M.TECH.(SE) – COURSE STRUCTURES

I SEMESTER

Subject Code	Name of the Subject	Contact Hours/Week		Credits	Scheme of Evaluation		Total
		L+T	P		Internal (CIE)	External (SEE)	
MTIT101	Advanced Problem Solving	4+1		3	40	60	100
MTIT102	Software Architecture	4+1		3	40	60	100
MTIT103	Software Process Management	4+1		3	40	60	100
MTIT104	Object Oriented Software Engineering	4+1		3	40	60	100
	Elective – I						
MTIT1051	Service Oriented Architecture	4+1		3	40	60	100
MTIT1052	Mobile Computing						
MTIT1053	Advanced Multimedia						
MTIT1054	Advanced Databases						
	Elective - II						
MTIT1061	Software Reliability Engineering	4+1		3	40	60	100
MTIT1062	Formal Methods						
MTIT1063	Digital Image Processing						
MTIT1064	Natural Language Processing						
MTIT151	Advanced Problem Solving and OOAD Lab		3	2	25	50	75
MTIT152	Technical Seminar		3	2	75		75
	Total			22	340	410	750

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II SEMESTER
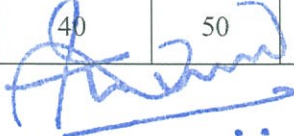
Subject Code	Name of the Subject	Contact Hours/Week		Credits	Scheme of Evaluation		Total
		L+T	P		Internal (CIE)	External (SEE)	
MTIT201	Software Metrics	4+1		3	40	60	100
MTIT202	Requirements Engineering and Estimation	4+1		3	40	60	100
MTIT203	Software Project Management	4+1		3	40	60	100
MTIT204	Software Testing & Quality Assurance	4+1		3	40	60	100
	Elective-III						
MTIT2051	Web Searching and Mining						
MTIT2052	Software Security Engineering	4+1		3	40	60	100
MTIT2053	Distributed Systems						
MTIT2054	Software Documentation						
	Elective-IV						
MTIT2061	Information Storage & Management						
MTIT2062	Neural Networks	4+1		3	40	60	100
MTIT2063	Human Computer Interfacing						
MTIT2064	Biometrics						
MTIT251	Software Testing and REE Lab		3	2	25	50	75
MTIT252	Mini Project		3	2	75		75
	Total			**22**	**340**	**410**	**750**

III & IV SEMESTERS

Subject code	Name of the Subject	Contact hours/week		Credits	Scheme of Valuation		Total Marks
		L+T	P		Internal (CIE)	External (SEE)	
MTIT351	Dissertation			40	50	150	200
	Total			40	50	150	200

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I SEMESTER

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MTIT101 - ADVANCED PROBLEM SOLVING

Lecture : 4 Periods/week	Internal Marks	: 40
Tutorial : 1 Period/Week	External Marks	: 60
Credits : 3	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

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

UNIT IV

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

UNIT V

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees –Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, 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.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).
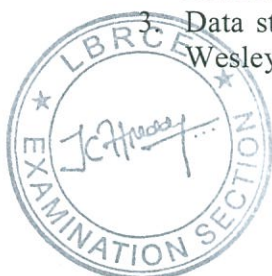
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REFERENCES:
1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition,Wiley India Edition.
5. Data structures and the Java Collection Frame work,W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education

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MTIT102 - SOFTWARE ARCHITECTURE

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

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

Data base integration, Batch sequential, Simple Repository, Virtual Repository, Hierarchical Layers, Evolution of Shared Information Systems in Business Data Processing, Integration in Software Development Environments, Integration in Design of Buildings, Architectural Structures for 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:
1. Mary Shaw & David Garlan, "Software Architecture", Prentice Hall India Private Limited

REFERENCES:
1. Len Bass, Paul Clements, & Rick Kazman, "Software Architecture in Practice", Second Edition, Pearson Education.

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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.
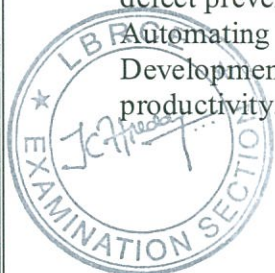
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TEXT BOOKS:
1. Managing the software process by Watts S. Humphrey, published by Pearson Education.

