

**MASTER OF TECHNOLOGY IN CSE /COMPUTER ENGINEERING
SEMESTER-II**

S. No.	Course Code	Subject	Teaching Schedule			Hours/Week	Examination Schedule & Percentage Distribution			Duration of Exam (Hrs.)	Credit
			L	T	P		Major Test	Minor Test	Total		
1	MTCE-102A	Social Networks	3	0	0	3	60	40	100	3	3
2	MTCE-104A	Advanced Database System Design	3	0	0	3	60	40	100	3	3
3	*	Program Elective-III	3	0	0	3	60	40	100	3	3
4	**	Program Elective-IV	3	0	0	3	60	40	100	3	3
5	MTCE-118A	Social Networks Lab	0	0	4	4	60	40	100	3	2
6	\$	Program Elective Lab-II	0	0	4	4	60	40	100	3	2
7	#MTCE-120A	Mini Project	0	0	4	4	-	100	100	3	2
8	***	Audit Course-II	2	0	0	2	--	100	100	3	0
Total						26	360	340	700	-	18

*Program Elective -III		**Program Elective -IV	
Course No.	Subject	Course No.	Subject
MTCE-106A	Mobile Ad-hoc and Wireless Sensor Networks	MTCE-112A	Security In Computing
MTCE-108A	Information Theory and Coding	MTCE-114A	Embedded System
MTCE-110A	Agile Software Engineering	MTCE-116A	Data Mining

\$ Program Elective Lab-II			
MTCE-122A	Mobile Ad-hoc and Wireless Sensor Networks Lab	MTCE-128A	Security In Computing Lab
MTCE-124A	Information Theory and Coding Lab	MTCE-130A	Embedded System Lab
MTCE-126A	Agile Software Engineering Lab	MTCE-132A	Data Mining Lab

***Audit Course-II	
Course No.	Subject
MTAD-102A	Constitution of India
MTAD-104A	Pedagogy Studies

MTAD-106A	Stress Management by Yoga
MTAD-110A	Personality Development and Soft Skills

Note 1: After the second semester exams, the students are encouraged to go to Industrial Training/Internship for at least 6-8 weeks during the summer break with a specific objective for Dissertation Part-I (MTCE-207A). The industrial Training/Internship would be evaluated as the part of the Dissertation-I (with the marks distribution as 40 marks for Industrial Training/Internship and 60 marks for Dissertation Part-I).

Note 2: The course of program elective will be offered at 1/3rd or 6 numbers of students (whichever is smaller) strength of the class.

Note 3: Along with the credit course, a student may normally be permitted to take audit course, however for auditing a course; prior consent of the course coordinator of the course is required. These courses shall not be mentioned for any award/calculation of SGPA/CGPA in the DMC. A certificate of successful completion of the audit course will be issued by the Director/Head of institution.

Note 4: Mini project: During this course the student will be able to understand the contemporary/emerging technologies for various processes and systems. During the semester, the students are required to search/gather the material/information on a specific topic, comprehend it and present/discuss the same in the class. He/she will be acquainted to share knowledge effectively in oral (seminar) and written form (formulate documents) in the form of report. The student will be evaluated on the basis of viva/ seminar (40 marks) and report (60 marks).

MTCE-102A	Social Networks						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	60	40	100	3 Hrs.
Program Objective (PO)	This emerging and innovative field will provide the insight into latest communication techniques used in the online social networks for identifying and representing the hidden relationships, tracking the flow of information and to recognize data patterns in social networks by using graph, matrix, relationships, clustering, and equivalence between users.						
Course Outcomes (CO)							
CO1	To understand the essentials of social networks by learning different types of entities and relationships as nodes, edges within the graph and represent these information as relational data to determine the relative importance of a vertex to find the design levels						
CO2	To explore the detailed explanation of data generalization and mining from Twitter, Facebook and LinkedIn in well informed and efficient manner.						
CO3	To describe the semantic web using mining associations, correlations, classification, betweenness, centrality, equivalence relation, centralization, clustering coefficient and structural cohesion to generate visualizations and perform empirical investigations of network data.						
CO4	To interpret and synthesize the results with respect to collated datasets by using structural equivalence, automorphic equivalence and regular equivalence for interpreting quality factors and mining of complex type of data to execute better recommendation.						

