JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

M-TECH (WEB TECHNOLOGIES)

COURSE STRUCTURE AND SYLLABUS

I SEMESTER

SCODE	SUBJECTS	L	P
WT1. 1	Fundamentals of Web Technologies	4	-
WT1. 2	Internet Operating Systems	4	-
WT1. 3	Internet Protocols	4	-
WT1. 4	Software Engineering for Web Applications	4	-
WT1. 5	Data on the Web	4	-
WT1. 6	Multimedia and Application Development	4	-
	PRACTICALS		
WT1. 7	Web Technologies Lab (through Java)	-	4

II SEMESTER

SCODE	SUBJECTS	L	P
WT 2. 1	Grid Computing	4	-
WT 2. 2	Web Security	4	-
WT 2. 3	Data Mining & Web Mining	4	-
WT 2. 4	Advanced Web Techniques	4	-
WT 2. 5	Elective-I	4	-
WT 2. 6	Elective-II	4	-
	PRACTICALS		
WT 2. 7	Web Mining Lab	-	4

Elective-I
1. Mobile Computing
2. Information Retrieval Systems
3. Middleware Technologies

Elective-II
1. Distributed Databases
2. Distributed Computing
3. Distributed Multimedia

III & IV SEMESTERS
Seminar
Project

FUNDAMENTALS OF WEB TECHNOLOGIES

<div align="right">(WT1.1)</div>

UNIT-I:
HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

UNIT-II:
Introduction to Java Scripts, Objects in Java Script, Dynamic HTML Script with Java, VB Script.

UNIT-III:
XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX.

UNIT-IV:
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, Introduction to EJB's.

UNIT-V:
Servlets: Introduction to Servlets: Lifecycle of a Serverlet, JSDK, The Servlet API, The javax.Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.Servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,

UNIT-VI:
Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

UNIT-VII:
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

UNIT VIII:
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, Introduction to struts framework..

Text Books:
1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
3. Java Server Pages –Hans Bergsten, SPD O'Reilly

Reference Books:
1.Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
2. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly for chap 8.
3. Murach's beginning JAVA JDK 5, Murach, SPD
4. An Introduction to web Design and Programming –Wang-Thomson
5. Web Applications Technologies Concepts-Knuckles,John Wiley
6. Programming world wide web-Sebesta,Pearson
7. Building Web Applications-NIIT,PHI
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas
9. Beginning Web Programming-Jon Duckett WROX.
10. Java Server Pages, Pekowsky, Pearson.

ADVANCED OPERATING SYSTEMS CONCEPTS

UNIT-I
Process Synchronization: overview, synchronization mechanisms, process dead locks

UNIT-II
Distributed Operating Systems: architectures of distributed systems, theoretical foundations, distributed mutual exclusion, distributed deadlock detection, agreement protocols.

UNIT-III
Distributed Resource Management: Distributed file systems, shared memory and scheduling

UNIT-IV
Failure Recovery & Fault Tolerance: Recovery, Fault tolerance

UNIT-V
Protection & Security: Resource security, protection access, flow control, data security, cryptography

UNIT-VI
Multiprocessing Operating Systems: multi process system architectures, multiprocessor OS

UNIT-VII
Database Operating Systems: Introduction to databases, database OS

UNIT-VIII
Concurrency Control: Theoretical aspects, concurrency control, LDAP.

Text Book:
> 1. Advanced concepts in Operating Systems by Mukesh Singhlal Niranjan.

References:

1. Operating Systems by Andrew S. Tanenbaum
2. Operating System concepts by Slberstratz.

INTERNET PROTOCOLS

UNIT-I
Introduction to Networks:
OSI Network Architecture of Layers Model, TCPIP Layers Architecture Model, Other Network Architecture Models: IBM, SNA

UNIT-II
Transport Protocols – TCP, IP, UDP

UNIT-III
Mail Protocols (POP, IMAP, SMTP)

UNIT-IV
Remote login (telnet, rlogin, ssh)

UNIT-V
File Transfer (Protocols - FTP, TFTP)

UNIT-VI
Web Protocols (HTTP, HTTPS)

UNIT-VII
Real time Protocols, VOIP H.323
VOIP: H323, H.225.0, H.235
MGCP: Media Gateway Control Protocol, RTSP: Real Time Starry Protocol, SAP: Session Amounting Protocol
SDP: Session Description Protocol.
SIP: Session Initiation Protocol
Medial /CODEC.