REFERENCES:
1. Softare Project Management , Walker Royce, published by Pearson Education.
2. Software project management reading and cases by Chris Kemerertions, David Hilman , Galgotia

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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

System Concepts – Software Engineering Concepts – Development Activities – Managing Software Development – Unified Modelling Language – Overview –modelling concepts – deeper view into UML - Project Organization – Communication

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

Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities – Addressing Design Goals – Managing System Design –Case Study

UNIT IV
OBJECT DESIGN AND IMPLEMENTATION ISSUES

Reusing Pattern Solutions – Concepts– Activities – Managing Reuse – Case Study - Specifying Interfaces – Concepts – Activities –Management – Case Study - Mapping Models to Code – Concepts – Activities – Management –Case Study – Testing – Concepts – Activities – Management

UNIT V
MANAGING CHANGE

Rationale Management – Concepts – Activities – Management -Configuration Management – Concepts – Activities – Management - Project Management -Concepts – Activities – Management – Software Life Cycle

TEXT BOOKS:

1. Bernd Bruegge and Alan H Dutoit, "Object-Oriented Software Engineering", 2nd edition,Pearson Education, 2010.
2. Timothy Lethbridge and Robert Laganiere, "Object-oriented Software Engineering:Practical Software Development using UML and Java", McGraw Hill Publication, 2010.
3. Waman S Jawadekar: "Software Engineering Principles and Practice". The McGraw Hill Publications V edition.

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MTIT1051 - SERVICE ORIENTED ARCHITECTURE

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

UNIT I
SO A and Web Services Fundamentals
Introducing SOA-Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of **SOA**,Common pitfalls of adopting SOA.The Involution of SOA-An SOA timeline. The continuing evolution of SOA,The roots of SOA.Web Services and primitive SOA-The Web Services frame work, Services, Service descriptjons.Messaging.

UNIT II
SOA and WS- Extensions
Web Services and Contemporary SOA(Part I-Activity management and Composition)-Message exchange patterns. Service Activity Coordination, Atomic transactions, Business Activities, Orchestration, Choreography. Web Services and Contemporary's(Part-tJ-Advanced Messaging , Metadata , and Security) -Addressing , Reliable inessaging, Correlation, Policies, Metadata exchange, Security, Notification and evening.

UNIT III
SOA and Services Orientation: Principles of Service Orientation Service
-Orientation and the enterprise, Anatomy of SOA, Common Principles of Service Orientation. Interrelation between Principles of Service-Orientation, Service Orientation and Object Oncntation, Native Web Services support for Principles of Service Orientation. Service Layers Service Orientation , and Contemporary SOA, Service Layer abstraction, Application Service Layer , Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

UNIT IV
Building SOA (Planning and Analysis):SOA Delivery Strategies-SOA delivery lifecycle phases, the top down strategy. The bottom up strategy, The agile strategy. Service Oriented Analysis(Part I Introduction) Introduction to Service Oriented Analysis, Benefits of ;i Business Centric SOA, Deriving Business Services. Service Oriented Analysis (Part I Service Modeling) -Service Modeling. Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling App roaches.

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 ll SOA Composition Guide! lines) SOA Composing steps, Considerations for choosing service layers, Considerate, ions for positioning core SOA standards, Considerations for choosing SOA extensions.
Service Oriented Design (Part III Service Design) Service Design overview, Entity centric business Service Design, Application Service Design. Task centric business Service Design, Service Design guidelines.
 Service Oriented Design(Part IV Business Process Design)WS-BPEL language basics, WS Coordination overview, Service Oriented Business process Design. Fundamental WS Extensions WS Addressing language basics, WS Reliable Messaging language basics, WS Policy language basics, WSMetadata Exchange language basics, WS Security language

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

TEXT BOOKS:
1. Service Oriented Architecture Concepts, TechnoIogy, aud Design, Thomas ErI.Pearson Education.
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomowand 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.
5. Java Web Services Architecture, J.Me Govern,and others, MorganKaufmann Publishers, Elsevier.
6. SOA for Enterprise Applications, Shankar.K, Wiley India Edition.
7. SOA-Based Enterprise Integration, W.Roshen.TMII.
8. SOA Security.K.Rama Rao, C.Prasad, dreamtech press

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MTIT1052 - MOBILE COMPUTING

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

UNIT – I
Introduction to Mobile Communications and Computing : Mobile Computing (MC) : Introduction to MC, novel applications, limitations, and architecture. Wireless Transmission Fundamentals: Introduction to wireless transmission, signal propagation, Multiplexing, Modulation, Spread Spectrum

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
Bluetooth: User scenarios, Architecture, Radio layer, Baseband layer, Link manager protocol, L2CAP, Security , SDP , profiles , IEEE 802.15 .
Wireless Application Protocol : Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless truncation protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML Script, Wireless telephony application, Push architecture, Push/pull services, Examples stacks with WAP 1.X.

