

SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)



SYLLABUS

For

**M.Tech. in Computer Science Engineering
Semester - I to IV**

**Swami Vivekanand University, Sironja Sagar
2012-2014**

Scheme of Examination

First Semester- M.E./M.Tech. (Computer Science and Engineering)/ Computer Sc.)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments/ Quiz	End Sem. Practical/ Viva	Practical Record/ assignment/Quiz /Presentation	
1.	MTCS 101	Advanced Computational Mathematics	3	1	-	4	70	20	10	-	-	100
2.	MTCS 102	Advanced Data Structures and	3	1	-	4	70	20	10	-	-	100
3.	MTCS 103	Advanced Computer Architecture	3	1	-	4	70	20	10	-	-	100
4.	MTCS 104	Object Oriented Technology	3	1	-	4	70	20	10	-	-	100
5.	MTCS 105	Advanced Computer Networking	3	1	-	4	70	20	10	-	-	100
6.	MTCS 106	Lab-I MCSE-103 MCSE-105	-	-	6	6	-	-	-	90	60	150
7.	MTCS 107	Lab-II MCSE-102 MCSE-104	-	-	6	6	-	-	-	90	60	150
		Total	15	5	12	32	350	100	50	180	120	800

L: Lecture - T: Tutorial - P: Practical

Swami Vivekanand University, Sironja Sagar (M.P.)

Second Semester- M.E./M.Tech. (Computer Science and Engineering)/ Computer Sc.)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments/Quiz	End Sem. Practical / Viva	Practical Record/assignment/Quiz /Presentation	
1.	MTCS 201	Web Technology and Commerce	3	1	-	4	70	20	10	-	-	100
2.	MTCS 202	Information theory, coding and cryptography	3	1	-	4	70	20	10	-	-	100
3.	MTCS 203	Advanced Concept in Data Bases	3	1	-	4	70	20	10	-	-	100
4.	MTCS 204	System Programming	3	1	-	4	70	20	10	-	-	100
5.	MTCS 205	Soft Computing	3	1	-	4	70	20	10	-	-	100
6.	MTCS 206	Lab-I MCSE-204	-	-	6	6	-	-	-	90	60	150
7.	MTCS 207	Lab-II MCSE-205	-	-	6	6	-	-	-	90	60	150
		Total	15	5	12	32	350	100	50	180	120	800

L: Lecture - T: Tutorial - P: Practical

Swami Vivekanand University, Sironja Sagar (M.P.)

Third Semester- M.E./M.Tech. (Computer Science and Engineering)/ Computer Sc.

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments/Quiz	End Sem. Practical/ Viva	Practical Record/ assignment/Quiz /Presentation	
1.	MTCS 301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	MTCS 302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	MTCS 303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MTCS 304	Dissertation Part- I (Literature	-	-	8	8	-	-	-	120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L: Lecture - T: Tutorial - P: Practical

Elective –I (MCSE 301)

- (A) Data Warehousing & Mining
- (B) Real Time Fault Tolerant System

Elective-II (MCSE 302)

- (A) Network Security
- (B) Simulation and Modeling

Swami Vivekanand University, Sironja Sagar (M.P.)

Fourth Semester- M.E./M.Tech. (Computer Sc. & Engg./Computer Sc.)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments/Quiz	End Sem. Practical/ Viva	Practical Record/ assignment/Quiz/Presentation	
1.	MTCS 401	Dissertation Part- II	-	-	20	20	-	-	-	300	200	500
		Total	-	-	20	20	-	-	-	300	200	500

L: Lecture - T: Tutorial - P: Practical

MTCS-101 ADVANCED COMPUTATIONAL MATHEMATICS

UNIT 1

Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heavisite's unit function and error function. Elementary concepts of Modular mathematics.

UNIT 2

Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabolic) using finite difference methods, Elementary properties of FT, DFT, W FT, W avelet transform, Haar transform.