UNIT-VIII
BOOTP Boot strap protocol, DCAP: Data live Switching Client Access
Protocol: DHCP, DNS

Text Book:
    1. TCP/IP –Vol 1, Vol 2 by Douglas Comer

Reference Books:
    1.   Network Protocols Handbook by Javvin Technologies
    2.   TCP/IP, by B. Forouzan

SOFTWARE ENGINEERING FOR WEB APPLICATIONS

(WT1.4)

DESCRIPTION:

In this course we try to give students some experience in dealing with those challenges that are unique to Internet applications:

•concurrency -- 1000 people might be using the system at the same time

•unpredictable load -- 100,000 users might show up tomorrow even if only 100 are using the system today

•security risks -- an Internet application is forced to expose itself to attacks

•opportunity for wide-area distributed computing, i.e., using "Web services" provided by other machines on the Internet

•creating a reliable and stateful user experience on top of unreliable connections and stateless protocols

•extreme requirements and absurd development schedules

•requirements that change mid-way through a project, sometimes because of experience gained from testing with users

•user demands for a multi-modal interface: Web, mobile (WAP), and voice The bottom line: we want one someone who has finished this course to be able to build amazon.com, eBay, or photo.net by him or herself.

SYLLABUS:

Unit I:

Introduction to software engineering, need for software engineering, software engineering basics, Internet basics, Internet programming basics.

Unit II:

Planning:Usage scenarios, Evaluating alternatives, DNS.

Web based requirement analysis using use cases

Software structure

User registration and Management

Unit III:

Content management

Software modularity:Cohesion and coupling,modular programming

We based design patterns:MVC

Unit IV:

Adding mobile users to your community, WAP

VoiceXML, CVS

Unit V:

Scaling gracefully.

Search functionality

Load testing and profiling with Jprofiler

Unit VI:

Distributed computing with SOAP, WSDL, UDDI

Unit VII:

Metadata, User activity analysis, web testing with canoo web tests, web usability testing

Unit VIII:

Change management and concurrent version system using subversion

Text Books:

1. Software engineering for internet applications

By eve andersson, philip greenspun, and andrew grumet

2. Loney, k., and g. Koch. Oracle9i: the complete reference. Mcgraw-hill osborne, 2002.

3.Sql for web nerds   by philip greenspun

References:

1.Software engineering by Roger S. Pressman

2.Web testing handbook by Steven Splaine

DATA ON THE WEB

COURSE DESCRIPTION:

The widespread use of XML data and the Web has brought about new demands on traditional database engines. Traditional database engines, backed by more than 20 years of research and engineering, are well-known for their efficiency in managing large volumes of relational data (i.e., data that occurs in rigid table-like structures). Their ability, however, to efficiently manage XML data, which may not conform to a table structure, is still very much at the infancy. In this course, we shall study various technical issues that arise in the management of relational and XML data.

Data Exchange and Peer-to-Peer systems, fundamentals of relational query evaluation, and normalization of XML documents.

SYLLABUS:

Unit I:

History, various concepts (Object Exchange Model, UnQL, XML Data Model, some language flavors in these data models)

Unit II:

Queries:Query languages, Query languages for XML, Interpretations and advanced features

Unit III:

Types: Typing semi structured data

Unit IV:

Query processing

Unit V:

The lore system, Strudel

Unit VI:

Trading Between Relations and XML: Data integration, XML publishing and storage systems

Unit VII:

Storing and Querying XML Data Using an RDBMS; XML toolkit, XML Schema and queries, Translating Web Data

Unit VIII:

An Information-Theoretic Approach to Normal Forms for Relational and XML Data

Text Books:

1. "Data on the Web : From Relations to Semistructured Data and XML" by Serge Abiteboul, Peter Buneman, and Dan Suciu

2. Web Odyssey - From Codd to XML - by Vianu

References:

1.Foundations of Databases : The Logical Level by Serge Abiteboul

2.Database Management Systems by Korth

3.Database Management Systems by Raghuramakrishnan

MULTIMEDIA AND APPLICATION DEVELOPMENT

(WT1.6)

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, images, video, digital video, digitization of sound, MIDI, quantization and transmission of color models in audio.

