WSDL related XML Schema language basics. WSDL language basics. Service interface design tools.

Service Oriented Design (Part II SOA Composition Guide lines) SOA Composing steps, Considerations for choosing service layers, Considerations for positioning core SOA standards, Considerations for choosing SOA extensions.


basics. SOA Platforms SOA platform basics. SOA support in J2EE and .NET, Integration considerations.

TEXT BOOKS:
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow and Pearson Education.

REFERENCES:
1. The Definitive guide to SOA, Jeff Davies & others, Apress, Dreamtech.
2. Java SOA Cook book, E. Hewitt, SPD.
3. SOA in Practice, N.M. Josuttis, SPD.
4. Applied SOA, M. Rosen and others, Wiley India Pvt. Ltd.
7. SOA-Based Enterprise Integration, W. Roshen, TMII.
UNIT – I

UNIT – II
**GSM**: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. (Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT – III
**Mobile Network Layer**: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).
**Mobile Transport Layer**: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT – IV
**Wireless LAN Technology-IEEE 802.11** (System Architecture, protocol architecture, physical layer, medium access control layer, mac management, 802.11b, 802.11a)
**Mobile Ad hoc Networks (MANETs)**: Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT – V

TEXT BOOKS:

REFERENCES:
MTIT1053 - ADVANCED MULTIMEDIA

Lecture : 4 Periods/week  Internal Marks : 40
Tutorial : 1  External Marks : 60
Credits : 3  External Examination : 3 Hrs

UNIT - I

UNIT - II
Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT -III
Application Development: An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.

UNIT - VI

UNIT - IV
Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT - V

TEXT BOOKS:
1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.
2. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech

REFERENCES:
4. Multimedia Basics by Weixel Thomson
UNIT I
PARALLEL DATABASES

UNIT II
OBJECT ORIENTED DATABASES

UNIT III
WEB DATABASES

UNIT IV
INTELLIGENT DATABASES
Enhanced Data Models For Advanced Applications-Active Database Concepts And Triggers-Temporal Database Concepts-Deductive databases-Knowledge Databases

UNIT V
CURRENT TRENDS
Mobile Database-Geographic Information Systems-Genome Data Management-Multimedia Database-Parallel database-Spatial Databases-Database administration-Data Warehousing and data Mining

TEXT BOOKS:
REFERENCES:
MTIT1061 - SOFTWARE RELIABILITY ENGINEERING

Lecture : 4 Periods/week Internal Marks : 40
Tutorial : 1 External Marks : 60
Credits : 3 External Examination : 3 Hrs

UNIT I
SYSTEM RELIABILITY
Review of Reliability Mathematics–Random Experiment-Probability distributions-Binomial-Poisson-Exponential-Weibul and Generalized Exponential distributions-Reliability Block diagram-System Reliability-Repairable and Non Repairable systems-Maintainability and Availability-MTBF-MTTF-MDT-MTTR-Designing for higher reliability-Redundancy-k out of n systems

UNIT II
EVOLUTION OF SOFTWARE RELIABILITY MODELS
Basic Concepts – Failure and Faults-Introduction to Software Reliability Growth Models (SRGMs)-General Model Characteristic-Historical Development of models-Model Classification scheme-white box and black box models-models for application during operational phase and testing phase-Markovian models-Jelinski-Moranda model-Goel-Okumoto imperfect debugging model

UNIT III
NON-HOMOGENEOUS POISSON PROCESS MODELS

UNIT IV
FLEXIBLE AND QUALITY METRICS PRODUCING MODELS

UNIT V
ADVANCED TOPICS IN SOFTWARE RELIABILITY
Bayesian models-Littlewood-Verall model-Discrete models-Efforts based models Release Time determination-criteria-cost-failure intensity-reliability

REFERENCES:

Head of the Department
Department of Information Technology
Lakireddy Bali Reddy College of Engineering
LVANAM-521 230, Krishna Dt., A.P., INDIA.
UNIT I
INTRODUCTION

UNIT II
FORMAL SPECIFICATION STYLE
Model-Oriented – Specifications – Concurrency-Based Specifications – Example Specification Languages.

UNIT III
VDM
Introduction to VDM – Basic Types – Quote Types – Compound Types – Optional Types – Functions – Operations – Additional Constructs – Modules.

UNIT IV
THE Z NOTATION
The Interchange Language – User-Defined Identifiers – Data Types – Basic Types – Compound Types – Schemas – Additional Constructs.

