R18

M.Tech – CSE

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
(AUTONOMOUS)
Master of Technology
Department of Computer Science & Engineering
I M. Tech. – I Semester (CSE)

S.No.	Course Code	Subject	L	T	P/Drg	C
1	18HS0841	Mathematical Foundations of Computer Science	3	0	0	3
2	18CS5001	Advanced Data Structures	3	0	0	3
3	18CS5010 18CS5011 18CS5012	**Program Elective I** Machine Learning Wireless Sensor Networks Introduction to Intelligent Systems	3	0	0	3
4	18CS5013 18CS5014 18CS5015	**Program Elective II** Data Science Distributed Systems Advanced Wireless and Mobile Networks	3	0	0	3
5	18HS0823	Research Methodology and IPR	2	0	0	2
6	18CS5002	Advanced Data Structures Lab	-	-	4	2
7	18CS5016	Machine Learning Lab	-	-	4	2
8	18HS0818 18CE1029 18HS0825 18HS0826	**Audit I** English for Research PaperWriting Disaster Management Sanskrit for Technical Knowledge Value Education	3	0	0	0
Contact Periods / Week			16	00	08	**18**
			Total/Week 24			

I M. Tech. – II Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	18CS5003	Advance Algorithms	3		0	3
2.	18CS5004	Soft Computing	3		0	3
3.	18CS5017 18CS5018 18CS5019	**Program Elective III** Data Preparation and Analysis Secure Software Design & Enterprise Computing Computer Vision	3		0	3
4.	18CS5020 18CS5021 18CS5022	**Program Elective IV** Human and Computer Interaction GPU Computing Digital Forensics	3		0	3
5.	18CS5005	Advance Algorithms Lab	-	-	4	2
7.	18CS5006	Soft Computing Lab	-	-	4	2
7.	18CS5007	Mini Project with Seminar	2	-	0	2
8.	18HS0829 18HS0827 18HS0828 18HS0819	**Audit II** Constitution of India Pedagogy Studies Stress Management by Yoga Personality Development through Life Enlightenment Skills.	3	0	0	0
Contact Periods / Week			14	00	08	**18**
			Total/Week 22			

II M. Tech. – I Semester (CSE)

S. No.	Course Code	Subject	L	T	P	C
1.	18CS5023 18CS5024 18CS5025	**Program Elective V** Mobile Applications and Services Compiler for HPC Optimization Techniques	3	0	0	3
2.	18HS0824 18ME3121 18ME3122 18CE1028 18ME3128 18EE2128	**Open Elective** 1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering **Projects** 5. Composite Materials 6. Waste to Energy	3	0	0	3
3.	18CS5008	Phase-I Dissertation-I /Industrial Project	0	0	20	10
Contact Periods / Week			06	00	20	**16**
			Total/Week 26			

II M. Tech. – II Semester (CSE)

S.No.	Course Code	Subject	L	T	P	C
1.	18CS5009	Phase –II Dissertation II	0	0	32	16
Contact Periods / Week			0	0	32	
			Total/Week 32			

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(18HS0841) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Objectives:

- To understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning
- To develop the understanding of the mathematical and logical basis to many modern Techniques in information technology like machine learning, programming language design, and concurrency.

Course Outcomes:

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

- To understand the basic notions of discrete and continuous probability.
- To understand the methods of statistical inference, and the role that sampling distributions paly in those methods.
- To be able to perform correct and meaningful statistical analyses, of simple to moderate complexity.

UNIT I

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.

UNIT II

Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood.

UNIT III

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.

UNIT IV

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.

UNIT V

Recent Trends in various distribution functions in mathematical field of computer science for varying fields like bio informatic, soft computing, and computer vision.

Text /References:

1. John Vince, Foundation Mathematics for Computer Science, Springer.
2. K. Trivedi.Probability and Statistics with Reliability, Queuing, and Computer Science Applications, Wiley.
3. M. Mitzenmacher and E. Upfal.Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
4. Alan Tucker, Applied Combinatorics, Wiley

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(18CS5001) ADVANCED DATA STRUCTURES

Course Objectives:

The student should be able to choose appropriate data structures, understand the ADT/libraries, and use it to design algorithms for a specific problem.

- To familiarize students with advanced paradigms and data structure used to solve algorithmic problems.
- Student should be able to come up with analysis of efficiency and proofs of correctness.

Course Outcomes:

Understand the implementation of symbol table using hashing techniques.

- Develop and analyze algorithms for red-black trees, B-trees and Splay trees.
- Develop algorithms for text processing applications.
- Identify suitable data structures and develop algorithms for computational geometry problems.

UNIT I

Dictionaries: Definition, Dictionary Abstract Data Type, 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.

UNIT II

Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists
Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees

UNIT III

Text Processing: Sting Operations, 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.

UNIT IV

Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quadtrees, k-D Trees.

UNIT V

Recent Trends in Hashing, Trees, and various computational geometry methods for efficiently solving the new evolving problem

Text/ References:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.

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Program Elective I
(16CS5010) MACHINE LEARNING

Course Objectives:

To learn the concept of how to learn patterns and concepts from data without being explicitly programmed in various IOT nodes.

- To design and analyze various machine learning algorithms and techniques with a modern
- outlook focusing on recent advances.
- Explore supervised and unsupervised learning paradigms of machine learning.
- To explore Deep learning technique and various feature extraction strategies.

Course Outcomes:

After completion of course, students would be able to:

- Extract features that can be used for a particular machine learning approach in various IOT applications.
- To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.
- To mathematically analyze various machine learning approaches and paradigms.

UNIT I

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 II

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 III

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)

UNIT IV

Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning 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 V

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

Text /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.

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Program Elective I
(16CS501) WIRELESS SENSOR NETWORKS
(Common to all Branches)

Course Objectives:

- Architect sensor networks for various application setups.
- Devise appropriate data dissemination protocols and model links cost.
- Understanding of the fundamental concepts of wireless sensor networks and have a basic knowledge of the various protocols at various layers.
- Evaluate the performance of sensor networks and identify bottlenecks.