UNIT 3

Probability, compound probability and discrete random variable. Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

UNIT 4

Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Application of Eigen value problems in Markov Process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)

UNIT 5

Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.

Reference Books:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, W iley Easten Edd.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH.
4. Advance Engg Mathematics, O' Neil, Cengage (Thomson)
4. Introductory Methods of Numerical Analysis by S.S. Shastry,
5. Introduction of Numerical Analysis by Forberg
6. Numerical Solution of Differential Equation by M. K. Jain
7. Numerical Mathematical Analysis By James B. Scarborough
8. Fourier Transforms by J. N. Sheddon
9. Fuzzy Logic in Engineering by T. J. Ross
10. Fuzzy Sets Theory & its Applications by H. J. Zimmersoms

MTCS-102 ADVANCED DATA STRUCTURES AND ALGORITHM

UNIT 1

INTRODUCTION: Basic concepts of OOPs – Templates – Algorithm Analysis – ADT - List (Singly, Doubly and Circular) Implementation - Array, Pointer, Cursor Implementation

UNIT 2

BASIC DATA STRUCTURES: Stacks and Queues – ADT, Implementation and Applications - Trees – General, Binary, Binary Search, Expression Search, AVL, Splay, B-Trees – Implementations - Tree Traversals.

UNIT 3

ADVANCED DATA STRUCTURES: Set – Implementation – Basic operations on set Priority Queue – Implementation - Graphs – Directed Graphs – Shortest Path Problem - Undirected Graph - Spanning Trees – Graph Traversals

UNIT 4

MEMORY MANAGEMENT ; Issues - Managing Equal Sized Blocks – Garbage Collection Algorithms for Equal Sized Blocks - Storage Allocation for Objects with Mixed Sizes - Buddy Systems - Storage Compaction

UNIT 5

SEARCHING, SORTING AND DESIGN TECHNIQUES: Searching Techniques, Sorting – Internal Sorting – Bubble Sort, Insertion Sort, Quick Sort, Heap Sort, Bin Sort, Radix Sort – External Sorting – Merge Sort, Multi-way Merge Sort, Polyphase Sorting - Design Techniques - Divide and Conquer - Dynamic Programming - Greedy Algorithm – Backtracking - Local Search Algorithms

Reference Books :

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson P
2. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education P
3. Drozdek, Data Structures and algorithm in Java, Cengage (Thomson)
4. Gilberg, Data structures Using C++, Cengage
3. Horowitz, Sahni, Rajasekaran, "Computer Algorithms", Galgotia,
4. Tanenbaum A.S., Langram Y, Augestien M.J., "Data Structures using C & C++", Prentice Hall of India, 2002

MTCS-103 ADVANCED COMPUTOR ARCHITECTURE

UNIT 1

Flynn's and Handler's Classification of parallel computing structures. Pipelined and Vector Processors.

UNIT 2

Data and control hazards and method to resolve them. SIMD multiprocessor structures. I

UNIT 3

Interconnection networks. Parallel Algorithms for array processors, Search algorithms, MIMD multiprocessor systems,

UNIT 4

Scheduling and load balancing in multiprocessor systems, Multiprocessing control and algorithms.

Reference Books:

1. Advance Computer Architecture, parthsarthy, Cengage (Thomson)
2. Computer Architecture and Organisation- John Hays, Mc.Graw-Hill.
3. Computer Architecture and Parallel Processing- Hwang And Briggs, TMH.

MTCS-104 OBJECT ORIENTED TECHNOLOGY

UNIT 1

Overview of object oriented concepts: Need for object oriented programming, characterization of object oriented languages.

Unit 2

Object oriented Design : object structure concepts, methodology for object oriented design (Booch, and chen and chen), Design modelling, system design life cycle.

Unit 3

Object oriented programming : An overview of c++ programming, loops and decisions, structures and functions, objects and classes, Array and pointers, Inheritance, virtual function, files and stream.

