



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**M.Tech (Computer Science) II SEMESTER**

**MCS2.1 ARTIFICIAL INTELLIGENCE AND SOFT COMPUTING**

**UNIT I :Introduction:**

AI problems, AI technique, Problem as state space search, problem characteristics, production systems, types of production systems, Design of Search programs

Heuristic search techniques: Generate and test, Hill climbing, Best first search, Problem reduction, Constraint satisfaction, Means-Ends Analysis.

**UNIT II: Game Playing:**

Minimax search procedure, adding alpha-beta cutoffs, additional refinements, Iterative deepening,

Statistical Reasoning: Probability and Bayes theorem, Certainty factors and Rules based systems, Bayesian Networks, Dempster Shafer theorem

**UNIT III : Knowledge Representation:**

Theorem proving using Predicate logic, Resolution, Natural Deduction, Knowledge representation using Rules, Forward versus Backward Reasoning, Matching, Control Artificial Knowledge

**Knowledge Structures:** Semantic Networks, Frames, Conceptual Dependency diagrams, Scripts

**UNIT IV : Planning:**

Components of planning system, goal stack planning, nonlinear planning using constraint posting, Hierarchical planning, Reactive systems

**Natural Language Processing:** Steps in NLP, Syntactic processing, Semantic analysis, Discourse and Pragmatic processing, Statistical NLP, Spell checking.

**UNIT V : Learning:**

Rote learning, learning by taking advice, learning in problem solving, Learning from examples, Explanation based learning, Discovery, Analogy, Formal learning theory, NN learning and Genetic learning.

**Genetic Algorithms:** survival of the fittest principle in Biology, Genetic Algorithms, Significance of Genetic operators, termination parameters, Evolving Neural nets, Ant Algorithms

**UNIT VI : Fuzzy Set Theory:**

Classical & Fuzzy set theory, Interval Arithmetics, Operations on Fuzzy sets

**Fuzzy Logic Theory:** Classical logic theory, Boolean Logic, Multivalued Logics

**UNIT VII: Applications of Fuzzy Logic:**

PQE, Decision Making Investment, Examples

**Fuzzy Rule base and Fuzzy Modeling:** If-Then Rules, Fuzzy Modeling: System modeling, Static fuzzy systems, Parameter Identification

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**UNIT VIII: Fuzzy Control Systems:**

PLC, closed loop, fuzzy controllers, examples, Fuzzy PID controllers,type1 and type 2

**TEXT BOOKS:**

1. Intelligence, 3/e, E.Rich, K.Knight, TMH.
2. Introduction to Fuzzy Systems, Guanrong Chen, Trung Tat Pham, Chapman & Hall/CRC, 2009.

**REFERENCE BOOKS:**

1. Artificial Intelligence , A Modern Approach, 2/e, Stuart Russel, Peter Norvig, PHI/PEA.
2. Artificial Intelligence, 5/e, George F Luger, PEA.
3. Artificial Intelligence, 3/e, Patrick Henry Winston, PEA.
4. Artificial Intelligence and Expert Systems, Patterson, PHI .
5. Artificial Intelligence,A Systems Approach, Tim Jones, Infinity Science Press .

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**MCS2.2 COMPUTER NETWORKS**

**UNIT I: Introduction :**

OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks ,Arpanet, Internet, Network Topologies WAN, LAN, MAN.

**UNIT II : Physical Layer :**

Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

**UNIT III : Data link layer :**

Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

**UNIT IV : Medium Access Sub Layer :**

ALOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANS. Bridges

**UNIT V : Network Layer :**

Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

**UNIT VI : Network Layer(Cont.) :**

Dynamic routing – Broadcast routing. Rotary for mobility. Congestion, Control Algorithms,General Principlesof Congestion prevension policies.

Internetworking: The Network layer in the internet and in the ATM Networks.

**UNIT VII : Transport Layer:**

Transport Services, Connection management, TCP and UDP protocols; ATM AAL Layer Protocol.

**UNIT VIII : Application Layer :**

Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

**TEXT BOOKS :**

1. Computer Networks , Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networking , Behrouz A. Forouzan.Third Edition TMH.

**REFERENCES :**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

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**MCS2.3 OBJECT ORIENTED SOFTWARE ENGINEERING**

**Unit I: Introduction to Classical software Engineering :**

Historical, Economic and Maintenance aspects. Introduction to OO Paradigm. Different phases in structured paradigm and OO Paradigm. Software Process and different life cycle models and corresponding strengths and weaknesses.

**Unit II: Planning and Estimation :**

Estimation of Duration and Cost – COCOMO components of software. Project Management plan, one case Study.

**Unit III : Tools for step wised refinement :**

Cost - Benefit analysis, Introduction to software metrics and CASE tools. Taxonomy and scope of CASE tools. Introduction to testing, with focus on Utility, Reliability, Robustness, Performance, Correctness.

**Unit IV: Modules to objects:**

Cohesion and Coupling, Data Encapsulation and Information hiding aspects of Objects. Inheritance, polymorphism and Dynamic Binding aspects. Cohesion and coupling of objects. Reusability, Portability and Interoperability aspects.

**Unit V: Requiement phase:**

Rapid Prototyping method, Specification phase , Specification Document, Formal methods of developing specification document, Examples of other semi - formal methods of using Finite-State- Machines, Petri nets and E- Language.

**Unit VI: Analysis phase:**

Use case Modeling , Class Modeling , Dynamic Modeling, Testing during OO Analysis

**Unit VII: Design phase:**

Data oriented design, Object Oriented design, Formal techniques for detailed design. One case study. Challenges in design phase.

**Unit VIII : IIM Phases:**

Implementation, Integration and maintenance phases, OOSE aspects in these phases

**TEXT BOOKS**

1. Object oriented and Classical Software Engineering, 7/e, Stephen R. Schach, TMH
2. Object oriented and classical software Engineering, Timothy Lethbridge, Robert Laganriere, TMH

**REFERENCE BOOKS**

1. Component-based software engineering: 7th international symposium, CBSE 2004, Ivica Crnkovic, Springer

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**MCS2.4 COMPILER DESIGN**

**UNIT I : Overview of Compilation:**

Phases of Compilation, Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation LEX lexical analyzer generator.

**UNIT II : Parsing:**

Context free grammars, Top down parsing, Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

**Bottom up parsing:** Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC, automatic parser generator.

**UNIT III : Semantic analysis:**

Intermediate forms of source Programs, abstract syntax tree, Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

**UNIT IV : Symbol Tables:**

Symbol table format, organization for block structured languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

**UNIT V : Code Generation :**

Processing the intermediate Code- Interpretation, Code generation, Simple code generation, code generation for basic blocks, BURS Code generation and dynamic programming, Register allocation by graph coloring, Evaluation of code generation techniques Preprocessing the intermediate code, post processing the target code, machine code generation.

**UNIT VI : Code optimization:**

Consideration for Optimization, Machine dependent and machine independent code optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

**UNIT VII : Data flow analysis:**

Dataflow Analysis, Intermediate representation for flow analysis , Various dataflow analyses , Transformations using dataflow analysis Speeding up dataflow analysis , Alias analysis.

**UNIT VIII : Loop Optimizations:**

Dominators, Loop-invariant computations, Induction variables, Array bounds checks, Loop unrolling

**TEXT BOOKS :**

1. Principles of compiler design, A.V. Aho . J.D.Ullman; Pearson Education
2. Modern Compiler Design, Dick Grune, Henry E. Bal, Criel T. H. Jacobs, Wiley dreamtech.

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**REFERENCE BOOKS :**

1. Advanced Compiler Design Implementation, S.S.Muchnick,Elsevier.
2. Compilers principles ,techniques and tools A.V.Aho,Ravi Sethi& J.D. Ullman; Pearson ed.,
3. lex &yacc , John R. Levine, Tony Mason, Doug Brown, O'reilly

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**MCS2.5.1 MOBILE COMPUTING (Elective 1)**

**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) 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).

**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.

**TEXT BOOKS:**

1. Mobile Communications, 2/e, Jochen Schiller, 2004, *Addison-Wesley*.
2. Handbook of Wireless Networks and Mobile Computing, Stojmenovic, Cacute, *Wiley*, 2002
3. Adhoc Wireless Networks, 2/e, Sivaram murthy, Manoj, Pearson, 2009



