

**M.Tech. (CS): Syllabus Revision in 2018-19.**

S.No	Course Code	Session 2017-18	Session 2018-19	Remark Syllabus Change/ new course
1	MTSCSC 101	<p><b>Advanced Computer Architecture</b></p> <p>UNIT 1: Parallel Computer Models: The state of computing, Classification of parallel computers, Multiprocessors and multicomputers, Multivector and SIMD computers. Program and network properties: Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms</p> <p>UNIT 2: System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks, Multiprocessor system Interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.</p> <p>Advanced processors: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors</p> <p>UNIT 3: Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines</p> <p>UNIT 4: Memory Hierarchy Design: Cache basics &amp; cache performance, reducing miss rate and miss penalty, multilevel cache hierarchies, main memory organizations, design of memory hierarchies. Scalable point – point interfaces: Alpha364 and HT protocols, high performance signaling layer.</p> <p>Enterprise Memorys subsystem Architecture: Enterprise RAS Feature</p>	<p><b>Mathematical Foundation of Computer Science</b></p> <p>Unit 1: Probability mass, density, and cumulative distribution functions, parametric families of distributions, Expected value, variance, conditional expectation, Applications of the univariate and multivariate Central Limit Theorem, Probabilistic inequalities, Markov chains</p> <p>Unit 2: Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood</p> <p>Unit 3: Statistical inference, Introduction to multivariate statistical models: regression and classification problems, principal components analysis, and The problem of over fitting model assessment.</p> <p>Unit 4: Graph Theory: Isomorphism, Planar graphs, graph colouring, Hamilton circuits and Euler cycles. Permutations and Combinations with and without repetition. Specialized techniques to solve combinatorial enumeration problems</p> <p>Unit 5: Computer science and engineering applications Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.</p> <p>Unit 6: Recent Trends in various distribution functions in mathematical field of computer science for varying fields like bioinformatics, soft computing, and computer vision.</p>	New Course

		<p>set: Machine check, hot add/remove, domain partitioning, memory mirroring/migration, patrol scrubbing, fault tolerant system.</p> <p>UNIT 5: Multiprocessor architectures: Symmetric shared memory architectures, distributed shared memory architectures, models of memory consistency, cache coherence protocols (MSI, MESI, MOESI), scalable cache coherence, overview of directory based approaches, design challenges of directory protocols, memory based directory protocols, cache based directory protocols, protocol design tradeoffs, synchronization.</p>		
2	MTSCSCS 102	<p><b>Advanced Communication Networks</b></p> <p><b>UNIT 1: Introduction:</b> Introduction to Network models-ISO-OSI, SNA, Apple talk and TCP/IP models. Review of Physical layer and Data link layers, Review of LAN (IEEE 802.3, 802.5, 802.11b/a/g, FDDI) and WAN (Frame Relay, ATM, ISDN) standards.</p> <p><b>UNIT 2:Network layer:</b> ARP, RARP, Internet architecture and addressing, internetworking, IPv4, overview of IPv6, ICMP, Routing Protocols- RIP, OSPF, BGP, IP over ATM.</p> <p><b>UNIT 3:Transportlayer:</b> Design issues, Connection management, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Finite state machine model.</p> <p><b>UNIT 4 :Application layer:</b> WWW, DNS, e-mail, SNMP, RMON</p> <p><b>UNIT 5: Network Security:</b> Cryptography, Firewalls, Secure Socket Layer (SSL) and Virtual Private Networks (VPN).</p> <p><b>Case study</b></p> <p>Study of various network simulators, Network performance analysis using</p>	<p><b>Advanced Data Structures</b></p> <p>Unit 1: Dictionaries: Definition, Dictionary Abstract Data Type, And Implementation of Dictionaries. Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.</p> <p>Unit 2: Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists</p> <p>Unit 3: Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees</p> <p>Unit 4: Text Processing: StingOperations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.</p> <p>Unit 5: Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quad trees, k-D Trees.</p> <p>Unit 6: Recent Trends in Hashing, Trees, and various computational geometry methods for efficiently solving the new evolving problem</p>	New Course

		NS2		
3	MTSCSCS 103/ MTSCSCS 103A/	<p><b>Data Mining &amp; Data Warehousing</b></p> <p><b>UNIT 1:</b> Introduction to Data Mining, Importance of Data Mining, Data Mining functionalities, Classification of Data mining systems, Data mining architecture, Major Issues in Data Mining, Applications of Data Mining, Social impacts of data mining. Data Preprocessing, Data cleaning, Data Integration and Transformation, Data reduction, Discretization and Concept Hierarchy Generation.</p> <p><b>UNIT 2:</b> Introduction to Data Warehouse and OLAP Technology for Data Mining, Multidimensional data Model, Data warehouse Data Model, Data warehouse Architecture, Data warehouse Implementation, Development of Data Cube Technology, From Data warehousing to Data Mining.</p> <p><b>UNIT 3:</b> Data Mining primitives, Languages and System Architectures, Concept description: Characterization and Comparison, Analytical Characterization, Mining Class Comparison.</p> <p><b>UNIT 4:</b> Association Rule Mining, Mining of Single dimensional Boolean association rules, Multilevel association rules and Multidimensional association rules, Correlation Analysis, Constraint based association Mining. Classification and Predication: Basic issues regarding classification and predication, Classification by Decision Tree, Bayesian classification, and classification by back</p>	<p><b>MTSCSCS 103A Machine Learning</b></p> <p><b>Unit 1:</b> <b>Supervised Learning (Regression/Classification)</b> Basic methods: Distance-based methods, Nearest- Neighbours, Decision Trees, Naïve Bayes Linear models: Linear Regression, Logistic Regression, Generalized Linear Models Support Vector Machines, Nonlinearity and Kernel Methods Beyond Binary Classification: Multi-class/Structured Outputs, Ranking</p> <p><b>Unit 2:</b> <b>Unsupervised Learning</b> Clustering: K-means/Kernel K-means Dimensionality Reduction: PCA and kernel PCA Matrix Factorization and Matrix Completion Generative Models (mixture models and latent factor models)</p> <p><b>Unit 3</b> Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)</p> <p><b>Unit 4</b> Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning</p> <p><b>Unit 5</b> Scalable Machine Learning (Online and Distributed Learning) A selection from some other advanced topics, e.g., Semi-supervised Learning, Active Learning, Reinforcement Learning, Inference in Graphical Models, Introduction to Bayesian Learning and Inference</p> <p><b>Unit 6:</b> Recent trends in various learning techniques of machine learning and classification methods for IOT applications. Various models for IOT applications</p>	New Course

		<p>propagation, Associative classification, Prediction, Classifier accuracy.</p> <p><b>UNIT 5:</b> Cluster Analysis, basic issues, clustering using partitioning methods, Hierarchical methods, Density based methods, Grid based methods and model based methods, Algorithms for outlier analysis. Mining complex Types of data: Multidimensional analysis and descriptive mining of complex data objects, Introduction to spatial mining, multimedia mining, temporal mining, text mining and web mining with related algorithms.</p>		
4	<b>MTSCS103 B</b>		<p><b>Wireless Sensor Networks (MTSCS103B)</b></p> <p><b>Unit 1:</b></p> <p><b>Introduction to Wireless Sensor Networks:</b> Course Information, Introduction to Wireless Sensor Networks: Motivations, Applications, Performance metrics, History and Design factors</p> <p><b>Network Architecture:</b> Traditional layered stack, Cross-layer designs, Sensor Network Architecture</p> <p><b>Hardware Platforms:</b> Motes, Hardware parameters</p> <p><b>Unit 2:</b></p> <p><b>Introduction to ns-3:</b> Introduction to Network Simulator 3 (ns-3), Description of the ns-3 core module and simulation example.</p> <p><b>Unit 3:</b></p> <p><b>Medium Access Control Protocol design:</b> Fixed Access, Random Access, WSN protocols: synchronized, duty-cycled</p> <p><b>Introduction to Markov Chain:</b> Discrete time Markov Chain definition, properties, classification and analysis</p> <p><b>MAC Protocol Analysis:</b> Asynchronous duty-cycled. X-MAC Analysis (Markov Chain)</p> <p><b>Unit 4:</b></p> <p><b>Security:</b> Possible attacks, countermeasures, SPINS, Static and dynamic key distribution</p> <p><b>Unit 5:</b></p> <p><b>Routing protocols:</b> Introduction, MANET protocols, <b>Routing protocols for WSN:</b> Resource-aware routing, Data-centric, Geographic Routing, Broadcast, Multicast, <b>Opportunistic Routing Analysis:</b> Analysis of opportunistic routing (Markov Chain), Advanced topics in wireless sensor networks.</p> <p><b>Unit 6:</b></p> <p><b>ADVANCED TOPICS</b></p> <p>Recent development in WSN standards, software</p>	<b>New Course</b>

			applications.	
5	MTSCSCS103 C		<p style="text-align: center;"><b>Introduction to Intelligent Systems(MTSCSCS103C)</b></p> <p><b>Unit 1:</b> Biological foundations to intelligent systems I: Artificial neural networks, Back- propagation networks, Radial basis function networks, and recurrent networks.</p> <p><b>Unit 2:</b> Biological foundations to intelligent systems II: Fuzzy logic, knowledge Representation and inference mechanism, genetic algorithm, and fuzzy neural networks.</p> <p><b>Unit 3:</b> Search Methods Basic concepts of graph and tree search. Three simple search methods: breadth-first search, depth-first search, iterative deepening search. Heuristic search methods: best-first search, admissible evaluation functions, hill- climbing search. Optimisation and search such as stochastic annealing and genetic algorithm.</p> <p><b>Unit 4:</b> Knowledge representation and logical inference Issues in knowledge representation. Structured representation, such as frames, and scripts, semantic networks and conceptual graphs. Formal logic and logical inference. Knowledge-based systems structures, its basic components. Ideas of Black board architectures.</p> <p><b>Unit 5:</b> Reasoning under uncertainty and Learning Techniques on uncertainty reasoning such as Bayesian reasoning, Certainty factors and Dempster-Shafer Theory of Evidential reasoning, A study of different learning and evolutionary algorithms, such as statistical learning and induction learning.</p> <p><b>Unit 6:</b> Recent trends in Fuzzy logic, Knowledge Representation</p>	Title and code changed
6	MTSCSCS 104A	<p><b>Distributed Computing</b></p> <p><b>UNIT 1:</b> Architectural models for distributed and mobile computing systems. Basic concepts in distributed computing such as clocks, message ordering, consistent global states, and consensus.</p>	<p><b>Data Science</b></p> <p><b>Unit 1:</b> Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.</p> <p><b>Unit 2:</b> Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data</p>	New Course