Unit 4

Object oriented Databases : Relational v/s object oriented databases, The architecture of OO databases, Query languages for OO databases, Gemstone/O2/orion.

Unit 5

Distributed object oriented systems: Object management group, CORBA.

Reference Books :

1. Object Oriented Analysis and Design, Satzinger, Cengage (Thomson)
2. Object Oriented S/W Development by Mc. Gregor & Sykes DA, Van Nostrand.
2. OOP in C++ by Lafore, Galgotia Pub.
3. The C++ Programming Language by Stroustrup B, Addison W esely
4. Introduction to OOP by Witt KV, Galgotia Pub.
5. Object Data Management by Cattel R., Addison W esely
6. Modern Data Base System by Kim W , ACM Press, Addison W esely
7. OOP by Blaschek G, Springer Verlag
8. An Introduction to Java Programming and OOAD, Johnson, Cengage

Swami Vivekanand University, Sironja Sagar (M.P.)

MTCS-105 ADVANCED COMPUTER NETWORKING

UNIT 1

Review of Networking and O.S. fundamentals, ISO-OSI Model, different layers and their functions, LAN, MAN, WAN, Communication media & principles IEEE standards etc.

UNIT 2

Internetworking with TCP/IP, Basic concepts, Principles, Protocols and Architecture, Address handling Internet protocols and protocol layering. DNS, Applications: TELNET, RLOGN, FTP, TFTP, NFS, SMTP, POP3, IMAP, MIME, HTTP, STTP, DHCP, VOIP, SNMP.

UNIT 3

Introduction to Router, Configuring a Router, Interior & Exterior Routing, RIP, Distance Vector Routing, OSPF, BGP, Uni-cast, Multicast and Broadcast. Multicast routing protocols: DVMRP, MOSPF, CBT, PIM, MBONE, EIGRP, CIDR, Multicast Trees, Comparative study of IPv6 and IPv4.

UNIT 4

VPN addressing and routing, VPN Host management, ATM Concepts, Services Architecture, Equipments and Implementation

UNIT 5

Introduction to wireless transmission and medium access control, wireless LAN: IEEE 802.11, Hiper LAN, Bluetooth Mobile Network and Transport layer, WAP GSM and CDMA: Network architecture and management

Reference Books:

1. Computer Networks: Tanenbaum.
2. Internetworking with TCP/IP: Comer.
3. Data Communications, Computer Networks and Open Systems: Hallsall.
4. Data Communications, Stalling.
5. Mobile Communication: Schiller, Pearson Education
6. Computer Communications and network Technology, Gallo, Cengage (Thomson)
7. Wireless and Mobile Network Architecture: Yi Bing Lin, Wiley
8. ATM Network: Kasara, TMH
9. TCP/IP protocol Suite, Forouzan, TMH

References:

1. Rambaugh, Object Oriented Modeling and Design with UML, Pearson Edu.
2. Simon Bennett, Steve McRobb and Ray Farmer, Object Oriented system Analysis and Design
Using UML, TMH
3. Docherty, Object Oriented Analysis & Design with UML, Wiley India
4. Ivar Jacobson, Patrik Jonsson, Object – Oriented Software Engineering, Pearson.Edu

Swami Vivekanand University, Sironja Sagar (M.P.)

MTCS 201 - Web Technology and Commerce

UNIT-1

Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.

Unit-2

Static and dynamic web pages, tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability, Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.

Unit-3

Electronic Commerce and physical Commerce, Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web-enabled services, Matchmaking services, information-selling on the web.

Unit-4

Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex. E-Governance: E-Governance architecture, Public private partnership, Readiness, Security, Cyber Crime and Law, IT Act

Unit-5

Advanced technologies for e-commerce: Introduction to mobile agents. WAP: the enabling technology : The WAP model, WAP Architecture, Benefit of WAP to e-commerce. Web Security, Encryption Schemes, Secure Web documents, Digital signatures and firewalls.