UNIT V
FORMAL SEMANTICS AND TOOLS

TEXT BOOKS:

REFERENCES:
MTIT1063 - DIGITAL IMAGE PROCESSING

- Lecture: 4 Periods/week
- Internal Marks: 40
- Tutorial: 1
- External Marks: 60
- Credits: 3
- External Examination: 3 Hrs

UNIT-I
Introduction: Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels

UNIT - II
Image enhancement in the spatial domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods (p.nos 76-141).

UNIT - III
Image restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering.
Color Image Processing: Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation

UNIT - IV
Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms
Image Segmentation: Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation

UNIT - V
Object Recognition: Patterns and patterns classes, recognition based on decision–theoretic methods, matching, optimum statistical classifiers, neural networks, structural methods – matching shape numbers, string matching

TEXT BOOKS:

REFERENCES:
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
MTIT1064 - NATURAL LANGUAGE PROCESSING

Lecture : 4 Periods/week     Internal Marks : 40
Tutorial : 1                External Marks : 60
Credits : 3                  External Examination : 3 Hrs

UNIT I

UNIT II
Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions
Non-probabilistic Parsing Efficient CFG parsing with CYK, another dynamic programming algorithms. Early parser. Designing a little grammar, and parsing with it on some test data.
Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language.
Information Theory The "Shannon game"—motivated by language! Entropy, cross-entropy, information gain. Its application to some language phenomena

UNIT III

UNIT IV
Probabilistic Context Free Grammars
Weighted context free grammars. Weighted CYK. Pruning and beam search.
Parsing with PCFGs A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers.
Maximum Entropy Classifiers
The maximum entropy principle and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

UNIT V
Maximum Entropy Markov Models & Conditional Random Fields
Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.
Lexical Semantics: Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's.


TEXT BOOKS:
1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing": Manning and Schutze, MIT Press

REFERENCES:
MTIT151 - ADVANCED PROBLEM SOLVING & OOAD LAB

Practical's : 3 Periods/week
Tutorial : 0
Credits : 2
Internal Marks : 25
External Marks : 50
External Examination : 3 Hrs

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ADVANCED PROBLEM SOLVING LAB

Programs:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods: a) Linear search b) Binary search
2. Write Java programs to implement the following using arrays and linked lists a) List ADT
3. Write Java programs to implement the following using an array.
   a) Stack ADT b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to implement circular queue ADT using an array.
6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7. Write Java programs to implement the following using a singly linked list.
   a) Stack ADT b) Queue ADT
8. Write Java programs to implement the deque (double ended queue) ADT using
   a) Array b) Singly linked list c) Doubly linked list.
9. Write a Java program to implement priority queue ADT.
10. Write a Java program to perform the following operations:
    a) Construct a binary search tree of elements.
    b) Search for a key element in the above binary search tree.
    c) Delete an element from the above binary search tree.
11. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
12. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
    a) Preorder b) Inorder c) Postorder.
13. Write Java programs for the implementation of bfs and dfs for a given graph.
14. Write Java programs for implementing the following sorting methods:
a) Bubble sort  d) Merge sort  g) Binary tree sort  
b) Insertion sort  e) Heap sort  
c) Quick sort  f) Radix sort  

15. Write a Java program to perform the following operations:  
a) Insertion into a B-tree  b) Searching in a B-tree  

TEXT BOOKS:  
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum’s Outlines, TMH  

REFERENCE BOOKS:  

OOAD LAB  

LIST OF OOAD LAB PROGRAMMS  
The student should take up the following case studies which are mentioned below, and Model it in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.  
1. Unified Library application  
2. Automatic Teller Machine( ATM)  
3. Student Admission Procedure  
4. Online Book Shopping  
5. Hospital Management System  
6. Cellular Network  

TEXT BOOKS:  

REFERENCES:  
MTIT201 - SOFTWARE METRICS

Lecture : 4 Periods/week Internal Marks : 40
Tutorial : 1 External Marks : 60
Credits : 3 External Examination : 3 Hrs

UNIT-I

UNIT- II

UNIT-III
Applying the Seven Basic Quality Tools in Software Development: Ishikawa’s Seven Basic Tools, Checklist, Pareto Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause-and-Effect Diagram, Relations Diagram.
Defect Removal Effectiveness: A closer look at Defect Removal Effectiveness, Defect Removal Effectiveness and Quality Planning, Cost Effectiveness of Phase Defect Removal

UNIT-IV

UNIT-V
Metrics 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 OO projects.