		<p>Basic Algorithms in Message: Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Fault-Tolerant Consensus, Causality and Time. Message Passing: PVM and MPI.</p> <p><b>UNIT 2:</b> Distributed Operating Systems: OS and network operating systems, Distributed File systems. Middleware, client/server model for computing, common layer application protocols (RPC, RMI, streams), distributed processes, network naming, distributed synchronization and distributed object-based systems.</p> <p><b>UNIT 3:</b>Simulation:A Formal Model for Simulations, Broadcast and Multicast, Distributed Shared Memory, Fault-Tolerant Simulations of Read/Write Objects Simulating Synchrony, Improving the Fault Tolerance of Algorithms, Fault-Tolerant Clock Synchronization.</p> <p><b>UNIT 4:</b> Distributed Environments: Current systems and developments (DCE, CORBA, JAVA).</p> <p>Advanced Topics: Randomization, Wait-Free Simulations of Arbitrary Objects, and Problems Solvable in Asynchronous Systems, Solving Consensus in Eventually Stable Systems, High Performance Computing-HPF, Distributed and mobile multimedia systems. Adaptability in Mobile Computing.Grid Computing and applications. Fault tolerant Computing Systems.</p> <p><b>UNIT 5:</b>Parallel Processing : Basic Concepts: Introduction to parallel processing, parallel processing</p>	<p><b>sources</b></p> <p><b>Unit 3:</b> Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.</p> <p><b>Unit 4:</b> Data visualization: Introduction, Types of data visualization,Data for visualization:Data types, Data encodings, Retinal variables, mapping variables to encodings, Visualencodings.</p> <p><b>Unit 5:</b> Applications of Data Science, Technologies for visualization, Bokeh (Python)</p> <p><b>Unit 6:</b> Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.</p>	
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		terminology, Parallel & Distributed Programming: Parallel Programming environments		
7	MTSCSC 104B	<p><b>Advanced Topics In Algorithms</b></p> <p><b>Unit 1: Advanced data structures:</b> Self adjustment tree (splay tree), Red- black tree, operations on Red-Black Trees. Weight Balanced Trees (Huffman Trees), Augmenting Red-Black Trees to Dynamic Order Statics and Interval Tree Applications, 2-3 Trees .</p> <p><b>Unit 2: Parallel algorithms:</b> Basic techniques for sorting, searching, merging, list ranking in PRAMs and Interconnection networks.</p> <p><b>Unit 3: Geometric algorithms:</b> Point location, convex hulls and Voronoi diagrams, Arrangements.</p> <p><b>Unit 4: Graph algorithms:</b> Isomorphism Components, Algorithms for Connectness, Finding all Spanning Trees in a Weighted Graph, Cut-sets. Cut-Vertices Planer and Dual graphs, Spanning Trees ,strongly Connected Components and Articulation Point. Single source shortest path and all pair shortest path algorithms. Min-Cut Max- Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms.</p> <p><b>Unit 5: Approximation algorithms:</b> Use of Linear programming and primal dual, local search heuristic.</p>	<p><b>Distributed Systems</b></p> <p><b>Unit 1:</b> <b>INTRODUCTION</b> Distributed data processing; What is a DDBS; Advantages and disadvantages of DDBS; Problem areas; Overview of database and computer network concepts <b>DISTRIBUTED DATABASE MANAGEMENT SYSTEM ARCHITECTURE</b> Transparencies in a distributed DBMS; Distributed DBMS architecture; Global directory issues <b>Unit 2:</b> <b>DISTRIBUTED DATABASE DESIGN</b> Alternative design strategies; Distributed design issues; Fragmentation; Data allocation <b>SEMANTICS DATA CONTROL</b> View management; Data security; Semantic Integrity Control <b>QUERY PROCESSING ISSUES</b> Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition; Localization of distributed data <b>Unit 3:</b> <b>DISTRIBUTED QUERY OPTIMIZATION</b> Factors governing query optimization; Centralized query optimization; Ordering of fragment queries; Distributed query optimization algorithms <b>TRANSACTION MANAGEMENT</b> The transaction concept; Goals of transaction management; Characteristics of transactions; Taxonomy of transaction models <b>CONCURRENCY CONTROL</b> Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management <b>Unit 4:</b> <b>RELIABILITY</b> Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery protocols <b>Unit 5</b> <b>PARALLEL DATABASE SYSTEMS</b> Parallel architectures; parallel query processing and optimization; load balancing <b>Unit 6: ADVANCED TOPICS</b> Mobile Databases, Distributed Object Management, Multi-databases</p>	New Course

MTCS104C	<p><b>Advanced Compilation Techniques</b></p> <p><b>Unit I:</b>Generic Code Optimization Techniques - loop optimization, inlining, and other transformations.</p> <p><b>Unit II:</b>Impact of architectures on code generation and optimization: RISC architectures, VLIW architectures, special-purpose architectures.</p> <p><b>Unit III:</b>Architecture- specific code optimizations – register allocation (coloring, allocation, live range splitting), instruction scheduling (pipelined architectures, delayed load architectures, list scheduling). Code Optimizations under real-time / embedded constraints – cacheless / diskless memory models, bounded time responses.</p> <p><b>Unit IV:</b>Garbage Collection Techniques – automatic memory management and data locality. Virtual Machines and Just-in-Time Compilation techniques - HotSpot-like optimizations.</p> <p><b>Unit V:</b>Implementation of exception handling, concurrency, and generic jumps (like call/cc).</p>	<p><b>Advanced Wireless and Mobile Networks</b></p> <p><b>Unit 1:</b> <b>INTRODUCTION:</b> Wireless Networking Trends, Key Wireless Physical Layer Concepts, Multiple Access Technologies -CDMA, FDMA, TDMA, Spread Spectrum technologies, Frequency reuse, Radio Propagation and Modelling, Challenges in Mobile Computing: Resource poorness, Bandwidth, energy etc. <b>WIRELESS LOCAL AREA NETWORKS:</b> IEEE 802.11 Wireless LANs Physical &amp; MAC layer, 802.11 MAC Modes (DCF &amp; PCF) IEEE 802.11 standards, Architecture &amp; protocols, Infrastructure vs. Adhoc Modes, Hidden Node &amp; Exposed Terminal Problem, Problems, Fading Effects in Indoor and outdoor WLANs, WLAN Deployment issues</p> <p><b>Unit 2:</b> <b>WIRELESS CELLULAR NETWORKS:</b> 1G and 2G, 2.5G, 3G, and 4G, Mobile IPv4, Mobile IPv6, TCP over Wireless Networks, Cellular architecture, Frequency reuse, Channel assignment strategies, Handoff strategies, Interference and system capacity, Improving coverage and capacity in cellular systems, Spread spectrum Technologies.</p> <p><b>Unit 3:</b> WiMAX (Physical layer, Media access control, Mobility and Networking), IEEE 802.22 Wireless Regional Area Networks, IEEE 802.21 Media Independent Handover Overview</p> <p><b>WIRELESS SENSOR NETWORKS</b> Introduction, Application, Physical, MAC layer and Network Layer, Power Management, Tiny OS Overview.</p> <p><b>Unit 4:</b> <b>WIRELESS PANS</b> Bluetooth AND Zigbee, Introduction to Wireless Sensors.</p> <p><b>Unit 5:</b> <b>SECURITY</b> Security in wireless Networks Vulnerabilities, Security techniques, Wi-Fi Security, DoS in wireless communication.</p> <p><b>Unit 6:</b> <b>ADVANCED TOPICS</b> IEEE 802.11x and IEEE 802.11i standards, Introduction to Vehicular Adhoc Networks</p>	new course
MTCS105	<p><b>Advanced Communication Network</b></p> <p>1. Write two programs in C: hello_client and hello_server</p> <ul style="list-style-type: none"> <li>• The server listens for, and accepts, a</li> </ul>	<p><b>Research Methodology and IPR</b></p> <p><b>Unit 1:</b> Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.</p>	New Course

		<p>single TCP connection; it reads all the data it can from that connection, and prints it to the screen; then it closes the connection</p> <ul style="list-style-type: none"> <li>• The client connects to the server, sends the string "Hello, world!", then closes the Connection</li> </ul> <p>2. Write an Echo_Client and Echo_server using TCP to estimate the round trip time from client to the server. The server should be such that it can accept multiple connections at any given time.</p> <p>3. Repeat Exercises 1 &amp; 2 for UDP.</p> <p>4. Repeat Exercise 2 with multiplexed I/O operations</p> <p>5. Simulate Bellman-Ford Routing algorithm in NS2</p> <p>6. Write client/server applications involving unix sockets involving TCP or UDP involving iterative or concurrent server.</p> <p>7. Understand IPV4 &amp; IPV6 interoperability issues.</p>	<p>Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations</p> <p><b>Unit 2:</b> Effective literature studies approaches, analysis Plagiarism, Research ethics,</p> <p><b>Unit 3:</b> Effective technical writing, how to write report, Paper</p> <p>Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee</p> <p><b>Unit 4:</b> Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.</p> <p><b>Unit 5:</b> Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.</p> <p><b>Unit 6:</b> New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.</p>	
	<p><b>MTCSCS 106</b></p>		<p><b>AUDIT 1 and 2 : ENGLISH FOR RESEARCH PAPER WRITING(MTCSCS 106)</b></p> <p><b>UNIT-1:</b> Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.</p> <p><b>UNIT-2:</b> Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction</p> <p>Review of the Literature, Methods, Results,</p>	<p><b>NEW Course</b></p>

