MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

ANNEXURE – I

Syllabi
of
Departmental Elective (DE) Courses
B.Tech VII Semester
(Computer Science & Engineering and Information Technology)
Under Flexible Curriculum
[ITEM-2]

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Department of Computer Science & Engineering and Information Technology

NETWORKING WITH TCP/IP
150711/160711 (DE-3)

COURSE OBJECTIVES

- To build an understanding of the fundamental concepts of TCP/IP with computer networking.
- To familiarize the student with the basic taxonomy and terminology of the TCP/IP area.
- To understand the network traffic, congestion, controlling and resource allocation.

Unit-I

Introduction : ARPANET, ISDN and Broadband ISDN, Protocols and Standards. Internet Administration , ATM Model. SONET & SDH. TCP/IP Protocol Suite. Network Addressing at various layer

Unit-II

IP Layer: Connection Oriented & Connection less Internet Working, IPV4 Addressing. Subnetting, Supernetting. Delivery and Forwarding of IP Packets. IPv4,IPV6, ARP. RARP, ICMPv4, IGMP, Mobile IP. Unicast Routing Protocols (RIP, OSPF, and BGP). Multicasting and Multicast Routing Protocols

Unit-III

TCP and UDP Layer: TCP Reliable data transfer, Connection Establishment & Release. TCP Frame, Header Checksum, Sliding Window Concept for error control, congestion control and TCP timer, UDP Format, Pseudo header, Encapsulation, Checksum, Multiplexing & Demultiplexing. Stream Control Transmission Protocol

Unit- IV

Application Layer: Client-Server Paradigm. DHCP, DNS, TELNET, FTP, TFTP, World Wide Web and HTTP, Electronic Mail: SMTP, POP, IMAP, and MIME, SNMP, BOOTP

Unit-V

Multimedia and Next Generation Protocol: Voice over IP, Real Time Transport Protocol, IPv6 Addressing, IPv6 Protocol, ICMPv6, Firewall, PGP, HTTPS.

RECOMMENDED BOOKS

- Data and Computer Communication, W. Stalling, Pearson
- Internetworking with TCP/IP - Vol. – I, D.E. Comer, PHI
- Data Communication & Networking, B.A. Forouzan
- ISDN and Broad band ISDN with Frame Relay & ATM, W. Stalling
- LANs, Keiser

COURSE OUTCOMES

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

CO1. define the concept of computer network and various layered architecture.
CO2. compare the classless and class full addressing of IPV4 .
CO3. identify the different types of networking devices and their functions within a network.
CO4. analyze various protocols of computer networks for assisting network design and implementation.
CO5. design client server applications and communication model and protocols for communication.
CO6. elaborate various TCP/IP protocol for achieving multimedia and security services.

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Department of Computer Science & Engineering and Information Technology

DATA MINING & WAREHOUSING
150712/160712 (DE-3)

COURSE OBJECTIVES

- To understand the value of data mining in solving real-world problems.
- To gain understanding of algorithms commonly used in data mining tools.
- To develop ability for applying data mining tools to real-world problems.

Unit - I

Introduction: Motivation, important, Data type for Data Mining. Relational Databases, Data Ware-Houses. Transactional Databases. Advanced Database System and Its Applications. Data Mining Functionalities Concept/Class Description. Association Analysis Classification & Prediction, Cluster Analysis. Outliner Analysis Classification of Data Mining Systems. Major Issues in Data Mining.

Unit - II

Data Warehouse and OLTP Technology for Data Mining: Differences between Operational Database Systems & Data Warehouse. Multidimensional Data Model, Data Warehouse Architecture. Data Warehouse Implementation, Data Cube Technology, Emerging Scenario of Pattern Warehousing System.

Unit - III

Data Pre-processing: Data Cleaning, Data Integration and Transformation, Data Reduction Discretization and Concept Hierarchy Generation. Data Mining Primitives Languages and System Architectures. Concept Description. Characterization and Comparison Analytical Characterization.

Unit - IV

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis. Basic Concepts, Mining Single Dimensional Boolean Association Rules from Transactional Databases: The Apriori Algorithm, Generating Association Rules from Frequent Items, Improving the Efficiency of Apriori, other Algorithms &

their Comparison, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint Based Association Rule Mining.

Unit - V

Classification & Predication and Cluster Analysis: Issues Regarding Classification & Predication, Different Classification Methods, Predication, Cluster Analysis, Major Clustering Methods, Currently Available Tools, Case Study.

RECOMMENDED BOOKS

- Data Mining: Concepts and Techniques, Han and Kamber, Morgan Kaufmann Publications.
- Data Mining Techniques, A. K. Pujari, Universities Press Pvt. Ltd.