Course Outcomes:

- Describe and explain radio standards and communication protocols for wireless sensor networks.
- Explain the function of the node architecture and use of sensors for various applications.
- Be familiar with architectures, functions and performance of wireless sensor networks systems and platforms.

UNIT I

Introduction to Wireless Sensor Networks: Course Information, Introduction to Wireless Sensor Networks: Motivations, Applications, Performance metrics, History and Design factors

Network Architecture: Traditional layered stack, Cross-layer designs, Sensor Network Architecture

Hardware Platforms: Motes, Hardware parameters

UNIT II

Introduction to ns-3: Introduction to Network Simulator 3 (ns-3), Description of the ns-3 core module and simulation example.

UNIT III

Medium Access Control Protocol design: Fixed Access, Random Access, WSN protocols: synchronized, duty-cycled

Introduction to Markov Chain: Discrete time Markov Chain definition, properties, classification and analysis.

MAC Protocol Analysis: Asynchronous duty-cycled. X-MAC Analysis (Markov Chain)

UNIT IV

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

Routing protocols: Introduction, MANET protocols

Routing protocols for WSN: Resource-aware routing, Data-centric, Geographic Routing, Broadcast, Multicast

UNIT V

Opportunistic Routing Analysis: Analysis of opportunistic routing (Markov Chain), Advanced topics in wireless sensor networks., Recent development in WSN standards, software applications.

TEXT BOOKS:

1.W. Dargie and C. Poellabauer, "Fundamentals of Wireless Sensor Networks –Theory and Practice", Wiley 2010

2.KazemSohraby, Daniel Minoli and TaiebZnati, "wireless sensor networks -Technology, Protocols, and Applications", Wiley Interscience 2007

REFERENCES:

1. Takahiro Hara,Vladimir I. Zadorozhny, and Erik Buchmann, "Wireless Sensor Network Technologies for the Information Explosion Era", springer 2010

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Program Elective I

(18CS5012) INTRODUCTION TO INTELLIGENT SYSTEMS

Course Objectives:

The aim of the course is to introduce to the field of Artificial Intelligence (AI) with emphasis on its use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach. It explores the essential theory behind methodologies for developing systems that demonstrate intelligent behaviour including dealing with uncertainty, learning from experience and following problem solving strategies found in nature.

Course Outcomes:

Able to Demonstrate knowledge of the fundamental principles of intelligent systems and would be able to analyse and compare the relative merits of a variety of AI problem solving techniques.

UNIT I

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

UNIT II

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

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

UNIT III

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 IV

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 V

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.

TEXT BOOKS:

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.

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Program Elective II
(16CS5013) DATA SCIENCE

Course objectives:

- Provide you with the knowledge and expertise to become a proficient data scientist.
- Demonstrate an understanding of statistics and machine learning concepts that are vital for data science;
- Produce Python code to statistically analyze a dataset;
- Critically evaluate data visualizations based on their design and use for communicating stories from data

Course outcome

- Explain how data is collected, managed and stored for data science;
- Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists;
- Implement data collection and management scripts using MongoDB

UNIT I

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

UNIT II

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 – III

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 IV

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

UNIT V

Applications of Data Science, Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

TEXT BOOKS:

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.

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Program Elective II
(16CS5014) DISTRIBUTED SYSTEMS

Course Objectives:

- To explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- To list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
- To recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- To design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why;
- To build distributed system software using basic OS mechanisms as well as higher-level middleware and languages.

Course outcomes:

- Able to demonstrate knowledge of the basic elements and concepts related to distributed system technologies;
- Able to demonstrate knowledge of the core architectural aspects of distributed systems;
- Able to design and implement distributed applications;
- Able to demonstrate knowledge of details the main underlying components of distributed systems (such as RPC, file systems);
- Able to use and apply important methods in distributed systems to support scalability and fault tolerance;
- Able to demonstrate experience in building large-scale distributed applications.

UNIT- I:

Characterization of Distributed Systems-Introduction-Examples - Resource Sharing and the Web - Challenges. System Models - Architectural - Fundamental. Interprocess Communication - Introduction - API for Internet protocols - External data representation and marshaling - Client -server communication - Group communication - Case study: Interprocess Communication in UNIX.

UNIT- II:

Distributed Objects and Remote Invocation - Introduction - Communication between distributed objects - Remote procedure calls - Events and notifications - Case study: Java RMI. Operating System Support - Introduction - OS layer - Protection - Processes and threads - Communication and invocation OS architecture.

UNIT- III:

Distributed File Systems - Introduction - File service architecture - Case Study: Sun Network File System - Enhancements and further developments. Name Services - Introduction - Name Services and the Domain Name System - Directory Services - **Case Study**: Global Name Service.

UNIT- IV:

Time and Global States - Introduction - Clocks, events and process states - Synchronizing physical clocks - Logical time and logical clocks - Global states - Distributed debugging. Coordination and Agreement - Introduction - Distributed mutual exclusion - Elections - Multicast communication - Consensus and related problems.

UNIT- V:

Distributed Shared Memory - Introduction - Design and implementation issues - Sequential consistency and Ivy case study Release consistency and Munin case study - Other consistency models. CORBA Case Study - Introduction - CORBA RMI - CORBA services.

TEXT BOOKS:

1. George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCES:

1. A.S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms",Second Edition, Prentice Hall, 2006.
2. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.
3. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.
4. Nancy A. Lynch, "Distributed Algorithms", The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers, 2000.

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Program Elective II
(16CS5015) ADVANCED WIRELESS AND MOBILE NETWORKS

Course Objectives:

The students should get familiar with the wireless/mobile market and the future needs and challenges.

- To get familiar with key concepts of wireless networks, standards, technologies and their basic operations
- To learn how to design and analyse various medium access
- To learn how to evaluate MAC and network protocols using network simulation software tools.
- The students should get familiar with the wireless/mobile market and the future needs and challenges.