TEXT BOOKS :
1. Jochen Schiller,"Mobile Communications",*Addison-Wesley*.

REFERENCES :
1. Williams Stallings, "Wireless Communication and Networks", Pearson Education.
2. Raj Pandya," Mobile and Personal Communication Systems and Services", Prentice Hall of
3. India, 2001.
4. Uwe Hansmann, Lother Merk, Martin Nicklous, Thomas Stober, " Principles of Mobile Computing" , Springer International Edition, 2nd edition , 2003.
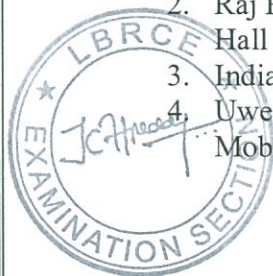
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MTIT1053 - ADVANCED MULTIMEDIA

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

UNIT - I
Fundamental concepts in Text and Image: Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

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
Multimedia data compression : Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

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
Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications : Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand(MOD).

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

REFERENCES:
1. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
2. Multimedia and communications Technology, Steve Heath, Elsevier(Focal Press).
3. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
4. Multimedia Basics by Weixel Thomson

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MTIT1054 - ADVANCED DATABASES

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

UNIT I
PARALLEL DATABASES
Database System Architectures: Centralized and Client - Server Architectures - Server System Architectures – Parallel Systems – Distributed Systems – Parallel Databases : I/ O Parallelism – Inter and Intra Query Parallelism – Inter and Intra Operation Parallelism - Case Studies.

UNIT II
OBJECT ORIENTED DATABASES
Object Oriented Databases-Introduction-Weakness of RDBMS-Object Oriented Concepts Storing Objects in Relational Databases-Next Generation Database Systems-Object Oriented Data models-OODBMS Perspectives-Persistence-Issues in OODBMS-Object Oriented Database Management System Manifesto-Advantages and Disadvantages of OODBMS-Object Oriented Database Design-OODBMS Standards and Systems-Object Management Group-Object Database Standard OOMG-Object Relational DBMS-Postgres-Comparison of ORDBMS and OODBMS

UNIT III
WEB DATABASES
Web Technology and DBMS-Introduction-The Web-The Web as a Database Application Platform-Scripting languages-Common Gateway Interfaces-HTTP Cookies-Extending the Web server-Java-Microsoft's Web Solution Platform-Oracle Internet Platform-Semi structured Data and XML-XML Related Technologies-XML Query Languages

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:
1. Thomas M.Connolly, Carolyn E.Begg,"Data base Systems-A Practical Approach to Design,Implementation and Management",Third Edition,Pearson Education,2003
2. Ramez Elmasri &Shamkant B. Navathe, "Foundamentals of Database Systems",Fourth Edition,Pearson Education,2004
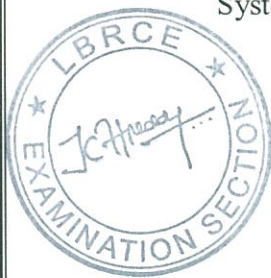
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REFERENCES:
1. Tamer Ozsu M.Patrick Ualdurial," principles of Distributed Database Systems", Second Edition, Pearson Education,2003
2. Prabhu C.S.R, "Object Oriented Database Systems",PHI,2003
3. Peter Rob and Corlos Corenel,"Database Systems-Design,Implementation and Management",Thompson Learning,Course Technology,5th Edition,2003
4. Subramanian V.S,"Principles of Multimedia Database Systems",Harcourt India Pvt Ltd,2001
5. Vijay Kumar,"Mobile Database Systems",John Wiley & Sons,2006

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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-HOMOGENOUS POISSON PROCESS MODELS