TEXT BOOKS:

REFERENCES:
MTIT202 - REQUIREMENTS ENGINEERING ESTIMATION

Lecture : 4 Periods/week Internal Marks : 40
Tutorial : 1 External Marks : 60
Credits : 3 External Examination : 3 Hrs

UNIT I
Introduction to Requirements Engineering

UNIT II
Requirements Elicitation, Analysis and Documentation

UNIT III
Requirements Validation and Management

UNIT IV
Software Size Estimation

UNIT V
Effort – Schedule, Cost Estimation & Tools

TEXT BOOKS:
2. Software Requirements and Estimation, Rajesh Naik, Swapna Kishore, TMH
REFERENCES:
UNIT - I

UNIT - II

UNIT - III
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Use of Software (Microsoft Project) to Assist in Project Planning Activities

UNIT - IV

UNIT - V

TEXT BOOK:

REFERENCES:
2. Software Project Management, Joel Henry, Pearson Education.
MTIT204 - SOFTWARE TESTING & QUALITY ASSURANCE

Lecture : 4 Periods/week Internal Marks : 40
Tutorial : 1 External Marks : 60
Credits : 3 External Examination : 3 Hrs

UNIT I
Introduction

UNIT II
Techniques for test generation and configuration
Test generation from finite state models, combinatorial designs-Regression testing, Techniques for selection, minimization and prioritization, Test Adequacy, assessment and enhancement.

UNIT III
Testing Strategies
White box and black box approach- integration testing-system and acceptance testing-performance testing-regression testing-internationalization testing-ad-hoc testing-website testing-usability testing - accessibility testing-Test plan management-Execution and reporting-Software test automation-automated testing tools

UNIT IV
Software Quality Models and Metrics

UNIT V
Software Measurements & Software Quality Standards

TEXT BOOKS:
1. Software quality assurance-from theory to implementation, Daniel Galin, Pearson, 2009.(U1)
2. Foundations of software Testing , Aditya Mathur , Pearson, 2008(U2,U3,U4)

REFERENCES:
1. Software Quality, Mordechei Ben – Menachem /Garry S. Marks , Thomson
2. Software Testing- Principles and practices, Srinivasan D., Ganjidaswamy Ramesh, Pearson, 2006(US)
3. Software Quality Theory and Management, 2/e, Alan C Gillies , Cenage Learning 2003(U6,U8)
MTIT2051 - WEB SEARCHING & MINING

<table>
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<th>4 Periods/week</th>
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UNIT-I

HYPERLINK-BASED RANKING: Introduction, Social Networks Analysis, Page Rank, Authorities and Hubs, Link-Based Similarity Search, Enhanced Techniques for Page Ranking

UNIT-II
WEB CONTENT MINING
CLUSTERING: Introduction, Hierarchical Agglomerative Clustering, k-Means Clustering, Probability-Based Clustering, Finite Mixture Problem, Classification Problem, Clustering Problem, Collaborative Filtering (Recommender Systems)

EVALUATING CLUSTERING: Approaches to Evaluating Clustering, Similarity-Based Criterion Functions, Probabilistic Criterion Functions, MDL-Based Model and Feature Evaluation, Minimum Description Length Principle, MDL-Based Model Evaluation, Feature Selection, Classes-to-Clusters Evaluation, Precision, Recall, and F-Measure Entropy

UNIT-III
CLASSIFICATION: General Setting and Evaluation Techniques, Nearest-Neighbor Algorithm, Feature Selection, Naive Bayes Algorithm, Numerical Approaches, Relational Learning

UNIT-IV
WEB USAGE MINING
INTRODUCTION TO WEB USAGE MINING: Definition of Web Usage Mining, Cross-Industry Standard Process for Data Mining, Click stream Analysis, Web Server Log Files, Remote Host Field, Date/Time Field, HTTP Request Field, Status Code Field, Transfer Volume (Bytes) Field, Common Log Format, Identification Field, Author Field, Extended Common Log Format, Referrer Field, User Agent Field, Example of a Web Log Record, Microsoft IIS Log Format, Auxiliary Information