Course Outcomes:

After completion of course, students would be:

- Demonstrate advanced knowledge of networking and wireless networking and understand various types of wireless networks, standards, operations and use cases.
- Be able to design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performance analysis.
- Demonstrate knowledge of protocols used in wireless networks and learn simulating wireless networks.
- Design wireless networks exploring trade-offs between wire line and wireless links. Develop mobile applications to solve some of the real world problems.

UNIT- I:

INTRODUCTION:

Wireless Networking Trends, Key Wireless Physical Layer Concepts, Multiple Access Technologies -CDMA, FDMA, TDMA, Spread Spectrum technologies, Frequency reuse, Radio Propagation and Modeling, Challenges in Mobile Computing: Resource poorness, Bandwidth, energy etc.

WIRELESS LOCAL AREA NETWORKS:

IEEE 802.11 Wireless LANs Physical & MAC layer, 802.11 MAC Modes (DCF PCF) IEEE 802.11 standards, Architecture & protocols, Infrastructure vs. Adhoc Modes, Hidden Node & Exposed Terminal Problem, Problems, Fading Effects in Indoor and outdoor WLANs, WLAN Deployment issues

UNIT- II:

WIRELESS CELLULAR NETWORKS:

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.

UNIT- III

WiMAX (Physical layer, Media access control, Mobility and Networking), IEEE 802.22

Wireless Regional Area Networks, IEEE 802.21 Media Independent Handover Overview

WIRELESS SENSOR NETWORKS: Introduction, Application, Physical, MAC layer and Network Layer, Power Management, Tiny OS Overview.

UNIT- IV

WIRELESS PANs: Bluetooth AND Zigbee, Introduction to Wireless Sensors.

SECURITY: Security in wireless Networks Vulnerabilities, Security techniques, Wi-Fi Security, DoS in wireless communication.

UNIT- V

ADVANCED TOPICS

IEEE 802.11x and IEEE 802.11i standards, Introduction to Vehicular Adhoc Networks

References:

1. Schiller J., Mobile Communications, Addison Wesley 2000
2. Stallings W., Wireless Communications and Networks, Pearson Education 2005
3. Stojmenic Ivan, Handbook of Wireless Networks and Mobile Computing, John Wiley and Sons Inc 2002
4. Yi Bing Lin and Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley and Sons Inc 2000
5. Pandya Raj, Mobile and Personal Communications Systems and Services, PHI 200

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(16HS0823) RESEARCH METHODOLOGY AND IPR

Course Objectives:

- Understand some basic concepts of research and its methodologies.
- Identify appropriate research topics.
- Enrich knowledge to their research field.
- Process for filing Patent.

Course outcomes:

At the end of this course, students will be able to

- Understand research problem formulation. Analyze research related information Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

UNIT I:

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 II:

Effective literature studies approaches, analysis Plagiarism, Research ethics,

UNIT III:

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 IV:

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 V

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

TEXT BOOKS:

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. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners" Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
4. Mayall , "Industrial Design", McGraw Hill, 1992. Niebel , "Product Design", McGraw Hill, 1974.
5. Asimov , "Introduction to Design", Prentice Hall, 1962.
6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
7. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

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(18CS5002) ADVANCED DATA STRUCTURES LAB

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
   a) Linear search b) Binary search
2. Write Java programs to implement the following using an array.
   a) Stack ADT b) Queue ADT
3. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
4. Write a Java program to implement circular queue ADT using an array.
5. Write Java programs to implement the following using a singly linked list.
   a) Stack ADT b) Queue ADT
6. Write Java programs to implement the deque (double ended queue) ADT using
   a) Array b) Singly linked list c) Doubly linked list.
7. Write a Java program to implement priority queue ADT.
8. Write a Java program to perform the following operations:
   a) Construct a binary search tree of elements.
   b) Search for a key element in the above binary search tree.
   c) Delete an element from the above binary search tree.
9. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
10. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
11. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
    a) Preorder b) Inorder c) Postorder.
12. Write Java programs for the implementation of bfs and dfs for a given graph.
13. Write Java programs for implementing the following sorting methods:
    a) Bubble sort b) Merge sort c) Binary tree sort d) Insertion sort
    e) Heap sort f) Quick sort g) Radix sort
14. Write a Java program to perform the following operations:
    a) Insertion into a B-tree b) Searching in a B-tree
15. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.
16. Write a Java program that implements KMP algorithm for pattern matching.

Reference Books:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition,Addison-Wesley (Pearson Education).

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(18CS5002) MACHINE LEARNING LAB

LIST OF EXPERIMENTS:

1. Decision Tree learning
2. Implement Logistic Regression
3. Implement classification using Multilayer perceptron
4. Implement classification using SVM
5. Implement Boosting and Bagging for Ensemble Learning
6. Implement K-means Clustering to Find Natural Patterns in Data
7. Implement Principle Component Analysis for Dimensionality Reduction
8. Maximum Likelihood Estimation of Gaussian Mixtures Using the Expectation Maximization Algorithm
9. Estimate Hidden Markov Model Parameters 10. Implement Genetic algorithms 11. Implement K-nearest Neighbors

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AUDIT-I
(18HS0818) ENGLISH FOR RESEARCH PAPER WRITING

Course objectives:
Students will be able to:
1. Understand that how to improve your writing skills and level of readability.
2. Learn about what to write in each section.
3. Understand the skills needed when writing a Title.
4. Ensure the good quality of paper at very first-time submission.

UNIT-I
Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

UNIT-II
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts and Introduction.

UNIT-III
Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT-IV
Key skills needed when writing a Title, key skills needed when writing abstract, key skills needed when writing an Introduction, skills when writing a Review of the Literature.

UNIT-V
Skills needed when writing the Methods, skills needed when writing the Results, skills needed when writing the Discussion, skills needed when writing the Conclusions.

