CS-751

DATA WAREHOUSING AND DATA MINING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I

Introduction: Motivation, Data Warehousing and Data Mining, Data Models, Data Warehousing and OLAP: User's perspective, Data Mining: User's perspective, Related Disciplines, other Issues, Future Trends

Frequent pattern Matching: Introduction, Problem Definition, Mining association rules, Applications, Variations, Interestingness, FIM algorithms, Current status, Optimal FIM algorithms, Incremental mining, Conciseness of results, Sequential rules.

UNIT-II

Classification: Introduction, Problem definition, Applications, Evaluation of clusters, Other issues, Classification techniques, Optimal Classification algorithms, Regression.

Clustering: Introduction, Problem definition, Applications, Measurement of similarity, evaluation, classification of clustering algorithms, partitioning methods, Hierarchical Methods, Density Based Methods, Grid Based methods, Outlier detection

UNIT-III

Applications of Data Mining, Issues and Challenges, Current Trends

Introduction to Data Warehousing: History, Demand for strategic information, Data warehouse Definition, Users, Benefits and Concerns

Data Warehousing: Defining Features: Introduction, Features, Granularity, Information flow mechanism, Metadata, Classes of data, Lifecycle of a data, Data flow from warehouse to operational systems

UNIT-IV

Architecture of a data warehouse: Introduction, Characteristics, Goals, Architecture, Data warehouse and data mart, Issues, Building data marts

Data Warehouse Schema: Introduction, Dimension Modeling, Star Schema, Snowflake schema, Aggregate tables, Fact Constellation, Strengths of DM, Data Warehouse and Data model

Dimensional Modelling: Characteristics of dimension table, Fact table, Factless fact table, Updates, cyclicity of data,

UNIT-V

Dimensional Modeling: Other types of dimension tables, Keys to DW Schema, Enhancing performance, Technology requirements

The ETL Process, Introduction, Data Extraction, Transformation, Loading, Quality

OLAP in the Datawarehouse: OLAP, Multidimensional analysis, Functions, Applications, Models, Design, Tools and Products, Data Design, Administration and performance, OLAP platforms.

Suggested Reading:

1. Vikram Pudi P. Radha Krishna , Data Mining, Oxford University Press, 1st edition 2009
2. Reema Theraja. Data Warehousing. Oxford University Press, 2009.
3. Jiawei Han, Micheline Kamber. Data Mining – Concepts and Techniques, Morgan Kayufman, 2006.
4. Arun K Pujari, Data Mining Techniques, University Press, 2nd Edn, 2009.
5. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education, 2008.
6. MH Dunham, "Data Mining", Pearson Education, 2009.
7. S Anahory, D Murray, "Data Warehousing in the real world", Pearson Education, 2009.

With effect from Academic year 2010-2011

CS 752

COMPUTER NETWORKS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT I

DATA COMMUNICATIONS : Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model, TCP/IP

Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing

UNIT II

DATA LINK LAYER : Error detection and correction ,CRC , Hamming code ,Flow Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQ-sliding window – HDLC.

MAC LAYER: LAN – Pure and Slotted ALOHA, Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5, Bridges.

UNIT III

NETWORK LAYER : Internetworks – virtual circuit and Datagram approach, Routers

IP addressing ,Subnetting , CIDR

Routing – Distance Vector Routing ,Link State Routing , OSPF and BGP

UNIT IV

TRANSPORT LAYER : Services of transport layer, Multiplexing

Transmission Control Protocol (TCP) – Congestion Control , timer management, Quality of services (QOS) and User Datagram Protocol (UDP)

UNIT V

APPLICATION LAYER : Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW

References:

1. Andrew S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition, 2008.
2. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 2009.
3. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2006.

WITH EFFECT FROM THE ACADEMIC YEAR 2010-2011

CS 753

Unix Programming

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

Unit I

Unix: Introduction, commands, file system, security and file permission, regular expression and grep, shell programming, awk

[chapter 1,3,4,5,9,10,12 and 14 of text book 1]

Unit II

The Unix Model, signal, process control, daemon process.

Interprocess Communication: Introduction , file and record locking, other unix locking techniques, pipes, FIFOs, streams and messages, namespaces, message queues, semaphores and shared memory.

[chapter 2 and 3 text book 2]

Unit-III

Socket programming, Socket address, elementary socket system calls, advanced socket system calls, reserved ports, socked options, asynchronous I/O, Input/ Output Multiplexing, out-off band data, sockets and signals, internet super server.