COURSE OUTCOMES

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

CO1. classify various databases systems and data models of data warehouse.
CO2. compare various methods for storing & retrieving data from different data sources/repository.
CO3. apply pre-processing techniques for construction of data warehouse.
CO4. analyse data mining for knowledge discovery & prediction.
CO5. explain data mining methods for identification of association for transactional databases.
CO6. develop various classification and clustering algorithms for data using data mining.

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Department of Computer Science & Engineering and Information Technology

DISTRIBUTED SYSTEMS
150713 (DE-3)

COURSE OBJECTIVES

- To provide students contemporary knowledge of distributed systems.
- To equip students with skills to analyze and design distributed applications.
- To gain experience in the design and testing of a large software system, and to be able to communicate that design to others.

Unit - I

Introduction to Distributed Systems: Architecture for Distributed System, Goals of Distributed System, Hardware and Software Concepts. Distributed Computing Model, Advantages & Disadvantage Distributed System, Issues in Designing Distributed System.

Unit -II

Distributed Share Memory: Basic Concept of Distributed Share Memory (DSM), DSM Architecture & Its Types, Design & Implementations Issues in DSM System, Structure of Share Memory Space, Consistency Model and Thrashing.

Unit - III

Distributed File System: Desirable Features of Good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault Tolerance.

Unit - IV

Inter Process Communication and Synchronization: Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms - Bully & Ring Algorithms.

Unit - V

Distributed Scheduling and Deadlock Distributed Scheduling- Issues in Load Distributing. Components for Load Distributing Algorithms. Different Types of Load Distributing Algorithms, Task Migration and its issues. Deadlock- Issues in deadlock detection & Resolutions, Deadlock Handling Strategy. Distributed Deadlock Algorithms. Case Study of Distributed System: Amoeba, Mach, Chorus.

RECOMMENDED BOOKS

- Distributed Operating System Concept & Design, Sinha, PHI .
- Distributed System Concepts and Design, Coulouris & Dollimore, Pearson Pub.
- Distributed Operating System, Andrew S. Tanenbaum, Pearson.

COURSE OUTCOMES

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

CO1. tell the basic elements and concepts related to distributed system technologies
CO2. demonstrate knowledge of the core architectural aspects of distributed systems.
CO3. identify how the resources in a distributed system are managed by algorithm.
CO4. examine the concept of distributed file system and distributed shared memory.
CO5. compare various distributed system algorithms for solving real world problems.
CO6. develop application for achieving various services of distributed system

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Department of Computer Science & Engineering and Information Technology

SOFTWARE TESTING
160713 (DE-3)

COURSE OBJECTIVES

- To understand defects and various levels of testing.
- To study about testing plan, management and its types.
- To understand the testing automation and its challenges.

Unit-I

Introduction: Overview, Objectives, Software Structure and Software Testing, Purpose of Testing, Testing vs. Debugging, Model for Testing, Taxonomy of Bugs, Mistakes, Bugs and Failures, Consequences of Bugs.

Unit –II

Testing Tactics: Software Testing Fundamentals, Basic Path Testing, Control Structure Testing, Black-Box Testing: Graph Based testing methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Testing, White Box Testing, Test Coverage – Traceability matrix.

Unit -III

Testing & Levels: Overview, Objectives, Testing Levels, Unit Testing, Component Testing, Integration Testing, System Testing, Interoperability Testing, Performance Testing, Regression Testing, Acceptance Testing.

Unit -IV

Special Tests: Introduction, Complexity Testing, Graphical User Interface Testing, Security Testing, Performance Testing, Volume and Stress Testing, Recovery Testing, Installation Testing, Requirement Testing.

Unit -V

Test Planning: Introduction, Test Policy, Test Strategy, Test Planning, Quality Plan and Test Plan, Guidelines for developing the Test Plan, Test Estimation, Test Standards, Building Test Data and Test Cases, Essential Activities in testing, Test

Management Software, Test Log Document, Effective Test Cases, Test File, Building test Data, Rules and Responsibilities in Testing Life Cycle, Test Progress Monitoring.

RECOMMENDED BOOKS

- Software Testing, Techniques and Applications, Arun Khannur, Pearson Education.
- Software Engineering, Roger S Pressman, Sixth Edition, Tata McGraw Hill.
- Software Testing Principles, Techniques and Tools, M G Limaye, Tata McGraw Hill.

COURSE OUTCOMES

After successful completion of the course students will be able to:

CO1. define different types of defects and testing models.

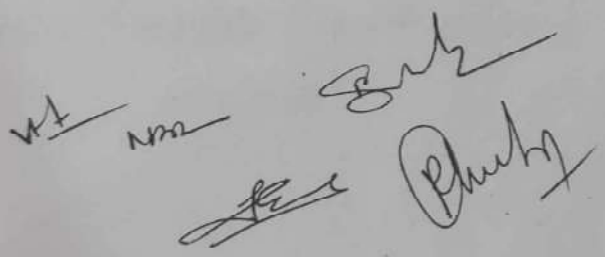
CO2. demonstrate methods of test generation from requirements.