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**REFERENCE BOOKS:**

1. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, Reza Behravanfar, Cambridge, University Press, 2004.
2. Fundamentals of Mobile and Pervasive Computing, Adelstein, Frank, Gupta, Sandeep KS. Richard III, Golden, Schwiebert, Loren, TMH, 2005.
3. Principles of Mobile Computing, 2/e, Hansmann, Merk, Nicklous, Stober, *Springer*, 2003.
4. Mobile and Wireless Design Essentials, Martyn Mallick, Wiley *DreamTech*, 2003
5. Mobile Computing, Rajkamal, Oxford, 2008
6. Adhoc Wireless Networks, 2/e, Sivaram murthy, manoj, Pearson, 2009

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**MCS 2.5.2 BIO-INFORMATICS (Elective 1)**

**UNIT I : Introduction :**

The Central Dogma, The Killer Application, Parallel Universes, Watson's Definition, Top Down Versus Bottom up, Information Flow , Convergence Databases , Data Management , Data Life Cycle , Database Technology , Interfaces , Implementation

**UNIT II : Networks:**

Networks , Geographical Scope , Communication Models , Transmissions Technology , Protocols , Bandwidth , Topology , Hardware , Contents , Security , Ownership , Implementation , Management

**UNIT III : Search Engines:**

The search process , Search Engine Technology , Searching and Information Theory , Computational methods , Search Engines and Knowledge Management

**UNIT IV : Data Visualization :**

Data Visualization , sequence visualization , structure visualization , user Interface , Animation Versus simulation, General Purpose Technologies.

**UNIT V : Statistics:**

Statistical concepts , Microarrays , Imperfect Data , Randomness , Variability , Approximation , Interface Noise , Assumptions , Sampling and Distributions , Hypothesis Testing , Quantifying Randomness , Data Analysis , Tool selection statistics of Alignment

**UNIT VI : Data Mining :**

Clustering and Classification , Data Mining , Methods , Selection and Sampling , Preprocessing and Cleaning , Transformation and Reduction , Data Mining Methods , Evaluation , Visualization , Designing new queries , Pattern Recognition and Discovery , Machine Learning , Text Mining , Tools.

**UNIT VII : Pattern Matching :**

Pairwise sequence alignment , Local versus global alignment , Multiple sequence alignment , Computational methods , Dot Matrix analysis , Substitution matrices , Dynamic Programming , Word methods , Bayesian methods , Multiple sequence alignment , Dynamic Programming , Progressive strategies , Iterative strategies , Tools , Nucleotide Pattern Matching , Polypeptide pattern matching , Utilities , Sequence Databases.

**UNIT VIII : Modeling and Simulation:**

Drug Discovery , components , process , Perspectives , Numeric considerations , Algorithms , Hardware , Issues , Protein structure , AbInitio Methods , Heuristic methods , Systems Biology , Tools , Collaboration and Communications , standards , Issues , Security , Intellectual property.

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**TEXT BOOKS**

1. Bio Informatics Computing, Bryan Bergeron, PHI, 2003.
2. Bio Informatics, Managing scientific Data, Lacroix, Terence Critchlow, Elsevier

**REFERENCE BOOKS**

1. Introduction to Bio Informatics, Attwood, Smith, Longman, 1999.
2. Bio-Informatics, D Srinivasa Rao, Biotech.
3. Bio Informatics Methods and Applications, Rastogi, Mendiratta, Rastogi, PHI

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**MCS 2.5.3 WEB TECHNOLOGIES (Elective 1)**

**Unit I: Introduction**

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

**Unit II: XML:**

Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

**Unit III: Java Beans:**

Introduction to Java Beans, Advantages of Java Beans, JDK; Introspection, Using Bound properties, Bean Info Interface, Constrained properties; Persistence, Customizes, Java Beans API, Introduction to EJB's

**Unit IV: Web Servers:**

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

**Unit V: 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 VI: 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 VII: 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.

**Unit VIII: Online Applications:**

Simple applications, On-line Databases, Monitoring User Events, Plug-ins, Database connectivity, Internet Information Systems, EDI application in business, Internet commerce, Customization of Internet commerce.

**TEXT BOOKS :**

1. Web Programming, building internet applications, 2/e, Chris Bates, Wiley Dreamtech
2. The complete Reference Java 2 ,5/e, Patrick Naughton , Herbert Schildt. TMH
3. Programming world wide web-Sebesta, PEA

**REFERENCE BOOKS :**

1. Internet , World Wide Web , How to program, Dietel , Nieto, PHI/PEA
2. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly
3. Web Tehnologies, 2/e, Godbole, kahate, TMH,202,

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4. An Introduction to web Design , Programming ,Wang,Thomson
5. Web Applications Technologies Concepts-Knuckles, John Wiley

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**MCS 2.5.4 HUMAN COMPUTER INTERACTION (Elective 1)**

**UNIT I: Introduction:**

Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

**UNIT II: The Graphical user interface:**

Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – interface popularity, characteristics- Principles of user interface.