		<p>Discussion, Conclusions, the Final Check.</p> <p><b>UNIT-3:</b> key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when Writing a Review of the Literature.</p> <p><b>UNIT-4:</b> skills are needed when writing the Methods, skills needed when writing the Results, Skills are needed when writing the Discussion; skills are needed when writing the Conclusions.</p> <p><b>UNIT-5:</b> useful phrases, how to ensure paper is as good as it could possibly be the first- time Submission.</p> <p><b>AUDIT 1 and 2: DISASTER MANAGEMENT</b></p> <p><b>UNIT-1:Introduction</b></p> <p>Disaster: Definition, Factors and Significance; Difference between Hazard And Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.</p> <p><b>UNIT-2: Repercussions Of Disasters And Hazards:</b> Economic Damage, Loss Of Human And Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks Of Disease And Epidemics, War and Conflicts.</p> <p><b>UNIT-3:Disaster Prone Areas In India</b> Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics.</p> <p><b>UNIT-4:Disaster Preparedness and Management</b></p> <p>Preparedness: Monitoring Of Phenomena</p>	
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			<p>Truthfulness, Cleanliness.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Honesty, Humanity. Power of faith, National Unity.</li> <li><input type="checkbox"/> Patriotism. Love for nature ,Discipline</li> </ul> <p><b>UNIT-3: Personality and Behavior Development</b> - Soul and Scientific attitude.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Punctuality, Love and Kindness.</li> <li><input type="checkbox"/> Avoid fault Thinking.</li> <li><input type="checkbox"/> Free from anger, Dignity of labor.</li> <li><input type="checkbox"/> Universal brotherhood and religious tolerance.</li> </ul> <p><b>UNIT-4: Positive Thinking. Integrity and discipline.</b> Positive Thinking. Integrity and discipline.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> True friendship.</li> <li><input type="checkbox"/> Happiness Vs suffering, love for truth.</li> <li><input type="checkbox"/> Aware of self-destructive habits.</li> <li><input type="checkbox"/> Association and Cooperation.</li> <li><input type="checkbox"/> Doing best for saving nature</li> </ul> <p><b>UNIT-5: Character and Competence –Holy books vs. Blind faith.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Self-management and Good health.</li> <li><input type="checkbox"/> Science of reincarnation.</li> <li><input type="checkbox"/> Equality, Nonviolence , Humility, Role of Women.</li> <li><input type="checkbox"/> All religions and same message.</li> <li><input type="checkbox"/> Mind your Mind, Self-control.</li> </ul> <p><b>AUDIT 1 and 2 : CONSTITUTION OF INDIA</b></p> <p><b>UNIT-1:History of Making of the Indian Constitution:</b></p> <p>History Drafting Committee, (Composition &amp; Working).</p> <p><b>Philosophy of the Indian Constitution:</b> Preamble Salient Features.</p> <p><b>UNIT-2:Contours of Constitutional Rights &amp; Duties:</b></p>	
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			<ul style="list-style-type: none"> <li><input type="checkbox"/> Fundamental Rights</li> <li><input type="checkbox"/> Right to Equality</li> <li><input type="checkbox"/> Right to Freedom</li> <li><input type="checkbox"/> Right against Exploitation</li> <li><input type="checkbox"/> Right to Freedom of Religion</li> <li><input type="checkbox"/> Cultural and Educational Rights</li> <li><input type="checkbox"/> Right to Constitutional Remedies</li> <li><input type="checkbox"/> Directive Principles of State Policy</li> <li><input type="checkbox"/> Fundamental Duties.</li> </ul> <p><b>UNIT-3:Organs of Governance:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Parliament</li> <li><input type="checkbox"/> Composition</li> <li><input type="checkbox"/> Qualifications and Disqualifications</li> <li><input type="checkbox"/> Powers and Functions</li> <li><input type="checkbox"/> Executive</li> <li><input type="checkbox"/> President</li> <li><input type="checkbox"/> Governor</li> <li><input type="checkbox"/> Council of Ministers</li> <li><input type="checkbox"/> Judiciary, Appointment and Transfer of Judges, Qualifications</li> <li><input type="checkbox"/> Powers and Functions</li> </ul> <p><b>UNIT-3:Local Administration:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> District's Administration head: Role and Importance,</li> <li><input type="checkbox"/> Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.</li> <li><input type="checkbox"/> Pachayati raj: Introduction, PRI: Zila Pachayat.</li> <li><input type="checkbox"/> Elected officials and their roles, CEO Zila Pachayat: Position and role.</li> <li><input type="checkbox"/> Block level: Organizational Hierarchy (Different departments),</li> <li><input type="checkbox"/> Village level: Role of Elected and Appointed officials,</li> </ul>	
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			<p><input type="checkbox"/> Importance of grass root democracy</p> <p><b>UNIT-5:Election Commission:</b></p> <p><input type="checkbox"/> Election Commission: Role and Functioning.</p> <p><input type="checkbox"/> Chief Election Commissioner and Election Commissioners.</p> <p><input type="checkbox"/> State Election Commission: Role and Functioning.</p> <p><input type="checkbox"/> Institute and Bodies for the welfare of SC/ST/OBC and women.</p> <p><b>AUDIT 1 and 2 : PEDAGOGY STUDIES</b></p> <p><b>UNIT-1:Introduction and Methodology:</b></p> <p><input type="checkbox"/> Aims and rationale, Policy background, Conceptual framework and terminology</p> <p><input type="checkbox"/> Theories of learning, Curriculum, Teacher education.</p> <p><input type="checkbox"/> Conceptual framework, Research questions.</p> <p><input type="checkbox"/> Overview of methodology and Searching.</p> <p><b>UNIT-2:Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.</b></p> <p><input type="checkbox"/> Curriculum, Teacher education</p> <p><b>UNIT-3: Evidence on the effectiveness of pedagogical practices</b></p> <p><input type="checkbox"/> Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</p> <p><input type="checkbox"/> Theory of change.</p> <p><input type="checkbox"/> Strength and nature of the body of evidence for effective pedagogical practices.</p> <p><input type="checkbox"/> Pedagogic theory and pedagogical approaches.</p> <p><input type="checkbox"/> Teachers' attitudes and beliefs and Pedagogic strategies</p> <p><b>UNIT-4:Professional development: alignment</b></p>	
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			<p>with classroom practices and follow up support</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Peer support</li> <li><input type="checkbox"/> Support from the head teacher and the community.</li> <li><input type="checkbox"/> Curriculum and assessment</li> <li><input type="checkbox"/> Barriers to learning: limited resources and large class sizes</li> </ul> <p><b>UNIT-5: Research gaps and future directions</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Research design</li> <li><input type="checkbox"/> Contexts</li> <li><input type="checkbox"/> Pedagogy</li> <li><input type="checkbox"/> Teacher education</li> <li><input type="checkbox"/> Curriculum and assessment</li> <li><input type="checkbox"/> Dissemination and research impact</li> </ul> <p><b>AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA</b> <b>Syllabus</b></p> <p><b>UNIT-1:</b> Definitions of Eight parts of yog ( Ashtanga ).</p> <p><b>UNIT-2:</b>Yam and Niyam: Do`s and Don`t`s in life.</p> <p><b>UNIT-3:</b> Ahinsa, satya, astheya, bramhacharya and aparigraha</p> <p>ii) Shaucha, santosh, tapa, swadhyay, ishwar pranidhan.</p> <p><b>UNIT-4:</b> Asan and Pranayam</p> <p>I) Various yog poses and their benefits for mind &amp; body</p> <p><b>UNIT-5:</b>Regularization of breathing techniques and its effects-Types of pranayam.</p> <p><b>AUDIT 1 and 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS</b> <b>Syllabus</b></p> <p><b>UNIT-1:</b> Neetisatakam - Holistic development of personality</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Verses- 19,20,21,22 (wisdom)</li> <li><input type="checkbox"/> Verses- 29, 31, 32 (pride &amp; heroism)</li> </ul>	
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	<p><b>MTCS107</b></p>		<p><b>Advanced Data Structures Lab (MTCS107)</b></p> <p><b>1- C programs to implement the following using an array.</b></p> <p style="padding-left: 40px;">a) Stack ADT b) Queue ADT</p> <p><b>2- Write C programs to implement the following using a singly linked list.</b></p> <p style="padding-left: 40px;">a) Stack ADT b) Queue ADT</p> <p><b>3- Write C programs to implement the deque (double ended queue) ADT using a doubly linked list and an array.</b></p> <p><b>4-Write a C program to perform the following operations:</b></p> <p style="padding-left: 40px;">a) Insert an element into a binary search tree.</p>	<p>NEW Course</p>

			<p>b) Delete an element from a binary search tree.</p> <p>c) Search for a key element in a binary search tree.</p> <p>5-.Write C programs that use non-recursive functions to traverse the given binary tree in</p> <p>a) Preorder b) inorder and c) postorder.</p> <p>6-.Write C programs for the implementation of bfs and dfs for a given graph.</p> <p>7- Write C programs for implementing the following sorting methods:</p> <p>a) Merge sort b) Heap sort</p> <p>8-.Write a C program to perform the following operations</p> <p>a) Insertion into a B-tree b) Deletion from a B-tree</p> <p>9-.Write a C program to perform the following operations</p> <p>a) Insertion into an AVL-tree b) Deletion from an AVL-tree</p> <p>10-Write a C program to implement Kruskal's algorithm to generate a minimum cost spanning tree.</p> <p>11-Write a C program to implement Prim's algorithm to generate a minimum cost spanning tree.</p>	
	<p><b>MTCS108</b></p>		<p><b>Distributed Systems Lab (MTCS108)</b></p> <ul style="list-style-type: none"> <li>• Accessing the Database: The first laboratory exercise is to connect to a database, populate it with data, and run very simple SQL queries. (Data Definition, Table Creation, Constraints, Insert, Select Commands, Update &amp; Delete Commands.)</li> <li>• Basic SQL: This lab covers simple SQL queries. (Inbuilt functions in RDBMS.)</li> <li>• Intermediate SQL: This lab covers more complex SQL queries. (Nested Queries &amp; Join Queries, Control structures)</li> </ul>	<p>NEW Course</p>

			<ul style="list-style-type: none"> <li>• <b>Advanced SQL:</b> This lab covers even more complex SQL queries. (Procedures and Functions, .PL/SQL, Cursors and Triggers)</li> <li>• <b>Database Access from a Programming Language:</b> This lab introduces you to database access from a programming language such as Java or C#. Although phrased using Java/JDBC, the exercise can be done using other languages, ODBC or ADO.NET APIs.</li> <li>• <b>Building Web Applications:</b> This lab introduces you to construction of Web applications. Although phrased using the Java Servlet API, the exercise can be done using other languages such as C# or PHP.</li> <li>• <b>Project:</b> Each student is assigned with a problem. The student is to develop a logical and physical database design for the problem and develop Forms, Menu design and Reports.</li> <li>• <b>The logical design performs the following tasks:</b> <ul style="list-style-type: none"> <li>• Map the ER/EER diagrams to a relational schema. Be sure to underline all primary keys, include all necessary foreign keys and indicate referential integrity constraints.</li> <li>• Identify the functional dependencies in each relation</li> <li>• Normalize to the highest normal form possible B. Perform physical design based above logical design using Oracle/MSSQL on Windows platform and MySQL/Postgre SQL on Linux platform.</li> </ul> </li> </ul>	
<p><b>MTCS201</b></p>	<p><b>DISTRIBUTED ALGORITHMS</b></p> <p>UNIT I: Course overview. Synchronous networks. Leader election in synchronous ring networks. Leader election in rings. Basic computational tasks in general synchronous networks: leader election. Breadth-first search. Broadcast and converge cast. Shortest paths. Spanning trees. Minimum spanning trees. Fault-tolerant consensus. Link failures: the two generals' problem. Process failures (stopping, Byzantine). Algorithms for agreement with stopping and Byzantine failures. Exponential information</p>	<p><b>INFORMATION SECURITY SYSTEMS</b></p> <p><b>Unit I:</b> Multi level model of security, Cryptography, Secret Key Cryptography, Modes of Operation, Hashes and Message Digest, Public Key Algorithm, Security Handshake Pitfall, Strong Password Protocol; Case study of real time communication security;</p> <p><b>Unit II:</b> Introduction to the Concepts of Security, Security Approaches, Principles of security, Types of attacks; Cryptographic Techniques: Plain text and Cipher text, Substitution Techniques, Transposition Techniques Encryption and Decryption, Symmetric and Asymmetric Key Cryptography. Computer-based symmetric Key Cryptographic;</p> <p><b>Unit III:</b> Algorithms: Algorithm Types and Modes, An Overview of Symmetric Key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES); Computer-based Asymmetric Key Cryptographic Algorithms; Cryptography, An Overview of</p>		

