PEOPLE'S UNIVERSITY, BHOPAL

PROGRAMME: M Tech (CSE) **SEM: II**

Subject Title	Subject Code
Artificial Intelligence & Soft Computing	MTCS 201

Unit	Contents *(Theory)*
I	**Artificial Intelligence**: Introduction, Various types of production systems, characteristics of production systems, breadth first search, depth first search techniques, other Search Techniques like hill Climbing, Best first Search, A* algorithm, AO* Algorithms and various types of control strategies. Knowledge representation issues, Prepositional and predicate logic, monotonic and non monotonic reasoning, forward Reasoning, backward reasoning, Weak & Strong Slot & filler structures, NLP.
II	**Neural Network:** Introduction to Soft Computing, Soft Computing Vs Hard Computing, Basic concept of neural networks, Mathematical model, Properties of neural network, Typical architectures: single layer, multilayer, competitive layer; Different learning methods: Supervised, Unsupervised & reinforced; Common activation functions; Feed forward, Feedback & recurrent N.N, Application of Neural Network
III	**Neural Network Architecture**: Models Of Neural Network Architecture, Algorithm & Application of - McCulloh-Pitts, Hebb Net, Perceptron (with limitations & Perceptron learning rule Convergence theorem), Back propagation NN, ADALINE, MADALINE, Discrete Hopfield net, BAM, Maxnet , Kohonen Self Organizing Maps, ART1,ART2
IV	**Fuzzy Logic:** Fuzzy Sets, Fuzzy versus Crisp; Fuzzy sets—membership function, linguistic variable, basic operators, properties; Fuzzy relations—Cartesian product, Operations on relations; Crisp logic—Laws of propositional logic, Inference; Predicate logic—Interpretations, Inference; Fuzzy logic—Quantifiers, Inference; Fuzzy Rule based system; Defuzzification methods
V	**Genetic Algorithm**: Genetic Algorithm Basic concept; role of GA in optimization, Fitness function, Selection of initial population, Cross over(different types), Mutation, Inversion, Deletion, Constraints Handling; Evolutionary Computation; Genetic Programming; Schema theorem; Multi objective & Multimodal optimization in GA; Application— Traveling Salesman Problem, Graph Coloring problem, Hybrid systems, GA based BPNN (Weight determination, Application); Neuro Fuzzy Systems—Fuzzy BPNN--fuzzy Neuron, architecture, learning, application; Fuzzy Logic controlled G.A

BOOKS

1. Fundamental of Soft Computing and Intelligent System-Padam Gulwani & Anshuman Sharma,IK International Publication PVT Ltd
2. Neural Networks, Fuzzy Logic & Genetic Algorithms – Synthesis & applications, T.S. Rajasekaran & G.A. Vijaylakshmi Pai, PHI
3. Genetic Algorithm & fuzzy Logic Systems - Sanchez, Takanori, Zadeh; World Scientific
4. Genetic Algorithm, Goldberg David E.; Pearson
5. Fuzzy Set Theory & Its Applications - Zimmermann H. J.; Allied Publishers Ltd.

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PEOPLE'S UNIVERSITY, BHOPAL

PROGRAMME: M Tech (CSE) **SEM: II**

Subject Title	Subject Code
Distributed Systems	MTCS 202

Unit	Contents *(Theory)*
I	Distributed Systems: Goal, Advantages, Organization of Multiprocessor Systems and related Hardware and Software Concepts, Design Issues
II	Communication - Layered protocols, RPC, RMI, Message oriented communication, Stream oriented communication, Process - Threads, Clients, Servers, Code Migration, Software agents, Naming - entities, locating mobile entities, removing unreferenced entities
III	Security, Distributed database systems - CORBA, Distributed COM, Distributed GLOBE, Comparison of CORBA, DCOM, and GLOBE, Distributed File Systems - SUN network file system, CODA file system, other distributed file systems and their comparison
IV	Distributed document based systems- Word Wide Web, Lotus notes, Distributed Coordination based systems – Introduction, TIB / RENDEZVOUS, JINI and their comparison.
V	Case Studies : From the Internet - OPEN SOURCE Security, Distributed database systems -CORBA, Distributed database systems, CORBA, Distributed COM, GLOBE, Comparision of CORBA, DCOM, and GLOBE

References :

1. Andrew S. Tanenbaum, Maarten Van Steen, "Distributed System Principles and Paradigms", Pearson education, 2002.
2. G Coulouris, J. Dollimore, "T. Kindberg, "Distributed System Concepts and Design, 4th Edition, Addison Wesley, 2005.
3. M. Reynal, "Distributed Algorithms and Protocols", John Wiley, 1988.

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PROGRAMME: M Tech (CSE) **SEM:II**

Subject Title	Subject Code
Network Security	MTCS 203

Unit	Contents *(Theory)*
I	Introduction to Classical and Modem techniques - Attacks, services and mechanisms, classical encryption techniques, DES, Block cipher design principles and modes of operation.
II	Encryption Algorithms and Hash Functions - Triple DES, RC5, key management, Public key.Cryptography RSA Algorithm, Digital signatures and authentication protocols.
III	System Security - Backups, integrity management, protecting against programmed threats,viruses and worms, physical security, personnel security.
IV	Network Security - Protection against eavesdropping, security for modems, IP security, web security, electronic mail security, authentication applications
V	Security tools - Firewalls, wrappers, proxies, discovering a break-in, denial of service attacks and solutions, Cryptographic security tools: KERBEROS, PGP, SSH, SRP, OPIE..

References :

1. William Stallings, "Cryptography and Network Security Principles and Practice ", 11 Edition, Pearson Education Asia Publishers (Low priced Edition), 2000, Ch 1 to 16.
2. Simson Garjainkal, and Gene Spafford, "Practical UNIX and Internet Security" 2nd edition Oreilly Pule Pvt. Ltd. 2000
3. Steve Burnett and Stephene Paine, "RSA Security 's official guide to cryptography", RSA Press, Tata McGraw Hill Edition, 2001.

