Department of Information Technology  
M.C.A.- 4th Semester  

**COURSE STRUCTURE**  
(Applicable for 2012-13 admitted batch)

### M.C.A.- 4th Semester

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<td>Data Warehousing &amp; Data Mining</td>
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Total Credits: 24
Course Title: DATA WAREHOUSING AND DATA MINING                  Course Code: ITP1 2413

Course objectives: Students undergoing this course are expected to:
• Differentiate OnLine Transaction Processing and OnLine Analytical processing
• Learn Multidimensional schemas suitable for data warehousing
• Understand various data mining functionalities
• Inculcate knowledge on data mining query languages.
• Know in detail about data mining algorithms

Course outcomes: After undergoing the course, Students will be able to understand
• Design a data mart or data warehouse for any organization
• Develop skills to write queries using DMQL
• Extract knowledge using data mining techniques
• Adapt to new data mining tools.
• Explore recent trends in data mining such as web mining, spatial-temporal mining

UNIT- I
Introduction: Fundamentals of data mining, Data Mining Functionalities, Major issues in Data Mining
Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multi-dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation.

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: Characterization and Comparison: Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes

UNIT- III
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

**Classification and Prediction**: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Backpropagation, Other Classification Methods, Prediction, Classifier Accuracy.

**UNIT IV**

15 Hrs

**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.

**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.

**Reference Books**:

1. Data Mining Introductory and advanced topics – MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION.
5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION.
Department of Information Technology  
M.C.A.- 4th Semester

COURSE STRUCTURE

(Applicable for 2012-13 admitted batch)

Course Title: MOBILE COMPUTING  
Course Code: ITP1 2414

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3   1   0   4

Course objectives: Students undergoing this course are expected to:

- The student learns about the mobile architecture
- The subject makes student to understand about how to interact even on move as roaming.
- Student understands blue tooth architecture and functionality.
- Security implementation in wireless network communication is acknowledged by student.

Course outcomes: After undergoing the course, Students will be able to understand

- How to implement multiple access and overcome the problems of hidden, exposed, far and near.
- Routing methods and handover process in mobile networks
- How to transmit an IP packet and optimization of its transmission
- How to implement blue tooth architecture.

UNIT – I 16 Hrs
Mobile Computing (MC) : Introduction to MC, limitations, and architecture GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security. Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT – II 14 Hrs
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 – III 15 Hrs
Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP, Overview and
Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT - IV                                                                                                            15 Hrs
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:


REFERENCES:

Course Title: UNIX PROGRAMING  

Course Code: ITP1 2415

L T P C

3 1 0 4

Course objectives:

- Students undergoing this course are expected to:
- Know about UNIX operating system
- Know about important commands which are used in UNIX
- Learn about shell programming in UNIX
- Understand inter-process communication tools

Course outcomes:

- After undergoing the course, Students will be able to understand
- UNIX/LINUX Operating System
- UNIX commands
- How to write shell programming
- How to establish communication through IPC tools

UNIT- I UNIX Commands and Shell programming  15 Hrs
File-handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Introduction about shell, working with bourn shell, shell responsibilities shell variables, control structures, shell script examples

UNIT- II UNIX file Structure, System Calls, Standard I/O Formatted I/O  14 Hrs
Unix file structure, and type of files. File handling system (open, creat, read, write, close, lseek, stat, fstat, octl, umask,dup,dup2). The standard I/O(fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc,putc, putchar, fgets,gets), formatted-I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir).

UNIT- III: UNIX Process, Threads and Record Locking:  14 Hrs
Threads and Signals: What is process, process structure, system calls for process-management (fork, vfork, exit, wait, waitpid, exec, and system) and zombie-process. Threads, Thread-creation, waiting for a thread to terminate, threads vs. processes, Signals, Signal functions, unreliable signals, interrupted system-calls, kill and
raise functions, alarm, pause functions, abort, sleep functions. File and record locking (creating lock-files, locking regions, use of read/write locking, competing locks, other commands, deadlocks).

