B.E. Sem.VIII – [CMPN]

Data Warehousing and Mining

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

Data Warehousing :

1. **Overview and Concepts:** Need for data warehousing, Basic elements of data warehousing, Trends in data warehousing.

2. **Planning and Requirements:** Project planning and management, Collecting the requirements.

3. **Architecture and Infrastructure:** Architectural components, Infrastructure and metadata.

4. **Data Design and Data Representation:** Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.

5. **Information Access and Delivery:** Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web.

6. **Implementation and Maintenance:** Physical design process, data warehouse deployment, growth and maintenance.

Data Mining :

1. **Introduction:** Basics of data mining, related concepts, Data mining techniques.

2. **Data Mining Algorithms:** Classification, Clustering, Association rules.

3. **Knowledge Discovery :** KDD Process

4. **Web Mining:** Web Content Mining, Web Structure Mining, Web Usage mining.

5. **Advanced Topics:** Spatial mining, Temporal mining.

6. **Visualisation :** 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

7. **Data Mining Primitives, Languages, and System Architectures:** Data mining primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems

8. **Application and Trends in Data Mining:** Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining

References

1. Data Warehousing Fundamentals *(Paulraj Ponnian)*, John Wiley
2. Data Mining Introductory and Advanced Topics *(M. H. Dunham)*, Pearson Education.
3. Data Mining Concepts and Techniques *(Han, Kamber)*, Morgan Kaufimann
4. The Data Warehouse Lifecycle toolkit *(Ralph Kimball)*, John Wiley
5. Building the Data Warehouses *(W. H. Inmon)*, Willey Dreamtech.
6. The Data Warehouse Toolkit *(R. Kimpall)*, John Wiley
7. Decision Support and Data Warehouse Systems *(R. G. Mallach)*

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B.E. Sem. VIII – [CMPN]

Distributed Computing

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

1. **Introduction to Distributed System:** Goals, Hardware concepts, Software concepts, and Client-Server model. Examples of distributed systems.

2. **Communication :** Layered protocols, Remote procedures call, Remote object invocation, Message-oriented communication, Stream-oriented communication.

3. **Processes :** Threads, Clients, Servers, Code Migration, Software agent.

4. **Naming :** Naming entities, Locating mobile entities, Removing un-referenced entities.

5. **Synchronization :** Clock synchronization, Logical clocks, Global state, Election algorithms, Mutual exclusion, Distributed transactions.

6. **Consistency and Replication :** Introduction, Data centric consistency models, Client centric consistency models, Distribution protocols, Consistency protocols.

7. **Fault Tolerance :** Introduction, Process resilience, Reliable client server communication, Reliable group communication. Distributed commit, Recovery.

8. **Security :** Introduction, Secure channels, Access control, Security management.

9. **Distributed File System :** Sun network file system, CODA files system.

10. **Case Study :** CORBA, Distributed COM, Globe, Comparison of CORBA, DCOM, and Globe.

References :

1. Distributed Systems : Principles and Paradigms *(A. Tauncenbaum)*
2. Distributed Systems : Concepts and Design (*G. Coulouris, J. Dollimore, and T. Kindberg),* Person Education
3. Advanced Concepts in Operating Systems *(M. Singhal, N. Shivaratri)*, TMH

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B.E. Sem.VIII – [CMPN]

Multimedia Systems

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

1. **Multimedia Systems Introduction :** Multimedia application, Multimedia system architecture, Evolving technologies for multimedia systems, defining objects for multimedia systems, Multimedia data interface standards

2. **Compression and Decompression :** Types of compression, Binary image compression schemes, Color, Gray scale, Still video image compression, Video image compression, Audio compression, Fractal compression, Data and File Format Standards: Rich text format, TIFF, RIFF, MIDI, JPEG, AVI, MPEG.

3. **Multimedia Input/Output Technologies :** Key technologies issues, Pen input, Video and Image display system, Printout technology, Image scanners, Digital Voice and Audio, Full motion video

4. **Storage and Retrieval Technologies :** Magnetic media technology, Optical media, Hierarchical storage management, Cache management for storage system, Image and video databases: Indexing and Retrieval.

5. **Architectural and Telecommunications Considerations :** Specialized computational processors, Memory systems, Multimedia board solutions, LAN/WAN connectivity, Multimedia transport across ATM networks, Multimedia across wireless, Distributed object models.

6. **Multimedia Networking :** Multimedia networking applications, Streaming stored audio and video, RTP, Scheduling and policing mechanisms, Integrated services, RSVP.

7. **Multimedia Application Design :** Multimedia application classes, Types of multimedia systems, Virtual reality design, Components of multimedia systems, Organizing multimedia databases, application workflow design issues, Distributed application design issues, Applications like Interactive, Television, Video Conferencing, Video-on-demand, Educational applications and authoring, Industrial applications, Multimedia archives and digital libraries.

