2 - Year Postgraduate Course in

M.Tech (Computer Science & Engineering)

Syllabi and Scheme of Instruction & Evaluation

With effect from

2013-2014

FACULTY OF ENGINEERING & TECHNOLOGY

COMPUTER SCIENCE & ENGINEERING

KAKATIYA UNIVERSITY

WARANGAL - 506 009

KAKATIYA UNIVERSITY
Warangal
Department of Computer Science and Engineering

The Scheme of Instruction, Evaluation and Syllabii of
Post-Graduate Program in

M.Tech(Computer Science and Engineering)

SEMESTER – I

Course Number	Name of the Course	Periods per Week		Internal Examination		End Semester Examination		Total	Credits
		L/T	P/D	Time (Hrs)	Max Marks	Time (Hrs.)	Max Marks		
CSE 1.1	Data Structures and Algorithms Design	4	-	2	50	3	100	150	4
CSE 1.2	Advanced Software Engineering	3	-	2	50	3	100	150	3
CSE 1.3	Computer Networks And Security	3	-	2	50	3	100	150	3
CSE 1.4	Data Mining and data warehousing	3	-	2	50	3	100	150	3
CSE 1.5	Advanced Computer Architecture	3	-	2	50	3	100	150	3
CSE 1.6	Elective-I	3		-	50	3	100	150	3
CSE 1.7	Seminar		3	Report & Present ation	100	-	-	100	4
CSE 1.8	Data Structures Laboratory		3	3	50	3	50	100	2
CSE 1.9	Data mining Lab		3	3	50	3	50	100	2
	Total	**19**	**9**		**500**		**700**	**1200**	**27**

Elective-I

CSE 1.6.1 Theoretical Foundations of Computer Science
CSE 1.6.2 Advanced Operating Systems
CSE 1.6.3 **Advances in Compiler Construction**
CSE 1.6.4 Advanced DBMS

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SEMESTER – II

Course Number	Name of the Course	Periods per Week		Internal Examination		End Semester Examination		Total	Credits
		L/T	P/D	Time (Hrs)	Max. Marks	Time (Hrs.)	Max. Marks		
CSE 2.1	Java and Web Technologies	3	-	2	50	3	100	150	3
CSE 2.2	Advanced Data Mining	3	-	2	50	3	100	150	3
CSE 2 3	Soft Computing	3	-	2	50	3	100	150	3
CSE 2.4	Software Quality Assurance & Testing	3	-	2	50	3	100	150	3
CSE 2.5	Elective-II	3	-	2	50	3	100	150	3
CSE 2.6	Elective-III	3	-	2	50	3	100	150	3
CSE 2.7	Java and Web Technologies Lab	-	3	3	50	3	50	100	2
CSE 2.8	Soft Computing lab	-	3	3	50	3	50	100	2
CSE 2.9	Comprehensive Viva-Voce	-	-	-	-	-	100	100	6
	Total	**18**	**6**		**400**		**800**	**1200**	**28**

Elective-II

CSE 2.5.1 Digital Image Processing
CSE 2.52 Object Oriented Analysis & Design
CSE 2.5.3 Mobile Computing

Elective-III

CSE 2.6.1 Cloud Computing
CSE 2.6.2 Pattern Recognition
CSE 2.6.3 Information Retrieval

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SEMESTER – III

Course Number	Name of the Course	Periods per Week	Internal Examination	End Semester Examination	Total	Credits
CSE 3.1	Industrial Training	08 Weeks	Report Submission			
CSE 3.2	Dissertation	18 Weeks	100	--	100	12

SEMESTER – IV

Course Number	Name of the Course	Periods per Week	Internal Examination	End Semester Examination	Total	Credits
CSE3.2	Dissertation	24 Weeks	--	200	200	8

KUCSE 1.1 DATASTRUCTURES AND ALGORITHMS DESIGN

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Algorithm Analysis: Mathematical Background, Model, Analysis and Run Time Calculations, **The List ADT:** Singly Linked, Doubly Linked, Circular Linked List. **Stacks ADT:** The Stack ADT and applications; infix to postfix expression conversion, Evaluation of Postfix expressions. **Queue ADT:** The Queue ADT and Applications. **Sorting:** Insertion Sort, Shell Sort, Heap Sort, Merge Sort, Quick Sort, and Bucket Sort.

UNIT – II

Hashing: Hash Function, Separate Chaining, Open Addressing, Rehashing, and Extendible Hashing.
Binary Trees: Implementation, Expression Tress. **Search Trees:** Binary Search Trees, Implementation. **AVL Trees:** Single Rotations, Double Rotations. **Splay Trees:** Splaying, BTrees.
Graph Algorithms: Topological Sort, Breadth First Search, Depth First search, Biconnected Components

UNIT – III

Algorithms Design Techniques: **Divide and Conquer Technique:** General Method, Strassen's Matrix Multiplication. **Greedy Method**: General Method, Knapsack Problem, Job sequencing with deadlines, Minimum cost spanning trees - Kruskal's algorithm, Single source shortest paths- Dijkstras Algorithm.

UNIT – IV

Dynamic Programming Method - General method, All pairs shortest path problem, Optimal Binary Search Trees, 0/1 Knapsack problem, Traveling salesman problem, **Back tracking Method** - General Method, 8-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycle, **Branch and Bound Method** - General Method, 0/1 Knapsack problem, Traveling salesperson.