UNIT IV            16 Hrs
Inter-Process Communication:
Inter-process Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes, FIFO’s. Message-Queues: IPC, permission issues, Access permission modes, message structure, working message queues, UNIX system V messages, UNIX kernel support for messages, Unix APIs for messages, client/server example. Shared-Memory: UNIX system-V API for Shared memory, working with shared memory segment. Semaphores: UNIX system V API for semaphores, file-locking with semaphores. Semaphore and shared memory example using semaphores.

Text Books:
1. Unix Concepts and Applications, 3/e, Sumitabha Das, TMH

Reference Books:
1. Unix and shell Programming, Sumitabha Das, TMH
4. Unix and shell Programming, NB Venkateswarlu, Reem, NewDelhi
ELECTIVE - I

Course Title: ARTIFICIAL INTELLIGENCE
Course Code: ITP1 2416

Course objectives:
Students undergoing this course are expected to:
- Understand the AI problems and techniques.
- Know the different heuristic search techniques.
- Represent the knowledge in different forms.
- Know the different ways of planning and natural language understanding.
- Realize the different methods of learning.

Course outcomes:
After undergoing the course, Students will be able to:
- Use the heuristic search techniques for AI related problems.
- Represent knowledge in suitable forms for computer processing.
- Apply the natural language processing techniques to computer.
- Can apply the learning techniques to computer.

UNIT- I 16 Hrs
Introduction: AI problems, AI techniques, defining problem as a state space search, production systems, problem characteristics, production system characteristics
Heuristic search techniques: Generate-and-test, hill climbing, best-first-search, problem reduction, constraint satisfaction, means-ends-analysis

UNIT-II 15 Hrs
Knowledge representation: Issues, predicate logic, resolution, representing, knowledge using rules, forward versus backward reasoning, matching, control knowledge, weak slot and filler structure- semantic nets, frames, strong slot and filler structures-conceptual dependency, scripts

UNIT- III 15 Hrs
Game playing: mini-max search, alpha-beta cutoffs, planning system, goal stack planning, hierarchical planning, understanding, understanding as constraint satisfaction, waltz algorithm, natural language processing, syntactic processing, semantic analysis, case grammars
UNIT- IV                                                                                                                                   14 Hrs

Learning: Rote learning, learning by taking advice, learning in problem solving, learning from examples, Winston’s learning program, decision trees, perception, vision, speech recognition, navigation, manipulation, robot architecture, expert systems, shell, explanation, knowledge acquisition.

Text Books:
2. Artificial Intelligence A modern Approach, Russel Norvig, Pearson Education

Reference Books:
1. Artificial Intelligence, third edition, Patrick henry Winston, Pearson Education Asia
2. Introduction to Artificial intelligence and Expert Systems, Dan W. Patterson, PHI
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**COURSE STRUCTURE**  
(Applicable for 2012-13 admitted batch)

**Course Title:** EMBEDDED SYSTEMS  
**Course Code:** ITP1 2417  
**L** **T** **P** **C**  
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**Course objectives:** Students undergoing this course are expected to:
- Learn the design process methods for Microprocessors and Microcontrollers.
- Understand 8051 Microcontroller Architecture.
- Explore the concepts of Assembly Level Language.
- Learn about interfacing with devices like keyboard, VDU, converters and so on.
- Know the Concepts of Real-Time Operating Systems

**Course outcomes:** After undergoing the course, Students will be able to understand
- Assembly Language Programs using all types of arithmetic, logical and data transfer instructions.
- Design of Interfaces for different Applications such as Displays, Keyboards etc.
- Development of simple Embedded Systems
- Implementation of a microcontroller such as Elevator using advanced processor Concepts.

**UNIT-I**  
**14 Hrs**  

**The 8051 Architecture:** Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts.

**UNIT-II**  
**16 Hrs**  
**Basic Assembly Language Programming Concepts:** Programming the 8051. Data Transfer and Logical Instructions, Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions

**Applications:** Interfacing with Keyboards, Displays, D/A and A/D Conversions
UNIT- III
Introduction to Real – Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. Introduction to ARM and SHARC, Processor

UNIT IV

Text Books:
1. Computers as Components-principles of Embedded computer system design, Wayne Wolf, Elseveir.


Reference Books:
1. Embedding system building blocks, Labrosse, via CMP publishers.

2. Embedded Systems, Raj Kamal, TMH.


4. An Embedded Software Primer, David E. Simon, Pearson Education.
COURSE STRUCTURE

(Applicable for 2012-13 admitted batch)

Course Title: DISTRIBUTED OPERATING SYSTEMS                   Course Code: ITP1 2418

Course objectives: Students undergoing this course are expected to:
• Learn the basic concepts upon which distributed systems at large and distributed operating systems
• Create awareness about overall architecture of distributed systems
• Focus on design issues, design problems, solutions and performance issues of distributed systems

Course outcomes: After undergoing the course, Students will be able to understand
• About effective distribution of data in a network.
• To choose suitable operating system for distribution of data.
• Learn about different data consistency models.

UNIT- I : 14 Hrs
Processes: Introduction to Threads, Threads in Distributed Systems; CODE MIGRATION: Approaches to
Code Migration, Migration and Local Resources, Migration in Heterogeneous Systems, Example: D'Agents ,
Introduction to Software Agents in Distributed Systems, Agent Technology.
Naming Systems: Naming Entities: Names, Identifiers, and Addresses, Name Resolution, The Implementation
of a Name Space, Example: DNS, X.500

UNIT-II : 16 Hrs
Synchronization: Clock synchronization, logical clocks, global state, election algorithms, mutual exclusion, distributed transactions.
Consistency and Replication: Introduction, Data-Centric Consistency Models, Client-Centric Consistency
Models, Distribution Protocols, Consistency Protocols.

UNIT- III: 14 Hrs
Fault Tolerance: Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication,
Reliable Group Communication, Distributed Commit, Recovery.
Distributed Object-Based Systems: CORBA, Distributed Com, Globe and Comparison of CORBA, DCOM, and Globe.

UNIT IV: 16 Hrs
**Distributed Document-Based Systems and Coordination-Based Systems:**

Distributed Coordination-Based Systems: Introduction to Coordination Models, TIB/Rendezvous, JINI, Comparison of TIB/Rendezvous and JINI.

**Text Books:**

1. Distributed Systems, Principles and Paradigms, 2/e, Tanenbaum, Maarten Van Steen, PHI.

**Reference Books:**

1. Distributed Operating Systems and Algorithm Analysis, Chow, Johnson, PEA.
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COURSE STRUCTURE

(Applicable for 2012-13 admitted batch)

ELECTIVE -II

Course Title: BIOINFORMATICS

Course Code: ITP1 2419

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Course objectives: Students undergoing this course are expected to:

• Understand the basic concepts and techniques of Bioinformatics.
• Develop an awareness of the computational problems that arise in the modeling and analysis of living systems.
• Understand basic abstractions and computational approaches used to formulate and address these problems.

Course outcomes: After undergoing the course, Students will be able to understand

• Sequencing Alignment and Dynamic Programming
• Sequence Databases

UNIT- I
14 Hrs
Introduction to Bioinformatics: Scope of Bioinformatics, Elementary commands and protocols, ftp, telnet, http. Primer on information theory.


UNIT-II
16 Hrs
Special Topics In Bioinformatics : DNA mapping and sequencing, Map alignment, Large scale sequencing methods Shotgun and Sanger method.

UNIT- III
16 Hrs
Primary Database and their Use : Introduction to Biological databases, Organization and management of databases. Searching and retrieval of information from the World Wide Web. Structure databases-PDB (Protein Data Bank), Molecular Modeling Databases (MMDB). Primary Databases NCBL,EMBL, DDBJ.
UNIT IV
Bio Chemical Data Bases : Introduction to BioChemical databases-organization and Management of databases.
KEGG, EXGESCY, BRENDA, WIT.

Introduction to Multiple sequence alignment.

TEXT BOOKS :

REFERENCES :
3. Developing Bioinformatics Skills. Cynthia Gibbas & Per Jamberk
COURSE STRUCTURE

(Applicable for 2012-13 admitted batch)

Course Title: CLOUD COMPUTING  
Course Code: ITP1 2420

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Course objectives: Students undergoing this course are expected to:

- Inculcate knowledge on Centralized and Distributed Computing.
- Understand Transparency and Fragmentation in Distributed Computing.
- Learn about transaction management, concurrency control, and reliability in Distributed Computing.
- Create awareness on the major technical challenges in distributed systems design and implementation.

Course outcomes: After undergoing the course, Students will be able to understand

- Decomposition of global relations into fragments.
- Concepts of transaction management, concurrency control in Distributed Computing, Resource finding, Resource Utilization etc.
- principles applied in contemporary distributed database systems
- Proper Utilization of Resources available in the cloud

UNIT- I  
16 Hrs

UNIT-II  
16 Hrs

UNIT- III  
16 Hrs

UNIT IV  
Disaster Recovery, Disaster Recovery, Planning, Cloud Disaster Management, Case Study: Types of Clouds – Eucalyptus, Amazon  
12 Hrs
Text Books:
1) Cloud Computing – Web Based Applications that change the way you work and collaborate online- Michael Miller, Pearson Education.

Reference Books:
Department of Information Technology
M.C.A.- 4th Semester

COURSE STRUCTURE

(Applicable for 2012-13 admitted batch)

Course Title: OPEN SOURCE SOFTWARE
Course Code: ITP1 2421

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Course objectives:

Students undergoing this course are expected to:

- Choose appropriate programming language for the given problem definitions.
- Use imperative (or procedural), an object-oriented, a functional, and a logical programming language.
- Expose programming concepts and choose best way to express things that simulate useful features
- Design new open source software.
- Make good use of debuggers and related tools.

Course outcomes:

After undergoing the course, Students will be able to understand

- Understand the significance of an implementation of a programming language in system software
- Usage of imperative, an object-oriented, a functional, and a logical programming language approaches.
- The purpose of Open Source Software.
- The implementation of Programming Language.
- Download and learn open source databases.
- Design of new programming language.

UNIT- I 14 Hrs


UNIT-II 16 Hrs

UNIT- III  
14 Hrs


UNIT IV  
16 Hrs


Text Books:

Reference Books:
Department of Information Technology  
M.C.A.- 4th Semester  

COURSE STRUCTURE  
(Applicable for 2012-13 admitted batch)  

Course Title: DATA WAREHOUSING AND DATA MINING LAB  
Course code: ITP1 2207  
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0 0 3 2  

Course Objectives: This lab course is intended to  
Introduce data mining techniques including predictive, descriptive and visualization modeling and their effective use in discovering interesting hidden patterns in large volume of data generated by businesses, science, web, and other sources. Focus is on the main process of data mining such as data preparation, classification, clustering, association analysis, and pattern evaluation.  

Course outcomes: After undergoing the course students will be able to:  
• Synthesize the data mining fundamental concepts and techniques from multiple perspectives.  
• Develop skills and apply data mining tools for solving practical problems  
• Advance relevant programming skills.  
• Gain experience and develop research skills by reading the data mining literature.  

List of Experiments  
1. Study of WEKA tool and applying data mining techniques on following data sets in ARFF file Format i.e customer’s data, weather forecasting data, agricultural data etc.  
2. Implementation / Usage of WEKA for classification of above mentioned data set.  
3. Implementation / Usage of WEKA for prediction of above mentioned data set.  
4. Study of Meta edits tool and drawing diagram for the problem statement: Any Hotel management system and employer management in pharmaceutical company.  
5. Usage of METAEDIT tool for making E-R diagrams for the above problem statement.  
7. Study of AR miner Tool.  
8. Usage of AR miner for data warehouse.  
11. Comparison of various databases such as Oracle, Sybase.  
12. Comparison of various data mining tools.