	<p>gathering. Number-of-processor bounds for Byzantine agreement. Weak Byzantine agreement. Time bounds for consensus problems. <math>k</math>-set-agreement. Approximate agreement. Distributed commit.</p> <p>UNIT II: Asynchronous distributed computing. Formal modeling of asynchronous systems using interacting state machines (I/O automata). Proving correctness of distributed algorithms. Non-fault-tolerant algorithms for asynchronous networks. Leader election, breadth-first search, shortest paths, broadcast and converge cast. Spanning trees. Gallager <i>et al.</i> minimum spanning trees.</p> <p>UNIT III: Synchronizers. Synchronizer applications. Synchronous vs. asynchronous distributed systems. Time, clocks, and the ordering of events. State-machine simulation. Vector timestamps. Stable property detection. Distributed termination. Global snapshots. Deadlock detection. Asynchronous shared-memory systems. The mutual exclusion problem. Mutual exclusion algorithms. More mutual exclusion algorithms. Bounds on shared memory for mutual exclusion. Resource allocation. The Dining Philosophers problem.</p> <p>UNIT IV: Shared-memory multiprocessors. Contention, caching, locality. Practical mutual exclusion algorithms. Reading/writing locks. Impossibility of consensus in asynchronous, fault-prone, shared-memory systems. Atomic objects. Atomic snapshot algorithms. Atomic</p>	<p>Asymmetric Key Cryptography, The RSA algorithm, Symmetric and Asymmetric Key Cryptography Together, Digital Signatures, Knapsack Algorithm;</p> <p><b>Unit IV:</b> Public Key Infrastructure (PKI) Digital Certificates, Private Key Management, The PKI Model, Public Key Cryptography Standards (PKCS); Internet Security Protocols Secure Socket Layer (SSL), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, 3-D Secure Protocol, Electronic Money, Email Security;</p> <p><b>Unit V:</b> User Authentication Mechanisms: Authentication Basics, Passwords, Authentication Tokens, Certificate-based Authentication; Practical Implementations of Cryptography/Security: Cryptographic Solutions Using Java, Cryptographic Solutions Using Microsoft, Cryptographic Toolkits, Security and Operating Systems; Network Security: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN); Case Studies on Cryptography and Security:</p>	
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		<p>read/write register algorithms.</p> <p>UNIT V:List algorithms: locking algorithms, optimistic algorithms, lock-free algorithms, lazy algorithms. Transactional memory: obstruction-free and lock-based implementations. Wait-free computability.The wait-free consensus hierarchy.Wait-free vs. <math>f</math>-fault-tolerant atomic objects.Boosting fault-tolerance.Asynchronous network model vs. asynchronous shared-memory model. Impossibility of consensus in asynchronous networks. Failure detectors and consensus.Paxos consensus algorithm. Self-stabilizing algorithms.</p>		
	<p><b>MTSCS202</b></p>	<p><b>CLOUD COMPUTING</b></p> <p><b>UNIT – I:</b> Evolution of computing paradigms, Introduction to virtualization and virtual machine, Virtualization in fabric/cluster/grid context, Virtual network, Information model &amp; data model for virtual machine, Software as a Service (SaaS), SOA, On Demand Computing.</p> <p><b>UNIT – II:</b>Cloud Computing: History; An introduction to characteristics, service models, deployment models, benefits, and challenges; Cloud software architecture issues, Cloud Computing with Titans: Google App Engine, Microsoft Windows Azure, Comparison of Google App Engine and Windows Azure; Cloud Infrastructure Models &amp; Cloud Scale.</p> <p><b>UNIT – III:</b><u>Migrating to the Cloud, Software Licenses, Cloud Cost Model, Service Levels for Cloud Applications;</u></p>	<p><b>SOFT COMPUTING</b></p> <p><b>Unit 1</b> <b>INTRODUCTION TO SOFT Computing</b></p> <p><b>Unit 2</b> <b>FUZZY LOGIC:</b> Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.</p> <p><b>Unit 3</b> <b>NEURAL NETWORKS:</b> Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks : Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks</p> <p><b>Unit 4</b> <b>GENETIC ALGORITHMS:</b> Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning: Machine Learning Approach to Knowledge Acquisition.</p> <p><b>Unit 5</b> <b>Matlab/Python Lib:</b> Introduction to Matlab/Python, Arrays and array operations, Functions and Files, Study of neural network toolbox and fuzzy logic toolbox, Simple implementation of Artificial Neural Network and Fuzzy Logic</p> <p><b>Unit 6</b> Recent Trends in deep learning, various</p>	<p><b>No Change</b></p>

	<p><u>Security: Disaster Recovery, Web Application Design, Machine Image Design, Privacy Design, Database Management, Data Security, Network Security, Host Security.</u></p> <p><b>UNIT – IV:</b>Service Models: <u>Storage-as-a-Service, Database-as-a-Service, Information-as-a-Service, Process-as-a-Service, Application-as-a-Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service, Infrastructure-as-a-Service.</u></p> <p><b>UNIT – V:</b><u>CloudDisaster Management: Disaster Recovery, Planning;</u> Types of Clouds, Cloud Centres, Comparing approaches: Xen, OpenNebula, Eucalyptus, Amazon, Nimbus.</p>	<p>classifiers, neural networks and genetic algorithm.</p>	
<p><b>MTCSCS203</b></p>	<p><b>Real Time Systems</b></p> <p><b>Unit I:</b> Introduction to Real-time computing: Characterizing Real-time System and Tasks; Real-Time Applications, Hard versus Soft Real-Time Systems; Parameters of Real-Time Workload – Temporal Parameters and Functional Parameters.</p> <p><b>Unit II:</b>Performance measures of real time systems, estimation of program run time, Real-time system design: Hardware requirement, system development cycle, data transfer techniques, synchronous &amp; asynchronous data communication, standard interfaces;</p> <p><b>Unit III:</b>Task assignment and scheduling: Priority scheduling, scheduling with</p>	<p><b>DATA PREPARATION AND ANALYSIS (MTCSCS203 A)</b></p> <p><b>Unit1:</b> <b>Data Gathering and Preparation:</b> Data formats, parsing and transformation, Scalability and real-time issues</p> <p><b>Unit2:</b> <b>Data Cleaning:</b> Consistency checking, Heterogeneous and missing data, Data Transformation and segmentation</p> <p><b>Unit3:</b> <b>Exploratory Analysis:</b> Descriptive and comparative statistics, Clustering and association, Hypothesis generation</p> <p><b>Unit4:</b> <b>Visualization:</b> Designing visualizations, Time series, Geolocated data, Correlations and connections, Hierarchies and networks, interactivity</p>	<p><b>New Course</b></p>

		<p>fixed priority, dynamic priority scheduling;</p> <p><b>Unit IV:</b>Real-time programming languages &amp; tools: desired language characteristics, data typing, control structure, run time error handling, overloading and generics, run time support; Real-time databases: Real-Time vs. General-Purpose databases, Transaction Priorities, Concurrency Control Issues.</p> <p><b>Unit V:</b>Real time communication algorithms, Fault tolerance techniques: Causes of failure, fault types, fault detection, redundancy, integrated failure handling; Reliability Evaluation techniques: Parameter values, reliability model for hardware redundancy, software error model.</p>		
	<p><b>MTCSCS203B</b></p>		<p><b>SECURE SOFTWARE DESIGN &amp; ENTERPRISE COMPUTING (MTCSCS203B)</b></p> <p><b>Unit 1:</b> <b>Secure Software Design</b> Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Perform security testing and quality assurance.</p> <p><b>Unit 2:</b> <b>Enterprise Application Development</b> Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, Design and develop a multi-tier solution to a problem using technologies used in enterprisesystem, Present software solution.</p> <p><b>Unit 3:</b></p>	<p><b>New Course</b></p>

			<p><b>Enterprise Systems Administration</b> Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services(DNS/DHCP/Terminal Services/Clustering/Web/Email).</p> <p><b>Unit 4:</b> Obtain the ability to manage and troubleshoot a network running multiple services, Understand the requirements of an enterprise network and how to go about managing them.</p> <p><b>Unit 5:</b> Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws.</p> <p><b>Unit 6:</b> Case study of DNS server, DHCP configuration and SQL injection attack.</p>	
	<p><b>MTSCSCS 203C</b></p>		<p><b>COMPUTER VISION</b></p> <p><b>Unit 1:</b> Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis</p> <p><b>Unit 2:</b> Edge detection, Edge detection performance, Hough transform, corner detection</p> <p><b>Unit 3:</b> Segmentation, Morphological filtering, Fourier transform</p> <p><b>Unit 4:</b> Feature extraction, shape, histogram, color, spectral, texture, using CVIPtools, Feature analysis, feature vectors, distance /similarity measures, data pre-Processing</p> <p><b>Unit 5:</b> Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians Classification: Discriminant Function, Supervised, Un-supervised, Semi- supervised Classifiers: Bayes, KNN, ANN models: Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods.</p> <p><b>Unit 6:</b> Recent trends in Activity Recognition, computational photography, Biometrics.</p>	<p><b>New Course</b></p>