TEXT BOOKS

1. Mark Allen Weiss: "Data Structures and Algorithm Analysis in C++", 2nd edition, Addison Wesley.
2. Ellis Horowitz, Sartaj Sahni, S. Rajasekaran "Fundamentals of Computer Algorithms in C++",Second editon, University Press

KUCSE1.2 ADVANCED SOFTWARE ENGINEERING

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Introduction to Software Engineering: Software Engineering Processes, Project Management concept, Project Effort estimation, and LOC and function point based estimates, Requirement Analysis and Specifications, Formal Requirements, Specifications, Dependability, Formal Specification. Analysis Modeling.

UNIT-II

Design Concepts and Principles: Fundamental issues in Software Design, Effective Modular Design, Architectural Design, Distributed Systems Architecture, Application Architectures, User Interface Design, and Modeling Language (UML).

UNIT-III

Software Development Methodologies: Iterative Software Development, Software Reuse, Verification and Validation.
Software Testing: software test life cycle, white box testing, black box testing, Software Testing Principles, Agile Software Engineering.

UNIT-IV

Object Oriented Software Engineering: Software Process Improvement, Software Quality, Software Metrics, Software Maintenance, Risk management, Requirement Engineering, Object oriented concepts and principles.
Advanced Software Engineering Process: Basic concepts, Clean room Software Engineering, Component Based Software Engineering, Web Engineering, Reengineering

Text Books:

1. K.K Aggarwal & Yogesh Singh," Software Engineering", 3rd Edition, New Age International, 2007

References:

1. Ian Somerville, "Software Engineering", 8th Edition, Addison-Wesley, 2006
2. Roger S Pressman, "Software Engineering: A Practitioner's Approach" 6th Edition, McGraw Hill, 2005.
3. Fenton and Pfleeger "Software Metrics: A Rigorous and Practical Approach", 2nd Edition, Tomson Learning
4. Grady Booch, Rumbaugh, Jacoboson, "Unified Modeling Language User Guide", Addison Wesley.

KUCSE1.3 COMPUTER NETWORKS AND SECURITY

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Introduction: Uses of computer Networks, Network H/w, Network S/W, Reference Models, Example Networks, and Network Standardization.
Physical Layer: Guided transmission media – Magnetic media, Twisted Pair, coaxial cable, fiber optics.
Data Link Layer: Design Issues, Error detection and correction , Elementary Data Link Protocols, Sliding Window Protocols, Protocol Verification, Example Data Link protocols.

UNIT-II

The Medium Access Sub Layer: The channel allocation problem, Multiple access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, and Data Link Layer Switching.
The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internet Working, Network Layer in Internet.

UNIT-III

The Transport Protocol: The Transport Service, Elements of transport protocol, A simple Transport Protocol, Internet Transport Protocols UDP, Internet Transport Protocols TCP, Performance Issues.
The Application Layer: DNS-(Domain Name System), Electronic Mail, World Wide Web Multimedia,

UNIT-IV

Network Security: Cryptography, Symmetric-key Algorithms, Public–Key Algorithms, Digital Signatures, Management of public keys.
Communication Security, Authentications Protocols, E-mail Security, Web security, Social Issues.

TEXT BOOKS:

1. Computer Networks -- Andrew S Tanenbaum, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. Computer Communications and Networking Technologies – Michael A. Gallo, William M.Hancock - Thomson Publication
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

KUCSE1.4 DATAMINING AND DATA WAREHOUSING

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Introduction to Data Warehouse: Fundamentals of data mining ,data Mining Functionalities, Classification of Data mining System, Major issues in Data Mining, Data warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data model, Data warehouse Architecture, Data warehouse Implementation, From Data warehousing to Data Mining. .

UNIT – II

Data Preprocessing Steps: Cleaning, Integration, Transformation & reduction.
Data Mining: Introduction, Functionalities, Classification: Major Issues, Priorities, System Architecture, and DMQL.
Descriptive Data Mining: Concept Description – Generalized Characterization, Summarized Characterization, Analytical Characterization, Class Comparison, Descriptive Statistical Measures.
Associative Rule Mining – Basic Concepts, Single and Multi Dimensional Boolean and Multilevel association rules for transaction databases, Correlation Analysis.

UNIT – III

Predictive Data Mining: What is Predictive Data Mining, Classification – Preparing Data, criteria for comparing algorithms,
Classification: Issues regarding Classification, classification by decision tree, Bayesian Classification, Classification by back propagation, Classification based on concepts from Association Rule Mining, k-nearest neighbor Classifiers.
Regression – Linear and Multiple Regression, Nonlinear Regression, classifier accuracy.

UNIT-IV

Cluster Analysis: Cluster analysis, Types of data in Cluster Analysis, partitioning methods, hierarchical methods, and Density based methods.
.Mining complex types of data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Time-Series and Sequence Data, Mining Text databases, Mining the World Wide Web.

TEXT BOOKS

1. Jiawei Han, Micheline Kambler, "Data Mining Concepts and Techniques" Morgan Kaufmann Publishers, ISBN-81-7867-023-2, 2002.
2. Sam Anahory, Dennis Murray, "Data Warehousing in the real world", Low Price Edition, Pearson Education, ISBN-81-7808-387-6, 2003.
3. Alex Berson, Stephen J. Smith "Data Warehousing Data Mining, & OLAP" Tata McGraw-ISBN-13:.978-0-07-058741-0, ISBN-10:0-07-058741-8,2008

REFERENCE BOOKS:

1. Paulraj Ponnaiah, "Data Warehousing fundamentals", Wiley India edition, 2008
2. Arun K. Pujari, "Data Mining Techniques", Universities Press, 2008
3. C.S.R. Prabhu, "Data Warehousing Concepts, Techniques, Products and Applications", Second Edition, Prentice-Hall of India, ISBN – 81-203-2068-9, 2002.