Stochastic process-Counting Process-NHPP-Execution time-Testing time and Calendar Time modeling-Musa models-Basic Execution time-Musa-Okumoto Logarithmic Poisson Execution time models-NHPP models-Goel-Okumoto-Yamada delayed S-shaped model-Log power model-Imperfect debugging models-Kapur-Garg model

UNIT IV
FLEXIBLE AND QUALITY METRICS PRODUCING MODELS

Flexible models-Goel Generalized NHPP-S-G GENHPP- SG We NHPP models-Quality metrics producing models- S-G-K (2007) model and S-G-K (2012) model-Failure Data-Parameter estimation-MLE and Least squares techniques-Use of tools-Comparison Criteria-Goodness of fit - Predictive Validity of Models-short term and long term

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:

1. John D. Musa, Anthony Iannino, Kazuhira Okumoto, "Software Reliability – easurement, Prediction, Application, Series in Software Engineering and Technology", McGraw Hill, 1987
2. John D. Musa, "Software Reliability Engineering", Tata McGraw Hill, 1999.
3. Patric D. T.O connor," Practical Reliability Engineering", 4th Edition, John Wesley & sons , 2003. M.Xie, "Software Reliability Modelling", World Scientific, Singapore, 1991
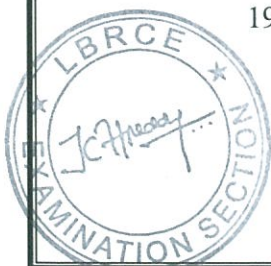
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MTIT1062 - FORMAL METHODS

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

UNIT I
INTRODUCTION

Need for Formal methods – Problems in Natural Language Specifications, Formal Versus Informal Programming – Advantages of Formal Methods – Requirements of Formal System – Types – Prepositional Logic – Predicate Logic – Relationships and Functions.

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

Operational Semantics – Denotational Semantics – Axiomatic Semantics Proof Editors – Proof Analyser – Symbolic Simulators –Translators –
Test Generation Tools.

TEXT BOOKS:
1. Andrew Harry, " Formal Methods: Fact File VDM and Z", John Wiley and Sons, 1996.

REFERENCES :
1. Jim Woodcock, Jim Davies, "Using Z Specification, Refinement and Proof", Prentice Hall International, 1996.

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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:
1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

REFERENCES:
1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
4. Digital Image Processing, William K. Prat, Wily Third Edition
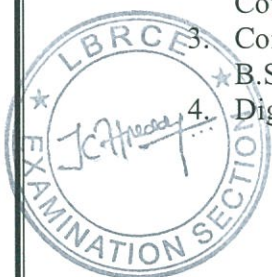
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MTIT1064 - NATURAL LANGUAGE PROCESSING

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

UNIT I

Introduction and Overview What is Natural Language Processing, hands-on demonstrations.Ambiguity and uncertainty in language. The Turing test. **Regular Expressions** Chomsky hierarchy,regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools. **Programming in Python** An introduction to programming in Python. Variables numbers,strings,arrays,dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) **String Edit Distance and Alignment** Key algorithmic tool: dynamic programming, a simple example, use inoptimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

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 naturallanguage.
Information Theory The "Shannon game"--motivated by language! Entropy, crossentropy, information gain. Its application to some language phenomena

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UNIT III
Language modeling and Naive Bayes
Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models, Viterbi Algorithm for Finding Most Likely HMM Path Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

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.

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Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's

Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS:
1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. *"Natural Language Understanding"*. James Allen. The Benajmins/Cummings Publishing Company

REFERENCES:
1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
2. Charniak, E.: Statistical Language Learning. The MIT Press.

3. Jelinek, F.: Statistical Methods for Speech Recognition

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

MTIT151 - ADVANCED PROBLE SOLVING & OOAD LAB

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

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:

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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:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.

2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum¡¦s Outlines, TMH

REFERENCE BOOKS:

1. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.

2. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.

3. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.

OOAD LAB

LST 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:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modelling Language User Guide, Pearson Education.

REFERENCES:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hil Companies.
4. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
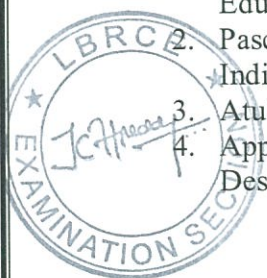
II SEMESTER

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MTIT201 - SOFTWARE METRICS

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

UNIT-I

Introduction to software quality: Quality: Popular Views & Professional Views, Software Quality, Total quality management 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.

