Veer Bahadur Singh Purvanchal University, Jaunpur

Department of Computer Science & Engineering

Evaluation Scheme & Syllabus

For

M. Tech.

(Computer Science & Engineering)

(SEMESTER I, II, III & IV)

AS PER AICTE MODEL CURRICULUM

(Effective from the Session: 2019-20)

Course structure and evaluation scheme for M.Tech. Computer Science & Engineering
(With effect from 2019)
SEMESTER –I

S.No.	Subject Code	Subject Name	Periods			Sessional Marks	External Marks	Total Marks	Credit
			L	T	P				
1	CSEMT101	Foundation of Computer Science	**3**	**0**	**0**	**30**	**70**	**100**	**3**
2	CSEMT102	Advanced Algorithms	**3**	**0**	**0**	**30**	**70**	**100**	**3**
3	CSEMTE1?	Program Elective - 1	**3**	**0**	**0**	**30**	**70**	**100**	**3**
4	CSEMTE2?	Program Elective - 2	**3**	**0**	**0**	**30**	**70**	**100**	**3**
5	CSEMT103	Research Methodology and IPR	**2**	**0**	**0**	**30**	**70**	**100**	**2**
6	CSEMTA??	Audit Course -1	**2**	**0**	**0**	**30**	**70**	**100**	**0**
(Practical)									
1	CSEMTL101	Foundation of Computer Science	**0**	**0**	**4**	**20**	**30**	**50**	**2**
2	CSEMTL102	Advanced Algorithms	**0**	**0**	**4**	**20**	**30**	**50**	**2**
		Total Credit:				**220**	**480**	**700**	**18**

Program Elective – 1:

1. Machine Learning
2. Wireless Sensor Network
3. Introduction to Intelligent System
4. Data Warehousing and Data Mining
5. Software Process Management

Program Elective – 2:

1. Data Science
2. Distributed Systems
3. Cloud Computing
4. Advanced Database System
5. Cyber Security and Law

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SEMESTER –II

S.No.	Subject Code	Subject Name	Periods			Sessional Marks	External Marks	Total Marks	Credit
			L	T	P				
1	CSEMT201	Computer Vision	**3**	**0**	**0**	**30**	**70**	**100**	**3**
2	CSEMT202	Wireless and Mobile Networks	**3**	**0**	**0**	**30**	**70**	**100**	**3**
3	CSEMTE3?	Program Elective - 3	**3**	**0**	**0**	**30**	**70**	**100**	**3**
4	CSEMTE4?	Program Elective - 4	**3**	**0**	**0**	**30**	**70**	**100**	**3**
5	CSEMTA??	Audit Course -2	**2**	**0**	**0**	**30**	**70**	**100**	**0**
6	CSEMTS21	Mini Project with Seminar	**0**	**0**	**4**	**20**	**30**	**50**	**2**
(Practical)									
1	CSEMTL201	Computer Vision	**0**	**0**	**4**	**20**	**30**	**50**	**2**
2	CSEMTL202	Wireless and Mobile Networks	**0**	**0**	**4**	**20**	**30**	**50**	**2**
		Total Credit:				**210**	**440**	**650**	**18**

Program Elective – 3:

1. Soft Computing
2. Secure E- Commerce
3. Modern Cryptography
4. Digital Image Processing
5. Data Preparation and Analysis

Program Elective – 4:

1. Professional Aspects in Software Engineering
2. Object Oriented Modeling & Design
3. Advanced Computer Networks
4. Python Programming
5. Digital Forensics

Audit Course- 1 & 2:

01. English for Research Paper Writing
02. Value Education
03. Disaster Management
04. Constitution of India
05. Pedagogy Studies
06. Stress Management by Yoga

Course structure and evaluation scheme for M.Tech. Computer Science & Engineering
(With effect from 2019)
SEMESTER –III

S.No.	Subject Code	Subject Name	Periods			Sessional Marks	External Marks	Total Marks	Credit
			L	T	P				
1	CSEMTE5?	Program Elective - 5	**3**	**0**	**0**	**30**	**70**	**100**	**3**
2	CSEMTOE?	Open Elective	**3**	**0**	**0**	**30**	**70**	**100**	**3**
(Practical)									
1	CSEMTL301	Dissertation - I	**0**	**0**	**20**	**75**	**175**	**250**	**10**
Total Credit:						**135**	**315**	**450**	**16**

Program Elective – 5:

1. Genetic Algorithms
2. Advanced Computer Architecture
3. Internet of Things
4. Natural Language Interface
5. Modeling and Simulation

Open Elective:

1. Industrial Safety
2. Waste to Energy
3. Cost Management of Engineering Projects
4. Operations Research
5. Composite Materials

Course structure and evaluation scheme for M.Tech. Computer Science & Engineering
(With effect from 2019)
SEMESTER –IV

S.No.	Subject Code	Subject Name	Periods			Sessional Marks	External Marks	Total Marks	Credit
			L	T	P				
1	CSEMTL301	Dissertation - I	**0**	**0**	**32**	**150**	**350**	**500**	**16**
Total Credit:						**150**	**350**	**500**	**16**

GRAND TOTAL CREDIT= 68

FOUNDATION OF COMPUTER SCIENCE (CSEMT 101)

Unit 1:

DATA STRUCTURE

List, Stack, Queue, Tree, Graph, Search and Sorting Algorithms.

Unit 2:

OPERATING SYSTEM

Scheduling Algorithms, Synchronization Techniques, Paging and Segmentation, Virtual Memory.

Unit 3:

AUTOMATA THEORY

Finite Automata, Regular Expression, Context Free Grammar, Push Down Automata.

Unit 4:

DATABASE SYSTEM

Concepts and Architecture, Data Model, Normalization, SQL Advanced Transaction Processing, Deadlock and Concurrency Control, Object Oriented and Object Relational Databases, Parallel and Distributed Databases, Backup and Recovery Concepts, Emerging Database Technologies.

References:

1. Hopcroft & Ullman, "Introduction to Automata Theory, Languages, and Computation", Narosa Publishing House.
2. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Addison Wesley.
3. Dhamdhere, Öperating Systems", Tata McGraw Hill.
4. Aho, Ullman and Sethi, "Compiler Design", Addison Wesley.
5. Ramez Elmasri, Shamkant Navathe: Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2007.
6. Raghu Ramakrishnan, Johannes Gehrke : Database Management Systems, Tata McGraw-Hill.
7. Alexis Lcon, Mathews Leon, "Database Management Systems".
8. C.J. Date, " An Introduction to Database Systems", Eighth Edition, Pearson Education.
9. Abraham Silberschatz, Henry F. Korth, S.Sudarshan, "Database System Concepts", Tata McGraw-Hill.