Suggested Studies:

1. Goldbort R (2006) Writing for Science, Yale University Press.
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 Books.
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht. Heidelberg London, 2011.

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I M.Tech. – I Sem.(CSE)

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AUDIT-I
(18CE1029) DISASTER MANAGEMENT*

Course *Objective:*

The objectives of this **subject** is to give the basic knowledge of Environmental Hazards and disasters. The syllabus includes the basics of Endogenous and Exogenous hazards and gives a suitable picture on the different types of hazard and disaster mitigation methods.

Course Outcomes:

On completion of the course the students will have knowledge on

1. Types of disasters and their effects on environment
2. Causes of disasters
3. Disaster management through engineering applications

UNIT-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology- Landscape Approach - Ecosystem Approach - Perception approach - Human ecology& its application in geographical researches.

UNIT –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters – Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards – Exogenous Hazards

UNIT–III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides – Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions – Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes – Hazardous effects of - earthquakes - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

UNIT –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/disasters infrequent events: Cyclones – Lightning – Hailstorms Cyclones: Tropicalcyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospherichazards/ disasters: - Floods- Droughts- Cold waves- Heat waves. Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception &mitigation).Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards /Disasters-Physical hazards/ Disasters-Soil Erosion Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion. Chemical hazards/ disasters: Release of toxic chemicals, nuclear explosion- Sedimentation processes. Sedimentation processes: -Global

Sedimentation problems- Regional Sedimentation problems- Sedimentation &Environmental problems- Corrective measures of Eros ion & Sedimentation. Biologicalhazards/ disasters: - Population Explosion.

UNIT –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

Text books:

1. Disaster Management by Rajib Shah, Universities Press, India, 2003
2. Disaster Science and Management by Tushar Bhattacharya, TMHPublications.
3. Disaster Mitigation: Experiences and Reflections by PardeepSahni
4. Natural Hazards & Disasters by Donald Hyndman & David Hyndman –Cengage Learning

References:

1. The Environment as Hazards by Kates, B.I & White, G.F, Oxford Publishers, NewYork, 1978
2. Disaster Management by R.B. Singh (Ed), Rawat Publication, New Delhi, 2000
3. Disaster Management by H.K. Gupta (Ed), Universiters Press, India, 2003
4. Space Technology for Disaster Mitigation in India (INCED) by R.B. Singh, University of Tokyo, 1994.

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AUDIT-I
(18HS0825) SANSKRIT FOR TECHNICAL KNOWLEDGE

Course Objectives:

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world.
- Learning of Sanskrit to improve brain functioning.
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects Enhancing the memory power.
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature.

Course Outcomes:

Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

UNIT-I

Alphabets in Sanskrit, Past/Present/Future Tenses, Simple Sentences.

UNIT-II

Order, Introduction of roots, Technical information about Sanskrit Literature.

UNIT-III

Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

Text Books:

1. "Abhyaspustakam" – Dr.Vishwas, Samskrita-Bharti Publication, New Delhi
2. "Teach Yourself Sanskrit" PrathamaDeeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

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AUDIT-I
(18HS0826) VALUE EDUCATION

Course Objectives:

Students will be able to

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course outcomes:

- Students will be able to:
- Knowledge of self-development.
- Learn the importance of Human values.

UNIT-I

Values and self-development – Social values and individual attitudes, Work ethics and Indian vision of humanism, Moral and non-moral valuation, Standards and principles, Value judgements.

UNIT-II

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 and Discipline.

UNIT-III

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, 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-IV

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.

Text Books:

1. *Values and Ethics for organizations Theory and practice*, Chakroborty, S.K. Oxford UniversityPress, New Delhi, 2010.
2. *Value Education*, N. Venkataiah, APH Publishing Corporation, 1998.

Reference Books:

1. *Value Education and Quality Teaching*: The double Helix effect, 2010
2.Values Education and lifelong learning: Principles, Policies,and Programs, N Aspin, D Chapman, Springer Publication, 2012.

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(18CS5003) ADVANCE ALGORITHMS

Course Objective:

- Introduce students to the advanced methods of designing and analyzing algorithms.
- The student should be able to choose appropriate algorithms and use it for a specific problem.
- To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems.
- Students should be able to understand different classes of problems concerning their computation difficulties.
- To introduce the students to recent developments in the area of algorithmic design.

Course Outcomes:

- After completion of course, students would be able to:
- Analyze the complexity/performance of different algorithms.
- Determine the appropriate data structure for solving a particular set of problems.
- Categorize the different problems in various classes according to their complexity.
- Students should have an insight of recent activities in the field of the advanced data structure.

UNIT-I

Sorting: Review of various sorting algorithms, topological sorting

Graph: Definitions and Elementary Algorithms: Shortest path by BFS, shortest path in edge-weighted case (Dijkstra's), depth-first search and computation of strongly connected components, emphasis on correctness proof of the algorithm and time/space analysis, example of amortized analysis.

UNIT-II

Matroids: Introduction to greedy paradigm, algorithm to compute a maximum weight maximal independent set. Application to MST.

Graph Matching: Algorithm to compute maximum matching. Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path.

UNIT-III

Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm.

Matrix Computations: Stassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrix operations, LUP-decomposition.

UNIT-IV

Shortest Path in Graphs: Floyd-Warshall algorithm and introduction to dynamic programming paradigm. More examples of dynamic programming.

Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation. Extension to polynomials. Application: Interpolation problem.

Discrete Fourier Transform (DFT): In complex field, DFT in modulo ring. Fast Fourier Transform algorithm. Schonhage-Strassen Integer Multiplication algorithm.

UNIT-V

Linear Programming: Geometry of the feasibility region and Simplex algorithm **NP-completeness:** Examples, proof of NP-hardness and NP-completeness.