KUCSE1.5

ADVANCED COMPUTER ARCHITECTURE

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Processor Design: CPU Organization, Data Representation, Instruction Formats, Data Path Design: Fixed Point Arithmetic and Floating Point Arithmetic Bus structure, Desine of a bus using MUX Instruction Pipelining, Super Scalar techniques, Linear pipeline processors, Super scalar and super pipeline design

UNIT – II

Control Unit Design:
Basic Concepts: Hardwired Control Unit Design approach, Micro-programmed Control Unit Design Approach, Micro program sequencer, Case studies based on both the approaches.
Memory Organization:
Internal memory, computer memory system overview, the memory Hierarchy, Random access memories, Cache memory, Elements of cache design, Virtual memory- protection and examples of virtual memory, Replacement Policies.

UNIT – III

I-O Organization: Accessing I/O Devices, Programmed I-O, Interrupts, DMA, Bus Arbitration; Synchronous bus and asynchronous bus, Interface circuits, Parallel port, Serial port, standard I/O interfaces, IO Processor, PCI bus, SCSI bus, USB bus protocols.

UNIT – IV

Introduction to Parallel Processing: parallelism in Uniprocessor systems, Parallel Computer Structures. Architectural classification schemes, parallel processing applications.
Parallel Computer Models: The state of Computing, Multiprocessors and Multi-computers, Multi-vector and SIMD Computers, PRAM and VLSI Models.

TEXT BOOKS:

1. William Stallings, Computer Organization and Architecture designing for Performance, 7th edition, PHI, 2007.
2. Carl Hamacher, Vranesic, Zaky, Computer Organization, 5th edition, MGH.
3. Hayes John P; Computer Architecture and organization; 3rd Edition, MGH, 1998.
4. John L. Hennessy and David A. Patterson, Computer Architecture – A quantitative Approach, 3rd Edition, Elsevier, 2005
5. Briggs and Kai Hwang, "Computer Architecture and parallel processing", Tata McGraw Hill Edition, 2005.

KUCSE 1.6.2 ADVANCED OPERATING SYSTEMS

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Process Synchronization:
Functions of an operating system, Design Approaches, why Advanced Operating Systems, Types of Advanced Operating Systems.
Architectures of Distributed Systems:
Motivations, System Architecture types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Networks, Communication Primitives.
Distributed Mutual Exclusion:
The Classification of Mutual Exclusion Algorithms, Preliminaries, A Simple Solution to Distributed Mutual Exclusion, Non_Token_Based Algorithms, Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, A Generalized Non_Token_Based Algorithm, Token Based Algorithm, Suzuki-Kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymond's Tree Based Algorithm, A Comparitive Performance Analysis.

UNIT – II

Distributed Deadlock Detection:
Preliminaries, Deadlock Handling Strategies In Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized Deadlock Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms.
Distributed Resource Management:
Distributed File Systems, Introduction, Architecture, Mechanism for Building Distributed File Systems, Design Issues, Log Structured File Systems.
Distributed Shared Memory:
Architecture and Motivation, Algorithms for Implementing DSN, Memory Coherence, Coherence Protocols, Design Issues.

UNIT-III

Distributed Scheduling:
Issues in Load Distributing, Components of a Load Distributing Algorithm, Stability, Load Distributing Algorithm, Performance Comparison, Selecting a Suitable Load Sharing Algorithm, Requirements for Load Distributing, Task Migration, Issues in Task Migration.
Failure Recovery:
Recovery, Introduction, Basic Concepts, Classification of Failures, Backward And Forward Error Recovery, Backward Error Recovery: Basic Approaches, Recovery in Concurrent Systems, Consistent Set of Checkpoints, Synchronous Check pointing and Recovery, Asynchronous Check pointing and Recovery, Check pointing for Distributed Database Systems, Recovery in Replicated Distributed Database Systems.
Fault Tolerance:
Issues, Atomic Actions and Committing, Commit Protocols, Non blocking Commit `Protocols, Voting Protocols, Dynamic Voting Protocols, The Majority Based Dynamic Voting Protocols, Dynamic Vote Reassignment Protocols.

UNIT - IV

Multiprocessor Operating Systems:
Structures Of Multiprocessor Operating Systems, Operating System Design Issues, Threads, Process Synchronization, Process Scheduling, Memory Management: The Mach Operating System, Reliability / Fault Tolerance: The Sequoia System.

Database Operating Systems:
Introduction to Database Operating Systems, What is Different, Requirements of a Database Operating, Concurrency Control: Theoretical Aspects, Introduction, Database Systems, A Concurrency Control Model of Database Systems, The Problem of Concurrency Control, Serializability theory, Distributed Database Systems.

Concurrency Control Algorithm:
Basic Synchronization Primitives, Lock Based Algorithms, Timestamp Based Algorithms, Optimistic Algorithms, and Concurrency Control Algorithms: Data Replication.

TEXT BOOK:

1) Mukesh Singhal, Niranjan G. Shivaratri, "Advanced Concepts In Operating Systems", Tata McGraw Hill Edition, 2001.

REFERENCE BOOKS:

1. Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 1994
2. Sinha, "Distributed Operating Systems Concepts and Design", IEEE Computer Society Press, 1997, ISBN - 0-7803-1119-1;
3. Tanenbaum and Steen, "Distributed Systems Principles and Paradigms", Prentice Hall Of India, 2002.

