Course Contents

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<th>Credits- 4C</th>
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UNIT I

UNIT II
Symmetric Ciphers: Principles of block ciphers, The Data Encryption Standard (DES), Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Modular Arithmetic, Finite Fields, Advanced Encryption Standard (AES), Multiple Encryption, Triple DES, Stream Ciphers, Confidentiality Using Symmetric Encryption

UNIT III

UNIT IV

UNIT V

Books Recommended:
2. Schneier, Bruce, “Applied Cryptography”, John Wiley and Sons
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<td>Digital Image Processing and computer vision</td>
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UNIT I
Introduction of Image processing, Fundamental Steps in image processing, Image Processing - Image Acquisition, Storage, Processing, Communication, Display, Image representation, Sampling and Quantization, Relationship between pixels, Image transformation-Fourier transformation, properties of Fourier transform, Fast Fourier transform Walsh transform, Hadamard transform, Hostelling transform

UNIT II

UNIT III

UNIT IV
Image Segmentation- Image Segmentation- Point Detection, Line Detection, Edge detection, Edge Linking & Boundary Detection- Local Processing, Global Processing using graph theoretic approach, Threshold - Foundation, Simple Global Threshold, Optimal Threshold; Region Oriented Segmentation - Basic Formulation, Region Growing by Pixel Aggregation, Region Splitting & Merging.

Unit V
Pattern Recognition- Classification and description, Artificial intelligence approach in pattern classification, Supervised and unsupervised learning methods, parametric approaches, nonparametric approaches, ANN approaches in pattern classification, Types of grammar. Syntactic pattern reorganization.

Books Recommended:
2. Digital Image processing, Rafael E. Gonzalez, Pearson education
Course Contents

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<td>MTIT-1123</td>
<td>L T P</td>
<td>Max. Marks-70 Min. Marks-28 Duration-3hrs.</td>
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UNIT I
Introduction to data mining, Data Warehouses, Transactional Databases, Data Mining Functionalities, Characterization and Discrimination, KDD vs Data mining, DBMS vs Data Mining, DM Techniques and applications, Mining Frequent Patterns, Associations, and Correlations, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with Data Warehouse System, Issues in Data Mining.

Data Warehouse, A Multidimensional Data Model, Warehouse schema, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

UNIT II

UNIT III
Classification and Clustering, Definition of Clusters, Clustering Applications, Proximity Measures, Hierarchical Clustering, Agglomerative Hierarchical Clustering, Divisive Hierarchical Clustering, Applications of Hierarchical Clustering, Partitional Clustering, Clustering Criteria, K-Means Algorithm, Mixture Density-Based Clustering, Graph Theory-Based Clustering, Fuzzy Clustering, Cluster Validity, External Criteria, Internal Criteria, Relative Criteria, Categorical clustering.

UNIT IV
Decision tree, Tree Construction Principle, Best split, Splitting indices, splitting criteria, Decision tree construction algorithms, ID3, C4.5, CART, Decision tree construction with presorting, Clouds, Boat, Pruning techniques, integration of pruning and construction. Comparison of the C5.0 and CART Algorithms.

UNIT V

Books Recommended:
1. Data Mining: A. Pujari, Universities Press
2. Data Mining, Han Kamber, Elsevier
3. Data Mining, Hand Manilla, Prentice-Hall of India, New Delhi
4. Data Mining Techniques, Berry, Liboff- Wiley dream tech.
5. Principal of data mining, David hand, helkki manila and padharic smyth MIT Press
Course Contents

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<td>MTIT-1124 A</td>
<td>3 1 0</td>
<td>Max. Marks-70 Min.Marks-28 Duration-3hrs.</td>
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</table>

**UNIT I**
Introduction to cellular mobile system- A basic cellular system, Performance criteria, Uniqueness of Mobile Radio Environment, Operation of cellular system, Planning a cellular system, Analog cellular system, Digital cellular system. Elements of Cellular radio system design- Concept of frequency reuse channels, Cochannel Interference Reduction factor, Desired C/I from a normal case in an Omnidirectional Antenna System, Handoff Mechanism, Cell Splitting, Consideration of the components of cellular system.