Unit: I: Social Networks and Related Concepts

Introduction to Social Networks: Introduction, uses, examples and types of social networks, Social and economic networks, Opportunities and challenges in social networks, Social structure in social networks, Properties of social networks, algorithmic and economic aspects of social networks

Social Network Data: Nodes, Edges, Relationship, Graphs, Samples and Boundaries, Formal methods, Adjacency Matrix for undirected and directed networked graphs and using matrices to represent social relations, Random graphs, Properties of random graphs, Percolations, Branching processes, Growing spanning tree in random graphs.

Level in Social Networks: Ego networks, partial networks, complete or global networks, social networks methods including binary or valued, directed or undirected.

Unit: II Mining the Social Web

Mining Twitter: Fundamental Twitter Terminology, creating a Twitter API Connection, Exploring Trending Topics, searching for Tweets, extracting Tweets entities, analyzing Tweets and Tweet entities with frequency analysis, computing the lexical diversity of Tweets, Examining patterns in Retweets, Visualizing frequency data with histograms.

Mining Facebook: Understanding the social graph API, Understanding the open graph protocol, Analyzing social graph connections

Mining LinkedIn: Making LinkedIn API requests, Downloading LinkedIn connections as a CSV file, Clustering, normalizing data for analysis, measuring similarity, and clustering algorithms.

Unit: III Mining Web pages and Semantic Web

Mining Web pages: Scraping, Parsing and Crawling the Web, Discovering semantics by decoding syntax, Entity-Centric analysis: A paradigm shift, Quality of analytics for processing human language data.

Mining the Semantically Marked-Up Web: Microformats: Easy-to-implement Metadata, Semantics markup to semantic Web: A brief interlude, The semantic Web: An evolutionary revolution.

Social Network Analysis: Introduction, History, Metrics in social network analysis (Betweenness, Centrality, Equivalence relation, Centralization, Clustering coefficient and Structural cohesion).

Unit IV: Equivalence in Social Networks

Structural equivalence, Automorphic equivalence and Regular equivalence

Text Books:

1. Matthew A. Russell, "Mining the Social Web", O'Reilly and SPD, Second edition New Delhi, 2013.
2. Hanneman, R. A., & Riddle, M., "Introduction to social network methods, Riverside, California: University of California, Riverside. Available at: <http://faculty.ucr.edu/~hanneman/nettext/>.
3. "Social network analysis: Theory and applications". A free, Wiki Book available at: http://train.ed.psu.edu/WFED-543/SocNet_TheoryApp.pdf.

Reference Books:

1. Lon Safko, "The Social Media Bible: Tactics, Tools, and Strategies for Business Success", Wiley 3rd Edition, 2012.
2. Peter K Ryan, "Social Networking", Rosen Publishing Group, 2011.
3. John Scott, Peter J. Carrington, "Social Network Analysis", SAGE Publishing Ltd., 2011.

MTCE-104A		Advanced Database System Design					
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	60	40	100	3 Hrs.
Program Objective (PO)	This course is designed to recognize data storage in DBMS, data representation using ER and EER modelling, query processing techniques, recovery management, data base security using firewall and digital signature						
Course Outcomes (CO)							
CO1	Understand the basics of DBMS architecture and data storage mechanism						
CO2	Depiction of various levels in database designing and database representation mechanism.						
CO3	To know the concepts of query processing, transition management and recovery management						
CO4	Explanation of database security techniques such as Firewalls, proxy servers, SSL and digital signatures						

Unit 1

Introduction: Overview of DBMS and its internal Architectural, Data Storage and representation in DBMS: Memory Hierarchy, Secondary storage mechanism and reliability improvement through mirroring and RAID, Recovery from disk crashes, Representing Relational data elements with records (fixed and variable) use of page and block formats, Heap, sorted and clustered file organization.

Unit 2

Indexing in DBMS: Clustered, primary, secondary, dense and Sparse indexing, Hash and Tree based index structures, ISA and B+ tree data structures, bit map indexing, R-indexing.

Database Design: Three steps of Conceptual, logical and Physical design, and methodology for design, Overview of E-R and Extended E-R Modeling and conversion to logical tables and normalization, Physical database design and tuning – overview of tasks involved and methodology, Guidelines for index selection, Clustering, Demoralization and view definitions, Tuning of Queries with Explain PLAN.

Unit 3

Query Processing and Transaction management in DBMS: Query processing architecture in DBMS, relational operations and implementation techniques, Algorithms for Selection, Projection and Join, Query optimization, Query tree and optimization using Relational equivalences, Transaction Management DBMS: Transaction and ACID Properties, schedules and serializability, Concurrency control techniques – locking timestamps and Optimistic Concurrency control, Concept of Recovery management,

Buffer and Recovery management structures in DBMS, Deferred update and ARIES algorithm for recovery with an example.