ADVANCED ALGORITHMS (CSEMT 102)

Unit 1:

Algorithm Fundamentals: Basic Concept, Analysis of Algorithm, Growth of Functions, Master's Theorem.

Unit 2:

Analysis of sorting Algorithms: Overview, Merge sort, Quick sort, Heap sort, radix sort.
Advance Data Structure: Red-Black Trees, B/B+ Trees.

Unit 3:

Parallel Algorithm: Performance Measures of Parallel Algorithms, Parallel Merging/Sorting Algorithms on CREW/EREW, Parallel searching algorithms.

Unit 4:

Advance Design and Analysis Techniques: Dynamic Programming, Greedy Algorithms, Branch and bound, Back Tracking.

Unit 5:

Graph Algorithm: DFS and BFS algorithm. NP Complete Problem.

References:

1. Coreman, Rivest, Lisserson, "Algorithm", PHI.
2. Basse, "Computer Algorithms: Introduction to Design & Analysis", Addision Wesley.
3. Horowitz, Sahani, and Rajasekaran, " Fundamental of Computer Algorithms", Universities Press.

RESEARCH METHODOLOGY AND IPR (CSEMT 103)

Unit 1:

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, Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

Unit 2:

Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

Unit 3:

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.

Unit 4:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology, Patent information and databases, Geographical Indications.

Unit 5:

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.

References:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. C R Kothari and Gaurav Garg, 4th Edition, "Research Methodology: Methods and Techniques"
4. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
5. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd,2007.
6. Mayall, "Industrial Design", McGraw Hill, 1992.
7. Niebel, "Product Design", McGraw Hill, 1974.
8. Asimov, "Introduction to Design", Prentice Hall, 1962.
9. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
10. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

MACHINE LEARNING (CSEMTE 11)

Unit 1:
Supervised Learning (Regression/Classification)
Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, Naive 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.

Unit 2:
Unsupervised Learning
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).

Unit 3:
Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests), Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning.

Unit 4:
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.

Unit 5:
Recent trends in various learning techniques of machine learning and classification methods for IOT applications, Various models for IOT applications.

References:

1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012.
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online).
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.

WIRELESS SENSOR NETWORK (CSEMTE 12)

Unit 1:

Basics of WSN: Basic components of a sensor node, Types of sensors, Constraints on the sensor nodes, WSN & its application areas, characteristics of WSN, Nature of Data in Sensor Networks, Manual vs Randomized node deployment, Event aware topology management in WSN, Issues & challenges with WSN, WSN coverage and placement, Localization and Positioning, Task driven sensing, Data Acquisition, Data Dissemination, Aggregation, Mobile WSN, Virtual Sensor Network, Operating Systems for WSN.

Unit 2:

MAC Protocols: Fundamentals of MAC Protocols, Design Issues, Overview of IEEE 802.15.4 and ZigBee, Contention-Free Medium Access, Contention-Based Medium Access.

MAC Protocols for WSN: Contention-Free MAC Protocols, Contention-Based MAC Protocols, Hybrid MAC Protocols, Characteristics of MAC Protocols in Sensor Networks.

Unit 3:

Routing Protocols: Classification of routing protocols, Proactive routing vs Reactive routing, QoS routing.

Flat Protocols: SPIN (Sensor Protocols for Information via Negotiation), Directed Diffusion, Hierarchical or Cluster Based Protocols: LEACH (Low Energy Adaptive Clustering Hierarchy), PEGASIS (Power-Efficient Gathering in Sensor Information Systems).

Location Based Protocols: GEAR (Geographic and Energy Aware Routing), Some Other Protocols.

Unit 4:

Sensor Network Applications Case Studies: Military Applications, Environmental monitoring applications, Traffic Monitoring, Weather Monitoring, Fire Detection, Underwater Monitoring, Underground Monitoring, Agricultural Applications, Habitat Monitoring, IoT related applications, other applications.

Unit 5:

Advanced Topics: Recent development in WSN standards, software applications.

Security: Possible attacks, countermeasures, SPINS, Static and dynamic key distribution.

References:

1. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice", Wiley Publishers, 2010, ISBN: 978-0-470-99765-9.
2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal, “Ad Hoc and Sensor Networks: Theory and Applications”, World Scientific Publishers, 2011, ISBN: 981-256-681-3.
3. Dorothea Wagner and Roger Wattenhofer, “Algorithms for Sensor and Ad Hoc Networks”, Advanced Lectures, Springer, Lecture Notes in Computer Science 4621, 2007, ISBN-13 978-3-540-74990-5.

INTRODUCTION TO INTELLIGENT SYSTEM (CSEMTE 13)

Unit 1:

Biological foundations to intelligent systems I: Artificial neural networks, Back propagation networks, Radial basis function networks, and recurrent networks.

Unit 2:

Biological foundations to intelligent systems II: Fuzzy logic, knowledge Representation and inference mechanism, genetic algorithm, and fuzzy neural networks.

Unit 3:

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. Optimization and search such as stochastic annealing and genetic algorithm.

Unit 4:

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 Blackboard architectures.

Unit 5:

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. Recent trends in Fuzzy logic, Knowledge Representation.

References:

1. Luger G.F. and Stubblefield W.A. (2008). Artificial Intelligence: Structures and strategies for Complex Problem Solving. Addison Wesley, 6th edition.
2. Russell S. and Norvig P. (2009). Artificial Intelligence: A Modern Approach. Prentice-Hall, 3rd edition.

DATA WAREHOUSING & DATA MINING (CSEMTE 14)

Unit 1:

Data Warehousing and Business Analysis: Data warehousing Components, Building a Data warehouse, Mapping the Data Warehouse to a Multiprocessor Architecture, DBMS Schemas for Decision Support, Data Extraction, Cleanup, and Transformation Tools, Metadata reporting, Query tools and Applications, Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

Unit 2:

Data Mining: Data Mining Functionalities, Data Preprocessing, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

Association Rule Mining: Efficient and Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules, association mining to Correlation Analysis, Constraint Based Association Mining.