UNIT-II

Fundamental concepts in video and digital audio: Types of video signals, analog, Audio / Video Streaming Servers.

UNIT-III

Action Script I: ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class. color models in video.

UNIT-IV

Action Script II : Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions.

UNIT-V

Application Development : An OOP Application Frame work, Using Components with ActionScript MovieClip 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-VII

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

UNIT-VIII

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. Essentials ActionScript 2.0, Colin Moock, SPD O,REILLY.

References:
1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier(Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson
6. Multimedia Technology and Applications, David Hilman , Galgotia

WEB TECHNOLOGIES LAB

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com The website should consist the following pages.
   Home page
   ☐Registration and user Login
   ☐User Profile Page
   ☐Books catalog
   ☐Shopping Cart
   ☐Payment By credit card
   ☐Order Conformation

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Bean Assignments
   a. Create a JavaBean which gives the exchange value of INR(Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
   b. Create a simple Bean with a label - which is the *count* of number of clicks. Than create a BeanInfo class such that only the "*count*" property is visible in the Property Window.
   c. Create two Beans-a)KeyPad .b)DisplayPad .After that integrate the two Beans to make it work as a Calculator.
   d. Create two Beans Traffic Light(Implemented as a Label with only three background colours-Red,Green,Yellow) and Automobile(Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.
      Light Transition Automobile State
      Red ---> Yellow Ready
      Yellow ---> Green Move
      Green --> Red Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

7. Implement the "Hello World!" program using JSP Struts Framework.

8. A login manager which takes username & password, sends data to server, verifies password in database & returns OK or FAILURE. Use MVC architecture.

GRID COMPUTING

UNIT-I
Introduction – Early Grid Activities, Current Grid Activities, An overview of Grid business areas, Grid applications.

Unit-II
Grid Computing organizations and their roles, Grid computing anatomy – the Grid problem – concept of virtual organizations, Grid architecture, Grid architecture and relationship to others distributed technologies.

UNIT-III
Grid Computing Road Map: Automatic computing, Business on Demand and infrastructure virtualization, Service oriented architecture and Grid, Semantic Grids.

UNIT-IV
Merging the Grid services Architecture with the web services Architecture.
Service oriented Architecture, web service Architecture, XML related technologies, XML message and enveloping services message descriptions measures, Relationship between web services and grid services, Web service interoperability and the role of the WS-1 organization.

UNIT-V
Open Grid services Architecture, Some sample use copy that drive the OGSA, Connected data center, National fusion collaborator, Online media and entertainment.
OGSA platform components;

UNIT-VI
Open grid services Infrastructure:
Introduction, Grid Services, Grid Details of OGIS spec., Introduction to services Data concepts, Naming and Change Management Recommendations.

UNIT-VII
OGSA Basic Services, Common Management Model, Servers Domains, Process Architecture, Security Architecture, Metering and Accessing, Common Distributed Logging, Distributed Data Access and Replication.

UNIT-VIII
Grid Computing Toolkits:
GT4 Software Architecture model, GLOBUS GT4 Toolkit Programming Model, Sample implementation, High-level services.
OGS 1 NOT Middleware solutions.

Text Book:
Grid Computing by Joshy Joseph, Craig Fellenstein

Reference Books:
1. Grid Computing: Second European AcrossGrids Conference, AxGrids 2004, Nicosia by Marios D. (EDT) Dikaiakos
2. Performance Analysis and Grid Computing edited by Vladimir Getov, Michael Gerndt, Adolfy Hoisie, Allen Malony, Barton Miller
3. Distributed and Parallel Systems: Cluster and Grid Computing by Peter Kacsuk, Dieter Kranzlmuller, Zsolt Nemeth

WEB SECURITY

COURSE OBJECTIVES:

The primary objective of this course is to provide coverage of fundamental techniques in developing secure web based applications, including vulnerability of web based applications and how to protect those applications from attacks.

Topics covered in this course include network security, Web server security, application-level security, web database security, and other related topics such as SSO (single sign-on), XML security, web services and security, wireless web security, etc.

UNIT-I
Introduction- A web security forensic lesson, Web languages, Introduction to different web attacks.

UNIT-II
Overview of N-tier web applications, Web Servers: Apache, IIS, Database Servers.

UNIT-III
Review of computer security, Public Key cryptography, RSA.

UNIT-IV
Review of Cryptography Basics, On-line Shopping, Payment Gateways

UNIT-V
Web Hacking Basics HTTP & HTTPS URL, Web Under the Cover Overview of Java security ,Reading the HTML source, Applet Security   Servlets Security

UNIT-VI
Symmetric and Asymmetric Encryptions, Network security Basics, Firewalls & IDS

UNIT-VII
Digital Certificates, Hashing, Message Digest, & Digital Signatures

UNIT-VIII
Basics, Securing databases, Secure JDBC, Securing Large Applications, Cyber Graffiti

Text Books:
1.McClure, Stuart, Saumil Shah, and Shreeraj Shah. Web Hacking:attacks and defense. Addison Wesley. 2003
2. Garms, Jess and Daniel Somerfield. Professional Java Security. Wrox. 2001.

Related Web Sites:
1.Collection of Cryptography Web Sites, Publications, FAQs, and References:
http://world.std.com/~franl/crypto.html
2.FAQ: What is TLS/SSL? http://www.mail.nih.gov/user/faq/tlsssl.htm
3.The Open SSL Project (SDKs for free download): http://www.openssl.org/
4.Windows & .NET security updates Web site: http://www.ntsecurity.net/

DATA MINING AND WEB MINING

UNIT-I
Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model.

UNIT-II
Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems, Concepts Description:

UNIT-III
Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, and Classifier Accuracy.

UNIT-IV
Cluste0r Analysis Introduction : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT-V
Mining Complex Types of Data: Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

UNIT-VI
Web search and Information retrieval: Introduction, Infrastructure, -Boolean queries, inverted index, Relevance ranking, Similarity search

UNIT-VII
Learning: similarity and clustering formulations and approaches Partitioning paradigms, clustering and visualization , supervised and semi- supervised learning –Evaluating text classifiers, Nearest neighbor learning ,feature selection, Bayesian learners, Hypertext classification.

UNIT-VIII
Applications—Social network analysis – Page rank and HITS, resource discovery – collecting important pages preferentially, similarity search, focused crawling, future trends

Text Books
    1. **Data Mining** – Concepts and Techniques - Jlaweihan & Micheline Kamber Harcourt India.
    2. **Data Mining Introductory and advanced topics** –Margaret H Dunham, Pearson education
    3.**Mining the Web**: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti Reference Books

Reference Books:
    1 **Data Mining Techniques** – Arun K Pujari, University Press.
    2.**Web Data Mining and Applications in Business Intelligence and Counter-Terrorism** by Bhavani M Thuraisingham
    3.**Data Mining: Technologies, Techniques, Tools, and Trends** by Bhavani Thuraisingham, Thuraisingham Thuraisingham

ADVANCED WEB TECHNOLOGIES

UNIT-I
Building Dynamic Web Applications- creating and configuring controls at run time Dynamic Control Creation, Localization and Globalization, Dynamic Master Pages, Dynamic Web Configuration

UNIT-II
Advanced Javascript and DHTML, CSS 2.0, Javascript libraries : Prototype, dojo

UNIT-III
XML, AJAX, JSF

UNIT-IV
SOAP, XML RPC

UNIT-V
Registering web services, UDDI

UNIT VI:
Describing web services, WSDL

UNIT-VII
Web services security stack.: SSL, IP V6 Security

UNIT-VIII
Case studies, Axis, UDDI4J, Google Maps

Text Books:
Web Service Essentials, Orielly Publications

References Books:

1. Mastering Java Script & Jscript by James Jaworsiki

2. Internet, how to program by Dietel & Dietel.

MOBILE COMPUTING
(Elective - I)

UNIT-I
Introduction to Mobile Communications and Computing : Mobile Computing (MC) : Introduction to MC, novel applications, limitations, and architecture.
GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT-II
(Wireless) Medilum Access Contro : 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).

UNIT-IV
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-V
Database Issues : Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT-VI
Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT-VII
Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT-VIII
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, MIDP.