8. **Multimedia Authoring and User Interface :** Multimedia authoring systems, Hyper media application design considerations, User interface design, information access, Object display/playback issues.

9. **Hypermedia Messaging :** Mobile messaging, Hyper media message components, Hypermedia linking and embedding, Creating hypermedia messages, integrated multimedia message standards, Integrated document management, The world-wide web, Open hypermedia systems, Content based navigation.

10. **Distributed Multimedia Systems :** Components of distributed multimedia systems, Distributed client server operations, Multimedia object servers, Multi-server network topologies, Distributed multimedia database, Managing distributed objects.

11. **Multimedia System Design :** Methodology and considerations, Multimedia systems design examples.

References

1. Multimedia Systems Design *(Prabhat K. Andheigh, Kiran Thakrar)*, PHI John F.
2. Multimedia Ssytems *(Koegel Buford)*, Pearson Education.
3. Multimedia Communications *(Free Halshall)* Pearson Education.
4. Multimedia Computing, Communications and Applications *(R. Steimnetz, K. Nahrstedt)*,Pearson Education
5. Multimedia Communications Systems : Techniques, Standards, and Networks *(K. R. Rao, D. Milovanovie)*
6. Multimedia Database Systems *(Subrahmanian),* M. Kaufiman
7. Multimedia Communications : Directions and Innovations *(J. D. Gibson)* Academic Press Hardcourt India.
8. Computer Networking *(J. F. Kurose, K. W. Ross)* Pearson Education

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B.E. Sem. VIII – [CMPN]

Neural Networks & Fuzzy Systems

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

1. **Introduction :** Biological neurons, McCulloch and Pitts models of neuron, Types of activation function, Network architectures, Knowledge representation. Learning process : Error–correction learning, Supervised learning, Unsupervised learning, Learning Rules.

2. **Single Layer Perceptron :** Perceptron convergence theorem, Method of steepest descent – least mean square alogorithms.

3. **Multilayer Perceptron :** Derivation of the back–propagation algorithm, Learning Factors.

4. **Radial Basis and Recurrent neural Networks :** RBF network structure, theorem and the reparability of patterns, RBF learning strategies, K–means and LMS algorithms, comparison of RBF and MLP networks, Hopfield networks : energy function, spurious states, error performance.

5. **Simulated Annealing :** The Boltzmann machine, Boltzmann learning rule, Bidirectional Associative Memory.

6. **Fuzzy logic :** Fuzzy sets, Properties, Operations on fuzzy sets, Fuzzy relations, Operatons on fuzzy relations, The extension principle, Fuzzy measures, Membership functions, Fuzzification and defuzzification methods, Fuzzy controllers.

References :

1. Neural Network a – Comprehensive Foundation *(Simon Haykin)*, Pearson Education
2. Introduction to Artificial Neural Systems *(Zurada J. M.)*, Jaico publishers
3. Fuzzy Logic with Engineering Applications *(Thimothy J. Ross)*, McGraw Hill
4. Introduction to Applied Fuzzy Electronics *(Ahmad Ibrahim)* PHI

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B.E. Sem. VIII – [CMPN]

Parallel Processing

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

1. **Introduction :**Parallel Processing Architectures : Parallelism in sequential machines, Abstract model of parallel computer, Multiprocessor architecture, Pipelining, Array processors.

2. **Programmability Issues :** An overview, Operating system support, Types of operating systems, Parallel programming models, Software tools.

3. **Data Dependency Analysis :** Types of dependencies loop and array dependences, Loop dependence analysis, Solving Diophantine equation, Program transformations.

4. **Shared Memory Programming :** General model of shared memory programming. Process model under UNIX.

5. **Algorithms for Parallel Machines :** Speedup, Complexity and cost, Histogram computation, Parallel reduction, Quadrature problem, Matrix multiplication, Parallel sorting algorithms, Solving linear systems, Probabilistic algorithms

6. **Message Passing Programming :** Introduction, Model, Interface, Circuit satisfiability, Introducing collective, Benchmarking parallel performance.

7. **Parallel Programming languages :** Fortran90, nCUBE C, Occam, C–Linda

8. **Debugging Parallel Programs :** Debugging techniques, Debugging message passing parallel programs, Debugging shared memory parallel programs

9. **Memory and I/O Subsystems :** Hierarchical memory structure, Virtual memory system, Memory allocation and management, Cache allocation and management, Cache memories and management, Input output subsystems.

10. **Other Parallelism Paradigms :** Data flow computing, Systolic architectures, Functional and logic paradigms, distributed shared memory

11. **Performance of Parallel Processors :** Speedup and efficiency, Amdabl's law, Gustafson–Barsis's law, Karf–Flatt metric, Isoeffeicency metric.