CO3. explain different types of testing.

CO4. apply software testing techniques in commercial environments.

CO5. examine various test plans and continuous quality improvement.

CO6. choose the various test tools for automation.



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ANNEXURE – II

Syllabi
of
Open Category (OC) Courses
offered by Department of CSE & IT
in B.Tech VII Semester
Under Flexible Curriculum

[ITEM-4]

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Department of Computer Science & Engineering and Information Technology

SOFT COMPUTING
900208 (OC-2)

COURSE OBJECTIVES

- To provide the student with the basic understanding of neural networks and fuzzy logic fundamentals. Program the related algorithms and Design the required and related systems.
- To understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
- To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.

Unit-I

Introduction and Fundamental Concept of ANN: Basic models of Artificial Neural Networks, Terminologies of ANNs McCulloch-Pitts Neurons, Linear Separability, Hebb Network, **Supervised Learning Networks:** Introduction, Perceptron Networks, Back Propagation Networks, Radial Basis Function Networks, Hopefield networks.

Unit-II

Unsupervised Learning: Fixed weight Competitive Nets, Kohonen Self-Organizing Map, Learning vector quantization, Counter propagation Networks, Adaptive Resonance Theory Network.

Unit-III

Fuzzy Set Theory: Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzzy rules, Fuzzy Reasoning, **Defuzzification:** Lembda-Cuts for Fuzzy sets (Alpha-Cuts), Lembda-Cuts for Fuzzy Relations, Fuzzy Inference System: Introduction, Mamdani Fuzzy Model, Takagi-Sugeno Fuzzy Model.

Unit-IV

Introduction: Biological Background, Traditional optimization and Search Techniques, Basic Terminologies in GA, Operators in Genetic Algorithm, Stopping Condition for

Genetic Algorithm Flow. Classification of Genetic Algorithm. Comparison with Evolutionary algorithm. Application of Genetic algorithm.

Unit-V

Hybrid Soft Computing Techniques: Introduction, Neuro-fuzzy Hybrid system, Adaptive Neuro fuzzy inference system(ANFIS), Genetic Neuro Hybrid system, Application of Soft Computing Techniques.

RECOMMENDED BOOKS

- Principles of Soft Computing, S. N. Sivanandam and S. N. Deepa , Wiley
- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications-S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI.
- Introduction to Soft Computing Neuro-Fuzzy and Genetic Algorithms. Samir Roy and Udit Chakraborty, Pearson.
- Neural Networks and Learning Machines-Simon Haykin PHI.
- Fuzzy Logic and Engineering Application, Tomthy Ross. TMH

COURSE OUTCOMES

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

CO1. define basic concepts of neural network and fuzzy systems.
CO2. compare solutions by applying various soft computing approaches on a given problem.
CO3. develop and train different supervised and unsupervised learning.
CO4. classify various nature inspired algorithms according to their application aspect.
CO5. compare the efficiency of various hybrid systems.
CO6. design a soft computing model for solving real world problems.

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Department of Computer Science & Engineering and Information Technology

NETWORK SECURITY
900209 (OC-2)

COURSE OBJECTIVES

- To provide conceptual understanding of network security principles, issues, challenges and mechanisms.
- To understand how to apply encryption techniques to secure data in transit across data networks.
- To explore the requirements of real-time communication security and issues related to the security of web services.

Unit-I

Security: Principles and Attacks. **Basic Number Theory:** Prime Number, Congruence's, Modular Exponentiation, Fundamentals of Cryptography, Steganography, Cryptanalysis, Code Breaking, Block Ciphers and Steam Ciphers, Substitution Ciphers, Transposition Ciphers, Caesar Cipher, Play-Fair Cipher, Hill Cipher, Cipher Modes of Operation.

Unit-II

Cryptography: Symmetric Key Cryptography, Public Key Cryptography, Principles of Public Key Cryptosystem, Classical Cryptographic Algorithms: DES, RC4, Blowfish, RSA, Distribution of Public Keys and Key Management, Diffie-Hellman Key Exchange.

Unit-III

Hash Functions: Hash Functions, One Way Hash Function, SHA (Secure Hash Algorithm). **Authentication:** Requirements, Functions, Kerberos, Message Authentication Codes, Message Digest: MD5, SSH (Secure Shell), Digital Signatures, Digital Certificates.

Unit -IV

IP & Web Security Overview: SSL (Secure Socket Layer), TLS (Transport Layer Security), SET (Secure Electronic Transaction). **IDS (Intrusion Detection System):** Statistical Anomaly Detection and Rule-Based Intrusion Detection, Penetration Testing, Risk Management. **Firewalls:** Types, Functionality and Polices.