KUCSE 1.6.3 **ADVANCES IN COMPILER CONSTRUCTION**

Class: **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT I

Overview of Compiler Structure: 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.

Parsing: Context frees grammars; top-down parsing – Backtracking, LL (1), Recursive descent parsing, Predictive parsing, and preprocessing steps required for predictive parsing.

UNIT II

Bottom-Up parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, Handling Ambiguous grammar, and YACC-Automatic parser generator.

Semantic analysis: Intermediate forms of source programs-abstract syntax tree, Attributed grammars, Syntax direction translation, Conversion of popular Programming language constructs into Intermediate code forms, Type checker.

UNIT III

Symbol tables: Symbol table format, organization for block structured languages, hashing, and 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.

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 IV

Code optimization: Consideration for optimization, Machine Dependent and Machine Independent Code Optimization, Scope of Optimization, Local Optimization, Loop Optimization, Frequency Reduction, Folding, DAG representation.

Loop optimizations: Dominators, Loop-invariant computation, Induction variable, Array bounds checks, Loop unrolling.

TEXT BOOKS

1. A.V. Aho. J.D. Ullman, "Principles of Compiler Design" -; Pearson Education; 2003
2. Jean Paul Tremblay- Paul G. Sorenson, "The Theory and Practice of Compiler Writing" McGraw-Hill International Edition; 2005

REFERENCE BOOKS

1. Louden, K.C, "Compiler Construction: Principles & Practice" Thompson Learning, 2003
2. Fischer, C.N. & LeBlanc, R.J., "Crafting a compiler with C", Benjamin Cummings, 2003.
3. Bennet, J.P., "Introduction to Compiler Techniques", 2nd Edition, TMH, 2003.

KUCSE 1.6.4 ADVANCED DATABASE MANAGEMENT SYSTEMS

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

DATA STORAGE AND INDEXING: Memory Hierarchy, RAID, Disk Space Management, Buffer Manager, Files and Indexes, Page Formats, Record Formats.
FILE ORGANIZATION AND INDEXES: Cost Model, Comparison of three file Organizations, Overview Indexes, Properties of Indexes, Index Specification in SQL-92.
TREE STRUCTURED INDEXING: ISAM, B+ TREE, Format of a node, Search, Insert, Delete, Duplicates, B+ Tree in Practice.

UNIT-II

HASH BASED INDEXING: Static Hashing, Extendible Hashing, Linear Hashing, Extendable Hashing vs. Linear Hashing
PARALLEL AND DISTRIBUTED DATABASES : Architecture for Parallel Databases, Parallel Query Evaluation, Parallelizing, Individual Operations, Parallel Query Optimization, Introduction to Distributed Databases, Distributed DBMS Architecture, Storing Data in a Distributed DBMS, Distributed Catalog Management, Distributed Query Processing, Updating Distributed data, Introduction to distributed data, Introduction to Distributed Transaction , Distributed Concurrency Control, Distributed Recovery.

UNIT-III

INTERNET APPLICATIONS: Internet Concepts, HTML Documents, XML Documents, The Three-Tier Application Architecture, The Presentation Layer, The Middle Tiergine
INFORMATION RETRIEVAL AND XML DATA: Databases versus IR systems, Introduction to Information Retrieval, Indexing for Text Search, Web Search Engines, Managing Text in a DBMS, and A Data Model for XML, X Query: Querying XML Data, Efficient Evaluation of XML Queries.

UNIT-IV

OBJECT-DATABASE SYSTEMS : User Defined Data types, Structured Types, Objects Identity and Reference Types, Inheritance, Database Design for ORDBMS, Implementation, OODBMS, Comparisons.
SPATIAL DATAMANAGEMENT : Types, Application, Indexing Based on Space Filling, Curves, Grid Files, R-Trees, High dimensional Indexing.
DEDUCTIVE DATABASES: Introduction to recursive Queries, Theoretical Foundations, Recursive Queries with Negation, Efficient Evaluation.

TEXT BOOK:

1. Raghu Ramakrishna and Johannes Gehrke, "Database Management System", Tata McGrawHill-2003, Third Edition.

REFERENCE BOOKS:

1. C.J.Date, "Introduction to Database Systems", Addison Wesley, 1981, Third Edition.
2. Elmasri and Navathe, "Fundamentals of Database systems", Addison Wesley, 1998.

KUCSE 1.7 SEMINAR

Class: M.Tech I Semester

Practicals: **1 Period**
Internal Examination: **100 Marks**

Note: Each student has to give independent seminars on the topics covering the following:

1. A Seminar Topic covering the state-of-the-art technical topics relevant up to the second Semester theory subjects, which would supplement and complement the programme are to be assigned to each student.

Guidelines:

1. The Students of M.Tech. I semester are to register a relevant topic within 4 weeks of commencement of semester class work and submit the same to the department.
2. Evaluation of seminar consists of two components namely Report (50 marks) and Presentation (50 marks)
   (a) Report: Students are required to submit a report on the chosen seminar topic as per the prescribed format and last date specified by the Departmental Post Graduate Review Committee (DPGRC)
   (b) Presentation: The students are required to deliver the seminar before the DPGRC as per the schedule notified by the department.

DPGRC will decide the course of action on the students who fail to submit the report and present the seminar.