One or more of the following topics based on time and interest - Approximation algorithms, Randomized Algorithms, Interior Point Method, Advanced Number Theoretic Algorithm

References:

1. "Introduction to Algorithms" by Cormen, Leiserson, Rivest, Stein.
2. "The Design and Analysis of Computer Algorithms" by Aho, Hopcroft, Ullman.
3. "Algorithm Design" by Kleinberg and Tardos

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(18CS5004) SOFT COMPUTING

Course Objectives:

- To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
- To implement soft computing based solutions for real-world problems.
- To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.
- To provide student an hand-on experience on MATLAB to implement various strategies.

Course Outcomes:

After completion of course, students would be able to:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem

UNIT-I

INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS: Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics.

UNIT-II

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-III

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-IV

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

UNIT-V

Mat lab/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

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Program Elective III
(18CS5017) DATA PREPARATION AND ANALYSIS

Course Objectives:

- To prepare the data for analysis and develop meaningful Data Visualizations

Course Outcomes:

After completion of course, students would be:

- Able to extract the data for performing the Analysis.

UNIT-I

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

UNIT-II

Data Cleaning:
Consistency checking, Heterogeneous and missing data, Data Transformation and Segmentation

UNIT-III

Exploratory Analysis:
Descriptive and comparative statistics, Clustering and association, Hypothesis Generation

UNIT-IV

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

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Program Elective III
(18CS5018) SECURE SOFTWARE DESIGN & ENTERPRISE COMPUTING

Course Objectives:

- To learn parallel programming with Graphics Processing Units (GPUs).

Course Outcomes:

After completion of course, students would be:

- Students would learn concepts in parallel programming, implementation of programs on GPUs, debugging and profiling parallel programs.

UNIT-I

Introduction: 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.

UNIT-II

Memory: 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.

UNIT-III

Synchronization: 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.
Functions: Device functions, Host functions, Kernels functions, Using libraries (such as Thrust), and developing libraries.

UNIT-IV

Support: Debugging GPU Programs. Profiling, Profile tools, Performance aspects
Streams: Asynchronous processing, tasks, Task-dependence, Overlapped data transfers, Default Stream, Synchronization with streams. Events, Event-based- Synchronization - Overlapping data transfer and kernel execution, pitfalls.

UNIT-V

Case Studies: Image Processing, Graph algorithms, Simulations, Deep Learning.
Advanced topics: Dynamic parallelism, Unified Virtual Memory, Multi-GPU processing, Peer access, Heterogeneous processing.

References:

1. Programming Massively Parallel Processors: A Hands-on Approach; David Kirk, Wen-meiHwu; Morgan Kaufman; 2010 (ISBN: 978-0123814722)
2. CUDA Programming: A Developer's Guide to Parallel Computing with GPUs; Shane Cook; Morgan Kaufman; 2012 (ISBN: 978-0124159334)

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Program Elective III
(18CS5019) COMPUTER VISION

Course Objectives:

- Be familiar with both the theoretical and practical aspects of computing with images.
- Have described the foundation of image formation, measurement, and analysis.
- Understand the geometric relationships between 2D images and the 3D world.
- Grasp the principles of state-of-the-art deep neural networks.

Course Outcomes:

After completion of course, students would be able to:

- Developed the practical skills necessary to build computer vision applications.
- To have gained exposure to object and scene recognition and categorization from images.

UNIT-I

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

UNIT-II

Edge detection, Edge detection performance, Hough transform, corner detection.

UNIT-III

Segmentation, Morphological filtering, Fourier transforms.

UNIT-IV

Feature extraction, shape, histogram, color, spectral, texture, using CVIPtools, Feature analysis, feature vectors, distance /similarity measures, data preprocessing.

Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians Classification: Discriminant Function, Supervised, Un-supervised, Semisupervised

UNIT-V

Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods.

Recent trends in Activity 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.

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Program Elective IV
(18CS5020) HUMAN AND COMPUTER INTERACTION

Course Objectives:

- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Be aware of mobile Human Computer interaction.
- Learn the guidelines for user interface.

Course Outcomes:

After completion of course, students would be:

- Understand the structure of models and theories of human computer interaction and vision.
- Design an interactive web interface on the basis of models studied.

UNIT-I

Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

UNIT-II

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT-III

Cognitive models –Socio-Organizational issues and stake holder requirements – Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT-IV

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT-V

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

Recent Trends: Speech Recognition and Translation, Multimodal System

References:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, 3rd Edition, Pearson Education, 2004 (UNIT I , II & III)
2. Brian Fling, “Mobile Design and Development”, First Edition , O Reilly Media Inc., 2009 (UNIT –IV)
3. Bill Scott and Theresa Neil, “Designing Web Interfaces”, First Edition, O Reilly, 2009. (UNIT-V)

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Program Elective IV
(18CS5021) GPU COMPUTING

Course Objectives:

- To learn parallel programming with Graphics Processing Units (GPUs).

Course Outcomes:

After completion of course, students would be:

- Students would learn concepts in parallel programming, implementation of programs on GPUs, debugging and profiling parallel programs.

UNIT-I

Introduction: 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.

UNIT-II

Memory: 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.

UNIT-III

Synchronization: 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

Functions: Device functions, Host functions, Kernels functions, Using libraries (such as Thrust), and developing libraries.

UNIT-IV

Support: Debugging GPU Programs. Profiling, Profile tools, Performance aspects

Streams: Asynchronous processing, tasks, Task-dependence, Overlapped data transfers, Default Stream, Synchronization with streams. Events, Event-based- Synchronization - Overlapping data transfer and kernel execution, pitfalls.

UNIT-V

Case Studies: Image Processing, Graph algorithms, Simulations, Deep Learning

Advanced topics: Dynamic parallelism, Unified Virtual Memory, Multi-GPU processing, Peer access, Heterogeneous processing.