Unit -V

Phishing: Attacks and Its Types, Buffer Overflow Attack, Cross Site Scripting, SQL Injection Attacks, Session Hijacking. **Denial of Service Attacks:** Smurf Attack, SYN Flooding, Distributed Denial of Service. **Hacker:** Hacking and Types of Hackers, Footprinting, Scanning: Types: Port, Network, Vulnerability), Sniffing in Shared and Switched Networks, Sniffing Detection & Prevention, Spoofing.

RECOMMENDED BOOKS

- Cryptography and Network Security, William Stallings, Pearson Education.
- Cryptography and Network Security, Atul Kahate, McGraw Hill Education.
- Incident Response and Computer Forensics, Kevin Mandia, Chris Prosise, Tata McGraw Hill.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1: define various aspects of network security.
CO2: illustrate fundamentals of number theory and cryptography.
CO3: apply security mechanisms to achieve principles of network security.
CO4: analyze the cause for various existing network attacks.
CO5: examine the vulnerabilities in applications over internet.
CO6: develop a secure protocol for achieving various network security services.

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Department of Computer Science & Engineering and Information Technology

DATA MINING & WAREHOUSING
900210 (OC-2)

COURSE OBJECTIVES

- To understand the value of data mining in solving real-world problems.
- To gain understanding of algorithms commonly used in data mining tools.
- To develop ability for applying data mining tools to real-world problems.

Unit - I

Introduction: Motivation, Important, Data Type for Data Mining: Relational Databases, Data Ware-Houses, Transactional Databases, Advanced Database System and Its Applications, Data Mining Functionalities Concept/Class Description, Association Analysis Classification & Prediction, Cluster Analysis, Outliner Analysis Classification of Data Mining Systems, Major Issues in Data Mining.

Unit - II

Data Warehouse and OLTP Technology for Data Mining: Differences between Operational Database Systems, & Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation Data Cube Technology, Emerging Scenario of Pattern Warehousing System.

Unit - III

Data Pre-processing: Data Cleaning, Data Integration and Transformation, Data Reduction Discretization and Concept Hierarchy Generation, Data Mining Primitives Languages and System Architectures, Concept Description, Characterization and Comparison Analytical Characterization.

Unit - IV

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single Dimensional Boolean Association Rules from Transactional Databases: The Apriori Algorithm, Generating Association Rules from Frequent Items, Improving the Efficiency of Apriori, Other Algorithms & their Comparison, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint Based Association Rule Mining.

Unit - V

Classification & Predication and Cluster Analysis: Issues Regarding Classification & Predication, Different Classification Methods, Predication, Cluster Analysis, Major Clustering Methods, Currently Available Tools, Case Study.

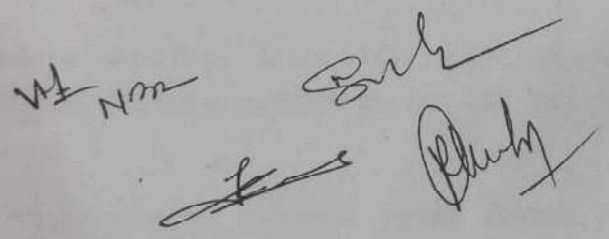
RECOMMENDED BOOKS

- Data Mining: Concepts and Techniques, Han and Kamber, Morgan Kaufmann Publications.
- Data Mining Techniques, A. K. Pujari, Universities Press Pvt. Ltd.

COURSE OUTCOMES

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

CO1. classify various databases systems and data models of data warehouse.
CO2. compare various methods for storing & retrieving data from different data sources/repository.
CO3. apply pre-processing techniques for construction of data warehouse.
CO4. analyse data mining for knowledge discovery & prediction.
CO5. explain data mining methods for identification of association for transactional databases.
CO6. develop various classification and clustering algorithms for data using data mining.



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Department of Computer Science & Engineering and Information Technology

R PROGRAMMING
900220 (OC-3)

COURSE OBJECTIVES

- To understand the critical programming language concepts.
- To perform data analysis using R commands.
- To make use of R loop functions and debugging tools.

Unit-I

Introduction to R: R Commands, Objects, Functions, Simple Manipulations, Matrices and Arrays, Factors, Lists, Data Frames.

Unit-II

Programming Using R: Introduction, Function Creation, Scripts, Logical Operators, Conditional Statements, Loops in R, Switch Statement, Creating List and Data Frames, List and Data Frame Operations, Recursive List.

Unit-III

Object- Oriented Programming in R: Introduction, S3 Classes, S4 Classes, References Classes, Debugging Principle in R, Import and Export Data from CSV, SAS and ODBC.

Unit-IV

Mathematical and Statistical Concepts, Hypothesis Testing, Different Statistical Distribution, Regression, Time Series Analysis.