PREPROCESSING FOR WEB USAGE MINING: Need for Preprocessing the Data, Data Cleaning and Filtering, Page Extension Exploration and Filtering, De-Spidering the Web Log File, User Identification, Session Identification, Path Completion, Directories and the Basket Transformation, Further Data Preprocessing Steps

UNIT-V
EXPLORATORY DATA ANALYSIS FOR WEB USAGE MINING: Introduction, Number of Visit Actions, Session Duration, Relationship between Visit Actions and Session Duration, Average Time per Page, Duration for Individual Pages

MODELING FOR WEB USAGE MINING: CLUSTERING, ASSOCIATION, AND CLASSIFICATION: Introduction, Modeling Methodology, Definition of Clustering, The BIRCH Clustering Algorithm, Affinity Analysis and the A Priori Algorithm

TEXT BOOKS:
1. Data Mining the Web: Uncovering Patterns in Web Content, Structure, and Usage, Publisher: Wiley-Interscience
MTIT2502 - SOFTWARE SECURITY ENGINEERING

Lecture : 4 Periods/week Internal Marks : 40
Tutorial : 1 External Marks : 60
Credits : 3 External Examination : 3 Hrs

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:

REFERENCES:
1. Developing Secure Software: Jason Grembi, Cengage Learning
MTIT2053 - DISTRIBUTED SYSTEMS

Lecture : 4 Periods/week     Internal Marks : 40
Tutorial : 1                   External Marks : 60
Credits : 3                       External Examination : 3 Hrs

UNIT I
Characterization of Distributed Systems- Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models- Introduction, Architectural and Fundamental models, Networking and Internetworking, Inter process Communication. Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT II

UNIT III
Peer to Peer Systems-Introduction, Napster and its legacy, Peer to Peer middleware, Routing Overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, Ocean Store.
Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging, Coordination and Agreement - Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT IV
Transactions and Concurrency control - Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency controls. Distributed Transactions - Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V
Security - Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 Wi-Fi. Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services.

TEXT BOOKS:
REFERENCES:
MTIT2054 - SOFTWARE DOCUMENTATION

Lecture: 4 Periods/week
Tutorial: 1
Credits: 3

Internal Marks: 40
External Marks: 60
External Examination: 3 Hrs

UNIT I:
Introductions; course overview; technology survey, Task Oriented Documentation, Understanding Task Orientation Writing for Software Users Analyzing Your Users, Software Research, Writing to Teach, Collaborative Planning (Chapters 1,2,5)

UNIT II:
Planning & Writing Your Documents, Collaborative Documentation Design
Collaborative Tutorial Drafting, Getting Useful Reviews (Chapters 6,7)

UNIT III:
Editing & Fine Tuning, Working with Clients & Users Final Project Selection, Designing for Task Orientation, Final Project Proposals, Work on Manual & Usability Testing Plans (Chapters 9,10)

UNIT IV:
Final Project Design Plan, Laying Out Pages & Screens, Using Graphics Effectively, Final Project Drafting, Getting the Language Right (Chapters 11, 12 ,13)

UNIT V:
Final Usability Testing, Designing Indexes, Conducting Usability Tests, Reporting Usability Testing, Final Project Prototype due, Final Project Presentations, Presentations of Software Manuals (Chapters 8,14,15)

TEXT BOOK:

REFERENCES:
UNIT I:
Introduction to Information Storage Technology, Review data creation and the amount of data being created and understand the value of data to a business, Challenges in Data Storage and Management, Data Storage Infrastructure, Storage Systems Environment, Components of a Storage System Environment: Disk drive components, Disk Drive Performance, Logical Components.

UNIT II:
Data protection, Concept of RAID and its Components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Comparison of Levels. Intelligent Storage Systems, Components, Intelligent Storage Array, High-level architecture and working of an intelligent storage system.

UNIT III:

UNIT IV:
Storage Virtualization, Forms, Taxonomy, Configuration, Challenges, Types of Storage Virtualizations. Information Availability & Monitoring & Managing Datacenter, Information Availability, Business continuity, Failure Analysis, Business impact Analysis, Differentiate between business continuity (BC) and disaster recovery (DR).

UNIT V:

TEXT BOOK:
1. EMC Educational Services, Information Storage and Management., Wiley India.