Unit 3:

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Introduction, Bayesian Classification, Rule Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor , Ensemble Methods, Model Section.

Unit 4:

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical methods, Density-Based Methods. Grid-Based Methods, Model-Based Clustering Methods, Clustering High- Dimensional Data, Constraint Based Cluster Analysis, Outlier Analysis.

Unit 5: Mining Object, Spatial, Multimedia, Text and Web Data, Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

References:

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition.
2. Alex Berson and Stephen J. Smith “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
3. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.
5. Soman K.P., Shyam Diwakar and V. Ajay, “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
6. Daniel T.Larose, “Data Mining Methods and Models”, Wile-Interscience, 2000.

SOFTWARE PROCESS MANAGEMENT (CSEMTE 15)

Unit 1:

DEVELOPMENT LIFE CYCLE PROCESSES

Overview of software development life cycle, introduction to processes, Personal Software Process (PSP), Team software process (TSP), Unified processes, agile processes, choosing the right process.

Unit 2:

REQUIREMENTS MANAGEMENT

Functional requirements and quality attributes elicitation techniques, Quality Attribute Workshops (QAW), analysis, prioritization, and tradeoff, Architecture Centric Development Method (ACDM), requirements documentation and specification, change management, traceability of requirements.

UNIT 3:

ESTIMATION, PLANNING, AND TRACKING

Identifying and prioritizing risks, risk mitigation plans, estimation techniques, use case points, function points, COCOMO II, top down estimation, bottom up estimation, work breakdown structure, macro and micro plans, planning poker, wideband delphi, documenting the plan, tracking the plan, earned value method (EVM).

Unit 4:

CONFIGURATION AND QUALITY MANAGEMENT

Identifying artifacts to be configured, naming conventions and version control, configuration control, quality assurance techniques, peer reviews, Fegan inspection, unit, integration, system, and acceptance testing – test data and test cases, bug tracking, causal analysis.

Unit 5:

SOFTWARE PROCESS DEFINITION AND MANAGEMENT

Process elements, process architecture, relationship between elements, process modeling, process definition techniques, ETVX (entry task validation exit), process base lining, process assessment and improvement, CMMI, Six Sigma.

References:

1. Pankaj Jalote, “Software Project Management in Practice”, Pearson, 2002.
2. Chris F. Kemerer, “Software Project Management – Readings and Cases”, McGraw Hill, 1997.
3.Watts S. Humphrey, “PSP: A selfimprovement process for software engineers”, AddisonWesley, 2005.
4. Watts S. Humphrey, “Introduction to the Team Software Process”, AddisonWesley, 2000.
5. Orit Hazzan and Yael Dubinsky, “Agile software engineering”, Springer, 2008.
6. James R. Persse, “Process Improvement Essentials”, O’Reilly, 2006.

DATA SCIENCE (CSEMTE 21)

Unit 1:
Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.

Unit 2:
Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources

Unit 3:
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.

Unit 4:
Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, mapping variables to encodings, Visual encodings.

Unit 5:
Applications of Data Science, Technologies for visualization, Bokeh (Python) Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

References:
1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly.
2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1,Cambridge University Press

DISTRIBUTED SYSTEMS (CSEMTE 22)

Unit 1:

Introduction

Distributed data processing, what is a DDBS, Advantages and disadvantages of DDBS, Problem areas, Overview of database and computer network concepts.

Distributed Database Management System Architecture

Transparencies in a distributed DBMS, Distributed DBMS architecture, Global directory issues.

Unit 2:

Distributed Database Design

Alternative design strategies, Distributed design issues, Fragmentation, Data allocation

Semantics Data Control

View management, Data security, Semantic Integrity Control.

Query Processing Issues

Objectives of query processing, Characterization of query processors, Layers of query processing, Query decomposition, Localization of distributed data.

Unit 3:

Distributed Query Optimization

Factors governing query optimization, Centralized query optimization, ordering of fragment queries, Distributed query optimization algorithms.

Transaction Management

The transaction concept, Goals of transaction management, Characteristics of transactions, Taxonomy of transaction models.

Concurrency Control

Concurrency control in centralized database systems, Concurrency control in DDBSs, Distributed concurrency control algorithms, Deadlock management.

Unit 4:

Reliability

Reliability issues in DDBSs, Types of failures, Reliability techniques, Commit protocols, Recovery protocols.

Unit 5:

Parallel Database Systems

Parallel architectures, parallel query processing and optimization, load balancing.

Advanced Topics

Mobile Databases, Distributed Object Management, Multi-databases.

References:

1. Principles of Distributed Database Systems, M.T. Ozsu and P. Valduriez, Prentice-Hall, 1991.
2. Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.

CLOUD COMPUTING (CSEMTE 23)

Unit 1:

Understanding Cloud Computing Overview of Computing Paradigm: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, History of Cloud Computing.
Cloud Computing: Definition, Characteristics, Advantages & Disadvantages, Cloud Service Providers.

Unit 2:

Cloud Computing Architecture: Cloud Service Model- SaaS, PaaS, IaaS, Deployment Model, Cloud Storage.
Cloud Service Models Infrastructure as a Service: IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM), Resource Virtualization of Server, Virtual Machine provisioning and manageability, storage as a service, Amazon EC2.

Unit 3:

Platform as a Service: PaaS definition, Service Oriented Architecture, Cloud Platform and Management: Computation, Storage, Example: Google App Engine, Microsoft Azure. Software as a Service: SaaS definition, Web 2.0, Example: Salesforce.

Unit 4:

Service and Data management in Cloud Service Level Agreements(SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, understanding cloud-based data storage, Storage types: SQL and NoSQL Databases, Understanding Distributed File systems, Managing Data and its Scalability, Large Scale Data Processing using Hadoop and GraphLab.

Unit 5:

Cloud Security and Simulation Tools Infrastructure Security: Network level security, Host level security, Application level security, Data security and Storage: Data privacy and security Issues, Identity & Access Management, Access Control, Authentication in cloud computing, Case study of CloudSim.

References:

1. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010.
2. Mastering Cloud Computing - Raj Kumar Buyya, Christian Vecchiola and S. Tanurai Selvi (TMH), 2012.
3. Cloud Computing for Dummies - Judith Hurwitz, R. Bloor, M. Kanfman, F. Halper (Wiley India Edition).
4. Distributed and Cloud Computing - Kaittwang Geoffrey C. Fox and Jack J Dongrra (Elsevier India) 2012.
5. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate - Michael Miller, Online, August 2008.
6. Cloud Computing – Insights into New Era Infrastructure - Kumar Saurabh (Wiley Indian Edition), 2011.