	<p><b>MTSCS</b> <b>204A</b></p>	<p><b>Artificial Intelligence</b> <b>Unit: I AI Techniques</b></p> <p>Meaning and definition of artificial intelligence, Application of AI, Turing Test Machine, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search Techniques, other Search Techniques like hill Climbing Simple and Steepest Ascent Hill Climbing, Greedy or Best first Search. A* algorithm, AO* algorithms Etc.</p> <p><b>Unit :II Knowledge Representation</b></p> <p>Knowledge Representation, Declarative and Procedural Knowledge, Symbolic Logic: knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, reasoning, monotonic and nonmonotonic reasoning. Forward and backward reasoning.</p> <p><b>Unit :III Learning and Expert System</b></p> <p>Introduction to learning, Various techniques used in learning (Supervised, Unsupervised, Reinforcement Learning), introduction to neural networks, applications of neural networks, Expert System, Building Block Diagram of Expert System , some example of expert systems. Applications of Expert System.</p> <p><b>Unit :IV Game Playing Techniques and NLP</b></p> <p>Game playing techniques like minimax Search procedure, alpha-beta cut-offs etc..Introduction to understanding and natural languages processing.Steps in NLP Process.</p>	<p><b>ADVANCED COMMUNICATION NETWORK</b></p> <p>UNIT 1: Introduction: Introduction to Network models-ISO-OSI, SNA, Apple talk and TCP/IP models. Review of Physical layer and Data link layers, Review of LAN (IEEE 802.3, 802.5, 802.11b/a/g, FDDI) and WAN (Frame Relay, ATM, ISDN) standards.</p> <p>UNIT 2: Network layer: ARP, RARP, Internet architecture and addressing, internetworking, IPv4, overview of IPv6, ICMP, Routing Protocols- RIP, OSPF, BGP, IP over ATM.</p> <p>UNIT 3: Transport layer: Design issues, Connection management, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Finite state machine model.</p> <p>UNIT 4 : Application layer: WWW, DNS, e-mail, SNMP, RMON</p> <p>UNIT 5: Network Security: Cryptography, Firewalls, Secure Socket Layer (SSL) and Virtual Private Networks (VPN).</p> <p>Case study Study of various network simulators, Network performance analysis using NS2</p>	<p><b>No Change</b></p>
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<p><b>MTCS204B</b></p>		<p><b>ADVANCED DATABASE MANAGEMENT SYSTEM</b></p> <p><b>Unit I</b></p> <p><b>Basic concepts:</b> Database &amp; database users, characteristics of the database, database systems, concepts and architecture, data models, schemas &amp; instances, DBMS architecture &amp; data independence, database languages &amp; interfaces, data modeling using the entity relationship approach. Overview of hierarchical, Network &amp; Relational Data Base Management Systems.</p> <p><b>Unit II</b></p> <p><b>Relational model, languages &amp; systems:</b> Relational data model &amp; relational algebra: relational model concepts, relational model constraints, relational algebra, SQL- a relational database language: data definition in SQL, view and queries in SQL, specifying constraints and indexes in sql, a relational database management systems.</p> <p><b>Unit III</b></p> <p>Oracle Architecture, Logical Data Structures Physical Data Structure, Instances, Table Spaces, Types of Tablespace, Internal Memory Structure, Background Processes, Data Types, Roles &amp; Privileges, Stored Procedures, User Defined Functions,</p>	<p><b>GPU COMPUTING</b></p> <p><b>Unit 1:</b></p> <p><b>Introduction:</b> History, Graphics Processors, Graphics Processing Units, GPGPUs. Clock speeds, CPU / GPU comparisons, Heterogeneity, Accelerators, Parallel programming, CUDA OpenCL / OpenACC, Hello World Computation Kernels, Launch parameters, Thread hierarchy, Warps / Wavefronts, Thread blocks / Workgroups, Streaming multiprocessors, 1D / 2D / 3D thread mapping, Device properties, Simple Programs</p> <p><b>Unit 2:</b></p> <p><b>Memory:</b> Memory hierarchy, DRAM / global, local / shared, private / local, textures, Constant Memory, Pointers, Parameter Passing, Arrays and dynamic Memory, Multi-dimensional Arrays, Memory Allocation, Memory copying across devices, Programs with matrices, Performance evaluation with different memories</p> <p><b>Unit 3:</b></p> <p><b>Synchronization:</b> Memory Consistency, Barriers (local versus global), Atomics, Memory fence. Prefix sum, Reduction. Programs for concurrent Data Structures such as Worklists, Linked-lists. Synchronization across CPU and GPU</p> <p><b>Functions:</b> Device functions, Host functions, Kernels functions, Using libraries (such as Thrust), and developing libraries.</p> <p><b>Unit 4:</b></p> <p><b>Support:</b> Debugging GPU Programs. Profiling, Profile tools, Performance aspects</p> <p><b>Streams:</b> Asynchronous processing, tasks, Task-dependence, Overlapped data transfers, Default Stream, Synchronization with streams. Events, Event-based-Synchronization - Overlapping data transfer and kernel execution, pitfalls.</p> <p><b>Unit 5:</b></p> <p><b>Case Studies:</b> Image Processing, Graph algorithms, Simulations, Deep Learning</p> <p><b>Unit 6:</b></p> <p><b>Advanced topics:</b> Dynamic</p>	<p><b>New Course</b></p>

		<p>Cursors, Error Handling, Triggers.</p> <p><b>Unit IV</b></p> <p><b>Relational data base design:</b></p> <p>Function dependencies &amp; normalization for relational dataases: functional dependencies, normal forms based on primary keys, (1NF, 2NF, 3NF &amp; BCNF), lossless join and dependency preserving decomposition.</p> <p><b>Unit V</b></p> <p><b>Concurrency control &amp; recovery techniques:</b> Concurrency control techniques, locking techniques, time stamp ordering, granularity of data items, recovery techniques: recovery concepts, database backup and recovery from catastrophic failures. Concepts of object oriented database management systems, Distributed Data Base Management Systems.</p>	<p>parallelism, Unified Virtual Memory, Multi-GPU processing, Peer access, Heterogeneous processing</p>	
<p>MTSCS204C</p>	<p><b>Multimedia Computing</b></p> <p><b>UNIT I.</b> Introduction, Uses of multimedia information, Historical background, Survey of hardware, Graphic boards and accelerators, Soundboards, Video capture boards, Magnetic and optical storage devices, DVD. Blu-Ray, HD-DV (macrovision, VCDs, SVCDs, VOBs, ripping techniques), Survey of software ,Graphic standards, Music computer formats, Video computer standards, Gaming, Authoring Systems</p> <p><b>UNIT 2.</b> Multimedia Platforms (QuickTime, MCI, Video for Windows, Active movie, Direct-X), Multimedia</p>	<p><b>DIGITAL FORENSICS</b></p> <p><b>Unit 1:</b>  <b>Digital Forensics Science:</b> Forensics science, computer forensics, and digital forensics.  <b>Computer Crime:</b> Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, holistic approach to cyber-forensics</p> <p><b>Unit 2:</b>  <b>Cyber Crime Scene Analysis:</b> Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.</p> <p><b>Unit 3:</b>  <b>Evidence Management &amp; Presentation:</b> Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case</p>	<p><b>DIGITAL FORENSICS</b></p> <p><b>Unit 1:</b>  <b>Digital Forensics Science:</b> Forensics science, computer forensics, and digital forensics.  <b>Computer Crime:</b> Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, holistic approach to cyber-forensics</p> <p><b>Unit 2:</b>  <b>Cyber Crime Scene Analysis:</b> Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.</p> <p><b>Unit 3:</b>  <b>Evidence Management &amp; Presentation:</b> Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case</p>	<p><b>New Course</b></p>

		<p>Programming (Java, Active-X, MCI, Windows Foundation Classes), The creative process: hardware, software, development team and methodology, Media Types – Media Objects (Implementations and methods)</p> <p>A. Text</p> <ul style="list-style-type: none"> <li>▪ 1. Encoding – ASCII, Unicode</li> <li>▪ 2. Formatting – in-line (.dot notation, HTML, SGML)</li> <li>▪ 3. Page description languages – Adobe pdf</li> </ul> <p>B. Image</p> <ul style="list-style-type: none"> <li>▪ 1. Bit mapped vs. vector based representations</li> <li>▪ 2. Color Space Representations – RGB, CMY, HSU</li> <li>▪ 3. CLUTs</li> <li>▪ 4. Color depth and resolution</li> <li>▪ 5. Image File Formats BMP, GIF, JPEG, PNG, TIFF</li> <li>▪ 6. Editing tools and effects (pixel methods, masking, morphing, etc.)</li> </ul> <p>C. Graphics – Internal and external modeling techniques, mapping, lighting, viewing and rendering</p> <p>D. Audio</p> <ul style="list-style-type: none"> <li>▪ 1. The physics</li> </ul>	<p>would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.</p> <p><b>Unit 4:</b>  <b>Computer Forensics:</b> Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case, <b>Network Forensics:</b> open-source security tools for network forensic analysis, requirements for preservation of network data.</p> <p><b>Unit 5:</b>  <b>Mobile Forensics:</b> mobile forensics techniques, mobile forensics tools <b>Legal Aspects of Digital Forensics:</b> IT Act 2000, amendment of IT Act 2008.</p> <p><b>Unit 6:</b>  Recent trends in mobile forensic technique and methods to search and seizure electronic evidence</p>	
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		<p>of sound</p> <ul style="list-style-type: none"> <li>▪ 2. Sound fields, the environment and acoustics – multi-channel/surround sound</li> <li>▪ 3. Quantization and sampling rate</li> <li>▪ 4. The Nyquist theorem</li> <li>▪ 5. Audio formats</li> <li>▪ 6. Digital encoding (PCM, ADPCM, A-law/m-law)</li> <li>▪ 7. Digital Audio Effects &amp; Filtering</li> </ul> <p>E. Music – MIDI, SMDL</p> <p>F. Video – analog, digital and broadcast</p> <ul style="list-style-type: none"> <li>▪ 1. Luminance and Chrominance representations</li> <li>▪ 2. Fields, frames and interlacing</li> <li>▪ 3. Color encoding (Camera, transmission and receiver: RGB, YUV, YIQ, YCbCr)</li> <li>▪ 4. RF, Composite, S-Video and Component video</li> <li>▪ 5. NTSC and HDTV</li> <li>▪ 6. Editing techniques (traditional vs. NLE systems)</li> <li>▪ 7. Transitions, keying, and scaling</li> <li>▪ 8. Storage and distribution</li> </ul> <p>G. Animation – Modeling &amp; Rendering</p>		
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		<p>H. Video Conferencing</p> <ul style="list-style-type: none"> <li>o I. Other Media types (speech, digital ink, virtual reality)</li> </ul> <p><b>UNIT 3.</b> Multimedia and the Internet, WWW, Web browsers, HTML, VRML, CGI, Active-X and Java, System survey (multimedia examples taken from science, entertainment, gaming, etc.)</p> <p><b>UNIT 4:</b> Design issues, System design issues, Implementation issues, Usability evaluation, Compression Techniques, Requirements, Basic information theory (1. Entropy vs. energy, Shannon's equation, Entropy vs. source encoding)</p> <p><b>UNIT 5:</b> JPEG and the DCT, MPEG file structure and I-, P-, B-frames, Practical compression techniques, mp3, DivX, MPEG-4</p>		
<p><b>MTCSCS 205</b></p>		<p><b>Cloud Computing</b></p> <p><b><u>List of Experiments</u></b></p> <ol style="list-style-type: none"> <li>1. Working of Goggle Drive to make spreadsheet and notes.</li> <li>2. Installation and Configuration of Justcloud.</li> <li>3. Working in Cloud9 to demonstrate different language.</li> <li>4. Working in Codenvy to demonstrate Provisioning and Scaling of a website</li> <li>5. Installation and Configuration of Hadoop/Eucalyptus.</li> <li>6. Working and installation of Google App Engine.</li> <li>7. Working and installation of Microsoft</li> </ol>	<p><b>AUDIT 1 and 2 : ENGLISH FOR RESEARCH PAPER WRITING</b></p> <p><b>UNIT-1:</b> Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.</p> <p><b>UNIT-2:</b> Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction</p> <p>Review of the Literature, Methods, Results, Discussion, Conclusions, the Final Check.</p> <p><b>UNIT-3:</b> key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when Writing a</p>	<p><b>New Course</b></p>