Unit-V

Graphics in R: Basic Plots, Labelling and Documenting Plots, Adjusting the Axes, Specifying Colour, Fonts and Sizes, Plotting symbols, Customized Plotting, Packages in R for Windows, Linus and Mac.

RECOMMENDED BOOKS

- "R for Beginners", Sandip Rakshit, Tata Mc Graw Hill Education.
- "R programming for Data Science", Roger D. Peng, Learn publishing.

COURSE OUTCOMES

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

CO1. define basic programming constructs used in R.
CO2. explain the various commands used in R.
CO3. apply various concept of programming for controlling the flow of data using R.
CO4. analyze the concept of concept of object oriented programming in R.
CO5. choose appropriate packages of R programming for dealing various tasks.
CO6. predict results from the datasets using R commands.

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Department of Computer Science & Engineering and Information Technology

ARTIFICIAL INTELLIGENCE
900221 (OC-3)

COURSE OBJECTIVES

- To enhance the capability of analysis for Machine learning and fuzzy logic.
- To apply the mathematical concepts in designing and executing the knowledge representation and problem solving.
- To design the mathematical model and rule formation for production system.

Unit-I

Introduction: Definition, Scope, Task and Objectives of Artificial Intelligence, AI Problems, Applications of AI. The Importance of AI, AI and related fields. Problems, Problem Spaces and Production System. Components of Production System, Characteristics of Production Systems, Types of Production System. Control Strategies, Application of Production Systems, water-jug, 8 – Puzzle and other advance Problems.

Unit-II

Searching: The Blind and Informed Searches, Breadth First Search, Depth First Search and their implementation using Open and Closed list, Heuristic estimation and evaluation, Hill climbing and their Problems. Best First Search, Searching And-Or Graphs, A * search, AO * search.

Unit-III

Knowledge Representation: General Concept, Introduction, Definition and Importance of Knowledge, Approaches to Knowledge Representation, Issues in Knowledge Representation, Procedural and Declarative Knowledge, Forward Versus Backward Reasoning, Knowledge Representation Techniques: Logics, Prepositional Logic, Predicate Logic.

Unit-IV

Semantic Nets, Partition Semantic Nets, Frames, Conceptual Dependencies, Scripts, Bay's Theorem, Fuzzy Logic, Game Playing: Min – Max Search Procedure.

Unit-V

Planning, Understanding, Natural Language Processing, Speech Recognition, Computer Vision, Expert System and Expert System Cell.

RECOMMENDED BOOKS

- Artificial Intelligence, Rich & Knight
- Introduction to Artificial Intelligence and Expert Systems, Dan. W. Patterson, PHI publication

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COURSE OUTCOMES

After successful completion of the course students will be able to:

CO1. outline the basic concepts of intelligent methods.
CO2. summarize various algorithms used in artificial intelligence.
CO3. identify the appropriate search methods to solve specific problems.
CO4. analyze the performance of knowledge representation methods used in artificial intelligence.
CO5. examine machine learning methods and robotics for listing their applications.
CO6. design game playing techniques by applying programming methods of puzzle solving techniques.

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Department of Computer Science & Engineering and Information Technology

COMPUTER NETWORKS
900222 (OC-3)

COURSE OBJECTIVES

- Familiarize the student with the basic taxonomy and terminology of the computer networking.
- Provide detail knowledge about various layers, protocols and devices that facilitate networking.
- Enable Students to deal with various networking problems such as flow control, error control and congestion control.

Unit-I

Introduction: Computer Network, Types- LAN,MAN & WAN. Data Transmission Modes- Serial & Parallel, Simplex, Half Duplex & Full Duplex, Synchronous & Asynchronous Transmission. Transmission Medium- Guided & Unguided. Cables- Twisted Pair, Coaxial Cable & Optical Fiber. Networking Devices-Repeaters, Hub, Switch, Bridge, Router, Gateway and Modem. Performance Criteria- Bandwidth, Throughput, Propagation Time & Transmission Time. Network Standardization- OSI Reference Model & TCP/IP Reference Mode.

Unit-II

Physical Layer: Network Topologies- Bus, Ring, Star & Mesh, Line Coding- Unipolar, Polar and Bipolar. Switching- Circuit Switching, Message Switching & Packet Switching, Multiplexing: FDM – Frequency Division Multiplexing, WDM – Wavelength Division Multiplexing & TDM – Time Division Multiplexing.

Unit-III

Data Link Layer: Introduction, Design Issues, Services, Framing, Error Control, Flow Control, ARQ Strategies, Error Detection and Correction, Parity Bits, Cyclic Redundant Code (CRC), Hamming Codes, MAC Sub Layer- The Channel Allocation Problem, Pure ALOHA ,Slotted ALOHA, CSMA ,CSMA/CD, IEEE 802.3, IEEE 802.4 and IEEE 802.5.