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PROGRAMME: M Tech (CSE) **SEM: II**

Subject Title	Subject Code
Wireless Sensor Networks	MTCS 204

Unit	Contents *(Theory)*
I	**Introduction :** Fundamentals of wireless communication technology, the electro magnetic spectrum radio propagation, characteristics of wireless channels, modulation techniques, multiple access techniques, wireless LANs, PANs, WANs, and MANs, Wireless Internet.
II	Introduction to adhoc/sensor networks: Key definitions of adhoc/ sensor networks, unique constraints and challenges, advantages of ad-hoc/sensor network, driving applications, issues in adhoc wirelesss networks, issues in design of sensor network, sensor network architecture, data dissemination and gathering
III	MAC Protocols : Issues in desiging MAC protocols for adhoc wireless networks, design goals, classification of MAC protocols, MAC protocols for sensor network, location discovery, quality, other issues, S-MAC, IEEE 802.15.4.
IV	Routing Protocols : Issues in designing a routing protocol, classification of routing protocols, table-driven, on-demand, hybrid, flooding, hierarchical, and power aware routing protocols
V	QoS and Energy Management : Issues and Challenges in providing QoS, classifications, MAC, network layer solutions, QoS frameworks, need for energy management,classification, battery, transmission power, and system power management schemes..

References :

1. C. Siva Ram Murthy, and B. S. Manoj, "AdHoc Wireless networks ", pearson Education - 2008.
2. Feng Zhao and Leonides Guibas, "Wireless sensor networks ", Elsevier publication - 2004.
3. Jochen Schiller, "Mobile Communications ". Pearson Education, 2nd Edition, 2003.
4. William Stallings, "Wireless Communications and Networks ", Pearson Education - 2004

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PROGRAMME: M Tech (CSE) **SEM: II**

Subject Title	Subject Code
Parallel Computer Architecture	**MTCS 205**

Unit	Contents *(Theory)*
I	Task of a Computer Designer - Measuring and Reporting Performance Quantitative Principles of Computer Design.
II	Shared-memory and distributed memory architectures - Taxonomy of MIMD computers Parallel processing applications - Performance metrics - Speedup performance laws. Instruction set architecture - Design considerations - CISC & RISC processors -Virtual Memory - Cache memory organization.
III	Review of the ABCs of Cache Performance **issues** - Main Memory and Organization for Improving Performance - Memory Technology.
IV	Instruction Level **Parallelism** - Concepts and Challenges - Dynamic Scheduling: Examples and Algorithm - Dynamic Hardware Prediction - Multiple Issue - Harware Based Speculation.
V	Basic Complier Techniques for Exposing ILP-Static Branch Prediction - the VLIW Approach - Advanced Compiler Support of Exposing ILPHardware Support for Exposing More Paralleslism at Compile Time Hardware Vs Software Speculation

BOOKS

1. D.A. Patterson, JL.Hennessy, "Computer Architecture : A Quantitative approach" Elsevier 3rd Edition 2003.
2. K.Hwang, Advanced Computer Architecture, Parallelism, Scalability, Programmability, "McGraw Hill, 1993 ".

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PROGRAMME: M Tech (CSE) **SEM: II**

Subject Title	Subject Code
LAB-III	MTCS 206

Set -1

1. Simulate A*, AO*.
2. Simulate 8-Puzzle Problem.
3. To Implement And Function Using Adaline With Bipolar Inputs And Outputs.
4. To Implement And Function Using Madaline With Bipolar Inputs And Outputs.
5. To Implement Discrete Hopfield Network And Test For Input Pattern.
6. To Implement Back Propagation Network For A Given Input Pattern.
7. To Implement Art 1 Network For Clustering Input Vectors With Vigilance Parameter.
8. To Perform Max-Min Composition Of Two Matrices Obtained From Cartesian Product.
9. To Verify The Various Laws Associated With Fuzzy Set Genetic Algorithm
10. To Implement a Program For Maximizing F(X)=X2 Using GA, Where X is Ranges From 0 To 31, Perform Only 5 Iteration.

Set-2

1. To Study Distributed Computing Models
2. To Study OSI/ISO Reference Model
3. To Implement Concurrent client server application
4. to Implement Concurrent Day time client server application
5. write a program to create COBRA based client server application
6. write a program to increment counter in shared memory
7. write program to monitor SOAP request and response packet
8. CSASE STUDY: TO study deadlock in message communication
9. CASE STDUY: to study JAVA RMI
10. CASE STUDY: to study DNS

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PROGRAMME: M Tech (CSE) **SEM: II**

Subject Title	Subject Code
LAB-IV	MTCS 207

Set -1

1. Program to implement Substitution Cipher
2. Program to implement Transposition Cipher
3. Program to implement RSA Algorithm
4. Program to implement Deffi-Hellman Algorithm
5. Program to implement DES Algorithm
6. Program to implement MD5 Algorithm
7. Program to implement Digital Signature Algorithm
8. Study of Virus
9. Study of KERBEROS, PGP, SSH, SRP, OPIE
10. Program to implement Authentication of Database

Set-2

1. Introduction to use of cryptographically secured communication in WSNs
2. collecting, disseminating and processing data in WSN
3. Using Public Key cryptography for communication in wsn
4. To Explain the design of sensor network, sensor network architecture
5. To designing MAC protocols for adhoc wireless networks
6. To Explain MAC protocols for sensor network
7. To designing a routing protocol
8. To Explain classification of routing protocols
9. To Explain QoS frameworks
10. To Issues and Challenges in providing QoS

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