**UNIT III: Design process:**

Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

**UNIT IV: Screen Designing :**

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.

**UNIT V: Windows:**

Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

**UNIT VI: Components :**

Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

**UNIT VII: Software tools :**

Specification methods, interface, Building Tools.

**UNIT VIII: 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 Finckay, Gre Goryd, Abowd, Russell Bealg, PEA.
2. The Essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.

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**REFERENCE BOOKS :**

1. Designing the user interface. 3/e, Ben Shneidermann , PEA.
2. User Interface Design, Soren Lauesen , PEA.
3. Interaction Design PRECE, ROGERS, SHARPS, Wiley Dreamtech.

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**MCS 2.6.1 DATA WAREHOUSING AND DATA MINING (Elective 2)**

**UNIT I : Introduction :**

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

**Data Preprocessing :** Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT II : Data Warehouse & OLAP :**

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse

Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

**UNIT III : 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.

**UNIT IV : Concepts Description , Characterization and Comparison :**

Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

**UNIT V : Mining Association Rules in Large Databases :**

Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

**UNIT VI : Classification and Prediction :**

Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

**UNIT VII : Cluster 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.



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**UNIT VIII : 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.

**TEXT BOOKS :**

1. Data Mining, Concepts and Techniques , JIAWEI HAN & MICHELINE KAMBER Harcourt India.
2. Data Mining Introductory and advanced topics, MARGARET H DUNHAM, PEARSON EDUCATION

**REFERENCES :**

1. Data Mining Techniques, ARUN K PUJARI, University Press.
2. Data Warehousing in the Real World, SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
3. Data Warehousing Fundamentals, PAULRAJ PONNAIAH WILEY STUDENT EDITION.
4. The Data Warehouse Life cycle Tool kit, RALPH KIMBALL WILEY STUDENT EDITION.

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**MCS 2.6.2 SECURED DATABASE APPLICATIONS DEVELOPMENT (Elective 2)**

**Unit I: Security Architecture:**

Introduction, Security, Information Systems, Database management systems, Information security, Information security Architecture, database security, Asset types and their value, Security methods.

**Unit II: Operating System Security Fundamentals:**

Introduction, operating systems overview, security environment, components, Authentication methods, user administration, password policies, Vulnerabilities of operating systems, E- Mail security.

**Unit III: Administration of Users :**

Introduction, user authentication, operating system authentication, creating/removing/modifying users, default/remote users, Database links, Linked servers, remote servers.

**Unit IV: Profiles, Password Policies, Privileges, and Roles:**

Introduction, Defining and using profiles, Designing and implementing password policies, Granting and revoking user privileges, creating, Assigning and revoking user roles.

**Unit V: Database Application Security Models :**

Introduction, Types of users, security models, application types, application security models and Data encryption.

**Unit VI: Virtual Private Databases (VPD):**

Introduction, Overview, implementing a VPD using views and application context. Implementing oracle VPD, Viewing VPD policies and application context using: data dictionary, policy manager, implementing row and column level security with SQL server.

**Unit VII: Database Auditing Models, Application Data Auditing:**

Database Auditing Models: Introduction, Auditing overview, environment, process, objectives, classification and types, benefits and side effects of auditing.

Application Data Auditing: Introduction, DML auction auditing architecture. Triggers, fine grained auditing, DML statement audit trail and auditing application errors with Oracle.

**Unit VIII: Auditing Database Activities, Security and Auditing Project Cases:**

Auditing Database Activities: Introduction, usage of database activities, creating DLL triggers, auditing database activities with oracle

Security and Auditing project cases: Introduction, case study for developing an online database, taking care of payroll, tracking database changes and developing a secured authentication repository

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**TEXT BOOKS:**

1. Database Security and Auditing, Hassan Afyouni, Cengage Learning, 2007
2. Database Security, S. Castano, M. Fugini, G. Martella, P. Samarati, Addison-Wesley, 1994
3. Implementing Database Security and Auditing, RonBen Natan: Elsevier, Indian reprint, 2006