References:

1. Web Technology, Achyut Godbole, Atul Kahate, TMH
2. Henry Chan, Raymond Lee, Tharam Dillon, E-Commerce Fundamental and Applications, Willey Publication.
3. Minoli & Minoli, Web Commerce Technology Hand Book, TMH
4. Satyanarayana, E-Government, PHI
5. Uttam K: Web Technologies, Oxford University Press.
6. G. Winfield Treese, Lawrence C. Stewart, Designing Systems for Internet Commerce, Longman Pub.
7. [Charles Trepper](#), E Commerce Strategies, Microsoft Press

MTCS- 202 Information theory, coding and cryptography

Unit1. Information Theory, Probability and Channel: Introduction, Information Measures, Review probability theory, Random variables, Processes, Mutual Information, Entropy, Uncertainty, Shannon's theorem, redundancy, Huffman Coding, Discrete random Variable. Gaussian random variables, Bounds on tail probabilities.

Unit.2 Stochastic Processes: Statistical independence, Bernoulli Process, Poisson Process, Renewal Process, Random Incidence, Markov Modulated Bernoulli Process, Irreducible Finite Chains with Aperiodic States, Discrete-Time Birth-Death Processes, Markov property, Finite Markov Chains, Continuous time Markov chain, Hidden Markov Model.

Unit 3. Error Control Coding: Channel Coding: Linear Block Codes: Introduction, Matrix description, Decoding, Equivalent codes, Parity check matrix, Syndrome decoding, Perfect codes Hamming Codes ,Optimal linear codes ,Maximum distance separable (MDS) codes. **Cyclic Codes:** Introduction, generation, Polynomials, division algorithm, Matrix description of cyclic codes, burst error correction, Fire Codes, Golay Codes, and CRC Codes. **BCH Codes:** Introduction, Primitive elements, Minimal polynomials, Generator Polynomials in terms of Minimal Polynomials, Decoding of BCH codes.

Unit.4 Coding for Secure Communications: Review of Cryptography, Introduction, Encryption techniques and algorithms, DES, IDEA , RC Ciphers ,RSA Algorithm ,Diffi-Hellman, PGP, Chaos Functions, Cryptanalysis, Perfect security, Unicity distance, Diffusion and confusion, McEliece Cryptosystem

Unit.5 Advance Coding Techniques: Reed-Solomon codes, space time codes, concatenated codes, turbo coding and LDPC codes (In details), Nested Codes, block (in Details), Convolutional channel coding: Introduction, Linear convolutional codes, Transfer function representation & distance properties, Decoding convolutional codes(Soft-decision MLSE, Hard-decision MLSE),The Viterbi algorithm for MLSE, Performance of convolutional code decoders, Soft & Hard decision decoding performance, Viterbi algorithm implementation issues: RSSE, trellis truncation, cost normalization, Sequential decoding: Stack, Fano, feedback decision decoding, Techniques for constructing more complex convolutional codes with both soft and hard decoding.

Text Books and References:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. Kishor S. Trivedi "Probability and Statistics with Reliability, Queuing and Computer Science Applications", Wiley India, Second Edition.
3. J.C.Moreira, P.G. Farrell "Essentials of Error-Control Coding", Willey Student Edition
4. San Ling and Chaoping "Coding Theory: A first Course", Cambridge University Press, 2004.
5. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.
6. Cole, "Network Security", Bible, Wiley INDIA, Second Addition
7. Proakis and Masoud, "Digital Communication", McGraw-Hill ,2008

MTCS- 203 Advanced Concept in Data Bases

UNIT-1

DBMS Concept Introduction, Data Model, Entity & Attributes, Relationship, E-R Model, Relational Data Model, Domain Tuples, Attributes, Key, Schema, Integrity Constraints, Relational Algebra & Relational Calculus, Normalization & Normal Form.