KUCSE 1.8 DATA STRUCTURES LABORATORY (Through C++)

1. Write C++ programs to implement the following using an array.
   a) Stack ADT
   b) Queue ADT
2. Write C++ programs to implement the following using a singly linked list.
   a) Stack ADT
   b) Queue ADT
3. Write C++ program to implement the deque (double ended queue) ADT using a doubly linked list.
4. Write a C++ program to perform the following operations:
   a) Insert an element into a binary search tree.
   b) Delete an element from a binary search tree.
   c) Search for a key element in a binary search tree.
5. Write a C++ program to implement circular queue ADT using an array.
6. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.
7. Write a C++ program to perform the following operations on B-Trees and AVL trees:
   a) Insertion.
   b) Deletion.
8. Write C++ programs for the implementation of bfs and dfs for a given graph.
9. Write C++ programs to implement the following to generate a minimum cost spanning tree:
   a) Prim's algorithm.
   b) Kruskal's algorithm.
10. Write a C++ program to solve the single source shortest path problem. (Note: Use Dijkstra's algorithm).
11. Write C++ program that uses non-recursive functions to traverse a binary tree in:
    a) Pre-order.
    b) In-order.
    c) Post-order.
12. Write C++ programs for sorting a given list of elements in ascending order using the following sorting methods:
    a) Quick sort.
    b) Merge sort.
13. Write a C++ program to find optimal ordering of matrix multiplication. (Note: Use Dynamic programming method).
14. Consider the problem of eight queens on an (8x8) chessboard. Two queens are said to attack each other if they are on the same row, column, or diagonal. Write a C++ program that implements backtracking algorithm to solve the problem i.e. place eight non- ttacking queens on the board.
15. Write a C++ program to find the strongly connected components in a digraph.
16. Write a C++ program to implement file compression (and uncompression) using Huffman's algorithm.
17. Write a C++ program to implement dynamic programming algorithm to solve the all pairs shortest path problem.
18. Write a C++ program to solve 0/1 knapsack problem using the following:
    a) Greedy algorithm.
    b) Dynamic programming algorithm.
    c) Backtracking algorithm.
    d) Branch and bound algorithm.

KUCSE 1.9 DATAMINING LABORATORY

List of Experiments

1. Apriori (An association rule mining algorithm)
2. Sampling (An association rule mining algorithm)
3. Partition (An association rule mining algorithm)
4. Comparison of Association Rule Mining Algorithms
5. K-Means (A partitioning clustering algorithm)
6. Agglomerative Clustering (A hierarchical clustering algorithm)
7. DBSCAN (A density-based clustering algorithm)
8. kNN (A nearest neighbor based classification algorithm)
9. Decision Tree (Classification algorithm)
10. Comparison of Classification algorithms

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SEMESTER – II

Course Number	Name of the Course	Periods per Week		Internal Examination		End Semester Examination		Total	Credits
		L/T	P/D	Time (Hrs)	Max. Marks	Time (Hrs.)	Max. Marks		
CSE 2.1	Java And Web Technologies	3	-	2	50	3	100	150	3
CSE 2.2	Advanced Data Mining	3	-	2	50	3	100	150	3
CSE 2 3	Soft Computing	3	-	2	50	3	100	150	3
CSE 2.4	Software Quality Assurance & Testing	3	-	2	50	3	100	150	3
CSE 2.5	Elective-II	3	-	2	50	3	100	150	3
CSE 2.6	Elective-III	3	-	2	50	3	100	150	3
CSE 2.7	Java And Web Technologies	-	3	3	50	3	50	100	2
CSE 2.8	Soft Computing techniques Lab	-	3	3	50	3	50	100	2
CSE 2.9	Comprehensive Viva-Voce	-	-	-	-	-	100	100	6
	Total	**18**	**6**		**400**		**800**	**1200**	**28**

Elective-II

CSE 2.5.1 Digital Image Processing
CSE 2.5.2 Object Oriented Analysis and Design
CSE 2.5.3 Mobile Computing

Elective-II

CSE 2.6.1 Cloud Computing
CSE 2.6.2 Pattern Recognition
CSE 2.6.3 Information Retrieval Systems

KUCSE 2.1 JAVA AND WEB TECHNOLOGIES

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

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

UNIT - II

Introduction to Swing: Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls.
Database Handling and Networking: All Database operations and Networking operations.

UNIT - III

Introduction to Servelets: Lifecycle of a Serverlet, JSDK the Servelet API, The javax. Servelet Package, Reading Servelet parameters, Reading Initialization parameters.
More on Servlets: The javax. Servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking.

UNIT - IV

Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC architecture. AJAX.

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.

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 & JAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES, Marty Hall and Larry Brown Pearson

KUCSE 2.2 ADVANCED DATA MINING

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures: **3 Periods**
Max Marks: **100 Marks**
Sessionals: **50marks**

UNIT - I

Mining Data Streams: Methods for Stream Data Processing and Stream Data Systems, Stream OLAP and Stream Data Cubes, Frequent Pattern mining in Data Streams.
Mining Time-Series Data: Trend Analysis, Similarity Search in Time Series Analysis.
Mining Sequence Patterns in Transactional Databases: Sequential Pattern Mining concepts and primitives, Scalable Methods for Mining Sequential Patterns, Constraint-Based Mining of Sequential Pattern.

UNIT – II

Graph Mining: Mining Frequent Subgraphs, Mining Variant and Constrained Substructure Patterns.
Social Network Analysis: Characteristics of Social Networks, Link Mining: Tasks and Challenges, mining on Social Networks.
Web Mining: Introduction to Web Content Mining, Web Structure Mining, and Web Usage Mining. Practical web mining applications overview.

UNIT – III

Web Content Mining: Document indexing and retrieval in the web environment - Boolean and vector retrieval models, latent semantic indexing (LSI), results ordering, meta-search. **Web Content Mining:** web documents categorization and clustering. **Web Usage Mining:** mining for user behavior on the web, internet marketing.