ADVANCED DATABASE SYSTEM (CSEMTE 24)

Unit 1:

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, other Models, Database Languages – DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER Diagrams, Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views, Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers.

Unit 2:

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms, BCNF, Properties of Decompositions- Loss less - join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design, Multi valued Dependencies, FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

Unit 3:

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock Based Concurrency Control, Deadlocks, Performance of Locking, Transaction Support in SQL. Concurrency Control: Serializability, and recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques, Concurrency Control without Locking. Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery.

Unit 4:

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Clustered Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing Storing data: Disks and Files: - The Memory Hierarchy, Redundant Arrays of Independent Disks. Tree Structured Indexing: - Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees, A Dynamic Index Structure, Search, Insert, Delete. Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

Unit 5:

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed Recovery.

References:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition. Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.
4. Introduction to Database Systems, C.J.Date,Pearson Education.

CYBER SECURITY AND LAW (CSEMTE 25)

Unit 1:

Introduction: Review of TCP/IP and TCP, IP Header analysis, Introduction to Cyber World, Cyber attacks and cyber security, Information warfare and cyber terrorism, Types of cyber attacks, Cyber Crime and Digital Fraud, Overview of Types of computer forensics i.e. Media Forensics, Network forensics (internet forensics), Machine forensic, Email forensic (e-mail tracing and investigations).

Unit 2:

Issues in cyber security: Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

Unit 3:

Intellectual property rights: Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

Unit 4:

Procedural Issues Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

Unit 5:

Legal aspects of cyber security: Ethics, Legal Developments, Late 1990 to 2000, Cyber security in Society, Security in cyber laws case. studies, General law and Cyber Law - a Swift Analysis.

References:

1. Jonathan Rosenoer,"Cyber Law: The law of the Internet", Springer-Verlag, 1997.
2. D. Bainbridge, Introduction to Computer Law, 5th Edition, Pearson Education, 2004.
3. P. Duggal, Cyber Law: The Indian Perspective, Saakshar Law Publications, 2005.
4. Mark F Grady, Fransesco Parisi, "The Law and Economics of Cyber Security", Cambridge University Press, 2006.
5. S.P. Tripathy, "Cyber security", Wiley Publications.

COMPUTER VISION (CSEMT 201)

Unit 1:
Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis.

Unit 2:
Edge detection, Edge detection performance, Hough transform, corner detection, Segmentation, Morphological filtering, Fourier transform.

Unit 3:
Feature extraction, shape, histogram, color, spectral, texture, using CVIP tools, Feature analysis, feature vectors, distance /similarity measures, data preprocessing.

Unit 4:
Pattern Analysis:
Clustering: K-Means, K-Medoids and 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.

Unit 5:
Recent trends inactivity Recognition, computational photography, Biometrics.

References:

1. Computer Vision: Algorithms and Applications by Richard Szeliski.
2. Deep Learning, by Goodfellow, Bengio, and Courville.
3. Dictionary of Computer Vision and Image Processing, by Fisher et al.

WIRELESS AND MOBILE NETWORKS (CSEMT 202)

Unit 1:

Introduction to Wireless and Mobile Networks, Wireless Transmission: Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum.

Unit 2:

Wireless Medium Access Control: Common Problems, SDMA, FDMA, TDMA, CDMA**,** Wireless Telecommunications Systems: GSM, DECT, TETRA, UMTS, IMT-2000, LTE.

Unit 3:

Satellite Systems: Introduction, Deficiencies of existing GEO/MEO/LEO Satellite Systems, Satellite Architectures, Satellite Routing, Satellite Channel Access, Satellite Handover, High Altitude Platforms, and Applications, Wireless LAN: IEEE 802.11, Bluetooth, RFID, Security issues.

Unit 4:

Mobile Network Layer I: Problems of IP in Wireless, Principles behind Mobile IP, Problems, Security issues, DHCP, Mobile Network Layer II: Routing in Ad-hoc Networks, Wireless Sensor Networks.

Unit 5:

Mobile Transport Layer: Effects of mobility and wireless transmissions on reliable transport protocols such as TCP, Support for Mobility: File Systems, databases, WWW and Mobility, WAP, Application layer for mobile networks.

References:

1. J. Schiller, Mobile Communications, 2nd edition, Addison Wesley.
2. Wireless Communications and Networks, William Stallings, 2nd edition, Prentice Hall.
3. Ad-hoc Networking by Charles Perkins, Pearson, 2008.

SOFT COMPUTING (CSEMTE31)

Unit 1:

Introduction to Soft Computing and Neural Networks:

Evolution of Computing, Soft Computing Constituents, From Conventional AI to Computational Intelligence, Machine Learning Basics.

Unit 2:

Fuzzy logic:

Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

Unit 3

Neural networks:

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.

Unit 4

Genetic algorithms:

Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning, Machine Learning Approach to Knowledge Acquisition.

Unit 5:

Matlab/Python Lib:

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.

Recent Trends in deep learning, various classifiers, neural networks and genetic algorithm, Implementation of recently proposed soft computing techniques.

References:

1. Jyh:Shing Roger Jang, Chuen:Tsai Sun, EijiMizutani, Neuro:Fuzzy and Soft Computing, Prentice:Hall of India, 2003.
2. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic:Theory and Applications, Prentice Hall, 1995.
3. MATLAB Toolkit Manual.

SECURE E - COMMERCE (CSEMTE32)

Unit 1:
Introduction to E-Commerce and Network Infrastructure for E-Commerce.

Unit 2:
Basics of User Interface, Web Interface, Transaction Processing, Web 3.0, Game Theory.

Unit 3:
E-commerce Models, e-Advertising & Marketing, Auctions.

Unit 4:
Information Security foundations and E-commerce Security, Electronic Payment Systems, Electronic Data Exchange, Internet Banking, Mobile Commerce.

Unit 5:
Requirement Analysis of E-commerce Initiatives in different domains.