Unit-2

Query Processing and Optimization Introduction, Query Processing, Syntax Analyzer, Query Decomposition: - Query Analysis, Query Normalization, Semantic Analyzer, Query Simplifier, Query Restructuring. Query Optimization, Cost Estimation in Query Optimization, Structure of Query Evaluation Plans, Pipelining and Materialization.

Unit-3

Distributed Databases Introduction, Architecture of Distributed Databases , Distributed Database System Design, Distributed Query Processing, Concurrency Control in Distributed Databases, Recovery Control in Distributed Databases. Web Databases, Multimedia Databases, Spatial Databases, Clustering-based Disaster-proof Databases, Mobile Databases.

Unit-4

Object-Oriented Databases Introduction, Concept of Object Oriented Database, Object Oriented Data Model(OODM), Object-Oriented DBMS(OODBMS), Object Data Management Group and Object-Oriented Languages. Object-Relational DBMS, ORDBMS Design, ORDBMS Query Language.

Unit-5

Design of Data Warehouse, Dimension and Measures, Data Marts and Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

Data Mining : Data, Information and Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing, Data Reduction, Data Mining Statistics. Data Mining Techniques.

References:

1. C. J. Date: An Introduction to Database Systems , Addison-Wesley
2. Avi Silberschatz, Henry F. Korth ,S. Sudarshan ,Data Base System Concepts, TMH
3. Patrick O'Neil & Elizabeth O'Neil, Database Principles, Programming and Performance,
4. Morgan Kaufmann Hardcourt India
5. Gillenson, Fundamental of Data Base Management Sytem, Willey India
6. Ceri & Pelagatti, Distributed Databases Principles & Systems, TMH
7. Paulraj Ponniah, Data Warehousing Fundamental, Willey India.
8. Jiawei Han, Data Mining Concept & Techniques, Elsevier Pub.

MTCS- 204 System Programming

Unit-1

Overview of language processors, Elements of assembly level programming, Design of assembler , Macro definition, Design of Macro preprocessor , Relocating and linking concepts , Design of linker , Programming Environments .

Unit-2

Aspects of Compilation, overview of the various phases of compiler , Scanning, Syntax error handling , Symbol table conceptual design , Intermediate Code conceptual Design , Intermediate code interfaces , Dynamic storage allocation techniques , Dynamic Programming code generation algorithm ,Principal sources of optimization , Approaches to compiler development. Register allocation techniques. Concurrentisation and vectorisation of programs .

Unit –3

Motivation and overview, Structure of a Parallelizing compiler. Parallelism detection: data dependence, direction vectors, loop carried and loop independent dependences. Compilation for Distributed Machines Data partitioning, instruction scheduling, register allocation, machine optimization. Dynamic compilation.

Introduction to code optimisation. Classical theory of data flow analysis. Bi-directional data flows. Unified algorithms for data flow analysis. Program representation for optimisation - SSA form, etc. Efficient code generation for expressions. Code generator generators (CGGs). Code generation for pipelined machines.

Unit-4

Design Issues in distributed operating system , Networking Issues , Communication Protocols , Message Passing , RPC in heterogeneous environment , Resource allocation , Algorithms for Distributed control . Distributed Deadlock detection , Mechanism for building Distributed File System, Distributed shared memory , Distributed scheduling .

Unit-5

Resource Security and Protection: The Access Matrix model , Advanced models of protection,., Cryptography, Authentication, Multiprocessor System Architecture , Structure of multiprocessor operating systems , Process synchronization, scheduling , Memory management, Fault tolerance. Case studies : Unix Operating system, Amoeba, Andrew.

References:

1. Dhamdhare, Systems Programming and Operating systems, TMH
2. Keith Cooper , Engineering a Compiler , Elsevier Pub
3. Mak , Writing compilers and Interpreters , Wiley India
4. Singhal & Shivaratri , Advanced concepts in Operating Systems, TMH
5. Sinha , Distributed operating system , PHI

MTCS- 205 Soft Computing

Unit – 1

Introduction of soft computing, soft computing vs hard computing. Soft computing techniques. Computational Intelligence and applications, problem space and searching: Graph searching, different searching algorithms like breadth first search, depth first search techniques, heuristic searching Techniques like Best first Search, A* algorithm, AO* Algorithms.