Unit-IV

Network Layer & Transport Layer: Introduction, Design Issues, Services, Routing- Distance Vector Routing, Hierarchical Routing & Link State Routing, Shortest Path Algorithm- Dijkstra's Algorithm & Floyd–Warshall's Algorithm, Flooding, Congestion Control- Open Loop & Closed Loop Congestion Control, Leaky Bucket & Token Bucket Algorithm, Connection Oriented & Connectionless Service, IP Addressing.

Unit-V

Presentation, Session& Application Layer: Introduction, Design Issues, Presentation Layer- Translation, Encryption- Substitutions and Transposition Ciphers, Compression- Lossy and Lossless, Session Layer – Dialog Control, Synchronization. Application Layer- Remote Login, File Transfer & Electronic Mail.

RECOMMENDED BOOKS

- Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill.
- Computer Networks, Andrew S. Tanenbaum, Pearson Education India.
- Computer Networks and Internets, Douglas E. Comer, Pearson India.

COURSE OUTCOMES

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

CO1. explain the fundamental concepts of computer network.
CO2. illustrate the basic taxonomy & terminologies of computer network.
CO3. Identify various parameter for affecting the performance of computer network.
CO4. analyze the concepts of communication using various layer of OSI model.
CO5. evaluate the performance of computer network in congestion and Internet.
CO6. design the network environment and applications for implementation of computer networking concept.

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ANNEXURE – III

Scheme and Syllabi
for
M.Tech (Computer Science & Engineering/ Information Technology/ Cyber Security) Programmes
[ITEM 11(a)]

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Master of Technology (Computer Science & Engineering) (Semester – I) **Recommended W.E.F JULY 2020**

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Periods per week			Total Credits
			Theory Slot			Practical Slot		MOOCs			L	T	P	
			End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work/ sessional	Assignment	Exam					
1.	620111	Database Systems	70	20	10	-	-	-	-	100	3	-	-	3
2.	620112	Distributed Computing	70	20	10	-	-	-	-	100	3	-	-	3
3.	620113	High-speed Networks	70	20	10	-	-	-	-	100	3	-	-	3
4.	DE	Departmental Elective-I	70	20	10	-	-	-	-	100	3	-	-	3
5.	OC	Open Category Course (OC-1)	70	20	10	-	-	-	-	100	3	-	-	3
6.	620121	Lab-I	-	-	-	90	60	-	-	150	-	-	4	4
7.	620122	Self-Learning Presentation	-	-	-	-	100	-	-	100	-	-	2	2
		Total	350	100	50	90	160	-	-	750	15	-	6	21

Open Category course (OC-1) will have to be opted from the pool of open courses. This course will be based on interdisciplinary aspects.
During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.
Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation).

DE-1	
Subject Code	Subject Name
620114	Mobile Computing & M-Commerce
620115	Adhoc & Sensor Based Networks
620116	Network Security
620117	Computer Architecture and Parallel Processing

OC-1	
Subject Code	Subject Name
620118	Soft Computing
620119	Blockchain Technology
620120	Machine Learning using Python

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

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Master of Technology (Computer Science & Engineering) (Semester-II) **Recommended W.E.F JULY 2020**

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Periods per week			Total Credits
			Theory Slot			Practical Slot		MOOCs						
			End sem	Mid sem	Quiz/ Assignment	End Sem	Lab work/ sessional	Assignment	Exam		L	T	P	
1.	620211	Algorithms Design Techniques and Analysis	70	20	10	-	-	-	-	100	3	-	-	3
2.	620212	Advanced Topics in Data Mining & Warehousing	70	20	10	-	-	-	-	100	3	-	-	3
3.	620213	Image Processing and Retrieval Techniques	70	20	10	-	-	-	-	100	3	-	-	3
4.	DE	Departmental Elective-II	-	-	-	-	-	25	75	100	3	-	-	3
5.	OC	Open Category Course (OC-2)	70	20	10	-	-	-	-	100	3	-	-	3
6.	620221	Lab-II	-	-	-	90	60	-	-	150	-	-	4	4
7.	620222	Self Learning / Presentation	-	-	-	-	100	-	-	100			2	2
		Total	**280**	**80**	**40**	**90**	**160**	**25**	**75**	**750**	**15**	**-**	**6**	**21**

Elective-II course *will run through SWAYAM / NPTEL /MOOC based learning platform (with credit transfer facility).*

Open Category course will have to be opted from the pool of open courses. This course will be based on interdisciplinary aspects. [This course may be run through SWAYAM/NPTEL based platform *(with credit transfer facility)* and accordingly, OC-2 pool may be created from the list of SWAYAM/NPTEL courses].

***During* labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.**

Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation).

