JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. TECH (SOFTWARE ENGINEERING)
COURSE STRUCTURE AND SYLLABUS

I YEAR I SEMESTER

Code	Group	Subject	L	P	Credit
		Software Requirements and Estimation	3	0	3
		Object Oriented Modeling	3	0	3
		Software Process and Project Management	3	0	3
		Java and Web Technologies	3	0	3
	Elective –I	Advanced Computer Networks Wireless Networks and Mobile Computing Adhoc and Sensor Networks	3	0	3
	Elective -II	Information Retrieval Systems Distributed Databases Storage Area Networks	3	0	3
	Lab	Java and Web Technologies Lab.	0	3	2
		Seminar	-	-	2
		Total Credits (6 Theory + 1 Lab.)			22

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER

SOFTWARE REQUIREMENTS AND ESTIMATION

UNIT I

Software Requirements: What and Why

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

UNIT II

Software Requirements Engineering

Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality, **Software Requirements Modeling-**
Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

UNIT III

Software Requirements Management

Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain **Requirements Management Tools:** Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation,

UNIT IV

Software Estimation

Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation. **Size Estimation-**Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

UNIT V

Effort, Schedule and Cost Estimation

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

Software Estimation Tools:

Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools

TEXT BOOKS:

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

REFERENCES:

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

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I YEAR I SEMESTER

OBJECT ORIENTED MODELING

UNIT I

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

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

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

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

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

UNIT II

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

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

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

UNIT III

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

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

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

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

UNIT IV

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

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

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

UNIT V

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

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

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

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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I YEAR I SEMESTER

SOFTWARE PROCESS AND PROJECT MANAGEMENT

UNIT I

Software Process Maturity

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

Process Reference Models

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

UNIT II

Software Project Management Renaissance

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

UNIT III

Life-Cycle Phases and Process artifacts

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

Workflows and Checkpoints of process

Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.

UNIT IV

Process Planning and Project Organizations

Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning, line-of- business organizations, project organizations, evolution of organizations, process automation.

UNIT V

Project Control and process instrumentation

The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

CCPDS-R Case Study and Future Software Project Management Practices

Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions

TEXT BOOKS:

1. Managing the Software Process,*Watts S. Humphrey*, Pearson Education,1999
2. Software Project Management,*Walker Royce,*Pearson Education,1998

REFERENCE BOOKS:

1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education,2000
2. Process Improvement essentials, James R. Persse, O'Reilly,2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,Tata Mc-Graw Hill,2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly,2007
6. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
7. Agile Project Management, Jim Highsmith, Pearson education, 2004.
8. Quality Software Project Management,R.F.Futrell ,D.F.Shafer,L.I.Shafer,Pearson.

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER

JAVA AND WEB TECHNOLOGIES

Unit I:
HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;
Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script, CSS

Unit II:
XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX
Review of Applets, Class, Event Handling, AWT Programming.
Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.

Unit III:
Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API.
Web servers: Tomcat Server installation & Testing.
Introduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters.

Unit IV:
More on Servlets: The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.
Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC architecture. AJAX.

Unit V:
JSP Application Development: Generating Dynamic Content, Using Scripting Elements
Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations
Database Access Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNIT 1,2)
2. The complete Reference Java 2 Fifth Edition ,Patrick Naughton and Herbert Schildt., TMH (Chapters: 25) (UNIT 2,3)
3. Java Server Pages –Hans Bergsten, SPD O'Reilly (UNITs 3,4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly for chap 8.
5. Murach's beginning JAVA JDK 5, Murach, SPD
6. An Introduction to web Design and Programming –Wang-Thomson
7. Professional Java Server Programming,S.Allamaraju and othersApress(dreamtech).
8. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
9. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas
10. Beginning Web Programming-Jon Duckett WROX.
11. Java Server Pages, Pekowsky, Pearson.
12. Java Script,D.Flanagan,O'Reilly,SPD.

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER
ADVANCED COMPUTER NETWORKS
(ELECTIVE-I)

UNIT I Review

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet - **Foundation of Networking Protocols:** 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **Networking Devices:** Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure.

UNIT II

The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization - **Routing and Internetworking:** Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer

UNIT III

Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **Multicasting Techniques and Protocols:** Basic Definitions and Techniques, Intradomain Multicast Protocols, Interdomain Multicast Protocols, Node-Level Multicast algorithms - **Transport and End-to-End Protocols:** Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **Application Layer:** Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, Building a Simple Web Server

UNIT IV

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Optical Networks and WDM Systems:** Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocation in Networks, Case Study: An All-Optical Switch

UNIT V

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony, VoIP Signaling Protocols, Real-Time Media Transport Protocols, Distributed Multimedia Networking, Stream Control Transmission Protocol - **Mobile A-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks – **Wireless Sensor Networks:** Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W.Ross,* Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007

REFERENCE BOOKS:

1. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill, 2007
2. Guide to Networking Essentials, *Greg Tomsho,Ed Tittel, David Johnson,*Fifth Edition, Thomson.
3. An Engineering Approach to Computer Networking , *S.Keshav,* Pearson Education.
4. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet,* Pearson Education (CISCO Press)
5. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
6. The Internet and its Protocols,A.Farrel,Elsevier.