**UNIT II**
Cell Coverage for Signal and Traffic – Obtaining the Mobile Point to Point Model, Propagation over Water or Flat Open Area, Foliage Loss, propagation in Near -in – Distance, Long Distance Propagation, Obtain Path Loss from a Point – to – Point Prediction Model, Form of a Point-to-Point Model, Computer Generation of a Point-to-Point Prediction, Cell Site Antenna Heights and Signal Coverage Cells, Mobile-to-Mobile Propagation.

**UNIT III**

**UNIT IV**
Frequency Management and Channel Assignment- Frequency Management, Frequency-Spectrum Utilization, Set-up Channels, Definition of Channels, Fixed Channel Assignment, Non Fixed Channel Assignment Algorithm, How to Operate with additional Spectrum, Traffic and Channel Assignment, Perception of Call Blocking from the Subscribers.
UNIT V
Handoff and Dropped Calls- Value of Implementing Handoffs, Initiation of Handoffs, Delaying a Handoff, Forced Handoffs, Queuing of Handoffs, Power –Difference Handoffs, Mobile Assisted Handoff and Soft Handoff, Cell-Site Handoff Only, Intersystem Handoff, Introduction to Dropped Call Rate, Formula of Dropped Call Rate, Finding the value of $\mu$.

Books Recommended:
## Course Contents

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**UNIT I**

**UNIT II**

**UNIT III**
Fuzzy Reasoning- Fuzzy matrices, Fuzzy functions, Fuzzy control methods, Fuzzy decision making, Fuzzy interface system-Classification and regression trees, Data clustering algorithms and Neuro-Fuzzy Controls.

**UNIT IV**
Probabilistic Reasoning and Baye’s Theorem, Certainty factors and rule based system, Bayesian networks: Bayesian belief network, Dempster-Shafer Theory.

**UNIT V**
Introduction to Evolutionary computation, Survival of the fittest, Fitness Computation- Cross over Mutation –Reproduction, Genetic Modeling: Cross over, Inversion and Deletion, Mutation operator, Bitwise operators, Rank and Rank space methods

**Books Recommended:**
1. Rajshekar and Pai-Neural Networks, Fuzzy logic and genetic algorithms PHI.
2. Keeman-Learning and soft computing, Pearson edu.
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UNIT I
Introduction to high performance computing: Aim, Architectures, Cluster, Grid, Meta-computing, Middleware, Examples of representative applications. Programming models: Parallel programming paradigms, task partitioning and mapping, shared memory, message passing, peer-to-peer, broker-based. Introduction to PVM and MPI.

Unit II

Unit III
Shared-memory processing: Architectures (extensions of the memory hierarchy), Programming paradigms, OpenMP. Distributed-memory processing: Architectural issues (networks and interconnects), Programming paradigms, MPI (+MPI2).

Unit IV

Unit V

Books Recommended:
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<td>MTIT-1124 D</td>
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UNIT I
Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs - Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms.

UNIT II
Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting - TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT III

UNIT IV
Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots - Security: Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT V

Books Recommended:
3. C.S. Murthy & B.S. Manoj, AdHoc Wireless Networks, Pearson
5. Ozan K. Tonguz & Gianluigi, Adhoc Wireless Networks, Wiley
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UNIT I
Introduction Reinforcement Learning, History of Reinforcement Learning, Elements of Reinforcement Learning, Evaluative Feedback, Action-Value Methods, Evaluation Versus Instruction Incremental Implementation, Tracking a Non-stationary Problem, Optimistic Initial Values Reinforcement Comparison, Pursuit Methods, Associative Search.

UNIT II

UNIT III

UNIT IV
Eligibility Traces, n-Step TD Prediction, The Forward View of TD(λ), The Backward View of TD(λ), Equivalence of Forward and Backward Views, Sarsa(λ), Q(λ), Replacing Traces Implementation Issues, Variable λ, Value Prediction with Function Approximation, Gradient-Descent Methods, Linear Methods, Control with Function Approximation, Off-Policy Bootstrapping.

UNIT V
Planning and Learning, Models and Planning, Integrating Planning, Acting, and Learning, When the Model Is Wrong, Prioritized Sweeping, Full vs. Sample Backups, Trajectory Sampling, Heuristic Search Introduction Dimensions of Reinforcement Learning, Case Studies like Samuel's Checkers Player, The Acrobat, Elevator Dispatching etc.