UNIT- II

Software Quality Metrics Overview: Product Quality Metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metrics Programs, Collecting Software Engineering Data.

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

In-Process Metrics for Software Testing: In-Process metrics for Software Testing, In-Process metrics and Quality Management, Possible Metrics for Acceptance Testing to evaluate Vendor Developed Software, How do you know Your Product is Good Enough to Ship?
Complexity Metrics and Models: Lines of Code, Halstead's Software Science, Cyclomatic Complexity, Syntactic Constructs, Structure Metrics, An Example of Module Design Metrics in Practice

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.
Using Function Point Metrics to Measure Software Process Improvement: Software Process Improvement Sequences, Process Improvement Economics, Measuring Process Improvements at Activity Levels

TEXT BOOKS:

1. Metrics and Models in Software Quality Engineering, Stephen H. Kan, Second Edition , Pearson Education Asia, 2003

REFERENCES:

1. Software Engineering Measurement, John C. Munson Auerbach Publication, 2003
2. Estimating Software – intensive systems: projects, products and processes, Rechard D. Stutzke, Addision – Wesley 2005
3. Software Metrics: A guide to planning, analysis and application, C. Ravindranath Pandian, Auerbach Publication, 2003
4. Practical Implementation of Software Metrics, Paul Goodman, Mc.Graw Hill, 1993
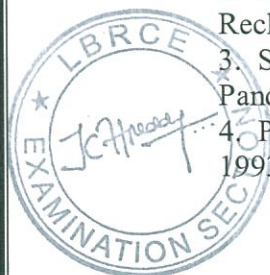
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MTIT202 - REQUIREMENTS ENGINEERING ESTIMATION

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

UNIT I
Introduction to Requirements Engineering
Software Requirements Definition – Levels of Requirements – Requirement Engineering - Requirements Development and Management – When Bad Requirements happen to Nice People - Benefits from a High quality requirements process – Characteristics of Excellent Requirements– Functional and Nonfunctional Requirements –Good Practices for Requirements Engineering - Practical process Improvement - Process Maturity – Requirement Engineering process maturity

UNIT II
Requirements Elicitation, Analysis and Documentation
Requirements Elicitation Guidelines – Requirements Elicitation Techniques – Requirement Analysis – Requirement Analysis Models – Requirement Analysis and Negotiation – Requirements Documentation – Characteristics of Software Requirements Specification Document – Contents of SRS – Common Problems with SRS

UNIT III
Requirements Validation and Management
Validation objectives –Review the Requirements – The Inspection Process – Requirements Review Challenges – Testing the Requirements – Defining Acceptance Criteria – Requirement Validation Guidelines
Requirements Management – Requirement Traceability – Database to Manage Requirements – Change Management Policies – Requirements Engineering for Critical Systems - Software Requirements and Risk Management

UNIT IV
Software Size Estimation
Software Estimation –Size Estimation – Two views of Sizing – Function Point Analysis – Mark II FPA – Full Function Points - LOC Estimation – Conversion between Size Measures

UNIT V

Effort – Schedule, Cost Estimation & Tools

What is Productivity? – Estimation Factors – Approaches for Effort and Schedule Estimation – COCOMOII – Putnam Estimation Model – Algorithmic Models – Cost Estimation
Tools: Desirable Features of Requirements Management Tools – Some Requirements Management Tools Available – Rational pro - Desirable Features in Software Estimation Tools – Some Software Estimation Tools Available

TEXT BOOKS:
1. Software Requirements, Karl E. Wiegers, Word Power Publishers, 2000
2. Software Requirements and Estimation, Rajesh Naik , Swapna Kishore, TMH
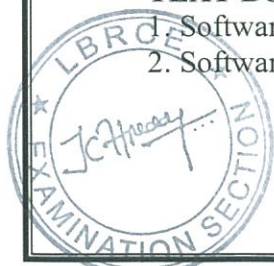
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REFERENCES:
1. Requirements Engineering: A Good practice Guide, Ian Sommerville, Pete Sawyer, Pearson, 2004
2. Managing Software Requirements A Use Case Approach, 2/e, Dean, Don , Addision-Wesley, 2003
3. Requirements Engineering and Rapid Development, Ian Graham, Addision-Wesley, 1998
4. Mastering the Requirements Process. 2/e, S.Robertson, J.Robertson, Pearson, 2006

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MTIT203 - SOFTWARE PROJECT MANAGEMENT

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

UNIT - I
Conventional Software Management: The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software Economics, pragmatic software cost estimation. **Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. **The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - II
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. **Model based software architectures:** A Management perspective and technical perspective.