		<p>Azure.</p> <p>8.Working with Mangrasoft Aneka Software.</p>	<p>Review of the Literature.</p> <p><b>UNIT-4:</b> skills are needed when writing the Methods, skills needed when writing the Results, Skills are needed when writing the Discussion; skills are needed when writing the Conclusions.</p> <p><b>UNIT-5:</b> useful phrases, how to ensure paper is as good as it could possibly be the first- time Submission.</p> <p><b>AUDIT 1 and 2: DISASTER MANAGEMENT</b>  <b>UNIT-1:Introduction</b></p> <p>Disaster: Definition, Factors and Significance; Difference between Hazard And Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.</p> <p><b>UNIT-2:Repercussions Of Disasters And Hazards:</b> Economic Damage, Loss Of Human And Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks Of Disease And Epidemics, War and Conflicts.</p> <p><b>UNIT-3:Disaster Prone Areas In India</b> Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics.</p> <p><b>UNIT-4:Disaster Preparedness and Management</b></p> <p>Preparedness: Monitoring Of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological And Other Agencies, Media Reports: Governmental and Community Preparedness.</p>	
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**UNIT-5:Risk Assessment**

Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation In Risk Assessment and Warning, People's Participation In Risk Assessment. Strategies For Survival.

**Disaster Mitigation:** Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends InMitigation. Structural Mitigation and Non-Structural Mitigation, Programs OfDisaster Mitigation In India.

**AUDIT 1 and 2 : SANSKRIT FOR TECHNICAL KNOWLEDGE****Syllabus**

**UNIT-1:** Alphabets in Sanskrit.

**UNIT-2:**Past/Present/Future Tense.

**UNIT-3:** Simple Sentences Order.

**UNIT-4:**Introduction of roots.

**UNIT-5:**Technical information about Sanskrit Literature, Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

**AUDIT 1 and 2 : VALUE EDUCATION**

**UNIT-1:** Values and self-development –Social values and individual attitudes.

Work ethics, Indian vision of humanism.

Moral and non- moral valuation. Standards and principles.

Value judgments

**UNIT-2:** Importance of cultivation of values.

Sense of duty. Devotion, Self-reliance. Confidence, Concentration.

Truthfulness, Cleanliness.

Honesty, Humanity. Power of faith, National Unity.

Patriotism. Love for nature ,Discipline

**UNIT-3:** Personality and Behavior Development - Soul and Scientific attitude.

			<ul style="list-style-type: none"> <li><input type="checkbox"/> Punctuality, Love and Kindness.</li> <li><input type="checkbox"/> Avoid fault Thinking.</li> <li><input type="checkbox"/> Free from anger, Dignity of labor.</li> <li><input type="checkbox"/> Universal brotherhood and religious tolerance.</li> </ul> <p><b>UNIT-4:</b> Positive Thinking. Integrity and discipline. Positive Thinking. Integrity and discipline.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> True friendship.</li> <li><input type="checkbox"/> Happiness Vs suffering, love for truth.</li> <li><input type="checkbox"/> Aware of self-destructive habits.</li> <li><input type="checkbox"/> Association and Cooperation.</li> <li><input type="checkbox"/> Doing best for saving nature</li> </ul> <p><b>UNIT-5:</b> Character and Competence –Holy books vs. Blind faith.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Self-management and Good health.</li> <li><input type="checkbox"/> Science of reincarnation.</li> <li><input type="checkbox"/> Equality, Nonviolence ,Humility, Role of Women.</li> <li><input type="checkbox"/> All religions and same message.</li> <li><input type="checkbox"/> Mind your Mind, Self-control.</li> <li><input type="checkbox"/> Honesty, Studying effectively.</li> </ul> <p><b>AUDIT 1 and 2 : CONSTITUTION OF INDIA</b></p> <p><b>UNIT-1:History of Making of the Indian Constitution:</b></p> <p>History Drafting Committee, (Composition &amp; Working).</p> <p><b>Philosophy of the Indian Constitution:</b> Preamble Salient Features.</p> <p><b>UNIT-2:Contours of Constitutional Rights &amp; Duties:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fundamental Rights</li> <li><input type="checkbox"/> Right to Equality</li> <li><input type="checkbox"/> Right to Freedom</li> <li><input type="checkbox"/> Right against Exploitation</li> </ul>	
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			<ul style="list-style-type: none"> <li><input type="checkbox"/> Right to Freedom of Religion</li> <li><input type="checkbox"/> Cultural and Educational Rights</li> <li><input type="checkbox"/> Right to Constitutional Remedies</li> <li><input type="checkbox"/> Directive Principles of State Policy</li> <li><input type="checkbox"/> Fundamental Duties.</li> </ul> <p><b>UNIT-3:Organs of Governance:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Parliament</li> <li><input type="checkbox"/> Composition</li> <li><input type="checkbox"/> Qualifications and Disqualifications</li> <li><input type="checkbox"/> Powers and Functions</li> <li><input type="checkbox"/> Executive</li> <li><input type="checkbox"/> President</li> <li><input type="checkbox"/> Governor</li> <li><input type="checkbox"/> Council of Ministers</li> <li><input type="checkbox"/> Judiciary, Appointment and Transfer of Judges, Qualifications</li> <li><input type="checkbox"/> Powers and Functions</li> </ul> <p><b>UNIT-3:Local Administration:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> District's Administration head: Role and Importance,</li> <li><input type="checkbox"/> Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.</li> <li><input type="checkbox"/> Pachayati raj: Introduction, PRI: Zila Pachayat.</li> <li><input type="checkbox"/> Elected officials and their roles, CEO Zila Pachayat: Position and role.</li> <li><input type="checkbox"/> Block level: Organizational Hierarchy (Different departments),</li> <li><input type="checkbox"/> Village level: Role of Elected and Appointed officials,</li> <li><input type="checkbox"/> Importance of grass root democracy</li> </ul> <p><b>UNIT-5:Election Commission:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Election Commission: Role and Functioning.</li> <li><input type="checkbox"/> Chief Election Commissioner and Election Commissioners.</li> </ul>	
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		<ul style="list-style-type: none"> <li><input type="checkbox"/> State Election Commission: Role and Functioning.</li> <li><input type="checkbox"/> Institute and Bodies for the welfare of SC/ST/OBC and women.</li> </ul> <p><b>AUDIT 1 and 2 : PEDAGOGY STUDIES</b></p> <p><b>UNIT-1:Introduction and Methodology:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Aims and rationale, Policy background, Conceptual framework and terminology</li> <li><input type="checkbox"/> Theories of learning, Curriculum, Teacher education.</li> <li><input type="checkbox"/> Conceptual framework, Research questions.</li> <li><input type="checkbox"/> Overview of methodology and Searching.</li> </ul> <p><b>UNIT-2:Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Curriculum, Teacher education</li> </ul> <p><b>UNIT-3: Evidence on the effectiveness of pedagogical practices</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</li> <li><input type="checkbox"/> Theory of change.</li> <li><input type="checkbox"/> Strength and nature of the body of evidence for effective pedagogical practices.</li> <li><input type="checkbox"/> Pedagogic theory and pedagogical approaches.</li> <li><input type="checkbox"/> Teachers' attitudes and beliefs and Pedagogic strategies</li> </ul> <p><b>UNIT-4:Professional development: alignment with classroom practices and follow up support</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Peer support</li> <li><input type="checkbox"/> Support from the head teacher and the community.</li> </ul>	
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			<ul style="list-style-type: none"> <li><input type="checkbox"/> Curriculum and assessment</li> <li><input type="checkbox"/> Barriers to learning: limited resources and large class sizes</li> </ul> <p><b>UNIT-5: Research gaps and future directions</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Research design</li> <li><input type="checkbox"/> Contexts</li> <li><input type="checkbox"/> Pedagogy</li> <li><input type="checkbox"/> Teacher education</li> <li><input type="checkbox"/> Curriculum and assessment</li> <li><input type="checkbox"/> Dissemination and research impact</li> </ul> <p><b>AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA</b></p> <p><b>UNIT-1:</b> Definitions of Eight parts of yog (Ashtanga ).</p> <p><b>UNIT-2:</b>Yam and Niyam: Do`s and Don`t`s in life.</p> <p><b>UNIT-3:</b> Ahinsa, satya, astheya, bramhacharya and aparigraha</p> <p>ii) Shaucha, santosh, tapa, swadhyay, ishwar pranidhan.</p> <p><b>UNIT-4:</b> Asan and Pranayam</p> <p>I) Various yog poses and their benefits for mind &amp; body</p> <p><b>UNIT-5:</b>Regularization of breathing techniques and its effects-Types of pranayam.</p> <p style="text-align: center;"><b>AUDIT 1 and 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS</b></p> <p><b>UNIT-1:</b> Neetisatakam - Holistic development of personality</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Verses- 19,20,21,22 (wisdom)</li> <li><input type="checkbox"/> Verses- 29, 31, 32 (pride &amp; heroism)</li> <li><input type="checkbox"/> Verses- 26,28,63,65 (virtue)</li> </ul>	
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			<ul style="list-style-type: none"> <li><input type="checkbox"/> Verses- 52, 53, 59 (dont's)</li> <li><input type="checkbox"/> Verses- 71,73,75,78 (do's)</li> </ul> <p><b>UNIT-2:</b> Approach to day to day work and duties.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Shrimad BhagwadGeeta: Chapter 2-Verses 41, 47, 48,</li> <li><input type="checkbox"/> Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5, 13, 17, 23, 35,</li> <li><input type="checkbox"/> Chapter 18-Verses 45, 46, 48.</li> </ul> <p><b>UNIT-3:</b> Statements of basic knowledge.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Shrimad BhagwadGeeta: Chapter2-Verses 56, 62, 68</li> <li><input type="checkbox"/> Chapter 12 -Verses 13, 14, 15, 16, 17, 18</li> </ul> <p><b>UNIT-4:</b> Personality of Role model. Shrimad BhagwadGeeta:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Chapter2-Verses 17,</li> <li><input type="checkbox"/> Chapter 3-Verses 36, 37, 42,</li> <li><input type="checkbox"/> Chapter 4-Verses 18, 38, 39</li> <li><input type="checkbox"/> Chapter18 – Verses 37, 38, 63</li> </ul>	
	MTCSCS206		<p><b>Information Security System LAB</b>  <b>Note: The following programs can be executed on Turbo C++ IDE (TurboC3), Borland Turbo C++</b></p> <ol style="list-style-type: none"> <li>1. Study of Network Security fundamentals - Ethical Hacking, Social Engineering practices.</li> <li>2. Study of System threat attacks - Denial of Services.</li> <li>3. Study of Sniffing and Spoofing attacks</li> <li>4. Study of Techniques uses for Web Based Password Capturing.</li> <li>5. Study of Different attacks causes by Virus and Trojans.</li> <li>6. Study of Anti-Intrusion Technique –Honey pot.</li> <li>7. Study of Symmetric Encryption Scheme – RC4.</li> <li>8. Implementation of S-DES algorithm for data encryption</li> </ol>	No Change