References:

1. Introduction to E-commerce by Jeffrey F. Rayport & Bernard J. Jaworski.

2. Effortless E-commerce with PHP and MYSQL by Larry Ullman.

3. E-Commerce- Strategy technologies and Applications by David Whiteley.

4. E-Commerce-Concepts, Models & Strategies by C.S.V. Murthy.

MODERN CRYPTOGRAPHY (CSEMTE33)

Unit 1:

Introduction: History and overview of cryptography, Probability and randomized algorithms, Number Theory.

Unit 2:

Basic symmetric-key encryption: One time pad and stream ciphers, Block ciphers, Attacks on block ciphers. AES, DES and other symmetric algorithms

Unit 3:

Public key cryptography: Arithmetic modulo primes, Cryptography using arithmetic modulo primes, Arithmetic modulo composites, RSA.

Unit 4:

Message integrity and authentication protocols: definition and applications, Collision resistant hashing, authenticated encryption, security against active attacks, Digital Signature.

Unit 5:

Advanced Topics: ECC, DNA cryptography, quantum cryptography, Digital Watermarking and Steganography etc.

References:

1. Introduction to Modern Cryptography by J. Katz and Y. Lindell.
2. Handbook of Applied Cryptography by A. Menezes, P. Van Oorschot, S. Vanstone.
3. Cryptography and Network Security: Principles and Practice – William Stallings.

DIGITAL IMAGE PROCESSING (CSEMTE34)

Unit 1:

Introduction:

Fundamental steps of image processing, components of an image processing of system, the image model and image acquisition, sampling and quantization, station ship between pixels, distance functions, scanner.

Unit 2:

Statistical and spatial operations:

Grey level transformations, histogram equalization, smoothing & sharpening-spatial filters, frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and wiener filtering, FIR Weiner filter, filtering using image transforms, smoothing splines and interpolation.

Unit 3:

Morphological and other area operations:

Basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images. Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

Unit 4:

Image compression:

Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding. Basics of color image processing, pseudo color image processing, color transformation, color smoothing and sharpening, color segmentation, color image compression, compression standards

Unit 5:

Image Transforms:

Fourier, DFT, DCT, DST, Haar, Hotelling, Karhunen -Loeve, Walsh, Hadamard, Slant. Representation and Description - Chain codes, Polygonal approximation, Signatures Boundary Segments, Skeletons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, PCA.

References:

1. Digital Image Processing – by Rafael. C. Gonzalez & Richard E. Woods, 3rd edition, Pearson Education, 2008.
2. Digital Image Processing, M.Anji Reddy, Y.Hari Shankar, BS Publications.
3. Fundamentals of Digital Image Processing – by A.K. Jain, PHI.
4. Digital Image Processing – William K, Part I - John Wiley edition.
5. Digital Image Processing using MATLAB – by Rafael.C.Gonzalez, Richard E.Woods, & Steven L.Eddins, Pearson Education, 2006
6. Digital Image Processing, Kenneth R. Castleman, Pearson Education, 2007.

DATA PREPARATION AND ANALYSIS (CSEMTE35)

Unit 1:
Data Gathering and Preparation:
Data formats, parsing and transformation, Scalability and real-time issues.

Unit 2:
Data Cleaning:
Consistency checking, Heterogeneous and missing data, Data Transformation and segmentation.

Unit 3:
Exploratory Analysis:
Descriptive and comparative statistics, Clustering and association, Hypothesis generation.

Unit 4:
Visualization:
Designing visualizations, Time series, Geolocated data, Correlations and connections, Hierarchies and networks, interactivity.

References:
1. Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, by Glenn J. Myatt

PROFESSIONAL ASPECTS IN SOFTWARE ENGINEERING (CSEMTE41)

Unit 1:
Intellectual Property rights
Confidential Information, Copyright, Infringement of Copyright, Acts permitted in Relation to Copyright Works, Licensing and Assignment of Copyright, Moral Rights, Designs, Trademarks, The tort of passing off, Domain Names, Patents.

Unit 2:
Software Licenses
Copyright, Contract, Patent, Free Software and Open Source Software, MIT License, BSD License, GNU General Public License, GNU Lesser General Public License, Q Public License, Proprietary License, Sun Community License.

Unit 3:
Software Contracts:
Basics of Software Contracts, Extent of liability, Contract for the supply of custom-built software at a fixed price, other types of software service Contract, Liability for defective software.

Unit 4:
Software Crime Prevention
Computing and criminal Activity, Reforms of Criminal Law, Categories of Misuse, Computer Fraud, Obtaining Unauthorized Access to Computer, Unauthorized Alteration or Destruction of Information, Denying Access to an Authorized user, Unauthorized Removal of Information Stored in a Computer.

Unit 5:
Data Protection Regulations
Data Protection and Privacy, The impact of the Internet, Factors Influencing the Regulation of Data Processing, Convergence of Data Protection Practice, Defamation and the protection of Reputation.

References:
1. Andrew M. St. Laurent, “Open Source and Free Software Licensing”, O’Reilly Publications.
2. Frank Bott, et. al, “Professional Issues in Software Engineering”, Taylor & Francis.

OBJECT ORIENTED MODELING AND DESIGN (CSEMTE42)

Unit 1:
Introduction to OOAD, What is OOAD?, What is UML? What are the Unified process (UP) phases, Case study – the NextGen POS system, Inception-Use case Modeling, Relating Use cases, Elaboration Domain Models, Finding conceptual classes and description classes, Associations, Attributes.

Unit 2:
Domain model refinement: Finding conceptual class hierarchies, Aggregation and Composition, UML activity diagrams and modeling

Unit 3:
System sequence diagrams: Relationship between sequence diagrams and use cases Logical architecture and UML package diagram, Logical architecture refinement, UML class diagrams, UML interaction diagrams

Unit 4:
GRASP: Designing objects with responsibilities, Creator, Information expert, Low Coupling, Controller, High Cohesion, Designing for visibility, Applying GoF design patterns, adapter, singleton, factory and observer patterns

Unit 5:
UML state diagrams and modeling, Operation contracts, mapping design to code, UML deployment and component diagrams.

References:

1.Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education, 2005.

2. Mike O'Docherty, "Object-Oriented Analysis & Design: Understanding System Development with UML 2.0", John Wiley & Sons, 2005.

3. James W- Cooper, Addison-Wesley, "Java Design Patterns – A Tutorial", 2000.

4.Micheal Blaha, James Rambaugh, "Object-Oriented Modeling and Design with UML", Second Edition, Prentice Hall of India Private Limited, 2007.

5. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides,"Design patterns: Elements of Reusable object-oriented software", Addison-Wesley, 1995.

6. Object-Oriented Analysis and Design with Applications - Grady Booch et al, 3rd Edition, Pearson.

ADVANCED COMPUTER NETWORKS (CSEMTE43)

Unit 1:
Review of Networking Concepts: MAC layer issues, Ethernet 802.3, ARP, IP addressing and Subnetting, NAT and PAT, Variable Length Subnet Masking, CIDR.

Unit 2:
End to End protocols: TCP connection establishment and termination, Sliding window concepts, other issues: wraparound, silly window syndrome, Nagle's algorithm, adaptive retransmission, TCP extensions. Congestion and flow control, Queuing theory.

Unit 3:
TCP flavors: Tahoe, Reno, New-Reno, TCP-SACK, TCP-RED and TCP-Vegas. Transport protocol for real time (RTP), Quality of service: Integrated Services, Differentiated services.

Unit 4:
Routing and Multicast: Structure of internet: Autonomous systems, Intra-domain routing: OSPF and RIP, Inter-domain routing: BGP. Multicasting: Group Management (IGMP), Internet scale multicasting: Reverse path broadcast, MOSPF, DVMPRP, PIM.

Unit 5:
Peer to peer and overlay networks: Concept of overlays, Unstructured Overlays: Gnutella, Concepts of Distributed Hash Table, Structured Overlays: Chord, CAN, Pastry.

References:

1. Computer Networks: A Systems Approach, by Peterson and Davie, 5th Ed. Morgan Kauffman, 2011
2. Computer Networking: Top Down Approach, by Kurose and Ross, 6th Ed. Pearson, 2011
3. V. Paxson. "End-to-end Internet packet dynamics," in IEEE/ACM Transactions on Networking, Vol 7, No 3, 1999.
4. W. Stevens, "TCP Slow Start, Congestion Avoidance, Fast Retransmit, and Fast Recovery Algorithms," RFC2001.

PYTHON PROGRAMMING (CSEMTE44)

Unit 1:

Introduction to Python:

Introduction, History, Features, Basic Syntax, Interacting with Python Program, Elements of Python - Data types, variables, immutable variables, Operators, expressions, Control Statements, loops, Short-Circuit (lazy) Evaluation, Functions.

Unit 2:

Strings and text files, manipulating files and directories, os and sys modules, reading/writing text file, creating and reading a formatted file (csv or tab-separated).

Unit 3:

String manipulations: subscript operator, indexing, slicing a string Lists, tuples, and dictionaries- basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries.

Unit 4:

Simple Graphics and Image Processing: turtle module, simple 2d drawing, colors, shapes, digital images, image file formats, image processing, Simple image manipulations with image module.

Unit 5:

Classes and OOP: classes, objects, attributes and methods, inheritance, polymorphism, operator overloading, abstract classes, exception handling, Graphical user interfaces, Multithreading, Networks, and Client/Server Programming.

References:

1. Fundamentals of Python: First Programs- Kenneth Lambert, Course Technology, Cengage Learning, 2012, ISBN-13: 978-1-111-82270-5.
2. Python Programming for the Absolute Beginner - Michael Dawson, Premier Press.
3. Learning Python, 5th Edition- Mark Lutz, O'Reilly.

DIGITAL FORENSICS (CSEMTE45)

Unit 1:

Digital Forensics Science:

Forensics science, computer forensics, and digital forensics.

Computer Crime:

Criminalistics as it relates to the investigative process, analysis of cyber criminalistics area, holistic approach to cyber-forensics.

Unit 2:

Cyber Crime Scene Analysis:

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.

Unit 3:

Evidence Management & Presentation:

Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.

Unit 4:

Computer Forensics:

Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case.

Network Forensics:

Open-source security tools for network forensic analysis, requirements for preservation of network data.

Unit 5:

Mobile Forensics:

Mobile forensics techniques, mobile forensics tools.

Legal Aspects of Digital Forensics:

IT Act 2000, amendment of IT Act 2008, recent trends in mobile forensic technique and methods to search and seizure electronic evidence.

References:

1. John Sammons, The Basics of Digital Forensics, Elsevier.
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications.

AUDIT 1 & 2: ENGLISH FOR RESEARCH PAPER WRITING (CSEMTA01)

Unit 1:
Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

Unit 2:
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts, Introduction.

Unit 3:
Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check. 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.

Unit 4:
Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, and skills are needed when writing the Conclusions.

Unit 5:
Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission.

References:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books).
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press.
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book.
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011.

AUDIT 1 & 2: VALUE EDUCATION (CSEMTA02)

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, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour.

Unit 4:
Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature.

Unit 5:
Character and Competence: Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively.

References:

1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi.

AUDIT 1 & 2: DISASTER MANAGEMENT (CSEMTA03)

Unit 1:

Introduction:

Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster, Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Unit 2:

Repercussions of Disasters and Hazards:

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.

Unit 3:

Disaster Prone Areas in India:

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.

Unit 4:

Disaster Preparedness and Management:

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.

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 in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

References:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company.
2. Sahni, Pardeep Et.Al. (Eds.)," Disaster Mitigation Experiences and Reflections", Prentice Hall of India, New Delhi.
3. Goel S. L. , Disaster Administration And Management Text And Case Studies" ,Deep & Deep Publication Pvt. Ltd., New Delhi.

AUDIT 1 & 2: CONSTITUTION OF INDIA (CSEMTA04)

Unit 1:

History of Making of the Indian Constitution:
History Drafting Committee, (Composition & Working).
Philosophy of the Indian Constitution:
Preamble, Salient Features.

Unit 2:

Contours of Constitutional Rights & Duties:
Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

Unit 3:

Organs of Governance:
Parliament**,** Composition**,** Qualifications and Disqualifications**,** Powers and Functions**,** Executive**,** President**,** Governor**,** Council of Ministers Judiciary, Appointment and Transfer of Judges, Qualifications**,** Powers and Functions

Unit 4:

Local Administration:
District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative.
CEO of Municipal Corporation, Pachayati raj: Introduction.
PRI: Zila Pachayat, Elected officials and their roles.
CEO Zila Pachayat: Position and role.
Block level: Organizational Hierarchy (Different departments).
Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

Unit 5:

Election Commission:
Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners.
State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

References:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

AUDIT 1 and 2: PEDAGOGY STUDIES (CSEMTA05)

Unit 1:

Introduction and Methodology:

Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education, Conceptual framework, Research questions**,** Overview of methodology and Searching.