Unit 4

Database Security: Access Control mechanisms in DBMS, GRANT and REVOKE of VIEWS, Security for Internet applications through Encryption Firewalls, proxy servers, SSL and digital signatures.

Reference Books

1. Gracia-Molina, Ullman and Widom, "Database System Implementation", (2001)-Pearson Education.
2. Connolly & Begg, "Database Systems", Third Edition (2002)-Pearson Publication.
3. Raghu Ramkrishnan & Gehrke, "Database Management Systems", Third Edition McGraw Hill Publications (2003).

MTCE-106A								
Mobile Ad-hoc and Wireless Sensor Networks								
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Practical	Total	Time
3	0	0	3	60	40	-	100	3 Hrs.
Program Objective (PO)	To enable students to describe and deal with computer communication and networking, various reference models and architectures along with implemented wireless communication techniques and various security and privacy parameters are also studied.							
Course Outcomes (CO)								
After completion of course students will be able to								
CO1	Classify traditional networks and discuss various wireless networking standards, compare and contrast various IEEE wireless LAN and Ethernet standards.							
CO2	Describe cellular architecture and IPv4 and IPv6 header formats has to be discussed along with mobile IP.							
CO3	Recently deployed high performance computing standards, VPN, routing protocols as to be gone through.							
CO4	Various security and privacy standards/tools to be described.							

Unit 1

Mobile Ad hoc Networks (MANET) – Mobility Management, modeling distributed applications for MANET, MAC mechanisms and

protocols.

Unit 2

MANET Routing Protocols: Ad hoc network routing protocols, destination sequenced distance vector algorithm, cluster based gateway switch routing, global state routing, fish-eye state routing, dynamic source routing, ad hoc on-demand routing, OLSR & TORA routing, location aided routing, zonal routing algorithm.

Unit 3

Ad hoc network security – Link layer, Network layer, Trust and key management.
Self policing MANET – Node Misbehaviour, secure routing, reputation systems.
Wireless Sensor Networks (WSN) – Design Issues, Clustering, Applications of WSN.

Unit 4

MAC layer and routing protocols in WSN
Data Retrieval Techniques in WSN – Sensor databases, distributed query processing, Data dissemination and aggregation schemes, Operating Systems for WSN, Security issues in WSN.

Books and References:

- 1 C. Siva Ram Murthy & B.S. Manoj, Mobile Ad hoc Networks – Architectures & Protocols, Pearson Education, New Delhi, 2004
- 2 C M Cordeiro& D.P. Agrawal, Adhoc& Sensor Networks – Theory and Applications, ISBN 981256-682-1, World Scientific Singapore, 2006
- 3 C. S. Raghvendra, Wireless Sensor Networks, Springer-Verlag, 2006.

MTCE-108A	Information Theory and Coding						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	60	40	100	3Hrs.

Program Objective (PO)	The objective of this course is to introduce the basic concepts of information theory and coding, including information, source coding, channel model, channel capacity, channel coding in an exemplary way.
Course Outcomes (CO)	
CO1	To understand and explain the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
CO2	To describe the real life applications based on the fundamental theory and to apply convolution codes for performance analysis & cyclic codes for error detection and correction.
CO3	To calculate entropy, channel capacity, bit error rate, code rate and steady-state probability.
CO4	To implement the encoder and decoder of one block code or convolutional code using any program language.

Unit 1

Overview; Basic Concepts - Entropy and Mutual information; Lossless Source Coding – Source entropy rate; Kraft inequality; Huffman code; Asymptotic equipartition property; Universal coding; Noisy Channel Coding - Channel capacity; Random channel codes; Noisy channel coding theorem for discrete memory-less channels; Typical sequences; Error exponents; Feedback; Continuous and Gaussian channels; Lossy Source Coding - Rate- Distortion functions; Random source codes; Joint source-channel coding and the separation theorem.

Unit 2

Source coding- Text, Audio and Speech: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 - Speech: Channel V coder, Linear Predictive Coding Source coding- Image and Video: Image and Video Formats – GIF, TIFF, SIF, CIF, QCIF –Image compression: READ, JPEG – Video Compression: Principles-I,B,P frames, Motion estimation, Motion compensation, H.261, MPEG

Unit 3

Standard Error control coding- Block codes: Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes -Linear block codes,

Unit 4

Cyclic codes - Syndrome calculation, Encoder and decoder – CRC Error control coding- convolution codes: code tree, trellis, state diagram - Encoding – Decoding:
Sequential search and Viterbi algorithm – Principle of Turbo coding

Text Books:

1. Mark Kelbert(Author), Yuri Suhov, Information Theory and Coding by Example, CambridgeUniversity Press, 2013.

Reference Books:

1. Simon Haykin and Michael Moher, Communication Systems, 5th Edition, Wiley, 2010
2. T.M. & Thomas, J.A. (2006). Elements of Information Theory. New York: Wiley.
3. Jiri Adamek, Foundations of coding, Wiley Interscience, 1991.
4. T. M. Cover and J. A. Thomas, Elements of information theory, Wiley, 1991.