REFERENCES:
MTIT2062 - NEURAL NETWORKS

Lecture : 4 Periods/week  
Tutorial : 1  
Credits : 3  
Internal Marks : 40  
External Marks : 60  
External Examination : 3 Hrs

UNIT I
INTRODUCTION - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks (p. no’s 1 –49)
LEARNING PROCESS 1 – Error Correction learning, Memory based learning, Hebbian learning, and (50-55)

UNIT II
LEARNING PROCESS 2: Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process, (p. no’s 50 –116)
SINGLE LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception – convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment (p. no’s 117 –155)

UNIT III

UNIT IV
SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantilizer, contexmnel Maps (p. no’s 443 –469, 9.1 –9.8)

UNIT V
NEURO DYNAMICS – Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors’ as a recurrent network paradigm (p. no’s 664 –680, 14.1 –14.6)
HOPFIELD MODELS – Hopfield models, computer experiment I (p. no’s 680-751, 14.7 – 14.8)

TEXT BOOKS:

REFERENCES:
1. Artificial neural networks - B.Vegnamarayana Prentice Hall of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M kapura Pearson Education 2004
UNIT I
Introduction
Importance of user interface, definition, importance of good design, Benefits of good design, A brief history on screen design.
**Graphical User Interface:** Popularity of Graphics, the concept of direct manipulation, graphical system, characteristics, web user interface popularity, characteristics-principles of user interface.

UNIT II
Design process
Human interaction with computers, importance of human characteristics, human considerations, human interaction speeds, understanding business junctions.

UNIT III
Screen Designing & Window
Design goals, screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, technological consideration in interface design Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT IV
Components and Software tools
Components: text and messages, Icons and increases, multimedia, colors, user problems, choosing colors.
**Software tools:** Specification methods interface, building tools.

UNIT V
Interaction Devices
Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

**TEXT BOOKS:**
1. Human Computer Interaction, Alan Dix, Janet Finlay, Gre Goryd, Abowd, Russel Bealg, PEA.
2. The Essential guide to user interface design, Wilbert O Galitz, Wiley Dreama Tech.
MTIT2064 - BIOMETRICS

Lecture : 4 Periods/week Internal Marks : 40
Tutorial : 1 External Marks : 60
Credits : 3 External Examination : 3 Hrs

UNIT I

UNIT II
Finger scan – Features – Components – Operation (Steps) – Competing finger Scan technologies – Strength and weakness. Types of algorithms used for interpretation. Facial Scan - Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness.

UNIT III
Iris Scan - Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness .Voice Scan - Features – Components – Operation (Steps) – Competing voice Scan (facial) technologies – Strength and weakness.

UNIT IV

UNIT V

TEXT BOOKS:

REFERENCE:
SOFTWARE TESTING LAB

1. Study of various tools Study various tools such as Win Runner, Load Runner, Test Director, Rational Rose Suite etc.

2. Perform experiments to do the following:
   a. Requirements Testing
   b. Use - case Scenario Testing
   c. Unit Testing
   d. Regression Testing
   e. Integration Testing
   f. Validation Testing
   g. Acceptance Testing
   h. System Testing

3. Prepare test plan and develop test case hierarchy

4. Generate Test cases and Test Documentation in the following case studies
   a. Library System
   b. Course Registration System
   c. Implement a Quiz System
   d. Student Marks Analyzing System
   e. Online Ticket Reservation System
   f. Stock Management System

REQUIREMENTS ENGINEERING AND ESTIMATION LAB

Aim: The students should go through full SDLC traceability for features, requirements.

OBJECTIVES:
The students are expected to refine and validate software requirements through the performance of the following:
   • Identify customer's needs.
   • Evaluate system for feasibility.
   • Perform economic and technical analysis.
   • Allocate functions to system elements.
   • Establish schedule, constraints and estimate cost.
   • Create system definitions

Study various tools such as OSRMT, Borland Caliber Analyst, IBM Telelogic DOORS, Rational Rose Suite etc.
2. Do experiments that cover following Requirements Lifecycle Management practices, and techniques of the whole requirements process and also estimate the cost:
   a. Requirements elicitation (requirements capture)
   b. Requirements definition
   c. Requirements validation
   d. Requirements analysis
   e. Requirements modeling
   f. Requirements management
   g. Requirements traceability

3. Mini projects on any relevant current topics. Suggested topics:
   a. IT Infrastructure Management Application
   b. Reservation Systems for Air lines, Railways etc.
   c. Knowledge Management System
   d. Remote Procedure Call Implementation
   e. Inventory Management System