Unit 2:

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries, Curriculum, Teacher education.

Unit 3:

Evidence on the effectiveness of pedagogical practices, 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?, Theory of change, Strength and nature of the body of evidence for effective pedagogical Practices, Pedagogic theory and pedagogical approaches, Teachers' attitudes and beliefs and Pedagogic strategies.

Unit 4:

Professional development: alignment with classroom practices and follow up support, Peer support, Support from the head teacher and the community, Curriculum and assessment Barriers to learning: limited resources and large class sizes.

Unit 5:

Research gaps and future directions

Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

References:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA (CSEMTA06)

Unit 1:

Definitions of Eight parts of yog. (Ashtanga)

Unit 2:
Yam and Niyam
Do`s and Don't's in life
i) Ahinsa, satya, astheya, bramhacharya and aparigraha.
ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan.

Unit 3:
Asana and Pranayam
i) Various yoga poses and their benefits for mind & body.
ii) Regularization of breathing techniques and its effects-Types of pranayam.

References:

1. 'Yogic Asanas for Group Tarining-Part-I" : Janardan Swami Yogabhyasi Mandal, Nagpur
2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

GENETIC ALGORITHMS (CSEMTE51)

Unit 1:

Introduction:

Robustness of Traditional Optimization and Search Methods, The goals of Optimization, How are Genetic Algorithms Different from Traditional Methods?, A simple genetic algorithm, Genetic algorithms at work – a simulation by hand, Grist for the Search Mill – important similarities, Similarity templates (Schemata), Learning the Lingo.

Unit 2:

Genetic Algorithms Revisited:

Mathematical Foundations – Who shall live and who shall die? The fundamental theorem, Schema Processing at work: An example by hand revisited, the two armed and K-armed bandit problem, How many schemata are processed usefully?, The building block hypothesis, another perspective: the minimal Deceptive problem, Schemata revisit: similarity templates as hyper planes.

Unit 3:

Computer Implementation of a Genetic Algorithm:

Data structures, reproduction, crossover, and mutation, A time to reproduce, a time to cross, get with the main program, How well does it work? Mapping objective functions to fitness form, fitness scaling, codings, a multiparameter, mapped, fixed-point coding, discretization, Constraint Handling.

Unit 4:

Techniques In Genetic Search:

Dominance, diploidy and abeyance, inversion and other reordering operators, other micro operators, niche and speciation, multiobjective optimization - Knowledge-based techniques, genetic algorithms and parallel processors.

Unit 5:

Multi objective evolutionary optimization:

Pareto optimality, multi-objective evolutionary algorithms: MOGA, NSGA-II, etc. Applications of GA in engineering problems, job-shop scheduling and routing problems.

References:

1. David E.Goldberg, “Genetic Algorithms” – 1/e, Pearson Education.
2. Genetic algorithms in search, optimization and Mechine learning, By David E. Gold Berg Pearson Edition.
3. An Introduction to Genetic Algorithm by Melanie Mitchell.
4. The Simple Genetic Algorithm Foundation & Theores by Michael P. Vosk.

ADVANCED COMPUTER ARCHITECTURE (CSEMTE52)

Unit 1:
Review of Computer Organization and Architecture, RISC-CISC architecture, Instruction Set Principles and Examples, Memory addressing modes.

Unit 2:
Advance Pipelining and Instruction level parallelism, Hardware and Software technique for ILP, Dynamic Instruction Scheduling.

Unit 3:
Memory Hierarchy, Cache design issues, Virtual memory addressing, memory protection mechanisms, Multiprocessor memory architecture.

Unit 4:
Multi Core Architectures: Multi processor systems and interconnection networks, Software and Hardware multithreading, Case studies.

Unit 5:
Simulators in Computer Architecture, And Latest Research Paper Topics.

References:
1. ACM SIGARCH Computer Architecture News.
2. The WWW Computer Architecture page http://www.cs.wisc.edu/arch.
3. Hennessy J. L., D. Patterson, Computer Architecture – A quantitative Approach, Morgan Kuffman (5/e).
4. K. Hwang, Advanced Computer Architecture: Parallelism, Scalability, programmability, McGraw Hill.

INTERNET OF THINGS (CSEMTE53)

Unit 1:
Introduction to IoT: IoT Technology & Applications, Issues & Challenges, Integration of Sensors and Actuators, Sensor Networks, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, Machine-to-Machine Communications, Difference between IoT and M2M.

Unit 2:
Software Defined Networking, SDN for IoT, Network Function Virtualization, Interoperability in IoT, Basics of Programming for developing IoT: Introduction to Arduino and Python programming.

Unit 3:
Implementation of IoT with Raspberry Pi: Introduction to Raspberry Pi, Raspberry Architecture, Raspberry OS & Programming, Raspberry Pi I/O Interfaces, Raspberry Communication Interfaces, and Sensor based IoT application development on Raspberry Pi.

Unit 4:
Data Management & Computing: Data Handling and Analytics, Bigdata management in IoT, Cloud Computing, IoT Network & Cloud Services, Introduction to Cloud Service Model, Sensor-Cloud, Fog Computing.

Unit 5:
Case Studies: Smart Cities, Smart Homes, Surveillance applications, Vehicular networks - Connected Vehicles, Smart Lighting System, Weather Monitoring System, Smart Agriculture, Healthcare, Activity Monitoring, Industry applications, Other IoT applications.

References:

1. Pethuru Raj and Anupama C. Raman, “The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press, Taylor & Francis Group, 2017, ISBN: 9781498761284.
2. AdrianMcEwen, “Designing the Internet of Things”, Wiley Publishers, 2013, ISBN: 978-1-118-430620.
3.VijayMadisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”,2014, ISBN:9780996025515.
4. Daniel Kellmereit, “The Silent Intelligence: The Internet of Things”, 2013, ISBN: 0989973700.
5. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice", Wiley Publishers, 2010, ISBN 978-0-470-99765-9.