MTCE-110A	Agile Software Engineering						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
4	0	0	4	60	40	100	3 Hrs.
Program Objective (PO)	Introduces the business value of adopting Agile approaches and provide complete understanding of the Agile development practices.						
Course Outcomes (CO)							
CO1	To understand the background and driving forces for taking an Agile approach to software development.						
CO2	To explore the business value of adopting Agile approaches.						
CO3	To drive development with unit tests using Test Driven Development.						
CO4	To apply design principles and refactoring to achieve Agility.						

Unit I: Fundamentals of Agile

The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools

Unit II: Agile Scrum Framework

Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

Unit III: Agile Testing

The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

Unit IV: Agile Software Design and Development

Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

Text Books:

1. Ken Schwaber, Mike Beedle, Agile Software Development with Scrum, Pearson publications.
2. Robert C. Martin, Agile Software Development, Principles, Patterns and Practices, Prentice Hall.
3. Lisa Crispin, Janet Gregory, Agile Testing: A Practical Guide for Testers and Agile Teams, Addison Wesley.

Reference books:

1. Alistair Cockburn, Agile Software Development: The Cooperative Game, Addison Wesley.

2. Mike Cohn, User Stories Applied: For Agile Software, Addison Wesley.

MTCE-112A	Security In Computing						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
3	0	0	3	100	50	150	3 Hrs.
Program Objective (PO)	To introduce the detailed study of Probability, Random Variables and Stochastic Processes.						
Course Outcomes (CO)							
CO1	To evaluate the risks and vulnerabilities in protocols/Standards.						
CO2	To apply number theory and algebra required for designing cryptographic algorithms.						
CO3	To Design symmetric key, asymmetric key encryption techniques, design authentication, message integrity and authenticated encryption protocols.						
CO4	To design and security analysis of systems including distributed storage and Electronic voting.						

UNIT – I

Computer Security Concept, Threats, Attacks and Assets, Security Functional Requirements, Security Architecture for Open System, Scope of Computer Security, Computer Security Trends and Strategy.

Cryptography: Terminology and Background, Substitution Ciphers, Transpositions, Cryptanalysis, Data Encryption Standard, DES & AES Algorithms and comparison, Public Key Encryption, Possible Attacks on RSA Malicious Software: Types of Malicious Software, Viruses, Virus countermeasures, Worms, Bots, Rootkits.

UNIT – II

Protection in General-Purpose Operating Systems: Security Methods of Operating Systems, Memory and Address Protection.

Designing Trusted Operating Systems: Security Policies, Models of Security, Designing of Trusted Operating System. Linux Security: Linux Security Model, Linux Vulnerabilities, Linux System Hardening, Application Security, Mandatory Access Control

UNIT – III

Database Security: Relational Database, Database Access Control, Inference, Statistical Databases, Database Encryption, Data Mining Security: Security Requirements, Reliability and Integrity, Sensitive data, Multilevel Databases, Proposal for Multilevel Security, Data Mining - Privacy and Sensitivity, Data Correctness and Integrity, Data Availability.
 Trusted Computing: Concept of Trusted System, Trusted Computing and Trusted Platform Module, Common Criteria for Information Technology Security Evaluation.

UNIT – IV

Security in Networks: Threats in networks, Network security controls, Firewall and Intrusion Prevention Systems: Need, Characteristics, Types of Firewalls, Firewall Basing, Intrusion Prevention Systems. Intrusion Detection Systems.
 Internet Security Protocols and Standards: Secure Socket Layer (SSL) and Transport Layer Security (TLS), IP4 and IP6 Security, Secure Email. Legal and Ethical Aspects: Cybercrime and Computer Crime, Intellectual Property, Copyrights, Patents, Trade Secrets, Privacy and Ethical Issues.

Text Books:

1. Pfleeger C. & Pfleeger S.L., "Security in Computing", 4th Ed., Pearson Education.
2. Stalling W., Brown L., "Computer Security Principles and Practice", 3rd Ed., Pearson Education.

