B.E. Sem.VIII – [INFT]
Data Warehousing and Mining

SYLLABUS

Time : 3 Hrs.

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
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

Reference:
2. Data Mining Introductory and Advanced Topics (*M.H.Dunham*), Pearson Education.
3. Data Mining Concepts and Techniques (*Han, Kamber*), Morgan Kaufmann.
4. The Data Warehouse Lifecycle toolkit (*Ralph Kimball*), John Wiley.
8. Decision Support and Data Warehouse systems (*E.G. Mallach*), TMH.
1. **Introduction to GIS:**
   Introduction, Definition of GIS, Evolution of GIS, Component of GIS.

2. **Maps And GIS:**
   Map scale, Classes of map, Mapping process, Coordinate systems, Map projection, Spatial framework for mapping locations, Topographic mapping, Attribute data for Thematic mapping.

3. **Digital Representation of Geographic Data:**
   Technical issues of digital representation of data, Database and Database management System, Raster geographic data representation, Vector geographic data representation, Object oriented geographic data representation, Relationship between Data representation and Data analysis.

4. **Data Quality And Standards:**
   Concepts and definition of data quality, Component of geographic data, Data quality assessment, Spatial data error management, Geographic data standards, Geographic data standards and GIS development.

5. **GIS Data Processing, Analysis and Visualization:**
   Raster based GIS data processing, Vector based GIS data processing, Human computer interaction and GIS, Visualization of geographic information, Principles of Cartographic design in GIS, Generation of information product.

6. **Data Modeling:**
   Digital Terrain Modeling, Approaches to digital terrain data modeling, Acquisition of digital terrain data, Data processing, Analysis and visualization, Spatial modeling, Descriptive statics, Spatial autocorrelation, Quadrat counts and Nearest-Neighbor analysis, Trend surface analysis, Gravity models.

7. **GIS Project Design And Management:**
   Software engineering as applied to GIS, GIS project planning, System analysis and study user requirement, Geographic database design methodology, GIS application software design methodology, System implementation, System maintenance and support.

8. **GIS Issues and Future of GIS:**
   Issues of implementing GIS, Trend of GIS development, GIS, applications and GIS users.

**References:**
2. Introduction to Geographic Information Systems (*Kang-Tsung Chang*), TMH
3. An Introduction to Geographical Information System (*Ian Heywood, Sarah Cornelius, Steve Carver*), Person Education
1. **Introduction**: Security, Attacks, Computer criminals, Method of defense

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


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

5. **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. **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

**Reference:**
4. Network Security *(Kaufman, Perlman, Speciner)*
6. Java Network Security *(Macro Pistoia)*, Pearson Education
7. Principles of information security *(Whitman, Mattord)*, Thomson
B.E. Sem.VIII – [INFT]
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


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.


Reference:
3. Multimedia Communications *(Free Halshall)*, Person Education.
SYLLABUS

Lectures : 4 Hrs.  
Practical : 2 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 algorithms.

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

4. **Radial Basis and Recurrent Neural Networks:**  

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

6. **Fuzzy logic:**  

**Reference:**
1. Neural Network a – Comprehensive Foundation (*Simon Haykin*), Pearson Education
2. Introduction to Artificial Neural Systems (*Zurada J.M.*), Jaico Publishers
4. Introduction to Applied Fuzzy Electronics (*Ahmad Ibrahim*), PHI
5. Artificial Neural Networks (*Yegnanarayana B.*), PHI
B.E. Sem.VIII – [INFT]

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.**

Reference:
2. Robotics *(Fu, Gonzales and Lee)*, McGraw Hill
3. Introduction to Robotics *(J.J.Craig)*, Person Education
4. Robotics and AI *(Staughard)*, PHI.
6. Robotics and Mecatronics *(Walfram Studer)*, TMH.
7. Introduction to Robotics *(Niku)*, Pearson Education
8. Robot Engineering *(Klafter, Chmielewski, Negin)*, PHI
9. Robotics and Control *(Mittal, Nagrathe)*, TMH

### TAGS

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1. Introduction:
Defect, Defect Vs failures, Process problems and defect rates. The business perspective for testing.

2. Building a Software Testing Strategy:
Computer system strategic risk, Economics of testing, Common computer problems, Economics of SDLC testing, Testing– an organizational issue, Establishing a testing policy, Structured approach to testing, Test strategy, Testing methodology.

3. Establishing a Software Testing Methodology:
Introduction, Verification and validation, Functional and structural testing, Workbench concept, Considerations in developing testing methodologies.

4. Determining Software Testing Techniques:
Testing techniques/tool selection process, Selecting techniques/tools, Structural system testing techniques, Functional system testing techniques, unit testing techniques, Functional testing and analysis.

5. Selecting and Installing Software Testing Tools:
Testing tools–Hammers of testing, Selecting and using the test tools, Appointing managers for testing tools.

6. Software Testing Process:
Cost of computer testing, life cycle testing concept, Verification and validation in the software development process, Software testing process, Workbench skills.

7. Software Testing Process:

8. Testing Specialized Systems and Applications:
Client/Server systems, RAD, System documentation, Web based systems, Off–the–self software, Multi platform environment, Security, Data Warehouse

9. Building Test Document:
Uses, Types, Responsibility, Storage, Test plan documentation, Test analysis report documentation

Reference:
3. Software Testing Techniques (Boris Beizer), Dreamtech
4. Introducing Software Testing (Louise Tamres), Pearson Education.