UNIT – IV

Text Mining: Text Data Analysis and Information Retrieval, Dimensionality Reduction for Text and Text Mining Approaches.
Spatial Data Mining: Spatial Data Cube Construction and Spatial OLAP, Mining Spatial Association and Co-location Patterns, Spatial Clustering Methods.

TEXT BOOKS:

1. J Han and M Kamber, Data Mining Concepts & Techniques, 2nd Edition, Elsevier, 2011.
2. Pang Ning Tan, M Steinbach, Vipin Kumar, Introduction to Data Mining, Addision Wesley, 2006.
3. G Dong and J Pei, Sequence Data Mining, Springer, 2007;
4. Charu C Aggarwal and Philip S Yu, Privacy - Preserving Data Mining: Models and Algorithms, Springer, 2008.

KUCSE2.3 SOFT COMPUTING

Class: M.Tech II Semester
Duration of Univ. Exam: 3 Hours

Lectures : 3 Periods
Max Marks : 100 Marks
Sessionals : 50 Marks

UNIT I

INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics. Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning and Unsupervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning -Neural Networks – Adaptive Resonance architectures.

UNIT II

GENETIC ALGORITHMS

Genetic algorithm - Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling - Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generation Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

UNIT III

FUZZY LOGIC

Fuzzy Logic - Crisp set and Fuzzy set - Basic concepts of fuzzy sets, membership functions. Basic operations on fuzzy sets, Properties of fuzzy sets, Fuzzy relations. Propositional logic and Predicate logic, fuzzy If – Then rules, fuzzy mapping rules and fuzzy implication functions, Applications.

UNIT IV

HYBRID SYSTEMS:

Integration of neural networks, fuzzy logic, genetic algorithms and evolutionary programming.

TEXT BOOKS

1. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
2. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
3. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
4. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
5. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.

REFERENCES

1. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
2. S.N.Sivanandam · S.N.Deepa, "Introduction to Genetic Algorithms", Springer, 2007.
3. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS, Publishers, 1992.

KUCSE2.4 SOFTWARE QUALITY ASSURENCE & TESING

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Software Quality: Perspective and Expectations, Historical perspective of Quality, Quality frameworks, Quality Assurance as dealing with defects, Defect prevention detection and Containment strategies.

QA Process and Quality Engineering:
QA Activates in Software Processes, Verification and Validation Perspectives, Reconciling the Two Views Quality Engineering: Activities and Process Quality Planning: Goal Setting and Strategy Formation Quality Assessment and Improvement Quality Engineering in Software Processes.

UNIT-II

Software Testing Background: Infamous Software Case Studies, Bug, Why Do Bugs Occur, The Cost of Bugs, What Exactly Does a Software Testing Do, What Makes a Good Software Tester.

The Realities of Software Testing: Testing Axioms, Software Testing Terms and Definitions, Precision and Accuracy, Testing and Quality Assurance.

Examining the Specification: Black-Box and White-Box Testing, Static and Dynamic Testing, Performing a High Level Review of the Specification, Low Level Specification Test Techniques.

Testing the Software with Blinders: Dynamic Black-Box Testing, Test-To-Pass and Test-To-Fail, Equivalence Partitioning Data Testing, State Testing, Other Black-Box Test Techniques.

Examining the Code: Static White-Box Testing: Examining the Design Code, Formal Reviews, Peer Reviews, Walk Through, Inspectors, Coding Standards and Guidelines, Examples of Programming Standards and Guidelines, Obtaining Standards, Generic Code Review Checklist.

UNIT-III

Testing the Software with Dynamic White-Box Testing: Dynamic White-Box Testing, Dynamic White-Box Testing Vs. Debugging, Testing the Pieces, Data Coverage, Code Coverage.

Configuration Testing: An Overview of Configuration Testing, Approaching the Task, Obtaining the Hardware, Identifying Hardware Standards, Configuration Testing Other Hardware.

Compatibility Testing: Compatibility Testing Overview, Platform and Application Versions, Standards and Guidelines Data Sharing Compatibility.

Usability Testing: User Interface Testing, What Makes Good User Interface Testing, Guidelines, Intuitive Consistent, Flexible, Comfortable, Correct, Useful, Accessibility Testing, Accessibility Features in Software.

UNIT-IV

Testing the Documentation: Types of Software Documentation, the Importance of Documentation Testing, Reviewing Documentation, the Realities of Documentation Testing.

Web Site Testing: Black-Box Testing, Gray-Box Testing, White-Box Testing, Configuration and Compatibility Testing, Usability Testing, Introducing Automation. **Automated Testing and Test Tools:** The Benefits of Automation and Tools, Test Tools, Software Test Automation, Random Testing.

Planning Test Effort: The Goal of Test Planning, Test Planning Topics.
Writing and Tracking Test Cases: The Goals of Test Case Planning, Test Case Planning Overview, Test Case Organization and Tracking.
Reporting: Bugs Fixation, Isolating and Reproducing Bugs, A Bug's Life Cycle, Bug Tracking Systems.
Measuring Testing Results: Metrics for Testing, Common Project-Level Metrics.

TEXT BOOKS:

1. Jeff Tian, "Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement", - John Wiley & Sons Inc., and IEEE Computer Society Press, Feb, 2005.
2. Ron Patton, "Software Testing", Techmedia, First Edition, ISBN 81-7635-507-0, 2002.