DE-2 (Tentative)	
Subject Code	**Subject Name**
620214	Internet of Things
620215	Deep Learning
620216	Cloud Computing
620217	Social Networking

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

Master of Technology (Computer Science & Engineering) (Semester-III) ***Recommended W.E.F JULY 2020***

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot		MOOC's			L	T	P	
			End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation	Assign ment	Exam					
1.	620311	Dissertation Part-I *(Literature Review Problem Foundation Synopsis survey paper, etc.)*	-	-	-	150	100	-	-	250	-	-	10	10
2.	OC	MOOC Course*	-	-	-	-	-	25	75	100	-	-	02	02
		Total	-	-	-	**150**	**100**	**25**	**75**	**350**	-	-	**12**	**12**

* **MOOC course will be treated as the course of open nature and will be decided by concerning department / BoS.**

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

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Master of Technology (Computer Science & Engineering) (Semester-IV) ***Recommended W.E.F JULY 2020***

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot			L	T	P	
			End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation					
1.	620405	Dissertation Part-II	-	-	-	300	200	500	-	-	14	14
		Total	-	-	-	**300**	**200**	**500**	-	-	**14**	**14**

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

Master of Technology (Information Technology) (Semester - 1) Recommended W.E.F JULY 2020

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Periods per week			Total Credits
			Theory Slot			Practical Slot		MOOC's			L	T	P	
			End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work/ sessional	Assignment	Exam					
1.	630111	Database Systems	70	20	10	-	-	-	-	100	3	-	-	3
2.	630112	Distributed Computing	70	20	10	-	-	-	-	100	3	-	-	3
3.	630113	High-speed Networks	70	20	10	-	-	-	-	100	3	-	-	3
4.	DE	Departmental Elective-I	70	20	10	-	-	-	-	100	3	-	-	3
5.	OC	Open Category Course* (OC-1)	70	20	10	-	-	-	-	100	3	-	-	3
6.	630121	Lab-I	-	-	-	90	60	-	-	150	-	-	4	4
7.	630122	Self-Learning Presentation#	-	-	-	-	100	-	-	100	-	-	2	2
		Total	350	100	50	90	160	-	-	750	15	-	6	21

* Open Category course (OC-1) will have to be opted from the pool of open courses. This course will be based on interdisciplinary aspects.
# During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.
Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation).

DE-1	
Subject Code	Subject Name
630114	Mobile Computing & M-Commerce
630115	Adhoc & Sensor Based Networks
630116	Information Security & Systems
630117	Models and Techniques in Computer Graphics

OC-1	
Subject Code	Subject Name
630118	Soft Computing
630119	Blockchain Technology
630120	Machine Learning using Python

DEAN (ACADEMICS)
M.I.T.S
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MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

Master of Technology (Information Technology) (Semester-II) **Recommended W.E.F JULY 2020**

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Periods per week			Total Credits
			Theory Slot			Practical Slot		MOOCs						
			End sem	Mid sem	Quiz/ Assignment	End Sem	Lab work/ sessional	Assignment	Exam		L	T	P	
1.	630211	Algorithms Design Techniques and Analysis	70	20	10	-	-	-	-	100	3	-	-	3
2.	630212	Advanced Topics in Data Mining & Warehousing	70	20	10	-	-	-	-	100	3	-	-	3
3.	630213	Image Processing and Retrieval Techniques	70	20	10	-	-	-	-	100	3	-	-	3
4.	DE	Departmental Elective-II	-	-	-	-	-	25	75	100	3	-	-	3
5.	OC	Open Category Course (OC-2)	70	20	10	-	-	-	-	100	3	-	-	3
6.	630221	Lab-II*	-	-	-	90	60	-	-	150	-	-	4	4
7.	630222	Self Learning / Presentation**	-	-	-	-	100	-	-	100			2	2
		Total	280	80	40	90	160	25	75	750	15	-	6	21

\# **Elective-II course *will run through SWAYAM / NPTEL /MOOC based learning platform (with credit transfer facility).***

** **Open Category course will have to be opted from the pool of open courses. This course will be based on interdisciplinary aspects. [This course may be run through SWAYAM/NPTEL based platform *(with credit transfer facility)* and accordingly, OC-2 pool may be created from the list of SWAYAM/NPTEL courses].**

* **During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.**

Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation).

DE-2 (Tentative)	
Subject Code	Subject Name
630214	Internet of Things
630215	Deep Learning
630216	Cloud Computing
630217	Social Networking

DEAN (ACADEMICS)
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MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

Master of Technology (Information Technology) (Semester-III) *Recommended W.E.F JULY 2020*

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot		MOOCs						
			End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation	Assign ment	Exam		L	T	P	
1.	630311	Dissertation Part-I *(Literature Review/ Problem Foundation Synopsis/survey paper, etc.)*	-	-	-	150	100	-	-	250	-	-	10	10
2.	OC	MOOC Course*	-	-	-	-	-	25	75	100	-	-	02	02
-		Total	-	-	-	150	100	25	75	350	-	-	12	12

* MOOC course will be treated as the course of open nature and will be decided by concerning department / BoS.