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER

WIRELESS NETWORKS AND MOBILE COMPUTING
(ELECTIVE – I)

UNIT I : INTRODUCTION TO MOBILE AND WIRELESS LANDSCAPE

Definition of Mobile and Wireless, Components of Wireless Environment, Challenges
Overview of Wireless Networks, Categories of Wireless Networks
Wireless LAN : Infra red Vs radio transmission, Infrastructure and Ad-hoc Network, IEEE 802.11, HIPERLAN, Bluetooth

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS(GSM)

GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security

UNIT II: 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 Ad-hoc networks : Routing, destination Sequence Distance Vector, Dynamic Source Routing.

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 III: BROADCAST SYSTEMS

Overview, Cyclical repetition of data, Digital audio broadcasting: Multimedia object transfer protocol, Digital video broadcasting: DVB data broadcasting, DVB for high-speed internet access, Convergence of broadcasting and mobile communications.

UNIT IV : PROTOCOLS AND TOOLS:

Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

WIRELESS LANGUAGE AND CONTENT – GENERATION TECHNOLOGIES

Wireless Content Types, Markup Languages: HDML, WML, HTML, cHTML, XHTML, VoiceXML.
Content- Generation Technologies: CGI with Perl, Java Servlets, Java Server Pages, Active Server Pages, XML with XSL Stylesheets, XML Document, XSL Stylesheet

UNIT V: MOBILE AND WIRELESS SECURITY

Creating a Secure Environment, Security Threats, Security Technologies, Other Security Measures, WAP Security, Smart Client Security

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, Pearson Education, Second Edition, 2008.
2. Martyn Mallick, “Mobile and Wireless Design Essentials”, Wiley, 2008.
3. Asoke K Talukder, et al, “Mobile Computing”, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1.Mobile Computing,Raj Kamal,Oxford University Press.
2.William Stallings, “ Wireless Communications & Networks”, Person, Second Edition, 2007.
3.Frank Adelstein et al, “Fundamentals of Mobile and Pervasive Computing”, TMH, 2005.
4.Jim Geier, “Wireless Networks first-step”, Pearson, 2005.
5.Sumit Kasera et al, “2.5G Mobile Networks: GPRS and EDGE”, TMH, 2008.
6.Matthew S.Gast, “802.11 Wireless Networks”, O’Reilly, Second Edition, 2006.
7.Ivan Stojmenovic , “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2007.

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I YEAR I SEMESTER

ADHOC AND SENSOR NETWORKS

(ELECTIVE I)

UNIT I

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs - **Routing in MANETs:** Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, Other routing algorithms.

UNIT II

Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting - **TCP over Ad Hoc:** TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT III

Basics of Wireless, Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT IV

Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots - **Security:** Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT V

Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms - **Operating System:** TinyOS - **Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal*, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER
INFORMATION RETRIEVAL SYSTEMS
(ELECTIVE II)

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, **Information Retrieval System Capabilities -** Search, Browse, Miscellaneous.

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure - **Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT III

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters - **User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext - **Information Visualization**: Introduction, Cognition and perception, Information visualization technologies.

UNIT IV

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. **Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT V

Multimedia Information Retrieval – Models and Languages – Data Modeling, Query Languages, Indexing and Searching - **Libraries and Bibliographical Systems –** Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.
2. Modern Information Retrival By Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2nd Edition, Springer International Edition, 2004.

REFERENCE BOOKS:

1. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.
3. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER

DISTRIBUTED DATABASES
(ELECTIVE-II)

UNIT I

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Distributed Database Design

UNIT II

Translation of Global Queries to Fragment Queries, Equivalence transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries

UNIT III

The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions

Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT IV

Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT V

Architectural Issues, Alternative Client/Server Architectures, Cache Consistency, Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution, Transaction Management, Transaction Management in Object DBMSs, Transactions as Objects

Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues Transaction Management Transaction and Computation Model, Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation and Interoperability, Object Management Architecture CORBA and Database interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability, PUSH-Based Technologies

TEXT BOOKS:

1. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti,TMH.
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.

M. Tech. (SOFTWARE ENGINEERING)
I YEAR I SEMESTER
STORAGE AREA NETWORKS
(ELECTIVE-II)

Unit I: Introduction to 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 data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

Unit II: Storage Systems Architecture
Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, 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, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

Unit III: Introduction to Networked Storage
Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN , Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS ulfils the need , Understand the appropriateness of the different networked storage options for different application environments

Unit IV: Information Availability & Monitoring & Managing Datacenter
List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures , Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities
Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center

Unit V: Securing Storage and Storage Virtualization
Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes

Case Studies
The technologies described in the course are reinforced with EMC examples of actual solutions.
Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOKS :

1.EMC Corporation, Information Storage and Management,G.Somasundaram,A.Shrivastava, Wiley Publishing.
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.Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.