NATURAL LANGUAGE INTERFACE (CSEMTE54)

Unit 1:
Introduction: Models and Algorithms, The Turing Test, Regular Expressions, Basic Regular Expression Patterns, Finite State Automata, Regular Languages and FSAs, Morphology, Inflectional Morphology, Derivational Morphology, Finite, State Morphological Parsing , Combining an FST Lexicon and Rules, Porter Stemmer.

Unit 2:
N- Grams Models of Syntax, Counting Words, Unsmoothed N, grams – Smoothing, Back off – Deleted Interpolation – Entropy , English Word Classes , Tagsets for English , Part of Speech Tagging, Rule, Based Part of Speech Tagging, Stochastic Part of Speech Tagging, Transformation, Based Tagging. Context Free Grammars for English Syntax, Context, Free Rules and Trees, Sentence, Level Constructions – Agreement – Sub Categorization.

Unit 3:
Parsing: Top-down, Earley Parsing, Feature Structures, Probabilistic Context, Free Grammars Representing Meaning, Meaning Structure of Language, First Order Predicate Calculus Representing Linguistically Relevant Concepts, Syntax, Driven Semantic Analysis.

Unit 4:
Semantic Attachments, Syntax, Driven Analyzer, Robust Analysis, Lexemes and Their Senses, Internal Structure , Word Sense Disambiguation, Information Retrieval Discours, Reference Resolution – Text Coherence Discourse Structure.

Unit 5:
Dialog and Conversational Agents, Dialog Acts, Interpretation, Coherence, Conversational Agents, Language Generation Architecture, Surface Realizations, Discourse Planning, Machine Translation, Transfer Metaphor, Interlingua, Statistical Approaches.

References:
1. D. Jurafsky and J. Martin “Speech and Language Processing: An Introduction to Natural Language. Processing, Computational Linguistics, and Speech Recognition”.
2. C. Manning and H. Schutze, “Foundations of Statistical Natural Language Processing”.
3. James Allen. “Natural Language Understanding”, Addison Wesley, 1994.

MODELING AND SIMULATION (CSEMTE55)

Unit 1:

Introduction:

Systems, models, deterministic and stochastic systems, static and dynamic systems, discrete event simulation, continuous simulation, Monte Carlo simulation. Discrete Event Simulation: Time-advance mechanisms, event modeling of discrete dynamic systems, event graphs, process oriented and event oriented approaches, single-server single queue model.

Unit 2:

GPSS:

Program model, entities and transactions, blocks in GPSS, user defined functions, SNA, logic switches, save locations, user chains, tabulation of result, programming examples. Random Number Generation: Congruence generators, long period generators, statistical quality measures of generators, uniformity and independence testing, chi-square and other hypotheses testing, runs testing

Unit 3:

Random Variable Generation:

Random variable, probability density and distribution functions, Location, scale and shape parameters, discrete and continuous probability distributions; Inverse transform method, composition and acceptance rejection methods, efficiency and quality measures of generators; Input Modelling, selection of distribution for a random source, fitting distributions to data, constructing empirical distributions from data.

Unit 4:

Random Processes and Queuing Models:

Random process, discrete/continuous time processes, Markovian property, Markov chain, state transition diagrams, birth-death process, Little's theorem, steady state analysis of M/M/1 model; multi-server models, M/G/1 and other queuing models, Burke's theorem, network of queues, Jackson theorem.

Unit 5:

Network Simulation:

SimEvent tool box in MATLAB, general features of network simulation packages, case study of OMNET++/ns2/ns3/NetSim.

References:

1. Network Simulation: SimEvent tool box in MATLAB, general features of network simulation packages, case study of OMNET++/ns2/ns3/NetSim.
2. Banks J., Carson, L.S., Nelson, B.L. and Nicol, D.M., "Discrete Event System Simulation", 4th Ed., Pearson Education.
3. Law, A.M. and Kelton, W.D., "Simulation, Modeling and Analysis", 3rd Ed., Tata McGraw-Hill.
4. Alberto Leon-Garcia, "Probability and Random Processes for Electrical Engineers", 2nd Ed., Pearson Education.

INDUSTRIAL SAFETY (CSEMTOE1)

Unit 1:
Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive 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.

Unit 2:
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 & its relation with replacement economy, Service life of equipment.

Unit 3:
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.

Unit 4:
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.

Unit 5:
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.

Reference:
1. Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
2. Maintenance Engineering, H. P. Garg, S. Chand and Company.
3. Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.
4. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

WASTE TO ENERGY (CSEMTOE2)

Unit 1:
Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors.

Unit 2:
Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit 3:
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.

Unit 4:
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.

Unit 5:
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.

References:

1. Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
2. Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.
4. Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.

COST MANAGEMENT OF ENGINEERING PROJECTS (CSEMTOE3)

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.

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 nontechnical activities, Detailed Engineering activities, Pre project execution main clearances and documents Project team: Role of each member.

Unit 3:
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.

Unit 4:
Cost Behavior and Profit Planning Marginal Costing, Distinction between Marginal Costing and Absorption Costing, Break-even Analysis, Cost, Volume and 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 Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.

Unit 5:
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, Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

References:
2. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi.
3. Charles T. Horngren and George Foster, Advanced Management Accounting.
4. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting.
5. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher.
6. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

OPERATIONS RESEARCH (CSEMTOE4)

Unit 1:
Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models.

Unit 2:
Formulation of a LPP, Graphical solution revised simplex method, duality theory, dual simplex method, sensitivity analysis, parametric programming.

Unit 3:
Nonlinear programming problem, Kuhn-Tucker conditions min cost flow problem, max flow problem, CPM/PERT.

Unit 4:
Scheduling and sequencing, single server and multiple server models, deterministic inventory models, Probabilistic inventory control models - Geometric Programming.

Unit 5:
Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation.

References:
1. H.A. Taha, Operations Research, An Introduction, PHI, 2008.
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008.
4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009.
5. Pannerselvam, Operations Research: Prentice Hall of India 2010.
6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010.

COMPOSITE MATERIALS (CSEMTOE5)

Unit 1:
INTRODUCTION: 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.

Unit 2:
REINFORCEMENTS: 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.

Unit 3:
Manufacturing of Metal Matrix Composites: 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.

Unit 4:
Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs, hand layup method Autoclave method – Filament winding method, Compression moulding, Reaction injection moulding, Properties and applications.

Unit 5:
Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure, Laminate first play failure-insight strength, Laminate strength-ply discount truncated maximum strain criterion, strength design using caplet plots, stress concentrations.

References:
1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.