References:

1. Programming Massively Parallel Processors: A Hands-on Approach; David Kirk, Wen meiHwu;Morgan Kaufman; 2010 (ISBN: 978-0123814722)
2. CUDA Programming: A Developer's Guide to Parallel Computing with GPUs; Shane Cook; Morgan Kaufman; 2012 (ISBN: 978-0124159334)

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Program Elective IV
(18CS5022) DIGITAL FORENSICS

Course Objectives:

- Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
- Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
- Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools
- E-evidence collection and preservation, investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics

Course Outcomes:

After completion of course, students would be able to:

- Understand relevant legislation and codes of ethics
- Computer forensics and digital detective and various processes, policies and procedures
- E-discovery, guidelines and standards, E-evidence, tools and environment.
- Email and web forensics and network forensics

UNIT-I

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-II

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-III

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-IV

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-V

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

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AUDIT-II
(16HS0816) CONSTITUTION OF INDIA

Course Objectives:

Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes:

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

UNIT –I
History of Making of the Indian Constitution:

History, Drafting Committee, (Composition & Working)

UNIT-II
Philosophy of the Indian Constitution:

Preamble, Salient Features

UNIT-III
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- IV

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-V

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

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.

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AUDIT-II
(18HS0827) PEDAGOGY STUDIES

Course Objectives:

Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Outcomes:

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

UNIT-I

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-II

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

UNIT-III

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-IV

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-V

Research gaps and future directions: Research design – Contexts- Pedagogy- Teacher education- Curriculum and assessment- Dissemination and research impact.

Text Books:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
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.

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AUDIT-II
(18HS0828) STRESS MANAGEMENT BY YOGA

Course Objectives:

- *To achieve overall health of body and mind*
- *To overcome stress*

Course Outcomes:

Students will be able to:

- *Develop healthy mind in a healthy body thus improving social health also*
- *Improve efficiency.*

UNIT-I

Definitions of Eight parts of yoga(Ashtanga)

UNIT-II

Yam and Niyam. Do`s and Don'ts in life:

i) Ahinsa, satya, astheya, bramhacharya and aparigraha.

ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan.

UNIT-III

Asan and Pranayam:

i) Various yog poses and their benefits for mind & body.

ii)Regularization of breathing techniques and its effects-Type of pranayam.

Text Books:

1. 'Yogic Asanas for Group Tarining-Part-I" :Janardan Swami Yogabhyasi Mandal, Nagpur Model Curriculum of Engineering & Technology PG Courses [Volume-I] [47].
2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, AdvaitaAshrama (Publication Department) Kolkata.

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AUDIT-II
(18HS0819) PERSONALITY DEVELOPMENT THROUGH LIFE

ENLIGHTENMENT SKILLS

Course Objectives:

- To learn to achieve the highest goal happily.
- To become a person with stable mind, pleasing personality and determination.
- To awaken wisdom in students.

Course Outcomes:

Students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.

Study of Neetishatakam will help in developing versatile personality of students

UNIT-I

Neetisatakam-Holistic development of personality

- Verses- 19,20,21,22 (wisdom)
- Verses- 29,31,32 (pride & heroism)
- Verses- 26,28,63,65 (virtue)
- Verses- 52,53,59 (dont's)
- Verses- 71,73,75,78 (do's)

UNIT-II

- Approach to day to day work and duties.
- Shrimad BhagwadGeeta : Chapter 2-Verses 41, 47,48,
- Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35,
- Chapter 18-Verses 45, 46, 48.

UNIT-III

- Statements of basic knowledge.
- Shrimad BhagwadGeeta: Chapter2-Verses 56, 62, 68
- Chapter 12 -Verses 13, 14, 15, 16,17, 18
- Personality of Role model. Shrimad BhagwadGeeta:

Chapter2-Verses 17, Chapter 3-Verses 36,37,42,

- Chapter 4-Verses 18, 38,39

- Chapter18 – Verses 37,38,63

Suggested Reading:

1. "Srimad Bhagavad Gita" by Swami SwarupanandaAdvaita Ashram (Publication Department), Kolkata.
2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, 4. Rashtriya Sanskrit Sansthanam, New Delhi.

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(18CS5005) ADVANCE ALGORITHMS LAB

1. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the lIst to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

2. Using Open, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

3. a. Obtain the Topological ordering of vertices in a given digraph.
b.Compute the transitive closure of a given directed graph using Warshall's algorithm. 4. Implement 0/1 Knapsack problem using Dynamic Programming.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra‟s algorithm.

6. Find Minimum Cost Spanning Tree of a given undirected graph using Kristal‟s algorithm.

7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.

b. Check whether a given graph is connected or not using DFS method.
8. Find a subset of a given set S = {sl,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}.A suitable message is to be displayed if the given problem instance doesn't have a solution.

9. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.

10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim‟s algorithm.

11. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm, implement it using Open and determine the speed-up achieved.

12. Implement N Queen's problem using Back Tracking.

References:
1. "Introduction to Algorithms" by Cormen, Leiserson, Rivest, Stein.
2. "The Design and Analysis of Computer Algorithms" by Aho, Hopcroft, Ullman.
3. "Algorithm Design" by Kleinberg and Tardos

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(18CS5006) SOFT COMPUTING LAB

LIST OF PROGRAMS

1. Write A Program For Implementing Linear Saturating Function.

2. Study And Analysis Of Art Model.

3. Write A Program For Error Back Propagation Algorithm (Ebpa) Learning.

4. Study And Analysis Of CPN

5. Study And Analysis Of Genetic Algorithm Life Cycle.

6. Study And Analysis Of Fuzzy Vs Crisp Logic.

7. Write A Program Of Perceptron Training Algorithm.

8. Write A Program To Implement Hebb's Rule

9. Write A Program To Implement Of Delta Rule

10. Write A Program For Back Propagation Algorithm

11. Write A Program To Implement Logic Gates

REFERENCE BOOKS :