REFERENCE BOOKS:

1. Edwar. Dkit. "Software testing in the Real World", Pearson Education 2003.
2. M.G. Limayc, "Software Testing: Principles Techniques and Tools", TMH, 2009
3. CEM Kaner, Jack Falk, Hung Quoc Nguyen, "Testing Computer Software", 2nd Edition International Thomson Computer press (comdex), 2001

KUCSE 2.5.1 - DIGITAL IMAGE PROCESSING

Class: M.Tech II Semester
Duration of Univ. Exam: 3 Hours

Lectures : 3 Periods
Max Marks : 100 Marks
Sessionals : 50 Marks

UNIT I

FUNDAMENTALS OF IMAGE PROCESSING and applications

Introduction – Elements of visual perception, Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Color Fundamentals and Models, File Formats. Introduction to the Mathematical tools.

Image Recognition- Image Understanding – Image Classification – Video Motion Analysis – Image Fusion – Steganography – Color Image Processing.

UNIT II

IMAGE ENHANCEMENT AND RESTORATION

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – DFT, FFT, DCT, Smoothing and Sharpening filters – Holomorphic Filtering., Noise models, Constrained and Unconstrained restoration models.

UNIT III

IMAGE SEGMENTATION AND FEATURE ANALYSIS

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV

MULTI RESOLUTION ANALYSIS AND COMPRESSIONS

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms, Fast Wavelet transforms, Wavelet Packets.

Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards – JPEG/MPEG.

REFERENCES

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2008.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Third Edition, Third Edition, Brooks Cole, 2008.
3. Anil K.Jain, "Fundamentals of Digital Image Processing", Prentice-Hall India, 2007.
4. Madhuri A. Joshi, 'Digital Image Processing: An Algorithmic Approach", Prentice - Hall India, 2006.
5. Rafael C.Gonzalez, Richard E.Woods and Steven L. Eddins, "Digital Image Processing Using MATLAB", First Edition, Pearson Education, 2004.

KUCSE 2.5.2 OBJECT ORIENTED ANALYSIS AND DESIGN

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Introduction to UML
Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle.
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

UNIT – II

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

UNIT – III

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT – IV

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.
Case Study: This unit covers all the OOAD aspects Covered in Previous units of this course Automation of Library, ATM system

TEXT BOOKS

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

REFERENCES

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TATA Mc Graw Hill
5. Craig Larman Appling UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process, Pearson Education.
6. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

KUCSE 2.5.3 MOBILE COMPUTING

Class: M.Tech II Semester
Duration of Univ. Exam: 3 Hours

Lectures : 3 Periods
Max Marks : 100 Marks
Sessionals : 50 Marks

UNIT – I

Introduction: Applications: Vehicles, Emergencies, And Business. A short history of Wireless Communication.

Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.

Medium Access Control: Motivation for a specialized MAC: Hidden and Exposed terminals. Near and Far terminals. SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access.

UNIT – II

Medium Access Control: CDMA: Spread Aloha multiple access, Comparison of SDMA, FDMA, TDMA, CDMA.

Telecommunication Systems: GSM: Mobile Services, System Architecture, radio interface, Protocols, Localization and Calling, Handover, Security, New Data Services. Over view of Satellite Systems, history, applications, basics, routing, localization, handover.

UNIT – III

Wireless LAN: Infrared Vs Radio Transmission, Infrastructure and Ad-Hoc Networks, IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, Medium Access Control Layer, MAC Management. Bluetooth: User Scenarios, Physical Layer, MAC Layer, Networking, Security, Link Management.

Mobile Network Layer: Mobile IP: Goals, Assumptions and Requirements, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse Tunneling, Ipv6. Dynamic Host Configuration Protocol, Mobile Ad-Hoc Networks: Routing, Destination Sequence Distance Vector, Dynamic Source Routing, Alternative Metrics, Over View of Ad-Hoc Routing Protocols.

UNIT – IV

Mobile Transport Layer: Traditional TCP: Congestion Control, Slow Start, Fast Retransmit/Fast Recovery, Implications on Mobility. Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission/Time-Out Freezing, Selective Retransmission, Transaction Oriented TCP, TCP Over 2.5/3G Wireless Networks.

Support for Mobility: World Wide Web: Hypertext Transfer Protocol, Some Approaches that might help Wireless Access, System Architectures. Wireless Application Protocol: Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Environment.

TEXT BOOK:

1. Jochen Schiller, "Mobile Computing", Second Edition, First Indian Reprint-2004, Pearson Education Asia, ISBN NO. 81-297-0350-5,2004

REFERENCE BOOKS:

1. M. Richharia, "Mobile Satellite Communication: Principles and Trends", First Edition, 2001, Pearson Education Asia, ISBN NO. 8129700255, 2001.
2. Theodore S. Rappaport,"Wireless Communications", 2nd Edition, Pearson Education, ISBN: 81- 7808-648-4, 2002.