Text Books:
    1. Jochen Schiller,"Mobile Communications",*Addison-Wesley*. (Chapters 4,7,9,10,11),second edition, 2004.
    2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", *Wiley*, 2002, **ISBN** 0471419028. (Chapters 11, 15, 17, 26 and 27)

References:
1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", *Springer*, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley *DreamTech*, 2003.

INFORMATION RETRIEVAL SYSTEMS
(Elective-I)

UNIT-I
Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

UNIT-II
Information Retrieval System Capabilities: Search, Browse, Miscellaneous

UNIT-III
Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

UNIT-IV
Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT-V
Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT-VI
Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT-VII
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-VIII
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.

Text Book
1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.

Reference Books
1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrival By Yates Pearson Education.
3. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

MIDDLEWARE TECHNOLOGIES
(Elective – I)

UNIT-I
Introduction to client server computing: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

UNIT-II
CORBA with Java: Review of Java concept like RMI, RMI API, JDBC. Client/Server CORBA-style, The object web: CORBA with Java.

UNIT-III
Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object –Oriented Programming with C#; Callback Interfaces, Delegates, and Events.

UNIT-IV
Building c# applications: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

UNIT-V
Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count multi count.

UNIT-VI
Existential CORBA: CORBA initialization protocol, CORBa activation services, CORBAIDL mapping CORBA java- to-IDL mapping, The introspective CORBA/Java object.

UNIT-VII
Java Bean Component Model: Events, properties, persistency, Intrespection of beans, CORBA Beans

UNIT-VIII
EJBs and CORBA: Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process The EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

Text Books:
1. Client/Server programming with Java and CORBA Robert Orfali and Dan Harkey, John Wiley & Sons ,SPD 2nd Edition
2. Java programming with CORBA 3rd Edition, G.Brose, A Vogel and K.Duddy, Wiley-dreamtech, India John wiley and sons.
3. C# and the .NET Platform Andrew Troelsen, Apress Wiley-dreamtech, India Pvt Ltd

Reference Books:
1. Distributed Computing, Principles and applications, M.L.Liu, Pearson Education
2. Client/Server Survival Guide 3rd edition Robert Orfali Dan Harkey and Jeri Edwards, John Wiley & Sons
3. Client/Server Computing D T Dewire, TMH.
4. IBM Webspere Starter Kit Ron Ben Natan Ori Sasson, TMh, New Delhi
5. Programming C#, Jesse Liberty, SPD-O'Reilly.
6. C# Preciesely Peter Sestoft and Henrik I. Hansen, Prentice Hall of India
7. Intoduction to C# Using .NET Pearson Education
8. C# How to program, Pearson Education

DISTRIBUTED DATABASE SYSTEMS

(Elective – II)   (Wt 2.6)

OBJECTIVE

The database field has experienced rapid and incessant growth since the development of centralized relational databases. This course provides an in-depth discussion of some advanced database areas. In particular, it focuses on studying object-relational databases, active databases, and distributed databases. Topics covered include object-relational type extension, active rules and their design, distributed database design, distributed query processing and optimization, distributed concurrency control, and multi databases. An overview of other modern database technologies, such as parallel databases, multimedia databases, web databases is also included.

The aim of this course is to build on the previous background of database systems by

· deepening the understanding of the theoretical and practical aspects of the database technologies,
· Showing the need for distributed database technology to tackle deficiencies of the centralised   database systems,
· Introducing the concepts and techniques of distributed database including principles, architectures, design, implementation and major domain of application,
· Exposing students to active research topics of the distributed database field, and
· Finally, the course addresses advanced issues faced in distributed database application development; it aims to familiarize students with the current technological developments and trends, and to make them experiment with these technologies.

SYLLABUS

UNIT-I
Overview of modern database technologies   DB technology trends in data model, database hardware, user interface, modern DB technologies: object-relational databases, active databases, distributed databases, parallel databases, deductive databases, fuzzy databases, multimedia databases, mobile database processing, semi structured data processing, long-duration transactions, real-time transactions, and transactional workflows**.**

UNIT-II
Introductory concepts and design of Distributed Database Systems (DDBMS):
What and why distributed databases**,** Data Fragmentation, Replication, and allocation techniques for DDBMS,

UNIT-III
Methods for designing and implementing DDBMS - designing a distributed relational database, strategies, fragmentation, etc.

UNIT-IV
Architectures for DDBMS - cluster, federated, parallel databases and client server   architecture.