			<p>9. Implementation of Asymmetric Encryption Scheme –RSA.</p> <p>10. Study of IPbased Authentication.</p>	
	<b>MTCS207</b>		<p><b>Advanced Communication Network LAB</b></p> <p>1. Write two programs in C: hello_client and hello_server</p> <ul style="list-style-type: none"> <li>The server listens for, and accepts, a single TCP connection; it reads all the data it can from that connection, and prints it to the screen; then it closes the connection</li> <li>The client connects to the server, sends the string "Hello, world!", then closes the Connection</li> </ul> <p>2. Write an Echo_Client and Echo_server using TCP to estimate the round trip time from client to the server. The server should be such that it can accept multiple Connections at any given time.</p> <p>3. Repeat Exercises 1 &amp; 2 for UDP.</p> <p>4. Repeat Exercise 2 with multiplexed I/O operations</p> <p>5. Simulate Bellman-Ford Routing algorithm in NS2</p> <p>6. Write client/server applications involving unix sockets involving TCP or UDP involving iterative or concurrent server.</p> <p>7. Understand IPV4 &amp; IPV6 interoperability issues</p>	<b>No Change</b>
	<b>MTCS208</b>		<b>Mini Project and Seminar</b>	<b>New Course</b>
	<b>MTCS301/MTCS301A</b>	<p><b>E-BUSINESS SYSTEMS Unit I</b></p> <p>Overview of e-Business: Definition, Business Process, Moving from e-commerce to e-business, advantages and disadvantages; trends and forces driving e-business, comparative study of e-commerce and e-business; E-</p>	<p><b>MOBILE APPLICATIONS AND SERVICES (MTCS301A)</b></p> <p><b>Unit 1:</b> Introduction: Introduction to Mobile Computing, Introduction to Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development</p> <p><b>Android User</b></p> <p><b>Unit 2:</b> More on Uis: VUIs and Mobile Apps, Text-to-Speech Techniques, Designing the</p>	<b>New Course</b>

	<p>commerce models; E-business models; e-business communities; E-business Design steps; External and internal information systems, networks, or technical infrastructures that enable e-business.</p> <p><b>Unit II</b></p> <p><b>Customer Relation Management (CRM):</b> Introduction to CRM - definition and overview, role and importance of CRM; CRM architecture, Supporting requirements of the next-generation CRM infrastructure, Challenges in CRM implementation, Next-generation CRM trends.</p> <p><b>Unit III</b></p> <p><b>Selling-Chain Management:</b> Deriving forces for Selling-Chain management, Managing the order acquisition process, Elements of Selling-Chain infrastructure.</p> <p><b>Supply Chain Management (SCM):</b> Defining SCM, Basics of Internet-Enabled SCM, e-Supply chain fusion, Manager's roadmap for SCM.</p> <p><b>Unit IV</b></p> <p><b>E-Procurement:</b> Purchasing versus procurement, Operating resource procurement, e-Procurement chain management, Next generation integrated procurement applications, Elements of Buy-Side e-Procurement solutions, Elements of Sell-Side e-Procurement solutions.E-Logistics; Data Warehousing for e-business.</p> <p><b>Unit V</b></p> <p>Challenges of e-Business strategy</p>	<p>Right UI, Multichannel and Multimodal Uis, Storing and Retrieving Data, Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider</p> <p><b>Unit 3:</b> Communications via Network and the Web: State Machine, Correct Communications Model, Android Networking and Web, Telephony Deciding Scope of an App, Wireless Connectivity and Mobile Apps, Android Telephony</p> <p>Notifications and Alarms: Performance, Performance and Memory Management, Android Notifications and Alarms, Graphics, Performance and Multithreading, Graphics and UI Performance, Android Graphics</p> <p><b>Unit 4:</b> Putting It All Together: Packaging and Deploying, Performance Best Practices, Android Field Service App, Location Mobility and Location Based Services Android Multimedia: Mobile Agents and Peer-to-Peer Architecture, Android Multimedia</p> <p><b>Unit 5:</b> Platforms and Additional Issues: Development Process, Architecture, Design, Technology Selection, Mobile App Development Hurdles, Testing, Security and Hacking , Active Transactions, More on Security, Hacking Android</p> <p><b>Unit 6:</b> Recent trends in Communication protocols for IOT nodes, mobile computing techniques in IOT, agents based communications in IOT</p>	
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		<p>creation; e-Business blueprint creation; Online Business with technology - Internet, Intranet, Extranet, Internet Protocols; E-commerce Applications: Issues and Prospects - Buying and paying online, Electronic Payment, E-banking, E-tailing, Security in e-Business.</p>		
	<p><b>MTCS301B</b></p>		<p><b>COMPILER FOR HPC</b></p> <p><b>Unit1:</b></p> <p><b>High Performance Systems,</b> Structure of a Compiler, Programming Language Features, Languages for High Performance.</p> <p><b>Unit2:</b></p> <p><b>Data Dependence:</b> Data Dependence in Loops, Scalars. Data Dependence Analysis for Arrays.</p> <p><b>Unit3:</b></p> <p>Array Region Analysis, Pointer Analysis, I/O Dependence, Procedure Calls, Inter-procedural Analysis.</p> <p><b>Loop Restructuring:</b> Simple Transformations, Loop Fusion, Loop Fission, Loop Reversal, Loop Interchanging, Loop Skewing, Linear Loop Transformations, Strip-Mining, Loop Tiling, Other Loop Transformations, and Inter-procedural Transformations.</p> <p><b>Optimizing for Locality:</b> Single Reference to Each Array, Multiple References, General Tiling, Fission and Fusion for Locality.</p> <p><b>Unit4:</b></p> <p><b>Concurrency Analysis:</b> Concurrency from Sequential Loops, Concurrency from Parallel Loops, Nested Loops, Round off Error, Exceptions and Debuggers.</p> <p><b>Vector Analysis:</b> Vector Code, Vector Code from Sequential Loops, Vector Code from For all Loops, Nested Loops, Round off Error, Exceptions, and Debuggers, Multi-vector Computers.</p> <p><b>Unit5:</b></p> <p><b>Message-Passing Machines:</b> SIMD Machines, MIMD Machines, Data Layout, Parallel Code for Array Assignment, Remote Data Access, Automatic Data Layout, Multiple Array Assignments, Other Topics.</p> <p><b>Scalable Shared-Memory Machines:</b> Global Cache Coherence, Local Cache Coherence, Latency Tolerant Machines.</p> <p><b>Unit 6:</b></p> <p>Recent trends in compiler design for high performance computing and</p>	<p><b>New Course</b></p>

			messagepassing machines and scalable shared memory machine.	
	<b>MTSCSCS 301C</b>		<p><b>OPTIMIZATION TECHNIQUES</b></p> <p><b>Unit 1:</b> Engineering application of Optimization, Formulation of design problems as mathematical programming problems.</p> <p><b>Unit 2:</b> General Structure of Optimization Algorithms, Constraints, The Feasible Region.</p> <p><b>Unit 3:</b> Branches of Mathematical Programming: Optimization using calculus, Graphical Optimization, Linear Programming, Quadratic Programming, Integer Programming, Semi Definite Programming.</p> <p><b>Unit 4:</b> Optimization Algorithms like GeneticOptimization, Particle Swarm Optimization, Ant Colony Optimization etc.</p> <p><b>Unit 5:</b> Real life Problems and their mathematical formulation as standard programming problems.</p> <p><b>Unit 6:</b> Recent trends: Applications of ant colony optimization, genetics and linear and quadratic programming in real world applications.</p>	<b>New Course</b>
	<b>MTSCSCS302/( MTSCSCS302A )</b>	<p><b>SOFT COMPUTING</b></p> <p><b>UNIT-I</b></p> <p><b>Neural Networks:</b> History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.</p>	<p><b>Business Analytics (MTSCSCS302A)</b></p> <p><b>Unit-I:</b> Business analytics: Overview of Business analytics, Scope of Businessanalytics, Business Analytics Process, Relationship of Business Analytics, Process and organisation, competitive advantages of Business Analytics.Statistical Tools: Statistical Notation, Descriptive Statistical methods, Reviewof probability distribution and data modelling, sampling and estimationmethods overview.</p> <p><b>Unit-II:</b> Trendiness and Regression Analysis: Modelling Relationships and Trends inData, simple Linear Regression.Important Resources, Business Analytics Personnel, Data and models forBusiness analytics, problem solving, Visualizing and Exploring Data, BusinessAnalytics Technology.</p>	<b>New Course and Code Change</b>