KUCSE 2.6.1 CLOUD COMPUTING

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Introduction to Cloud computing: Approaches to cloud computing, long term vision, Windows Azure as a Pass solution, Windows Azure and cloud computing
Introduction to the Windows Azure Platform : The operating system, service creation, Windows Azure storage , The worker role , The virtual Machine role, Windows Azure AppFabric , SQL Azure

UNIT-II

Creating a Webrole Project: Software Development kits, Windows Azure tools for Visual studio, Webrole project template, the cloud project, Deployment to Windows Azure, Configuration and upgrading, Service Definition file, Role properties
Windows Azure storage: Local storage, The Windows Azure storage Account, Windows Azure Management tool, Blob APIs

UNIT – III

Tables, Queues, and Worker roles: The table service, The Queue service
Windows Azure Operating System Details: Affinity group, Content Delivery Network, Certificates, Diagnostics

UNIT-IV

Accessing Azure Services from Everywhere: Creating the storage Account project, accessing the Storage Account from PHP, Using HTTP and REST
Application Architecture: Characteristics of a Multitier solution, The Data Access Layer, The Service Agent

TEXT BOOKS:

1. Windows azure step by step – Roberto brunetti – phi learning – Microsoft press.

REFERENCE BOOKS:

1. Cloud Computing with the Windows Azure Platform – Roger Jennings-Paperback
2. Programming Windows Azure: Programming the Microsoft Cloud – Sriram Krishnan
3. Windows Azure Platform (Expert's voice in .NET) [Paperback] – Tejaswi Redkar
4. Pro SQL Azure (Expert's Voice in .NET) [Paperback] – Scott Klein, HerveRoggero

KUCSE 2.6.2 INFORMATION RETRIEVAL SYSTEMS

Class: M.Tech II Semester
Duration of Univ. Exam: 3 Hours

Lectures : 3 Periods
Max Marks : 100 Marks
Sessionals : 50 Marks

UNIT I

Boolean retrieval. The term vocabulary and postings lists. Dictionaries and tolerant retrieval. Index construction. Index compression.

UNIT II

Scoring, term weighting and the vector space model. Computing scores in a complete search system. Evaluation in information retrieval. Relevance feedback and query expansion.

UNIT III

XML retrieval. Probabilistic information retrieval. Language models for information retrieval. Text classification. Vector space classification.

UNIT IV

Support vector machines and machine learning on documents. Flat clustering. Hierarchical clustering. Matrix decompositions and latent semantic indexing.
Web search basics. Web crawling and indexes. Link analysis.

TEXT BOOKS:

1. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press, 2008.

REFERENCE BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrival, Ricardo Baeza -Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.
4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
5. Information Storage & Retrieval, Robert Korfhage, John Wiley & Sons.

KUCSE 2.6.3 PATTERN RECOGNITION

Class: **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT I:

INTRODUCTION

Pattern and features – Training and learning in pattern recognition systems – Pattern recognition approaches – Statistical pattern recognition – Syntactic attern recognition – Neural pattern recognition – Reasoning driven pattern recognition – Discriminant functions – Linear and Fisher's Discriminant functions.

UNIT II

STATISTICAL PATTERN RECOGNITION

Gaussian model – Supervised learning – Parametric estimation – Maximum likelihood estimation – Bayesian parameter estimation – Perceptron algorithm – LMSE algorithm – Problems with Bayes approach – Pattern classification by distance functions – Maximum distance pattern classifier.

UNIT III

CLUSTER ANALYSIS

Unsupervised learning – Clustering for unsupervised learning and classification – C-means algorithm – Hierarchical clustering procedures – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

UNIT IV

SYNTACTIC PATTERN RECOGNITION and Feature Extraction

Elements of formal grammar – String generation as pattern description – Recognition of syntactic description –Parsing – Stochastic grammar and applications – Graph based structural representation.
Entropy minimization – Karhunen –Loeve transformation-unsupervised learning

TEXT BOOK

1. Robert J, Schalkoff, "Pattern Recognition: Statistical, Structural and Neural Approaches", JohnWiley & Sons Inc., New York, 1992.

REFERENCE BOOKS

1. Duda R.O. and Hart P.E., "Pattern Classification and Scene Analysis", John Wiley, New York, 2001
2. Morton Nadler and Eric Smith P, "Pattern Recognition Engineering", John Wiley and Sons, New York, 1993.
3. Touand, Gonzalez R. "Patten Recognition Principles" Addision Wesley, 1974.
4. Earl Gose, Richard Johnsonbaugh, Steve Jost, "Pattern Recognition and Image Analysis", Prentice Hall of India Private Ltd., New Delhi – 110 001, 1999.
5. Duda R.O, Hart .P.E., D.G. Stal, "Pattern Classification", John Wiley, 2001
6. Sergious Theodoridis, Konstantinos Koutroumbus, "Pattern Recognition", Elsevier, 2006

KUCSE 2.7 JAVA & WEB TECHNOLOGIES LABORATORY

1. Develop static pages (using only HTML) of an online Book store.
   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 confirmation.
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 input and returns the user details by taking the user information from the XML document.
4. Develop swings program to demonstrate colors.
5. Develop swings program to demonstrate fonts.
6. Develop swings program tometrics.
7. Develop swings program to implement lines, rectangles ,ovals and arcs.
8. Develop swings program to draw polygons.
9. Develop swings program to create buttons and test buttons.
10. Develop swings program to create text boxes and combo boxes.
11. Develop swings program to demonstrate tabbed pins.
12. Develop swings program to demonstrate scroll pains.
13. Develop swings program to demonstrate trees.
14. Develop swings program to demonstrate tables.
15. Servelet Program for implementing scopes of servlet variables
16. Servelet Program for implementing RequestDispatcher Forward
17. Servelet Program for implementing RequestDispatcher Include
18. Develop Servelet program to count visitor count
19. Reading Initialization parameters from a web.xml
20. Developing a case study demonstrating all the concepts discussed in theory.

KUCSE 2.8 SOFT COMPUTING LABORATORY

1. Programs on Supervised Learning
2. Programs on Back Propagation
3. Programs on Un-Supervised Learning
4. Programs on basic Genetic Algorithm Implementation
5. Programs on Genetic Algorithm Implementation with improved operators
6. Programs on Fuzzy Set Applications