Books Recommended:
1. Reinforcement Learning- An Introduction -Richard S. Sutton and Andrew G. Barto
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<td>L T P</td>
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**UNIT I**  
**PATTERN CLASSIFIER:** Overview of pattern recognition - Discriminant functions - Supervised learning - Parametric estimation - Maximum likelihood estimation - Bayesian parameter estimation - Perceptron algorithm - LMSE algorithm - Problems with Bayes approach - Pattern classification by distance functions - Minimum distance pattern classifier. Support Vector Machines: Separable Classes, Nonseparable Classes

**UNIT II**  
**FEATURE EXTRACTION AND SELECTION:** Introduction, Pre-processing, Feature Selection Based on Statistical Hypothesis Testing, Entropy minimization - Karhunen - Loeve transformation - Feature selection through functions approximation - Binary feature selection. Feature Selection Using Functional Approximation

**UNIT III**  
**UNSUPERVISED CLASSIFICATION:**  
Clustering for unsupervised learning and classification - Clustering concept - C-means algorithm - Hierarchical clustering procedures - Graph theoretic approach to pattern clustering - Validity of clustering solutions.

**UNIT IV**  
**STRUCTURAL PATTERN RECOGNITION:**  
Elements of formal grammars - String generation as pattern description - Recognition of syntactic description - Parsing - Stochastic grammars and applications - Graph based structural representation.

**UNIT V**  
**FUZZY CLASSIFICATION AND PATTERN RECOGNITION:**  

**Books Recommended:**

3. Introduction to pattern recognition(Statistical, Structural, Neural and Fuzzy Logic Approaches), Menahem Friedman, Abraham Kandel. Series in Machine Perception and Artificial Intelligence-Vol. 32
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<td>ITC</td>
<td>Distributed Computing</td>
<td>MTIT-1125 C</td>
<td>3 1 0</td>
<td>Max. Marks-70 Min.Marks-28 Duration-3hrs.</td>
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UNIT I

UNIT II
Distributed file system: Distributed File System-File accessing models, Naming/ location transparency, R/W semantics, File caching, replication, DCE Directory Services. Distributed shared memory: DSM architecture, Design and implementation issues of DSM consistency models and relation to caching, Replacement Strategy, Thrashing, comparison with message passing and RPC. Remote procedure call- Events and Notifications-Java RMI- Case Study

UNIT III
Communication: Layered protocols, Client server protocols, RPC, group communication. Coordination, synchronization & consistency: Logical clocks, Physical clocks, Lamport’s Logical clock mutual exclusion, election algorithms, atomic broadcast, sequential consistency transaction distributed consensus, Threads: Thread synchronization, implementation issues, and threads vs. RPC, Process migration

UNIT IV
Fault Tolerance: Introduction to fault tolerance, basic concept, Failure models, process resilience-design issues failure masking and replication, failure detection, Reliable group communication-multicasting scheme and multicast, Distributed commit- Two phase and three phase, Recovery, Introduction to replication and replication as scaling techniques.

UNIT V
Distributed Transaction Processing- Transactions and Concurrency Control, Distributed Transactions, Distributed Deadlocks, Transaction Recovery, Fault-tolerant Services, Transaction Ordering- Comparison-Flat and Nested Distributed Transactions-Atomic Commit Protocols, Distributed Deadlocks, Distributed Multimedia System CORBA Case Study, CORBA services.
Books Recommended:
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<td>Parallel Computing</td>
<td>MTIT-1125 D</td>
<td>L 1 T 1 P 0</td>
<td>Max. Marks-70 Min.Marks-28 Duration-3hrs.</td>
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Parallel processing, Parallel Computer structure, Designing of Parallel algorithms, Analysis algorithms, General principles of Parallel sorting algorithms, Batcher’s bitonic sort using the perfect shuffle, Parallel bubble Sort, Add-even transport sort, Tree sort, Quick sort, Sorting on the CRCW, CRCW & EREW, EREW Models, Searching a sorting sequence, CREW, CRCW & EREW searching, Searching on the random sequence EREW, ERCW, CREW, CREW & CRCW searching on SIMD computers, Searching on a tree, Mess, A Network for merging, Merging on the CRFW, ERFW models, Computing Fourier Transforms, Computing the DFT in Parallel, A Parallel FFT Algorithm.

Books Recommended: