MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

Department of Computer Science & Engineering and Information Technology

DATABASE SYSTEMS
620111/630111

UNIT I

Review of Databases: Characteristics & Implications of Database Approach, Data Models, Architectures, Database Languages & Interfaces, Classification of DBMS, Data Independence, ER-Models, High Level Conceptual Data Models, Relationships, ER-Diagrams, Design Issues.

UNIT II

Object Oriented and Extended Relational Databases: Concepts of Object Oriented Databases, Object Identity, Object Structure and Type Constructors, Encapsulation of Operations, Methods & Persistence, Type Hierarchies and Inheritance, Object Database Standards, Object Definition Language, Object Query Language and Object Database Conceptual Design.

UNIT III

Distributed Databases: Concepts, Fragmentation, Replication, Allocation Techniques for Distributed Database Design, Types of Distributed Database Systems, Query Processing, Concurrency Control and Recovery, Distributed Databases in Oracle.

UNIT IV

Transaction Processing: Introduction, Transaction and System Concepts, Properties of Transactions, Schedules & Recoverability, Serializability of Schedules, Transaction Support in SQL, Concurrency Control Techniques: Locking Techniques, Time Stamp Ordering, Multi Version Concurrency, Validation Concurrency, Locks for Concurrency Control.

UNIT V

Image and Multimedia Databases: Modeling and Storage of Image and Multimedia Data, Data Structures- R-Tree, k-d Tree, Quad Trees, Content Based Retrieval: Color Histograms, Textures, etc., Image Features, Spatial and Topological Relationships, WEB Database: Accessing Databases through WEB, WEB Servers, XML Databases, Commercial Systems, Mobile Databases, Case Study: Oracle Xi

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Recommended Books:

1. Elmarsi, Navathe, Somayajulu, Gupta, "Fundamental of Database Systems", 4th Edition , Pearson Education, 2007
2. R. Ramakrishanan, "Database Management Systems", McGraw Hill International Editions, 1998
3. Date, Kannan, Swaminathan, "An Introduction to Database Systems", 8th Edition Pearson Education, 2007
4. Silberscatz, Korth, Sudarshan, "Database System Concepts", Mcgraw Hill, 6th Edition, 2006

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: recall the fundamental of RDBMS, DBMS storage structures and access techniques.

CO2: illustrate the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.

CO3: make use of various concurrency control mechanisms for error free transaction processing.

CO4: analyze various types of databases.

CO5: design ER-models to represent simple database application scenarios and improve the database design by normalization.

CO6: propose the improved data-intensive application using DBMS APIs program.

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Department of Computer Science & Engineering and Information Technology

DISTRIBUTED COMPUTING
620112/630112/640112

UNIT I

Introduction To Distributed System, Communication: Layered Protocols, Client Server Protocols, RPC, Group Communication, Coordination, Synchronization & Consistency: Logical Clocks, Physical Clocks, Mutual Exclusion, Election Algorithms, Atomic Broadcast, Sequential Consistency Transaction Distributed Consensus, Threads: Thread Synchronization, Implementation Issues and Threads Vs RPC.

UNIT II

Models Of Distributed Computing: Client Server and RPC, RPC Architecture, Exceptions, Underlying Protocols, IDL, Marshalling Etc. Group Models and Peer to Peer: Groups for Service Replication/ Reliability, Groups For Parallelism/ Performance, Client/ Server Vs. Peer-To-Peer, Multicast, Atomic Broadcast.

UNIT III

Distributed File System: Security, Naming/ Location Transparency, R/W Semantics, Cache Coherence, Replication. Distributed Shared Memory: DSM Architecture, Consistency Models and Relation to Caching, Release Consistency, Comparison with Message Passing and RPC.

UNIT IV

Fault Tolerant Distributed Systems: Introduction, Dependability, Faults Vs. Errors Vs. Failure, Space Time and Value Redundancy, Fault Tolerant Architecture, Failure Detection Algorithms, Partitioning, FT Consensus.

UNIT V

Distributed Multimedia System: Introduction, Characteristics, And Resource Management Stream Adaptation, Security: Introduction, Security Techniques, Cryptographic Algorithms, Authentication and Access Control, Case Study: CORBA, MACH.

Recommended Books:

1. Andrew S Tanenbaum, Distributed Systems: Principles and Paradigms, Pearson
2. Pradeep K. Sinha, Distributed Operating Systems, PHI

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: demonstrate knowledge of the basic elements and concepts related to distributed system technologies

CO2: summarize various architectures used to design distributed systems.

CO3: build distributed systems using various inter process communication techniques.

CO4: analyze a problem and form a distributed system to work towards a solution.
CO5: explain various distributed algorithms, such as logical clocks and leader election.
CO6: propose own reflections and attitudes in regard to the area of research.

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Department of Computer Science & Engineering and Information Technology

HIGH-SPEED NETWORKS
620113/630113/640113

UNIT I

Review of Networking and Networking Protocols, TCP/IP Model, OSI Model, Internet Protocols and Addressing, Routing and Internetworking: Network–Layer Routing, Congestion Control at Network Layer, Logical Addressing: IPv4 Addresses, IPv6, Multicasting Techniques and Protocols.

UNIT II

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control, Application Layer: Principles of Network Applications, Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS).

UNIT III

Optical Networks and WDM Systems: Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocation in Networks. WDM Network elements: Optical line terminals and amplifiers.

UNIT- IV

ATM-based Services and Applications, ATM Switching, ATM Transmission, Wireless ATM and mobile ATM, Security in ATM network, VPNs: Introduction, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Overlay Networks – VoIP.

UNIT- V

Mobile Ad-Hoc Networks: Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks – Wireless Sensor Networks: Sensor Networks and Protocol Structures.

Recommended Books:

1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007
2. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall
3. Adhoc Wireless Networks: Architecture & protocols, Sivaram Murthy, PHI
4. Optical Networks: Third Generation Transport Systems, Uyless Black, Pearson
5. Optical Networks: A Practical Perspective, Rajeev Ramaswami and N. Sivarajan, Morgan Kaufmann
6. ATM Networks: Concepts, Protocols, Applications, Rainer Handel, Huber and Schroder, Pearson

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COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: recall the understanding of network engineering principles for network, system and service management

CO2: classify the theoretical and practical concepts behind the design of multi-constained applications and the need for service integration.

CO3: apply the knowledge of Advanced Network Engineering including design, routing, management, security, performance and ability to understand and use industry standard tools used.

CO4: solve the problems associated with network design, routing, management, security and performance.

CO5: analyze the concepts underlying different protocols, QoS architectures and mechanisms and their main characteristics and functionality.

CO6: assess the network management issues and devise adequate network management solutions using industry design techniques/possible research opportunities.

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Department of Computer Science & Engineering and Information Technology

NETWORK SECURITY
620116

UNIT I

Introduction to security attacks, services and mechanism, introduction to cryptography Conventional Encryption: Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers, Modern Block Ciphers: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality

UNIT II

Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat's and Euler's theorem, primality testing, Euclid's Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffie-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, ElGamal encryption.

UNIT III

Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS).

UNIT IV

IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, Secure Electronic Transaction (SET). System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems.

UNIT V

Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME. Security in WLAN: Security mechanisms: WEP, WPA, Radius, CHAP, EAP, 802.11i

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Recommended Books:

1. William Stallings, "Cryptography and Network Security", Second edition, Prentice Hall, 1999.
2. Atul Kahate, "Cryptography and Network Security," TMH
3. William Stallings, "Cryptography and Network Security", Third Edition, Pearson Ed.

4. Introduction to network Security, Krawetz, Cengage.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: define computer security and basics of cryptography.

CO2: demonstrate different data encryption algorithms and keys used during encryption techniques.

CO3: identify the various security attacks and threats.

CO4: analyse evaluation criteria for AES, Triple DES and Traffic Confidentiality.

CO5: explain SSL and TSL, Firewall, Digital Signatures and its standards & schemes and the enhancements made to IPv4 by IPsec.

CO6: discuss various web security considerations.

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Department of Computer Science & Engineering and Information Technology

MACHINE LEARNING USING PYTHON
620120/630120/640120

COURSE OBJECTIVES:

- To learn the basic construct of python programming for implementing various Machine Learning algorithms.
- To understand the basic concepts of Machine Learning.
- To use Machine Learning concepts and algorithms for real-world problem solving.

Unit – I

Introduction to Python Programming: Setting up Programming Environment, Running Python Programs from a Terminal, Variables and Simple Data Types: Numeric, String, List, Tuple, Dictionary, Set, Boolean, Conditional Statements and Loops, Lambda Functions; Various inbuilt Functions; Read Write Operations in Files; using Python Packages and Modules.

Unit – II

Data Processing and Visualization: Introduction to Pandas, Installation, Reading CSV Files and Performing Various Operations: Slicing, Merging, Concatenation on Various Datasets. Introduction to Numpy, Vector Representation, Basic Operations on N-Dimensional Matrices using Numpy. Data Visualization using Matplotlib, Plotting Various Types of Graphs: Line, Bar, Scatter, Histogram and Pie-Charts.

Unit – III

Introduction to Machine Learning: Basic Principles, Applications, Challenges; Supervised, Unsupervised and Reinforcement Learning Approaches; Basic Steps of Machine Learning: Data Collection, Data Preparation, Choosing a Learning Model, Training a Model, Evaluation of Model, Parameter Tuning and Prediction.

Unit – IV

Supervised Learning: Linear Regression, Gradient Descent, Features, Overfitting, Regularization and Complexity, Training, Validation, Testing Data, Performance Matrices: Mean Squared Error(MSE), Root-Mean-Squared-Error(RMSE), Mean-Absolute-Error(MAE), R^2 or Coefficient of Determination; Multivariate Regression; Applications of Regression. **Classification:** Binary, Multi-Class and Multi-Label Classification; Applications: Logistic Regression, K-Nearest Neighbour, Decision Trees, Random Forests, Support Vector Machines and Neural Networks; Comparison Matrix.

Unit – V

Unsupervised Learning: Clustering and Association Problems; Applications; K-

Means, DBSCAN, Principal Component Analysis, Apriori Algorithm for Association Rule Learning Problems, Machine Learning Model Building on Various Datasets available on Kaggle and UCI Repositories using Python Machine Learning Library Scikit-Learn.

RECOMMENDED BOOKS:

- John Hunt, A Beginners Guide to Python 3 Programming, Springer, 1st Edition, 2019.
- Learn Python the Hard Way, 3rd Edition
- Python Crash Course: A Hands-On, Project-Based Introduction to Programming, By Eric Matthes
- Andreas C. Müller, Sarah Guido, Introduction to Machine Learning with Python, O'Reilly Media, Inc, 2016.
- Aurélien Géron, Hands-On Machine Learning with Scikit-Learn and TensorFlow, O'Reilly Media, Inc, 2017.

COURSE OUTCOMES:

After completion of this course, the students would be able to.

CO1. define basic concepts of machine learning.

CO2. summarize various concepts of python programming, data processing and visualization.

CO3. apply machine learning algorithms to solve real world problems using python programming.

CO4. compare machine learning algorithms for applicability and performance analysis

CO5. assess various open source datasets and estimate the most suitable machine learning model for prediction process.

CO6. build machine learning models on open source datasets using python machine learning library.

Department of Computer Science & Engineering and Information Technology

MOBILE COMPUTING & M-COMMERCE
620114

UNIT I

Review Of Personal Communication Services (PCS). Basic Concepts of Cellular Systems. Global System for Mobile Communication (GSM). Protocols. Handover. Data Services. and Multiple Division Techniques.

UNIT II

General Packet Radio Services (GPRS): GPRS Architecture. GPRS Network Nodes. Mobile Data Communication. Wlans (Wireless Lans) IEEE 802.11 Standard. Mobile IP. Wireless Application Protocol (WAP): Mobile Internet Standard. WAP Gateway and Protocols, Wireless Markup Languages (WML).

UNIT III

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision. Wideband Code Division Multiple Access (W-CDMA), And CDMA 2000. Quality Of Services In 3G.

UNIT IV

Wireless Local Loop (WLL): Introduction to WLL Architecture, WLL Technologies. Global Mobile Satellite Systems: Case Studies of IRIDIUM and GLOBALSTAR Systems. Bluetooth Technology. Wi-Fi and Wi-Max.

UNIT V

M-Commerce: Introduction, Emerging Applications. Different Players in M-Commerce. M-Commerce Life Cycle, Mobile Financial Services. Mobile Entertainment Services. Management of M-Commerce Services. Emerging Issues in M-Commerce. Future Trends in M-Commerce Services.

Recommended Books:

1. "Wireless and Mobile Networks Architecture," by Yi –Bing Lin & Imrich Chlamatac. John Wiley & Sons, 2001.
2. "Mobile & Personnel Communication Systems and Services", By Raj Pandya, Prentice Hall India, 2001.
3. "Wireless Communication- Principles and practices," 2nd Ed., Theodore S. Rappaport, Pearson Education Pvt. Ltd, 2003.
4. "Mobile communications," J. Schiller, Pearson Education Pvt. Ltd., 2002.
5. "The Wireless Application Protocol," Singhal & Bridgman et. al.,Pearson Education. 2004.

COURSE OUTCOMES

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Department of Computer Science & Engineering and Information Technology

ADHOC & SENSOR BASED NETWORKS
620115

UNIT I

Introduction to Mobile Adhoc Networks, Technologies for Ad Hoc Network, Issues in Ad hoc wireless Networks, IEEE 802.11 Architecture and protocols, Protocol for Adhoc Wireless Network, Issues and classification of MAC protocol.

UNIT II

Transport layer & Security protocols: Issues in designing transport layer protocols, TCP over Adhoc Wireless Networks, Network Security Attacks and Key management.

UNIT III

Wired Sensor Networks: Basic Sensor Network Architectural Elements, Applications of Sensor Networks, Comparison with Adhoc Wireless Networks, Challenges and Hurdles, Architecture of WSNs, Hardware components, Operating systems and execution environments, some examples of sensor nodes, Network Architecture, Sensor networks scenarios, Optimization goals, Design principles for WSNs.

UNIT IV

Communication protocols: Physical Layer and Transceiver design considerations in WSNs, Fundamentals of (wireless) MAC protocol, Address and name management in wireless sensor networks, Localization and positioning.

UNIT V

Routing Protocols-Dynamic Source Routing (DBR), Adhoc Distance Vector (AoDV) routing, Multicasting Routing issues, Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless Environment, Routing Strategies in Wireless Sensor Networks, QoS in wireless sensor networks, Coverage and deployment.

Recommended Books:

1. Ad HOC Wireless Networks: Architectures & Protocols by C Siva Ram Murty & BS Manoj 2nd Ed, Pearson Education.
2. Adleshein & Gupta. "Fundamentals of Mobile and Pervasive Computing", TMH, 2005.
3. Handbook of Ad Hoc wireless network, By Mohamed Illayas, CRC press.
4. Protocols and Architectures for Wireless Sensor Networks, By Holger Karl, John Wiley & Sons.
5. Wireless Sensor Networks Technology, Protocols, and applications by Kazem Sohraby, Daniel Minoli, Taieb Znati, John Willey & Sons.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: list various design and implementation issues and available solutions of mobile adhoc

networks

CO2: summarize the basics of infrastructure less networks and their importance in the future directions for wireless communications

CO3: model different adhoc and sensor networks

CO4: analyze various technologies associated with adhoc networks

CO5: determine various parameters associated with adhoc & sensor based networks

CO6: develop adhoc and sensor networks using network simulation tools

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Department of Computer Science & Engineering and Information Technology

NETWORK SECURITY
620116

UNIT I

Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption: Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality

UNIT II

Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat's and Euler's theorem, primality testing, Euclid's Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffle-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, ElGamal encryption

UNIT III

Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS).

UNIT IV

IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, Secure Electronic Transaction (SET). System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems.

UNIT V

Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP). S/MIME. Security in WLAN: Security mechanisms: WEP, WPA, Radius, CHAP, EAP, 802.11i

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Recommended Books:

1. William Stallings, "Cryptography and Network Security", Second edition, Prentice Hall, 1999.
2. Atul Kahate, "Cryptography and Network Security," TMH
3. William Stallings, "Cryptography and Network Security", Third Edition, Pearson Ed.

4. Introduction to network Security, Krawetz, Cengage.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: define computer security and basics of cryptography.

CO2: demonstrate different data encryption algorithms and keys used during encryption techniques.

CO3: identify the various security attacks and threats.

CO4: analyse evaluation criteria for AES, Triple DES and Traffic Confidentiality.

CO5: explain SSL and TSL, Firewall, Digital Signatures and its standards & schemes and the enhancements made to IPv4 by IPsec.

CO6: discuss various web security considerations.

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Department of Computer Science & Engineering and Information Technology

COMPUTER ARCHITECTURE AND PARALLEL PROCESSING
620117

UNIT I

Review: Evolution of computer architecture Needs of parallelism. Parallelism in Uniprocessor system. Parallel Computer Structures: Pipeline computers. Array Computers, Multiprocessor Systems. Performance of Parallel computers. Dataflow and new trends. Architectural Classification schemes. Application of Parallel Processing.

UNIT II

Conditions of Parallelism, Program Partitioning and Scheduling, Program flow Mechanisms, System Interconnect Architectures. Performance metrics and Measures. Scalability, Analysis and approaches. Linear Pipeline processors, Nonlinear Pipeline processors, Instruction pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT III

Advanced processor technology. Superscalar and vector processors. Memory hierarchy technology. Bus system. Cache Memory Organization. Shared-Memory organization, Sequential and weak consistency models. Weak consistency models.

UNIT IV

Multiprocessor system interconnects. Cache coherence and synchronization mechanism. Message-passing mechanism, Vector processing principles. Multivector multiprocessors, compound vector processing, SIMD computer organizations, latency-Hiding techniques. Principles of multithreading. Scalable and multithreaded architectures, Dataflow and hybrid architectures.

UNIT V

Parallel programming models, Parallel languages and compilers, Dependence analysis of data arrays, code optimization and scheduling, Loop parallelization and pipelining, Trends in parallel systems: Overview of technology, Forms of parallelism, Case studies: Cray line Sun UltraSparc T2 processor, AMD Opteron, Intel Pentium processors.

Recommended Books:

1. Kai Hwang & Naresh Jotwani, "Advanced Computer Architecture", TMH
2. J.P. Hayes, "Computer Architecture and Organization", MGH
3. Hwang & Briggs, "Computer Architecture and Parallel Processing", MGH
4. Kain, "Advance Computer Architecture:- A System Design Approach"' PHI Learning
5. M.J. Flynn, "Computer Architecture, Pipelined and Parallel Processor Design", Narosa Publishing
6. V. Rajaraman & C.S.R. Murthy," Parallel Computer", PHI Learning

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COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: compare the organization and operation of current generation parallel computer systems.

CO2: explain pipelining and its speed advantage and pipelined logic.

CO3: apply concept and principle of cache memory and virtual memory to high- performance computer architecture.

CO4: examine the challenges faced in the implementation of high performance system.

CO5: evaluate various multiprocessing configurations.

CO6: design the overall organization of cache and virtual memories.

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Department of Computer Science & Engineering and Information Technology

SOFT COMPUTING
620118/630118/640118

COURSE OBJECTIVES

- To provide the student with the basic understanding of neural networks and fuzzy logic fundamentals, Program the related algorithms and Design the required and related systems.
- To understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
- To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.

Unit-I

Introduction and Fundamental Concept of ANN: Basic models of Artificial Neural Networks, Terminologies of ANNs McCulloch-Pitts Neurons, Linear Separability, Hebb Network, **Supervised Learning Networks:** Introduction, Perceptron Networks, Back Propagation Networks, Radial Basis Function Networks, Hopefield networks.