UNIT - III
Work Flows of the process: Software process workflows, Iteration workflows.
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
Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. **Process Automation:** Automation Building blocks, The Project Environment. **Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

UNIT - V
Tailoring the Process: Process discriminants. **Future Software Project Management:** Modern Project Profiles, Next generation Software economics, modern process transitions.
Case Study: The command Center Processing and Display system- Replacement (CCPDS)

TEXT BOOK:
1.Software Project Management, Walker Royce: Pearson Education, 2009.

REFERENCES:
1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, PankajJalote, Pearson Education.2008.
4. Microsoft Office Project 2003 Bible, Elaine Marmel, Wiley Publishing Inc

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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
Software Quality- Challenges- Objectives-Quality Factors-Components of SQA-Contract review-development and quality plans –SQA components in project life cycle-SQA defect removal policies-Reviews-Software Testing Preliminaries-Basics of Software testing, Test Generation from requirements

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
Hierarchical models of software quality - Software quality metrics - Function points-Software product quality - Software maintenance quality- effect of case tools- Software quality infrastructure-procedures- certifications-configuration management-documentation control.

UNIT V
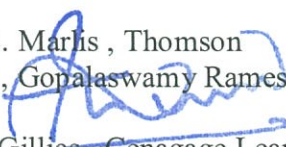**Software Measurements & Software Quality Standards**
Software Testing Measurement and Association Metrics - Control of software Testing - The role of software   testing coverage criteria in testing control - Coverage criteria design and implementation -Automated Tools for software Testing - Static code analyzers Test case generators ,Project progress control – costs – quality management standards – project process standards – management and its role in SQA – SQA unit.

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. Marlis , Thomson
2.Sofware Testing- Principles and practices, Srinivasan D , Gopalaswamy Ramesh , Pearson, 2006(US)
3.Software Quality Theory and Management, 2/e, Alan C Gillies , Cenagage Learning 2003(U6,U8)

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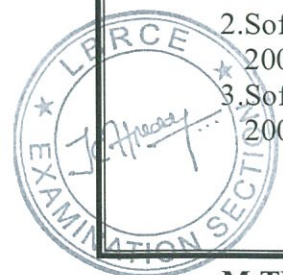
MTIT2051 - WEB SEARCHING & MINING

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

UNIT-1

WEB STRUCTURE MINING INFORMATION RETRIEVAL AND WEB SEARCH :Web Challenges -Web Search Engines ,Topic Directories ,Semantic Web, Crawling the Web -Web Basics, Web Crawlers ,Indexing and Keyword Search -Document Representation, Implementation Considerations, Relevance Ranking, Advanced Text Search, Using the HTML Structure in Keyword Search, Evaluating Search Quality -Similarity Search, Cosine Similarity Jaccard Similarity

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, Authuser 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,
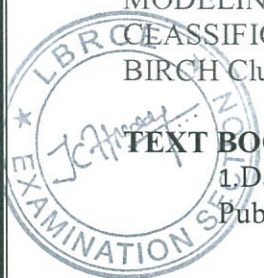
UNIT-V

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

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MTIT2052 - 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 throughput the SDLC

UNIT – IV

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

UNIT – V

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

TEXT BOOK:

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

REFERNCES:

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

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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

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems. Name Services-Introduction; Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

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:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.
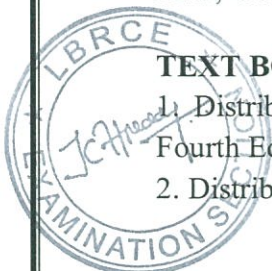
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REFERENCES:

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
6. Distributed Operating Systems and Algorithm Analysis, R.Chow, T.Johnson, Pearson.
7. Distributed Operating Systems, A.S.Tanenbaum, Pearson education.
8. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani & Mukesh Singhal, Cambrigde, rp 2010

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MTIT2054 - SOFTWARE DOCUMENTATION

Lecture : 4 Periods/week	Internal Marks : 40
Tutorial : 1	External Marks : 60
Credits : 3	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:
1. Writing Software Documentation: A Task-Oriented Approach (Part of the Allyn & Bacon Series in Technical Communication), Second Edition by Thomas T. Barker, Longman (Paperback,2002): ISBN: 0321103289.

REFERENCES:
1. Recommended Prentice Hall Reference Guide by Muriel Harris, customized for DSU, Prentice, 2007, ISBN:0-536-06188-2.
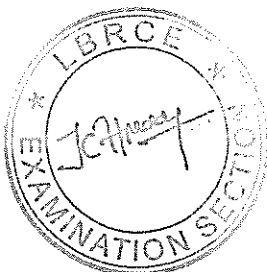
MTIT2061 - INFORMATION STORAGE & MANAGEMENT

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

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 :
Introduction to Networked Storage, **Evolution** of networked storage, Architecture, Overview of FC-SAN, NAS, and IP-SAN. Network-Attached Storage (NAS): Benefits of NAS, Components, Implementations, File Sharing, I/O operations, Performance and Availability. Content Addressed Storage (CAS), features and Benefits of a CAS. CAS Architecture, Storage and Retrieval, Examples.

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 :
Disaster Recovery, Backup, Methods, And Technologies, Replication technologies: Local replicas, Technologies, Restore and Restart, Multiple Replicas. Remote Replication. Storage Security and Management, Security Framework, Storage security domains, Managing The Storage Infrastructure, Monitoring the Storage Infrastructure, Storage Management Activities, Challenges and solutions.

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

REFERENCES:
1. Richard Barker and Paul Massiglia, .Storage Area Network Essentials: A Complete Guide to Understanding and Implementing SANs., Wiley India.
2. Robert Spalding, .Storage Networks: The Complete Reference., Tata McGraw Hill Osborne,2003.
3. Marc Farley, .Building Storage Networks., Tata McGraw Hill, Osborne, 2001.
4. Meet Gupta, .Storage Area Network Fundamentals., Pearson Education Limited, 2002.

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

MTIT2062 - NEURAL NETWORKS

Lecture : 4 Periods/week   Internal Marks   : 40

Tutorial : 1   External Marks   : 60

Credits : 3   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 learing, 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

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, (p. no's 156 –201) **BACK PROPAGATION -** back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning. (p. no's 202 –234)

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, contexmel Maps (p. no's 443 –469, 9.1 –9.8)

UNIT V

NEURO DYNAMICS – Dynamical systems, stavility 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:

1.Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2ndEdition 2004

REFERENCES:

1. Artificial neural networks - B.Vegnanarayana 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 S kapura Pearson Education 2004
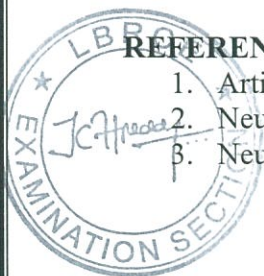
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MTIT2063 - HUMAN COMPUTER INTERACTION

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

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 Fincay, 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
Introduction – Benefits of biometric security – Verification and identification – Basic working of biometric matching – Accuracy – False match rate – False non-match rate – Failure to enroll rate – Derived metrics – Layered biometric solutions.

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
Other physiological biometrics – Hand scan – Retina scan – AFIS (Automatic Finger Print Identification Systems) – Behavioral Biometrics – Signature scan- keystroke scan.

UNIT V
Biometrics Application – Biometric Solution Matrix – Bio privacy – Comparison of privacy factor in different biometrics technologies – Designing privacy sympathetic biometric systems. Biometric standards – (BioAPI , BAPI) – Biometric middleware Biometrics for Network Security. Statistical measures of Biometrics. Biometric Transactions.

TEXT BOOKS:
1.	Biometrics – Identity Verification in a Networked World – Samir Nanavati, Michael Thieme, Raj Nanavati, WILEY- Dream Tech
2.	Biometrics for Network Security- Paul Reid, Pearson Education.

REFERENCE:
1.	Biometrics- The Ultimate Reference- John D. Woodward, Jr. Wiley Dreamtech.

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MTIT251 - SOFTWARE TESTING & REE LAB

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

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
   1. Study various tools such as OSRMT, Borland Caliber Analyst, IBM Telelogic DOORS, Rational Rose Suite etc.

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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

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