References :

1. Computer Architecture and Parallel Processing *(Hawang Kai and Briggs F. A.)*
2. Fundamentals of Parallel Processing *(Jordon H. F. and Alaghaband G.)*
3. Parallel Programming *(M. J. Quinn)* TMH.
4. Introduction to Paralel Processing *(Shasikumar M.)*, PHI
5. Practical Parallel Programming *(Wilson G. V.)* PHI
6. Parallel Computer Architecture *(D. E. Culler, J. P. Singh, A. Gupta)*, Morgan Kaufman

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B.E. Sem.VIII – [CMPN]

Robotics

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

1. **Robotic Manipulation :**
   Automation and Robots, Classification, Application, Specification, Notations.

2. **Direct Kinematics :**
   Dot and cross products, Co-ordinate frames, Rotations, Homogeneous, Co-ordinates, Link co-ordination arm equation, (Five-axis robot, Four axis robot, Six axis robot).

3. **Inverse Kinematics :**
   General properties of solutions tool configuration five axis robots, Three-Four axis, Six axis robot (Inverse kinematics).

   Workspace analysis and trajectory planning work envelop and examples, workspace fixtures, Pick and place operations, Continuous path motion, Interpolated motion, Straight-line motion.

4. **Robot Vision :**
   Image representation, Template matching, Polyhedral objects, Shane analysis, Segmentation (Thresholding, region labeling, Shrink operators, Swell operators, Euler numbers, Perspective transformation, Structured Illumination, Camera calibration).

5. **Task Planning :**
   Task level programming, Uncertainty, Configuration, Space, Gross motion, Planning, Grasp planning, Fine-motion Planning, Simulation of planer motion, Source and goal scenes, Task planner simulation.

6. **Moments of Inertia.**

7. **Principles of NC and CNC Machines.**

References

1. Fundamentals of Robotics–Analysis and Control *(Robert Shilling)*, PHI.
2. Robotics *(Fu, Gonzales and Lee)* McGraw Hill
3. Introduction to Robitics *(J. J. Craig)*, Pearson Education
4. Robotics and AI *(Staughard)*, PHI.
5. Industrial Robotics *(Grover, Wiess, Nagel, Oderey)*, McGraw Hill
6. Robotics and Mecatronics *(Walfram Stdder)*, TMH
7. Introduction to Robotics *(Niku)*, Pearson Education
8. Robot Engineering *(Klafter, Chmielewski, Negin)*, PHI
9. Robotics and Control*(Mittal, Nagrath)*, TMH.

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B.E. Sem.VIII – [CMPN]

System Security

SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks
Term Work : 25 Marks
Oral : 25 Marks

1. **Introduction :**
   Security, Attacks, Computer criminals, Method of defense.

2. **Cryptography : [Only for CMPN]**
   Basic Cryptography: Classical Cryptosystems, Public key Cryptography, Cryptographic checksum, Key Management: Key exchange, Key generation, Cryptographic key infrastru– cture, Storing and revoking keys, Hash algorithm, Digital signature, Cipher Techniques: Problems, Stream and block ciphers: AES, DES, RC4.

3. **Program Security :**
   Secure programs, Non-malicious program errors, Viruses and other malicious code, Targeted malicious code, Controls against program threats.

4. **Operating System Security:**
   Protected objects and methods of protection, Memory address protection, Control of access to general objects, File protection mechanism, Authentication: Authentication basics, Password, Challenge-response, Biometrics.

5. **Database Security:**
   Security requirements, Reliability and integrity, Sensitive data, Interface, Multilevel database, Proposals for multilevel security.

6. **Security in Networks:**
   Threats in networks, Network security control, Firewalls, Intrusion detection systems, Secure e-mail, Networks and cryptography, Example protocols: PEM, SSL, IPsec.

7. **Administrating Security:**
   Security planning, Risk analysis, Organizational security policies, Physical security.

8. **Legal, Privacy, and Ethical Issues in Computer Security:**
   Protecting programs and data, Information and law, Rights of employees and employers, Software failures, Computer crime, Privacy, Ethical issues in computer society, Case studies of ethics.

References

1. Cryptography and Network Security : Principles and Practice *(Stallings)*
2. Security in Computing *(C. P. Pfleeger, and S. L. Pfleeger)*, Pearson Education.
3. Computer Security : Art and Science *(Matt Bishop)*, Pearson Education.
4. Network Security *(Kaufman, Perlman, Speciner)*
5. Network Security : A Beginner's Guide *(Eric Maiwald)*, TMH
8. Applied Cryptography *(Bruce Scheler)*, John Wiley
9. Java network security *(Macro Pistoia)*, Person Education
10. Principles of information security *(Whitman, Mattord)*, Thomson

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