1. S.N. Shivnandam, "Principle of soft computing", Wiley.

2. S. Rajshekaran and G.A.V. Pai, "Neural Network , Fuzzy logic And Genetic Algorithm", PHI.

3. Jack M. Zurada, "Introduction to Artificial Neural Network System" JAico Publication.

4. Simon Haykins, "Neural Network- A Comprehensive Foudation" .

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(18CS5023) MOBILE APPLICATIONS AND SERVICES

Course Objectives:

- This course presents the three main mobile platforms and their ecosystems, namely Android, iOS, and PhoneGap/WebOS.
- It explores emerging technologies and tools used to design and implement feature-rich mobile applications for smartphones and tablets
- It also take into account both the technical constraints relative to storage capacity, processing capacity, display screen, communication interfaces, and the user interface, context and profile

Course Outcomes:

On completion of the course the student should be able to

- Identify the target platform and users and be able to define and sketch a mobile application
- Understand the fundamentals, frameworks, and development lifecycle of mobile application platforms including iOS, Android, and Phone Gap
- Design and develop a mobile application prototype in one of the platform (challenge project)

UNIT-I

Introduction: Introduction to Mobile Computing, Introduction to Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development Android User

UNIT-II

More on Uis: VUIs and Mobile Apps, Text-to-Speech Techniques, Designing the 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.

UNIT-III

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 Notifications and Alarms: Performance, Performance and Memory Management, Android Notifications and Alarms, Graphics, Performance and Multithreading, Graphics and UI Performance, Android Graphics.

UNIT-IV

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.

UNIT-V

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

Recent trends in Communication protocols for IOT nodes, mobile computing techniques in IOT, agents based communications in IOT.

References:

1. Wei-Meng Lee, Beginning Android™ 4 Application Development, 2012 by John Wiley & Sons

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(18CS5024) COMPILER FOR HPC

Course Objectives:

- The objective of this course is to introduce structure of compilers and high performance compiler design for students. Concepts of cache coherence and parallel loops in compilers are included.

Course Outcomes:

After completion of course, students would be:

- Familiar with the structure of compiler.
- Parallel loops, data dependency and exception handling and debugging in compiler.

UNIT-I

High Performance Systems, Structure of a Compiler, Programming Language Features, Languages for High Performance.

UNIT-II

Data Dependence: Data Dependence in Loops, Data Dependence in Conditionals, Data Dependence in Parallel Loops, Program Dependence Graph.

Scalar Analysis with Factored Use-Def Chains: Constructing Factored Use- Def Chains, FUD Chains for Arrays, Induction Variables Using FUD Chains, Constant Propagation with FUD Chains, Data Dependence for Scalars. Data Dependence Analysis for Arrays.

UNIT-III

Array Region Analysis, Pointer Analysis, I/O Dependence, Procedure Calls, Inter-procedural Analysis.

Loop Restructuring: 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.

Optimizing for Locality: Single Reference to Each Array, Multiple References, General Tiling, Fission and Fusion for Locality.

UNIT-IV

Concurrency Analysis: Concurrency from Sequential Loops, Concurrency from Parallel Loops, Nested Loops, Round off Error, Exceptions and Debuggers.

Vector Analysis: Vector Code, Vector Code from Sequential Loops, Vector Code from For all Loops, Nested Loops, Round off Error, Exceptions, and Debuggers, Multi-vector Computers.

UNIT-V

Message-Passing Machines: SIMD Machines, MIMD Machines, Data Layout, Parallel Code for Array Assignment, Remote Data Access, Automatic Data Layout, Multiple Array Assignments, Other Topics.

Scalable Shared-Memory Machines: Global Cache Coherence, Local Cache Coherence, Latency Tolerant Machines.

Recent trends in compiler design for high performance computing and message passing machines and scalable shared memory machine.

References:

1. Michael Wolfe, High-Performance Compilers for Parallel Computing, Pearson

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(18CS5025) OPTIMIZATION TECHNIQUES

Course Objectives:

- The objective of this course is to provide insight to the mathematical formulation of real world problems.
- To optimize these mathematical problems using nature based algorithms. And the solution is useful specially for NP-Hard problems.

Course Outcomes:

After completion of course, students would be:

- Formulate optimization problems.
- Understand and apply the concept of optimality criteria for various types of optimization problems.
- Solve various constrained and unconstrained problems in Single variable as well as multivariable.
- Apply the methods of optimization in real life situation.

UNIT-I

Engineering application of Optimization, Formulation of design problems as mathematical programming problems.

UNIT-II

General Structure of Optimization Algorithms, Constraints, The Feasible Region.

UNIT-III

Branches of Mathematical Programming: Optimization using calculus, Graphical Optimization, Linear Programming, Quadratic Programming, Integer Programming, Semi Definite Programming.

UNIT-IV

Optimization Algorithms like Genetic Optimization, Particle Swarm Optimization, Ant Colony Optimization etc.

UNIT-V

Real life Problems and their mathematical formulation as standard programming problems.

Recent trends: Applications of ant colony optimization, genetics and linear and quadratic programming in real world applications.

References:

1. Laurence A. Wolsey (1998). Integer programming. Wiley. ISBN 978-0-471-28366-9.
2. Practical Optimization Algorithms and Engineering Applications Andreas Antoniou.
3. An Introduction to Optimization Edwin K., P. Chong & Stanislaw h. Zak.
4. Dimitris Bertsimas; Robert Weismantel (2005). Optimization over integers. Dynamic Ideas, ISBN 978-0-9759146-2-5.
5. John K. Karlof (2006). Integer programming: theory and practice.CRC Press. ISBN 978-0-8493-1914-3.
6. H. Paul Williams (2009). Logic and Integer Programming. Springer. ISBN 978-0-387-92279-9.

7. Michael Jünger; Thomas M. Liebling; Denis Naddef; George Nemhauser; William R. Pulleyblank;Gerhard Reinelt; Giovanni Rinaldi; Laurence A. Wolsey, eds. (2009). 50 Years of Integer Programming 1958-2008: From the Early Years to the State-of-the- Art. Springer. ISBN 978-3-540-68274-5.
8. Der-San Chen; Robert G. Batson; Yu Dang (2010). Applied Integer Programming: Modeling and Solution. John Wiley and Sons. ISBN 978-0-470-37306-4.