Reference Books:

1. Schneier B., "Applied Cryptography: Protocols, Algorithms and Source Code in C", 2nd Ed., Wiley India Pvt. Ltd.

MTCE-114A		Embedded Systems					
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
4	0	0	4	60	40	100	3 Hrs.
Program Objective (PO)	To introduce the complete design of a modern embedded system with functional requirements for hardware and software components including processor, networking components, and sensors, along with applications, subsystem interfaces, networking, and middleware and to show how to understand and program such systems using a concrete platform built around.						
Course Outcomes (CO)							
CO1	Understand key concepts of embedded systems like History, definition and Classification, and characteristics of Embedded Systems						
CO2	Complete system design concepts of embedded systems for Processor and Memory Organization and peripheral devices.						
CO3	Understand the basics of Microcontrollers and assembly Language programming process.						

CO4	Become aware of interrupts and deployment of embedded processors and supporting devices in real-world applications
------------	--

Unit 1

Introduction to embedded systems: Background and History of Embedded Systems, definition and Classification, Programming languages for embedded systems: desirable characteristics of programming languages for embedded systems, low-level versus high-level languages, main language implementation issues: control, typing. Major programming languages for embedded systems. Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.

Unit 2

Processor and Memory Organization: Structural units in processor, Processor selection for an embedded system, Memory devices, Memory selection, Allocation for memory to program segments and blocks and memory map of a system, DMA, Interfacing processor. I/O Devices -Device I/O Types and Examples? Synchronous -iso-synchronous and Asynchronous Communications from Serial Devices -Examples of Internal Serial-Communication Devices -UART and HDLC -Parallel Port Devices -Sophisticated interfacing features in Devices/Ports-Timer and Counting Device.

Unit 3

Microcontroller: Introduction to Microcontrollers, Evolution, Microprocessors vs. Microcontrollers, MCS-51 Family Overview, Important Features, Architecture.8051 Pin Functions, Architecture, Addressing Modes, Instruction Set, Instruction Types.**Programming:** Assembly Programming. Timer Registers, Timer Modes, Overflow Flags, Clocking Sources, Timer Counter Interrupts, Baud Rate Generation. Serial Port Register, Modes of Operation, Initialization, Accessing, Multiprocessor Communications, Serial Port Baud Rate.

Unit 4

Interrupts: Interrupt Organization, Processing Interrupts, Serial Port Interrupts, External Interrupts, Interrupt Service Routines. Microcontroller Specification, Microcontroller Design, Testing, Timing Subroutines, Look-up Tables, Serial Data Transmission.**Applications:** Interfacing Keyboards, Interfacing Displays, Interfacing A/D and D/A Converters, Pulse Measurement, Loudspeaker Interface, Memory Interface.

Books and References:

1. John Catsoulis, "Designing Embedded Hardware", O'reilly
2. An Embedded Software Primer", David E. Simon, Pearson Education
3. Frank Vahid, Tony Givargis, "Embedded System Design", John Wiley & Sons, Inc
4. KarimYaghmour, "Building Embedded Linux Systems", O'reilly
5. Michael Barr, "Programming Embedded Systems", O'reilly
6. Alan C. Shaw, "Real-time systems & software", John Wiley & sons, Inc.
7. Wayne Wolf, "Computers as Components", Harcourt India Pvt. Ltd.

MTCE-116A	Data Mining						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time

4	0	0		60	40	100	3 Hrs.
Program Objective (PO)	To introduce the detailed study on data mining methodology.						
Course Outcomes (CO)							
CO1	Understand the basics of data mining and data warehousing						
CO2	Understand the detailed explanation of data generalization and statistical measures						
CO3	Description of mining associations, correlations, classification and prediction						
CO4	Description on cluster analysis and mining of complex type of data like world wide web and text data base						

Unit 1

Introduction

Data Mining, Functionalities, Data Mining Systems classification, Integration with Data Warehouse System, Data summarization, data cleaning, data integration and transformation, data reduction.

Data Warehouse

Need for Data Warehousing, Paradigm Shift, Business Problem Definition, Operational and Information Data Stores, Data Warehouse Definition and Characteristics, Data Warehouse Architecture and Implementation, OLAP.

Unit 2

Data Mining Primitives, Query Language and System Architecture, Concept Description, Data generalization, Analysis of attribute relevance, Mining descriptive statistical measures in large databases.

Unit 3

Mining association rules in large databases: Association rule mining, Mining single dimensional Boolean association rules from transactional databases, mining multilevel association rules from transaction databases, Relational databases and data warehouses, correlation analysis, classification and prediction.

Unit 4

Introduction to cluster analysis, Mining complex type of data: Multidimensional analysis and descriptive mining of complex data objects, Spatial databases, Multimedia databases, Mining time series and sequence data, Mining text databases, Mining the World Wide Web, Applications and trends in data mining.

Books and References:

- 1 Data Mining: Concepts and Techniques; Jiawei Han and Micheline Kamber; Elsevier.
- 2 "Mastering Data Mining: The Art and Science of Customer Relationship Management", by Berry and Lin off, John Wiley and Sons, 2001.
- 3 "Data Ware housing: Concepts, Techniques, Products and Applications", by C.S.R. Prabhu, Prentice Hall of India, 2001.
- 4 "Data Mining: Concepts and Techniques", J.Han, M.Kamber, Academic Press, Morgan Kanfman Publishers, 2001.
- 5 "Data Mining", by Pieter Adrians, DolfZantinge, Addison Wesley 2000.
- 6 "Data Mining with Microsoft SQL Server", by Seidman, Prentice Hall of India, 2001.

MTCE-122A	Mobile Ad-hoc and Wireless Sensor Networks Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time

0	0	4	2	60	40	100	3 Hrs.
Program Objective (PO)	To enable students to describe and deal with computer communication and networking, various reference models and architectures along with implemented wireless communication techniques and various security and privacy parameters are also studied.						
Course Outcomes (CO)							
CO1	Classify traditional networks and discuss various wireless networking standards, compare and contrast various IEEE wireless LAN and Ethernet standards.						
CO2	Describe cellular architecture and IPv4 and IPv6 header formats has to be discussed along with mobile IP.						
CO3	Recently deployed high performance computing standards, MANET, routing protocols as to be gone through.						

LIST OF PRACTICALS

1. Create scenarios, simulate, and study the evolution of contention-oriented protocols (Aloha, Slotted Aloha, and Ethernet).
2. Implement ARP to find the medium access control address of the destination using the destination's internet protocol address.
3. Create scenarios, simulate, and study the variation of throughput and Mean Delay as the number of nodes increase.
4. Create scenarios and study the difference in performance (with respect to throughput and delay) between token ring and token bus protocols.
5. Write a program to correct error using hamming code in a data received from a network simulator, error is introduced during transmission through as simulator.
6. Simulate a network implementing X.25 protocol. Change the Automatic Repeat Request (ARQ) protocol and then compare the network's performance.
7. Create a scenario, simulate, and study the performance of the different congestion control algorithms .
8. Write a program for the flow control protocols i.e Stop and wait, Go back-N, selective repeat over UDP and verify through a simulator
9. Implement, and verify through a simulator, a program to create sub-network and assign addresses based on the number of hosts connected to the network.
10. Implement AODV routing protocol in MANET.
11. Implement DSDV routing protocol in MANET.
12. Implement DSR routing protocol in MANET.

13. Study the effect of different Routing protocols (RIP and OSPF) on network's performance through simulation.
14. Create a scenario and study the performance of MANET mobility models.

MTCE-124A	Information Theory and Coding Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
0	0	4	2	60	40	100	3 Hrs.
Program Objective (PO)	This Information Theory and Coding Laboratory get exposure to emerging topics in information theory and coding.						
Course Outcomes (CO)							
CO1	Determine various entropies and compare channel capacity of different channels.						
CO2	Understand techniques of design & performance evaluation of error correcting codes.						
CO3	Design and develop solutions for technical issues related to information coding.						
CO4	Learn about syndrome calculation and design of encoder and decoder.						

LIST OF PRACTICALS

1. Write a program for determination of various entropies and mutual information of a given channel. Test various types of channel such as
 - a) Noise free channel
 - b) Error free channel
 - c) Binary symmetric channel
 - d) Noisy channel
 Compare channel capacity of above channels.
2. Implement a program for generation and evaluation of variable length source coding using Huffman Coding and decoding (C/MATLAB).
3. Implement coding and decoding of Cyclic codes.
4. Implement coding and decoding of Linear block codes.

5. Implement coding and decoding of BCH and RS codes.
6. Implement coding and decoding of Convolutional codes.
7. Write a simulation program to implement source coding and channel coding for transmitting a text file.
8. Implement a program to study performance of a coded and uncoded communication system (calculate the error probability).