Unit-II

Unsupervised Learning: Fixed weight Competitive Nets, Kohonen Self-Organizing Map, Learning vector quantization, Counter propagation Networks, Adaptive Resonance Theory Network.

Unit-III

Fuzzy Set Theory: Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzzy rules, Fuzzy Reasoning, **Defuzzification:** Lembda-Cuts for Fuzzy sets (Alpha-Cuts), Lembda-Cuts for Fuzzy Relations, Fuzzy Inference System: Introduction, Mamdani Fuzzy Model, Takagi-Sugeno Fuzzy Model.

Unit-IV

Introduction: Biological Background, Traditional optimization and Search Techniques, Basic Terminologies in GA, Operators in Genetic Algorithm, Stopping Condition for

Genetic Algorithm Flow, Classification of Genetic Algorithm, Comparison with Evolutionary algorithm, Application of Genetic algorithm

Unit-V

Hybrid Soft Computing Techniques: Introduction, Neuro-fuzzy Hybrid system, Adaptive Neuro fuzzy inference system(ANFIS), Genetic Neuro Hybrid system, Application of Soft Computing Techniques.

RECOMMENDED BOOKS

- Principles of Soft Computing, S. N. Sivanandam and S. N. Deepa . Wiley
- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications-S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI.
- Introduction to Soft Computing Neuro-Fuzzy and Genetic Algorithms, Samir Roy and Udit Chakraborty, Pearson.
- Neural Networks and Learning Machines-Simon Haykin PHI.
- Fuzzy Logic and Engineering Application, Tomthy Ross, TMH

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. define basic concepts of neural network and fuzzy systems.
CO2. compare solutions by applying various soft computing approaches on a given problem.
CO3. develop and train different supervised and unsupervised learning.
CO4. classify various nature inspired algorithms according to their application aspect.
CO5. compare the efficiency of various hybrid systems.
CO6. design a soft computing model for solving real world problems.

Department of Computer Science & Engineering and Information Technology

BLOCKCHAIN TECHNOLOGY
620119/630119/640119

Unit -I

Introduction to Blockchain: History: Digital Money to Distributed Ledgers. **Design Primitives:** Protocols, Security, Consensus, Permissions, Privacy.

Unit-II

Blockchain Architecture and Design. **Basic crypto primitives:** Hash, Signature, Hashchain to Blockchain, Basic consensus mechanisms.

Unit-III

Consensus: Requirements for the Consensus Protocols, Proof of Work (PoW), Scalability Aspects of Blockchain Consensus Protocols, **Permissioned Blockchains:** Design Goals, Consensus Protocols for Permissioned Blockchains.

Unit -IV

Use Case I: Blockchain in Financial Software and Systems (FSS): Settlements, KYC, Capital Markets, Insurance, **Use Case II:** Blockchain in Trade/Supply Chain: Provenance of Goods, Visibility, Trade/Supply chain finance, Invoice Management/Discounting, etc, **Use Case III:** Blockchain for Government: Digital Identity, Land Records and other kinds of Record Keeping between Government Entities, Public Distribution System / Social Welfare Systems.

Unit -V

Blockchain Cryptography, Privacy and Security on Blockchain, **Case Studies:** Comparing Ecosystems - Bitcoin, Hyperledger.

RECOMMENDED BOOKS

- Blockchain, Melanie Swa, O'Reilly
- Blockchain: From Concepts to Execution, DebajaniMohanty
- Zero to Blockchain, Bob Dill, David Smits

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. define the basic key concepts and elements related to blockchain technology.
CO2. interpret the needs /significances of blockchain technology.
CO3. identify the requirements for the consensus protocol.
CO4. examine the privacy and security issues in blockchain.
CO5. compare various use cases of blockchain technology for performance analysis and defining application domains.

CO6: explain the importance of blockchain technology in the fields other than financial systems, like trade/supply chain management and other governmental services