[chapter 6 of text book 2]

UNIT-IV

The Basics of Perl: Origin and uses of Perl, Strings and escape characters, Scalar variables, Control Statements, Fundamentals of arrays, Hashes, functions, Regular expressions and Pattern matching, File input and output.

Introduction to PHP: Overview, syntactic characteristics, primitives, operations and expressions, output, control statements, arrays, functions, pattern matching, form handling files, cookies and session tracking.

[chapter 8 and 11 of text book 3]

UNIT-V

Python Basics, Python Objects, Numbers, Sequences: Strings, Lists, and Tuples, Mapping and Set Types, Conditionals and Loops, Files and Input/Output, Errors and Exceptions, Functions and Functional Programming, Modules, Object oriented programming

[Part one of text book 4]

Books:

1: Behrouz A. Forouzan and Richard F. Gilberg, "Unix and Shell programming: a Text book" Cengage learning, 2008

2: W. Richard Stevens, "Unix Network Programming", Pearson Education, 2009

3: Robert W. Sebesta, "Programming the World Wide Web", Pearson Education, 2008

4: Wesley J. Chun, "Core Python Programming", Prentice hall

5. Sumitabha Das, "Unix concepts & Applications", Fourth Edition, Tata McGrawhill, 2006.

2010-2011

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

CS 754

WEB PROGRAMMING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I

HTML: Markup languages, common tags, header, test styling, linking images Formatting text, Unordered lists, nested and ordered list, Tabs and formatting, Basic forms, Complex forms linking, Meta Tags.

Dynamic HTML: Cascading style sheets in line styles, style element External Style sheet, text flow and Box model, user style sheets.

UNIT-II

Object model and collections: Object referencing, collections all, children frames, navigator object.

Event model: ONCLICK, ONLOAD, Error Handling, ON ERRORS ONMUOUSEMOVE, ONMUSEOVER, ONMOUSEOUT, ONFOCUS, ONBLUR, ONSUBMIT.

Dynamic HTML: Filters and transitions, Data binding with Tabular data control binding to IMG, TABLE, Structured graphics, Active controls.

UNIT-III

Introduction to scripting, Java Script, Data types, Arithmetic's Equality relational, assignment increment, decrement operators, Java Script Control Structures- if, if-else, while.

Java Script Control Structures: For, Switch, Do/while, break.

Programming modules, recursion, recursion vs iteration global functions arrays, using arrays, Reference and reference parameters, passing arrays to functions, multiplesubscripted arrays, objects-math, string. Boolean and number.

UNIT-IV

Client side scripting with VB Script, operations, Data types and control structures, Functions, Arrays, String manipulations, classes and objects.

Web Servers : Personal Web server, Internet information server, Apache Web Server, Installation of a Web Server.

UNIT-V

Active Sever Pages, Client side Scripting vs Server side Scripting, Server side Active X Component, ADO, file system objects, Session tracking, CGI and PERL5, String.

Processing and Regular Expressions, Server side includes, Cookies and PERL XML Document Type Definition, XML Parsers, Using XML with HTML.

Suggested Reading :

1. Deiterl, Deitel & NIETO, "Internet & World Wide Web – How to Program", Pearson Education, Third Edition, 2004.
2. Steven Holzner, HTML black Book – Comprehensive Problem Server, Dream Tech Press, 2000.
3. B Sosinsky, V Hilley, "Programming the Web – An Introduction", MGH, 2004.

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With effect from Academic year 2010-2011

CS 755

ARTIFICIAL INTELLIGENCE
(Elective-I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I

What is Artificial Intelligence : The AI Problems, The Underlying Assumption, What is an AI Technique, The Level of the model, Criteria for Success.

Problems, Problem Spaces, and Search : Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characateristics.

UNIT-II

Heuristic Search Techniques : Generate-and-Test, Hill Climbing, Best-first Search, Problem Reduction, Constraint Satisfaction.

KR using Predicate Logic : Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

UNIT-III

Representing Knowledge Using Rules : Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge.

Symbolic Reasoning Under Uncertainty : Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem-Server, Implementation : Depth-First Search, Implementation : Breadth-First Search.

UNIT-IV

Statistical Reasoning : Probability and Bayes Theorem, Certainty Factors and Rule-based Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic.

Weak Slot-and-Filler Structures : Semantic Nets, Frames.
Strong Slot-and-Filler Structures : Conceptual Dependency, Scripts, CYC.

UNIT-V

Game Playing : The MInimax Search Procedure, Adding Alpha-beta Cutoffs, Additional Refinements, Iterative Deepening.

Planning : The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems.

Suggested Reading :

1. Elaine Rich, Kevin Knight, Shivashankar B Nair "Artificial Intelligence", Third Edition, TMH, 2009.

2. NP Padhy, "Artificial Intellilgence and Intelligent Systems"- Oxford, 2009.

3. S Russell,PNorvig, "Artificial Intelligence", Second Edition, Pearson Education, 2009.

4. Ela Kumar, "Artifical Intelligence", IK International, 2008.

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2010-2011

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

CS 756

DISTRIBUTED SYSTEMS
(Elective - I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I

Introduction to Distributed Systems: Definition, Goals, Hardware and software concepts and client/server model.

Processes: Threads, Clients, Servers, Code Migration, Software agents.

UNIT-II

Naming: Entities: DNS, X.500, Locating Mobile entities, removing unreferenced entities.

Synchronization: clock, logical clock, Global state, election algorithms, Mutual exclusion, distributed Transaction.

UNIT-III

Consistency and Replication: Data-Centric, Client-Centric Consistency Models, Distribution and Consistency protocols.

Fault Tolerance: Introduction, Process resilience, Reliable client-server and Group communication, Distributed Commit and Recovery.

UNIT-IV

Distributed Object based Systems: CORBA, D-COM & GLOBE. Distributed File System, Case studies: SUN NFS, CODA.

UNIT-V

Distributed shared memory: Implementation algorithms, memory coherence, and Design issues.

Distributed Scheduling: Issues in Load Distributing, Components of Load Distributing Algorithms, Load Distributing Algorithms.

Suggested Reading:

1. Andrew S. Tanenbaum and Van Steen, *Distributed Systems,* Pearson Education, 2002.
2. Singhal M, Shivaratri N.G: *Advanced concepts in operating systems.* McGraw-Hill Intl., 1994.

With effect from Academic year 2010-2011

CS 757

INFORMATION RETRIEVAL SYSTEMS
(Elective-I)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I
Introduction
Retrieval Strategies: Vector Space model, Probabilistic Retrieval Strategies
Language Models: Simple Term Weights, Non Binary Independence Model

UNIT-II
Retrieval Utilities: Relevance Feedback, Clustering, N-grams, Regression Analysis, Thesauri

UNIT-III
Retrieval Utilities: Semantic Networks, Parsing
Cross-Language Information Retrieval: Introduction, Crossing the Language Barrier

UNIT-IV
Efficiency: Inverted Index, Query Processing, Signature Files, Duplicate Document Detection

UNIT-V
Integrating Structured Data and Text: A Historical Progression, Information Retrieval as a Relational Application, Semi-Structured Search using a Relational Schema
Distributed Information Retrieval: A Theoretical Model of Distributed Retrieval, Web Search

Suggested Readings:

1. David A. Grossman, Ophir Frieder. Information Retrieval – Algorithms and Heuristics, Springer, 2nd Edition (Distributed by Universities Press), 2004.
2. Gerald J Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000
3. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002.
4. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009

WITH EFFECT FROM THE ACADEMIC YEAR 2010-2011

CS 781

PROGRAMMING LAB - VII

(Unix Programming Lab)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

1. Examples using Shell scripts
2. Programming using IPC
3. Socket programs
4. Perl Programs using regular expressions and pattern matching
5. PHP Programs using form handling using cookies
6. Python programs based on object oriented design

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

CS 782

PROGRAMMING LAB-VIII
(WEB PROGRAMMING LAB)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

1. Creating HTML pages to test different Tags.
   a) Headers
   b) Linking Images.
   c) Images as anchor.
   d) Text Formatting.
2. a) HTML Table Formatting.
   b) Ordered and Unordered lists.
3. Creating Frames.
4. Examination result in Java Script.
5. Creation of Quiz program.
6. Usage Data and the methods of Date and Time objects.
7. Floating alerts, aligning text and setting box dimension using CSS.
8. Demonstrating object hierarchy using collection children.
9. Using HTML Events.
10. Using Transition & Filters like Flip filter, Chroma filter, Shadow filter etc.,
11. VB script classes and regular expression.
12. Installing Web Server (PWS or IIS).
13. Guest book Active Server pages.
14. Creation of Small full fledged database application using ADO spreading over to 3 sessions.