	<p><b>UNIT-II</b></p> <p><b>Fuzzy Logic:</b></p> <p>Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations.</p> <p><b>UNIT-III</b></p> <p><b>Fuzzy Arithmetic:</b></p> <p>Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals &amp; Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,</p> <p><b>Uncertainty based Information:</b></p> <p>Information &amp; Uncertainty, Nonspecificity of Fuzzy &amp; Crisp Sets, Fuzziness of Fuzzy Sets.</p> <p><b>UNIT-IV</b></p> <p><b>Introduction of Neuro-Fuzzy Systems:</b></p> <p>Architecture of Neuro Fuzzy Networks.</p> <p><b>Application of Fuzzy Logic:</b></p> <p>Medicine, Economics etc.</p> <p><b>UNIT V</b></p> <p><b>Algorithm:</b></p> <p>An overview of Genetic Algorithm, Artificial Bee Colony Algorithm, Ant Colony Algorithm etc.Applications and implementation of these algorithms.</p>	<p><b>Unit-III:</b> Organization Structures of Business analytics, Team management,Management Issues, Designing Information Policy, Outsourcing, EnsuringData Quality, Measuring contribution of Business analytics, ManagingChanges.</p> <p>Descriptive Analytics, predictive analytics, predicative Modelling, Predictiveanalytics analysis, Data Mining, Data Mining Methodologies, Prescriptiveanalytics and its step in the business analytics Process, Prescriptive Modelling,nonlinear Optimization.</p> <p><b>Unit-IV:</b> Forecasting Techniques: Qualitative and Judgmental Forecasting, StatisticalForecasting Models, Forecasting Models for Stationary Time Series,Forecasting Models for Time Series with a Linear Trend, Forecasting TimeSeries with Seasonality, Regression Forecasting with Casual Variables,Selecting Appropriate Forecasting Models.Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation UsingAnalytic Solver Platform, New-Product Development Model, NewsvendorModel, Overbooking Model, Cash Budget Model.</p> <p><b>Unit-V:</b> Decision Analysis: Formulating Decision Problems, Decision Strategies withthe without Outcome Probabilities, Decision Trees, The Value of Information,Utility and Decision Making.</p> <p><b>Unit-VI:</b> Recent Trends in: Embedded and collaborative business intelligence, Visualdata recovery, Data Storytelling and Data journalism.</p>	
<p><b>MTCS302B</b></p>		<p><b>Industrial Safety</b></p> <p><b>Unit-I:</b> Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive</p>	<p><b>New Course</b></p>

			<p>steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.</p> <p><b>Unit-II:</b> Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost &amp; its relation with replacement economy, Service life of equipment.</p> <p><b>Unit-III:</b> Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.</p> <p><b>Unit-IV:</b> Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic,automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.</p> <p><b>Unit-V:</b> Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.</p>	
	<p><b>MTSCS302C</b></p>		<p><b>Operations Research</b></p> <p><b>Unit 1:</b>  Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models</p>	<p><b>New Course</b></p>

			<p><b>Unit 2</b> Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming</p> <p><b>Unit 3:</b> Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT</p> <p><b>Unit 4</b> Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.</p> <p><b>Unit 5</b> Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation</p>	
	<p><b>MTSCS302D</b></p>		<p><b>Cost Management of Engineering Projects</b></p> <p>Unit 1: Introduction and Overview of the Strategic Cost Management Process Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.</p> <p>Unit 2: Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution : conception to commissioning. Project execution as conglomeration of technical and non technical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team : Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process</p> <p>Unit 3: Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement</p> <p>Unit 4: Planning, Enterprise Resource Planning,</p>	

			<p>Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.</p> <p>Unit 5: Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.</p>	
	<p><b>MTCS302E</b></p>		<p><b>Composite Materials</b></p> <p><b>UNIT-I: INTRODUCTION:</b> Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.</p> <p><b>UNIT – II: REINFORCEMENTS:</b> Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.</p> <p><b>UNIT – III: Manufacturing of Metal Matrix Composites:</b> Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.</p> <p><b>UNIT-IV: Manufacturing of Polymer Matrix Composites:</b> Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.</p> <p><b>UNIT – V: Strength: Laminar Failure Criteria-</b> strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first ply failure-insight strength; Laminate strength-ply discount</p>	<p><b>New Course</b></p>

			truncated maximum strain criterion; strength design using caplet plots; stress concentrations.	
	<b>MTCS302F</b>		<p><b>Waste to Energy</b></p> <p><b>Unit-I:</b> Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors</p> <p><b>Unit-II:</b> Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.</p> <p><b>Unit-III:</b> Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.</p> <p><b>Unit-IV:</b> Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.</p> <p><b>Unit-V:</b> Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.</p>	
	<b>(MTCS303)</b>	<p><b>INFORMATION SYSTEM SECURITY</b></p> <p><b>Unit I</b></p> <p>Multi level model of security, Cryptography, Secret Key Cryptography, Modes of Operation, Hashes and Message Digest, Public Key Algorithm, Security Handshake Pitfall, Strong Password Protocol; Case study of real</p>	<b>Dissertation I (MTCS303)</b>	<b>Code Change</b>

	<p>time communication security;</p> <p><b>Unit II</b></p> <p>Introduction to the Concepts of Security, Security Approaches, Principles of security, Types of attacks; Cryptographic Techniques: Plain text and Cipher text, Substitution Techniques, Transposition Techniques Encryption and Decryption, Symmetric and Asymmetric Key Cryptography. Computer-based symmetric Key Cryptographic;</p> <p><b>Unit III</b></p> <p>Algorithms: Algorithm Types and Modes, An Overview of Symmetric Key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES);</p> <p>Computer-based Asymmetric Key Cryptographic Algorithms; Cryptography, An Overview of Asymmetric Key Cryptography, The RSA algorithm, Symmetric and Asymmetric Key Cryptography Together, Digital Signatures, Knapsack Algorithm;</p> <p><b>Unit IV</b></p> <p>Public Key Infrastructure (PKI) Digital Certificates, Private Key Management , The PKI Model, Public Key Cryptography Standards (PKCS); Internet Security Protocols Secure Socket Layer (SSL) , Secure Hyper Text Transfer Protocol (SHTTP) , Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, 3-D Secure Protocol , Electronic Money , Email Security;</p> <p><b>Unit V</b></p> <p>User Authentication Mechanisms :</p>	
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		<p>Authentication Basics, Passwords, Authentication Tokens, Certificate-based Authentication; Practical Implementations of Cryptography/Security: Cryptographic Solutions Using Java, Cryptographic Solutions Using Microsoft, Cryptographic Toolkits, Security and Operating Systems; Network Security: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN); Case Studies on Cryptography and Security:</p>		
	<p><b>MTSCS304A</b></p>	<p><b>GRID COMPUTING</b></p> <p><b>Unit I</b></p> <p><b>Introduction:</b> Definition of Grid, history and evolution of Grid Computing, Virtual Organizations, Computational Grid projects around the world, Grid challenges, Grid organizations, Potential users and techniques for use of grids, Grid requirements of end users, application developers, tool developers, grid developers, and system managers. Service Oriented Architecture (SOA), Issues in Management of Grid Models.</p> <p><b>Unit II</b></p> <p><b>Architecture:</b> Components of Layered Grid Architecture, Open Grid Services Architecture (OGSA), Grid architecture models, Grid Resource Information Service (GRIS). Resource infrastructure.</p> <p><b>Grid Middleware:</b> Globus: Overview, resource specification language, information services, Globus Resource</p>		<p>(Subject Removed)</p>

Allocation Manager (GRAM), job submission with managed-job-globusrun, security, scheduling, Grid FTP protocol, overview of other middleware like Condor, Condor-G.

**Unit III**

**Resource Management and Scheduling:**

Resource Discovery and Information Services, Information directory services, schedulers and resource brokers, Characterization of resource management problems based on job requirements, algorithms, tools and sample resource management systems, Monitoring, Scheduling, Performance tuning, Debugging and performance diagnostic issues.

**Grid Security:** Grid security demands and solutions; authentication, authority, assurance, accounting, trust, group communication for large-scale, dynamic, multi-organization environments.

**Unit IV**

**Grid Portals:** Functionality and underlying infrastructure for sample general and application specific portals.

**Data Management:** Key issues for data management in Grids, including file transfer, data replication, data caching issues, catalog issues. **Unit V**

**Case Studies:** Seti project, Sun Grid engine, EuroGrid and some other

		<p>national grid projects.</p> <p><b>Advanced Topics:</b> Overview of: Grid simulation, Grid Economy, Semantic Grid, Autonomic Grid, Cloud Computing.</p>		
	<p><b>MTSCS304B (Subject Removed)</b></p>	<p><b>Parallel Computing</b></p> <p><b>Unit -1 Introduction to Parallel Processing:</b></p> <p>Supercomputers and grand challenge problems, Modern Parallel Computers, Data Dependence Graph, Data Parallelism, Functional Parallelism, Pipelining and Data Clustering.</p> <p><b>Unit -2 Interconnection Networks:</b></p> <p>Switch Network Topologies, Direct and Indirect Network Topology, Bus, Star, Ring, Mesh, Tree, Binary Tree Network, Hyper Tree Network, Hybrid, Hypercube, Perfect Shuffle Network, Torus and Butterfly Network.</p> <p><b>Unit-3 Performance Analysis:</b></p> <p>Introduction, Execution Time, Speedup, Linear and Superliner Speedup, Efficacy and Efficiency, Amdahl's Law and Amdahl Effect, Gustafson-Barsis's Law, Minsky's Conjecture, The Karp-Flat Metric, The Isoefficiency Metric, Isoefficiency Relation, Cost and Scalability.</p> <p><b>Unit-4 Parallel Computational Models:</b></p> <p>Flynn's Taxonomy, PRAM, EREW, CREW, ERCW, CRCW, Simulating CRCW, CREW and EREW, PRAM algorithms.</p> <p><b>Unit-5 Introduction to Parallel Algorithms:</b></p> <p>Parallel Programming Models, PVM,</p>		

		<p>MPI Paradigms, Parallel Programming Language, Brent's Theorem, Simple parallel programs in MPI environments, Parallel algorithms on network, Addition of Matrices, Multiplication of Matrices.</p>		
	<p><b>MTCS304C (Subject Removed)</b></p>	<p><b>Object Oriented Analysis and Design</b></p> <p><b>UNIT I: Introduction to UML</b>  Introduction to UML : Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.</p> <p><b>UNIT II: Basic and Advanced Structural Modeling</b>  Basic Structural Modeling : Classes, Relationships, common Mechanisms, and diagrams.  Advanced Structural Modeling :  Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.</p> <p><b>UNIT III: Class &amp; Object Diagrams, Class &amp; Object Diagrams</b> : Terms, concepts, modeling techniques for Class &amp; Object Diagrams. Basic Behavioral Modeling-I, Basic Behavioral Modeling-I : Interactions, Interaction diagrams.</p> <p><b>UNIT IV: Basic Behavioral Modeling-II, Basic Behavioral Modeling-II</b> : Use cases, Use case Diagrams, Activity Diagrams, Advanced Behavioral Modeling : Events and signals, state machines, processes and Threads, time and space, state chart diagrams.</p>		

		<b>UNIT V:</b> Architectural Modeling: Component, Deployment, Component diagrams and employment diagrams.		
	<b>MTCSCS305 (Subject Removed)</b>	<b>Seminar</b>		
	<b>MTCSCS401</b>	<b>Dissertation</b>	<b>Dissertation II</b>	No Change