MTCE-126A	Agile Software Engineering Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
0	0	4	2	60	40	100	3 Hrs.
Program Objective (PO)	This Software Laboratory focuses on to analyze, design and provide optimal solution for Computer Science & Engineering and multidisciplinary problems.						
Course Outcomes (CO)							
CO1	To Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.						
CO2	To Design solutions for complex engineering problems						
CO3	To Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools						

CO4	To demonstrate the knowledge of and need for sustainable development.
------------	---

1. Understand the background and driving forces for taking an Agile Approach to Software Development. Study the Important Characteristics that make agile approach best suited for Software Development.
2. Understand the business value of adopting agile approach.
3. Study the Agile Process Examples
 - a) SCRUM
 - b) FDD
 - c) Lean software development
 - d) XP
3. Understand agile development practices using SCRUM
4. Drive Development with Unit Test using Test Driven Development.
5. Apply Design principle and Refactoring to achieve agility
6. To study automated build tool.
7. To study version control tool.
8. To study Continuous Integration tool.
9. Perform Testing activities within an agile project.

MTCE-128A	Security in Computing Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
0	0	4	2	60	40	100	3 Hrs.
Program Objective (PO)	This Security in computing laboratory provide an applied understanding of the principles of network and computer security.						
Course Outcomes (CO)							
CO1	Learn about the encryption and decryption using different algorithms.						
CO2	A hands-on experience in attack execution and the use of tools in such attacks.						
CO3	Create virtual private network to evaluate response time.						
CO4	The practical knowledge to secure computers and network including the setup of policies and security assessment.						

LIST OF PRACTICALS

1. Write a program for encryption and decryption using DES algorithm in Java.
2. Write a program for encryption and decryption using AES algorithm in Java.
3. Design and implementation of a simple client/server model and running application using sockets and TCP/IP. Eavesdropping attacks and its prevention using SSH.
4. Create a virtual private network (VPN) WAN to evaluate application response time in the presence and absence of a firewall.
5. Isolate WLAN traffic using separate Firewall for VPN connection.
6. Implement a program to manage security in a small business network.
7. Implement security and networking policies settings across the company.
8. Demonstrate intrusion detection system (IDS) using any tool (snort or any other s/w).
9. Installation of rootkits and study about the variety of options.
10. Implement the simple substitution technique named Caesar cipher using C language.

MTCE-130A	Embedded Systems Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
0	0	4	2	60	40	100	3 Hrs.
Program Objective (PO)	This laboratory will develop the programming skills in the embedded systems field. Emphasis is given to interface handling; device driver and application development. Programming of mobile devices is included.						
Course Outcomes (CO)							
CO1	To Familiarize with programming methods and tools for embedded systems						
CO2	To Write efficient programs in C to develop embedded systems						
CO3	To Program Device Drivers for embedded systems						
CO4	To Program mobile devices						

LIST OF PRACTICALS/PROGRAMS

1. Design an embedded system for traffic light controller using 8051 microcontroller.
2. Program for an embedded system in C using GNU development tools.
3. Program to demonstrate a simple interrupt handler and setting up a timer.
4. Program to create two tasks which trigger blinking of two LEDs at different timings.
5. Program to send messages to mailbox by one task and read from mailbox by another task.
6. Write an assembly program to configure and control General Purpose Input/Output (GPIO) port pins.
7. Program to implement Buzzer interface on IDE environment.
8. To interface and convert Digital to Analog data using DAC in ARM processor.

9. To develop, code, configure and test a device driver.
10. To implement concurrency and resource management in mobile devices.

MTCE-132A	Data Mining Lab						
Lecture	Tutorial	Practical	Credit	Practical	Minor Test	Total	Time
0	0	4	2	60	40	100	3 Hrs.
Program Objective (PO)	To get awareness of data mining tools and getting knowledge of various performance metrics for evaluation of data mining techniques. To explore the different validation techniques on training data set.						
Course Outcomes (CO)							
CO1	To be able to get basic concepts of data mining.						
CO2	To get understanding of data pre-processing, generalization and data characterization techniques to provide suitable input for a range of data mining algorithms.						

CO3	Students are able to analyze and provide solutions for real world problems using mining association techniques.
CO4	Examine the different classification & clustering techniques in data mining.

EXPERIMENTS / OBJECTIVES

1. Study of Data Mining tool.
2. Develop an application to extract association mining rule.
3. Develop an application for classification of data.
4. Develop an application for one clustering technique.
5. Develop an application for implementing Naive Bayes classifier.
6. Implementation of association mining rule –Apriori algorithm.
7. Develop an application for decision tree.
8. To create a Decision tree by training data set.
9. To create a Decision tree by cross validation training data set.
10. To create a Decision tree by using Prune mode and Reduced error Pruning and show accuracy for cross validation trained data set.