UNIT-V
Distributed Query Processing and Optimization- query decomposition, localization of distributed data, distributed cost model, join and semi join, distributed query optimization algorithms

UNIT-VI
 Advanced Concepts in DDBMS:
- Overview of distributed transaction management, concurrency and recovery in DDBMS- distributed transaction processing**,** Distributed Deadlock Management and replication Servers,

- Distributed concurrency control, model, taxonomy of concurrency control mechanisms, locking-based concurrency control algorithms

UNIT-VII
Distributed Object/component-based DBMS
Database Interoperability including CORBA, DCOM and Java RMI,

Distributed document-based systems, XML and Workflow management, etc…

UNIT-VIII
Parallel Databases, Mobile database and Web Databases.

Text Books:

1. Tamer Ozsu, M. and Valduriez, P. **Principles of Distributed Database Systems**, (2nd Edition) Prentice Hall International Inc. 1999 ISBN 0-13-607938-5 (Main text)
2. Oefali, R., Harkey Dan and Edwards, J. **The essential Distributed Objects-Survival guide**. John Wiley & Sons, Inc. 1996 ISBN 0-471-12993-3 (recommended reading)
3. Connolly, T.M., Begg, C.E. and Strachan, A.D**. Database Systems - A Practical Approach to Design Implementation and Management**, (3rd Edition), Addison Wesley, 2001 ISBN 0-201-70857-4 (background reading**)**
4. **Object-Relational DBMSs,** by M. Stonebraker, Morgan Karfmann

References:

R1. Modern Database Systems: The Object Model, Interoperability, and Beyond, by W. Kim, ACM Press, 1995

R2. Database Directions: from Relational to Distributed, Multimedia, and Object-Oriented Database Systems, by J. A. Larson, Prentice Hall, Inc., 1995
R3. Using the New DB2: IBM's Object-Relational Database System, by D. Chamberlin, Morgan Kaufmann Publishers, Inc., 1996

DISTRIBUTED COMPUTING
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UNIT-I
Introduction, Message Passing: Basics, using workstation clusters, evaluating, debugging

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Parallel Computations, Partitioning: Divide and conques strategies

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Load Balancing, Programming with shared memory: Dynamic load balancing, distributed termination detection algorithms, program example

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UNIT-VI
Mobile Agents: MPI, an application: numerical integration, collective communication, grouping data for communication

UNIT-VII
Communicators & topologies: Matrix multiplication, Fox's algorithm, communications, working with groups, MPI-COMM-SPLIT, topologies, MPI-CART-sub, Dealing with I/O

UNIT-VIII
Case Studies: Debugging your proram design and coding of parallel programs, performance, advanced point to point communication

Text Book:
Parallel Programming by Barry Wilkinson
Parallel programming with MPI by Peter Pacheco

References Books:

1. Distributed Operating Systems by Tanenbaum
2. Parallel Computing by duinn
3. Distributed Operating Systems by coularius

DISTRIBUTED MULTIMEDIA
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Multimedia Communications, Audio-Visual Integration

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Distributed Multimedia Systems: Main features, Resource management, Networking,

UNIT-IV
Multimedia Standards, Mpeg 1, Mpeg 2, Mpeg 4

UNIT-V
Multimedia Standards – Mpeg 7, Mpeg 2, Mpeg1, ITU-T

UNIT-VI
Multimedia Communications over ATM Networks & IP Networks

UNIT-VII
Multimedia Communications – Mobile Networks & Broadcasting Networks

UNIT-VIII
Multimedia synchronization languages, smil

Text Book:
      Multimedia Communications by K.R. Rao, Zoran J Boj Kovic

References Books:

1.   Multimedia Systems by Chapman

WEB MINING LAB

DESCRIPTION:

The objective of the lab exercises is to use data mining techniques to identify customer segments and understand their buying behavior and to use standard databases available to understand DM processes using WEKA (or any other DM tool)

1. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.

2. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.

3. Using Teradata Warehouse Miner – Create mining models that are executed in SQL.

4. Use Perl to parse web pages and create data sets, example: Parse cricinfo pages to get cricket data.

5. Use Weka to create mining models of the cricket data set.

6. Use Weka to find associations between customer characteristics and credit card fraud.