Game Playing: Minimax search procedure, adding alpha-beta cutoffs, additional refinements, Iterative deepening, Statistical Reasoning: Probability and Bayes theorem, Certainty factors and Rules based systems, Bayesian Networks, Dempster Shafer theorem

Unit 2

Neural Network: Introduction, Biological neural network: Structure of a brain, Learning methodologies. Artificial Neural Network(ANN): Evolution of, Basic neuron modeling, Difference between ANN and human brain, characteristics, McCulloch-Pitts neuron models, Learning (Supervised & Unsupervised) and activation function, Architecture, Models, Hebbian learning, Single layer Perceptron, Perceptron learning, Windrow-Hoff/ Delta learning rule, winner take all, linear Separability, Multilayer Perceptron, Adaline, Madaline, different activation functions Back propagation network, derivation of EBPA, momentum, limitation, Applications of Neural network.

Unit 3

Unsupervised learning in Neural Network: Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Associative memory, hope field network and Bidirectional associative memory. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Introduction to Support Vector machine, architecture and algorithms, Introduction to Kohanan's Self organization map, architecture and algorithms

Unit – 4

Fuzzy systems: Introduction, Need, classical sets (crisp sets) and operations on classical sets Interval Arithmetics, Fuzzy set theory and operations, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Membership functions, Fuzzy rule base system: fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic, fuzzification and defuzzification. Fuzzy associative memory.

Fuzzy Logic Theory, Modeling & Control Systems

Unit – 5

Genetic algorithm: Introduction, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, including JSP (Job shop scheduling problem), TSP (Travelling salesman problem), Applications of GA, Differences & similarities between GA & other traditional methods. **Evolutionary Computing:** Concepts & Applications. Swarm Intelligence.

References:-

1. S.N. Shivnandam, "Principle of soft computing", Wiley India.
2. David Poole, Alan Mackworth "Computational Intelligence: A logical Approach" Oxford.
3. Russell & Yuhui, "Computational Intelligence: Concepts to Implementations", Elsevier.
4. Eiben and Smith "Introduction to Evolutionary Computing" Springer
5. Janga Reddy Manne; "Swarm Intelligence and Evolutionary Computing"; Lap Lambert Academic Publishing
6. E. Sanchez, T. Shibata, and L. A. Zadeh, Eds., "Genetic Algorithms and Fuzzy Logic Systems: Soft Computing Perspectives, Advances in Fuzzy Systems - Applications and Theory", Vol. 7, River Edge, World Scientific, 1997.
7. Ajith Abraham et.al, "Soft computing as transdisciplinary science and technology: proceedings of 4th IEEE International Workshop WSTST' 05" Springer.
8. D.E. Goldberg "Genetic algorithms, optimization and machine learning" Addison Wesley
9. De Jong, Kenneth "A Evolutionary Computation: A Unified Approach" Prentice-Hall Of India Private Limited
10. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.

Swami Vivekanand University, Sironja Sagar (M.P.)

MTCS 301 (A) – Data Warehousing & Mining

Unit – 1

Introduction : Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

Unit – 2

Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K-Medoid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

Unit – 3

Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

Unit – 4

Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

Unit – 5

Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

Reference Books :

1. Data Mining Techniques ; Arun K.Pujari ; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.
5. Text Mining Applications, Konchandy, Cengage

Swami Vivekanand University, Sironja Sagar (M.P.)

MTCS 301 (B) – Real Time Fault Tolerant Systems

Unit-I

Structure of Real Time System, Performance Measure for real time system, Task Assignments, Fault Tolerant Scheduling, Real Time Vs General purpose Data Bases, Data Bases for Hard Real Time System, Real Time Communication.