**REFERENCE BOOKS:**

1. Principles of Distributed Database Systems, Prentice Hall,2/e, M.TamerÖzsu, Patrick Valdureiz
2. Database Security, Castano, Fugini, Addison Wesley
3. The security Audit and control of Databases, Clark, Holloway, List, UK:Ashgate.
4. Security and Audit of Database System, Douglas, Blackwell(UK)
5. Database security and Integrity, Fernandez, Summers, Wood, Addison Wesley

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**MCS 2.6.3 MIDDLEWARE AND ENTERPRISE INTEGRATION TECHNOLOGIES (Elective 2)**

**UNIT I : Introduction to Object Oriented Systems :**

Preview of Object-orientation, Concept of distributed object systems, Reasons to distribute for centralized objects. Client-server system architecture, Multi tier system architectures. File Server, Database Server, Group Server, Object Server, Web Server.

**UNIT II : Introduction to Middleware Technologies:**

General Middleware, Service Specific Middleware, Client/Server Building blocks, RPC - messaging, Peer-to-Peer, Java RMI.

**UNIT III : Introduction to Distributed Objects :**

Computing standards, OMG, Overview of CORBA, Overview of COM/DCOM, and Overview of EJB.

**UNIT IV : EJB Architecture :**

Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

**UNIT V : CORBA :**

Introduction and concepts, distributed objects in CORBA, CORBA components, architectural features, method invocations, static and dynamic: IDL (Interface Definition Language) models and interfaces. Structure of CORBA IDL, CORBA's self-describing data; CORBA interface repository. Building an application using CORBA.

**UNIT VI : CORBA Services and CORBA Component Model :**

Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

**UNIT VII : COM and .NET**

Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces, COM Threading Models, Marshalling, Custom and standard marshalling, Comparison COM and CORBA, Introduction to .NET, Overview of .NET architecture, Remoting.

**UNIT VIII : Service Oriented architecture (SAO) Fundamentals**

Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, Basic SOA , Enterprise Service Bus (ESB), SOA enterprise Software Models.

**TEXT BOOKS :**

1. Distributed Component Architecture, G. Sudha Sadasivam , Wiley India edition.
2. Service Oriented Architecture: Concepts , Technology & Design, Thomas Erl, PHI
3. Java programming with CORBA, 3/e, G. Brose, A Vogel and K. Duddy, Wiley-dreamtech, India
4. Distributed Systems, 2/e, Tanenbaum, M. Van Steen, PEA

**REFERENCE BOOKS :**

1. Client/server Programming with Java & Corba W/cd, Robert Orfali, Dan Harkey, Wiley India
2. Component Software: Beyond Object-Oriented Programming, Clemens Szyperski, PEA.
3. Inside CORBA, Mowbray, PEA

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4. COM and CORBA side by side", Jason Pritchard, PEA
5. Enterprise JavaBeans 3.0, 5/e, Bill Burke, O'Reilly Publications.
6. Component Based technology, Sudha Sadasivam, Wiley India

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**MCS 2.6.4 IMAGE PROCESSING AND PATTERN RECOGNITION (Elective 2)**

**UNIT I : Introduction :**

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

**UNIT II : Transformation and Filtering :**

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening, spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

**UNIT III : Morphology :**

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

**UNIT IV : Segmentation and Edge Detection :**

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and laplace operators, edge linking and boundary detection, thresholding, regionbased segmentation, segmentation by morphological watersheds.

**UNIT V : Image compression:**

Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

**UNIT VI : Representation and Description :**

Chain codes, Ploygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description, Relational Descriptors

**UNIT VII : Pattern Recognition Fundamentals:** Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

**UNIT VIII : Pattern classification:**

Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**M.Tech (Computer Science) II SEMESTER**

**TEXT BOOKS :**

1. Digital Image Processing, 3/e,,Rafael C. Gonzalez, Richard E. Woods, PEA
2. Pattern recognition Principles, Julius T. Tou, and Rafel C. Gonzalez, Addison-Wesly

**REFERENCE BOOKS :**

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning.
2. Digital Image Processing,Williamk. Pratl, John wiley edition
3. Fundamentals of digital image processing, A.K. Jain. PH
4. Pattern classification, Richard Duda, Hart and David strok John Weily publishers.
5. Digital Image Processing,S.Jayaraman,S.Esakkirajan,T.Veerakumar,TMH.
6. Pattern Recognition,R.Shinghal,Oxford University Press.