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(18HS0824) BUSINESS ANALYTICS

Course objectives:

1. Understand the role of business analytics within an organization.
2. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
3. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.
4. To become familiar with processes needed to develop, report, and analyze business data.
5. Use decision-making tools/Operations research techniques.
6. Mange business process using analytical and management tools.
7. Analyze and solve problems from different industries such as manufacturing, service, retail,software, banking and finance, sports, pharmaceutical, aerospace etc.

Unit I:

Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organisation, competitive advantages of Business Analytics. Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modelling, sampling and estimation methods overview.

Unit II:

Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear Regression. Important Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology.

Unit III:

Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes.

Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

Unit IV:

Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables,

Selecting Appropriate Forecasting Models. Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

Unit V:

Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

Recent Trends in : Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism.

Reference:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press.
2. Business Analytics by James Evans, persons Education.

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(18ME3121) INDUSTRIAL SAFETY

Course Objectives:

- To learn about mechanical and electrical hazards.
- To learn about mechanical and electrical hazards.
- To learn about Wear and Corrosion and their prevention
- To learn about Periodic and preventive maintenance.

Course Outcomes:

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.

UNIT-I

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-II

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-III

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-IV

Fault tracing: Fault tracing-concept and importance, decision treeconcept, 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-V

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.

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(18ME3122) OPERATIONS RESEARCH

Course Objectives:

- To provide knowledge and training in using optimization techniques under limited resources for the engineering and business problems

Course Outcomes:

At the end of the course, the student should be able to

1. Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
2. Students should able to apply the concept of non-linear programming
3. Students should able to carry out sensitivity analysis
4. Student should able to model the real world problem and simulate it.

UNIT-I

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

UNIT-II

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming.

UNIT-III

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

UNIT-IV

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

UNIT-V

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

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(18CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS

Course Objectives:

- To Implement CPM and PERT concepts in construction
- To provide techniques to develop personal skills of practical use in the Management and implementation of Civil Engineering projects
- To know the Management techniques, the development of personal, interpersonal and Project Management skills
- To provide a fundamental of understanding of the social, economic, resource management within which the Construction Project takes place.

Course Outcomes:

After completion of this course, the student shall be able to

- Implement generic and special Construction Project Management skills to a higher level
- Understand the special management skills required in multidisciplinary and global Construction Industry
- Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice.
- Can plan, execute, monitor and control construction projects using Construction Project Management Tools such as CPM & PERT

UNIT-I

Introduction: Introduction to Mobile Computing, Introduction to Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development Android User.

UNIT -II

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-III

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. 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-IV

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 Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.

Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis.

UNIT-V

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:

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

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OPEN ELECTIVE
(18ME3022) COMPOSITE MATERIALS

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Course Objectives:

- To understand the mechanical behavior of composite materials
- To get an overview of the methods of manufacturing composite materials.

Course Outcomes:

- Upon completion of this course, the students will have an overview of the mechanical behavior and application of composite materials.

UNIT-I:

Introduction To Composites

Fundamentals of composites – need– enhancement of properties – classifications — Introduction to Reinforcement composites–types. Applications.Fiber production techniques for glass, carbon and ceramic fibers –Resin materials-Types.

UNIT-II:

Polymer Matrix Composites

Fabrication of PMC's :- Fabrication of Fibers, Plastic Fiber Forms, Prepregs, Molding Compounds-Processes, Lay-Ups, Filament Winding,Pultrusion, and Recycling. ; Matrix – Reinforcement Interface, Wettability.

UNIT-III:

MMC&CMC

Fabrication of MMC'S: Liquid Infiltration- Casting, Solid State Processes-Diffusion Bonding &In Situ Technique.

Fabrication of CMC's: Hot-Pressing, Infiltration,In Situ Chemical reaction Techniques.CVD& CVI, Sol-gel.

UNIT-IV:

Mechanics of Composites:

Basic assumptions of laminated anisotropic plates, symmetric laminates, angle ply laminates, cross ply laminates, laminate structural moduli, evaluation of lamina properties, determination of lamina stresses, maximum stress and strain criteria, von Mises Yield criterion for isotropic materials, generalized Hill's criterion for anisotropic materials, Tsai-Hill's criterion for composites, prediction of laminate failure, thermal analysis of composite laminates

UNIT-V :

Applications Of Composites

Applications of advanced composite materials.Environmental effects in Composites, Green composites, Synthesis and Properties of Nanocomposites. Surface Composites & Surface metal matrix composites: Need, Synthesis, Properties and applications.

Text Books:

1. Mathews F. L. and Rawlings R. D., "Composite Materials: Engineering and Science", 1st Edition, Chapman and Hall, London, England, 1994.
2. Chawla K. K., "Composite materials", Second Edition, Springer – Verlag, 1998.

References:

1. Clyne, T. W. and Withers, P. J., "Introduction to Metal Matrix Composites", Cambridge University Press, 1993.
2. Strong, A.B., "Fundamentals of Composite Manufacturing", SME, 1989.
3. Sharma, S.C., "Composite materials", Narosa Publications, 2000.

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OPEN ELECTIVE
(18EE2128) WASTE TO ENERGY

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Course Objectives:

- To understand the importance of gaining energy from the waste
- To Understand and analyze the pattern of renewable energy resources Suggest methodologies / technologies for its utilization Economics of the utilization and environmental aspects.
- To undusted the need and production of for bio gas.

Course Outcomes:

- Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

UNIT-I

INTRODUCTION TO ENERGY FROM WASTE:

Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors.

UNIT-II

BIOMASS PYROLYSIS:

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

UNIT-III

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-IV

BIOMASS COMBUTION:

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-V

PROPERTIES OF BIOGAS (CALORIFIC VALUE AND COMPOSITION)

Biogas plant technologyand 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

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