MTAD-102A	Constitution of India						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
2	0	0	0	-	100	100	3 Hrs.
Program Objective (PO)	<i>Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective and 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.</i>						
Course Outcomes (CO)							
CO1	<i>Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.</i>						
CO2	<i>Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</i>						
CO3	<i>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.</i>						
CO4	<i>Discuss the passage of the Hindu Code Bill of 1956.</i>						

Unit I

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

Unit 2

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

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 3

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

Unit 4

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

References

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

MTAD-104A	Pedagogy Studies						
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
2	0	0	0	-	100	100	3 Hrs.
Program Objective (PO)	<i>Review existing evidence on the review topic to inform programme design and policy making undertaken by the DFID, other agencies and researchers and Identify critical evidence gaps to guide the development.</i>						
Course Outcomes (CO)							
CO1	<i>What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</i>						
CO2	<i>What is the evidence on the effectiveness of these pedagogical practices, in what</i>						

	<i>conditions, and with what population of learners?</i>
CO3	<i>How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</i>
CO4	<i>What is the importance of identifying research gaps?</i>

Unit 1

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology , Theories of learning, Curriculum, Teacher education., Conceptual framework, Research questions. Overview of methodology and Searching. Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. , Curriculum, Teacher education.

Unit 2

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 3

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

Unit 4

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

References

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, *Compare*, 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*.

MTAD-106A		Stress Management by Yoga					
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Total	Time
2	0	0	0	-	100	100	3 Hrs.
Program Objective (PO)	To achieve overall health of body and mind and to overcome stress						
Course Outcomes (CO)							
CO1	<i>Develop healthy mind in a healthy body thus improving social health.</i>						
CO2	<i>Improve efficiency</i>						
CO3	<i>Learn the Yogasan</i>						
CO4	<i>Learn the pranayama</i>						

Unit – 1

Definitions of Eight parts of yog (Ashtanga).

Unit- 2

Yam and Niyam, Do`s and Don`t`s in life; Ahinsa, satya, astheya, bramhacharya and aparigraha; Shaucha, santosh, tapa, swadhyay, ishwarpnanidhan.

Unit- 3

Asan and Pranayam, Various yog poses and their benefits for mind & body,

Unit- 4

Regularization of breathing techniques and its effects-Types of pranayam.

References

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

MTAD-110A	Personality Development and Soft Skills							
Lecture	Tutorial	Practical	Credit	Major Test	Minor Test	Practical	Total	Time
2	0	0	0	--	100	-	100	3 Hrs.
Program Objective (PO)	To become a person with stable mind, pleasing personality and determination in order to achieve the highest goal.							
Course Outcomes (CO)								
CO1	Students become aware about leadership.							
CO2	Students will learn how to improve communication skills							
CO3	Understand the team building and conflict							
CO4	Student will learn how to manage the time.							

Unit 1

Leadership Introduction to Leadership, Leadership Power, Leadership Styles, Leadership in Administration.
 Interpersonal: Introduction to Interpersonal Relations, Analysis Relations of different ego states, Analysis of Transactions, Analysis of Strokes, Analysis of Life position

Unit II

Communication: Introduction to Communication, Flow of Communication, Listening, Barriers of Communication, How to overcome barriers of communication.
 Stress Introduction to Stress, Causes of Stress, Impact Management Stress, Managing Stress

Unit III

Group Dynamics and team Building: Importance of groups in organization, Interactions in group, Group Decision Taking, Team Building, Interaction with the Team, How to build a good team?
 Conflict: Introduction to Conflict, Causes of Conflict, Management Managing Conflict

Unit IV

Time Management: Time as a Resource, Identify Important Time Wasters, Individual Time Management Styles, Techniques for better Time Management.
 Motivation: Introduction to Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation

Suggested reading

- E. Berne, Games People Play, Grove Press Inc., 1964; Penguin, 1968.
- Hargreaves, G. Stress Management, Marshall Publishing, London 1998
- Barker D, TA and Training, Gower Publishing Company Ltd., 1982.

- Jongewardm D &Seyer P C, Choosing Success, John Wiley & Sons Inc.1978
- Arnold, JHC Feldman, D.C. Organizational Behaviour IRWIN/McGRAW-HILL 1986
- Chandan, J.S., Organizational Behaviour. Vikas Publishing House PVT LTD 1994
- Statt, D.A. Using Psychology in Management Training, Taylor and Francis Inc.2000
- Luthans F., OrganisationalBehaviour, IRWIN/McGRAW-HILL 1998