Unit-II

Fault Tolerance, Fault-Error-Failure. Redundancy, Error Detection, Damage Confinement, Error Recovery, Fault Treatment, Fault Prevention, anticipated and unanticipated Faults. Error models: General coding scheme Error detection techniques: Watchdog processors, Heartbeats, consistency and capability checking,

Unit-III

Fault tolerance: Coding technique-fault tolerant self checking and fail safe circuits-fault tolerance in combinatorial and sequential circuits- synchronous and asynchronous fail safe circuits. Software fault tolerance: Process pairs, robust data structures, N version programming, Recovery blocks, Replica consistency & reintegration, multithreaded programs Application:

Unit-IV

Experimental Evaluation: Modelling and simulation based, Fault injection based - Application: NFTAPE fault injector . Modelling for performance, dependability and perform ability: dependability-specific methods (fault trees, reliability block diagrams).

Unit-V

Practical Systems for Fault Tolerance: - Application: Ad-hoc wireless network - Application: NASA Remote Exploration & Experimentation System Architecture: Fault tolerant computers - general purpose commercial systems-fault tolerant multiprocessor and VLSI based communication architecture.

REFERENCES:-

1. K.K.Pradhan, "Fault Tolerant computing theory and techniques" volume III. Prentice Hall,1989.
2. Krishna, Real Time System, TMH
3. Anderson and Lee, "Fault Tolerant principles and practice" ,PHI 1989.
4. Siewert, Real Time Embedded System, Cengage Learning.
5. Rajiv Mall, Real Time System, Pearson Edu.
6. Parag K. Lala, "Fault Tolerant and Fault Testable, Hardware design" PHI 1985.
7. Shem , toy Levei , Ashok K.Agarwala , "Fault Tolerant System design", Tata McGraw Hill

MTCS 302 (A) – Network Security

Unit – 1

Convention Encryption : Conventional Encryption Model , Steganography , Classical Encryption Techniques, Simplified DES , Block Cipher Principles , The Data Encryption Standard, The Strength of DES , Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Conventional Encryption algorithms.

Unit – 2

Public Key Encryption And Hash Functions

Public Key Cryptography , Principles of Public Key Cryptosystems , The RSA Algorithm , Key Management , Diffie Hellman Key Exchange , Elliptic Curve Cryptography.

Unit – 3

Message Authentication and Hash Functions

Authentication Requirements, Authentication Functions, Message Authentication Codes , Hash Functions , Security of Hash Functions.

Unit – 4

Hash And Mac Algorithms

MD5 Message Digest Algorithm , Secure Hash Algorithm (SHA-1) , RIPEMD , HMAC Digital

Signatures and Authentication Protocols

Digital Signatures , Authentication Protocols -Digital Signature Standard.

Unit – 5

Authentication Applications , IP Security , Web Security

Intruders, Viruses and Worms Intruders , Viruses and Related Threats

Firewalls Firewall Design Principles , Trusted Systems

Reference 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

MTCS- 302 (B) Simulation and Modeling

Unit – 1

Introduction to modeling and simulation: Modeling and simulation methodology, system modeling ,concept of simulation, continuous and discrete time simulation.

Unit – 2

Basic concept of probability and random variables continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

Unit – 3

Introduction to Queuing Theory: Characteristics of queuing system, Poisson's formula, birth- death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.

Unit – 4

System Dynamics modeling: Identification of problem situation , preparation of causal loop diagrams and flow diagrams, equation writing, level and rate relationship. Simulation of system dynamics models.

Unit – 5

Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw - SIMULA, DYNAMO, STELLA, POWERSIM.

Reference Books :

1. Gordon G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. Seila, Applied Simulation Modeling, Cengage
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.
5. Sushil, System Dynamics, Wiley Eastern Ltd. 23
6. Shannon R.E., System simulation, Prentice Hall