DEAN (ACADEMICS)
M.I.T.S
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Master of Technology (Information Technology) (Semester-IV) ***Recommended W.E.F JULY 2020***

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot			L	T	P	
			End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation					
1.	630405	Dissertation Part-II	-	-	-	300	200	500	-	-	14	14
		Total	-	-	-	300	200	500	-	-	14	14

(ACADEMICS)
M.I.T.S
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Master of Technology (Cyber Security) (Semester – I) *Recommended W.E.F JULY 2020*

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Periods per week			Total Credits
			Theory Slot			Practical Slot		MOOCs			L	T	P	
			End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work/ sessional	Assignment	Exam					
1.	640111	Database Security and Privacy	70	20	10	-	-	-	-	100	3	-	-	3
2.	640112	Distributed Computing	70	20	10	-	-	-	-	100	3	-	-	3
3.	640113	High-speed Networks	70	20	10	-	-	-	-	100	3	-	-	3
4.	DE	Departmental Elective-I	70	20	10	-	-	-	-	100	3	-	-	3
5.	OC	Open Category Course* (OC-1)	70	20	10	-	-	-	-	100	3	-	-	3
6.	640121	Lab-I	-	-	-	90	60	-	-	150	-	-	4	4
7.	640122	Self-Learning / Presentation	-	-	-	-	100	-	-	100	-	-	2	2
		Total	350	100	50	90	160	-	-	750	15	-	6	21

* Open Category course (OC-1) will have to be opted from the pool of open courses. This course will be based on interdisciplinary aspects.
# During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.
$ Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation).

DE-1	
Subject Code	Subject Name
640114	Cyber Law and Emerging Jurisprudence
640115	Cloud Computing and Security
640116	E-Commerce Security
640117	Biometric Systems and Biometric Image Processing

OC-1	
Subject Code	Subject Name
640118	Soft Computing
640119	Blockchain Technology
640120	Machine Learning using Python

DI... (ACADEMICS)
MI...S
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Master of Technology (Cyber Security) (Semester-II) *Recommended W.E.F JULY 2020*

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Periods per week			Total Credits
			Theory Slot			Practical Slot		MOOCs						
			End sem	Mid sem	Quiz/ Assignment	End Sem	Lab work/ sessional	Assignment	Exam		L	T	P	
1.	640211	Cyber Crime Investigations and Digital Forensics	70	20	10	-	-	-	-	100	3	-	-	3
2.	640212	Advanced Topics in Data Mining & Warehousing	70	20	10	-	-	-	-	100	3	-	-	3
3.	640213	Information Security & Systems	70	20	10	-	-	-	-	100	3	-	-	3
4.	DE	Departmental Elective-II	-	-	-	-	-	25	75	100	3	-	-	3
5.	OC	Open Category Course (OC-2)	70	20	10	-	-	-	-	100	3	-	-	3
6.	640221	Lab-II*	-	-	-	90	60	-	-	150	-	-	4	4
7.	640222	Self Learning / Presentation ^	-	-	-	-	100	-	-	100			2	2
		Total	280	80	40	90	160	25	75	750	15	-	6	21

\# Elective-II course *will run through SWAYAM / NPTEL /MOOC based learning platform (with credit transfer facility).*

Open Category course will have to be opted from the pool of open courses. This course will be based on interdisciplinary aspects. [This course may be run through SWAYAM/NPTEL based platform *(with credit transfer facility)* and accordingly, OC-2 pool may be created from the list of SWAYAM/NPTEL courses].

* During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.

^ Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation).

DE-2# (Tentative)	
Subject Code	Subject Name
640214	Internet of Things
640215	Deep Learning
640216	Cloud Computing
640217	Social Networking

DEAN (ACADEMICS)
M.I.T.S

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

Master of Technology (Cyber Security) (Semester-III) ***Recommended W.E.F JULY 2020***

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot		MOOCs						
			End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation	Assign ment	Exam		L	T	P	
1.	640311	Dissertation Part-I *(Literature Review Problem Foundation Synopsis survey paper, etc.)*	-	-	-	150	100	-	-	250	-	-	10	10
2.	OC	MOOC Course*	-	-	-	-	-	25	75	100	-	-	02	02
		Total	-	-	-	150	100	25	75	350	-	-	12	12

* MOOC course will be treated as the course of open nature and will be decided by concerning department / BoS.

DEAN (ACADEMICS)
MITS
GWALIOR

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Master of Technology (Cyber Security) (Semester-IV) ***Recommended W.E.F JULY 2020***

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
			Theory Slot			Practical Slot						
			End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	640405	Dissertation Part-II	-	-	-	300	200	500	-	-	14	14
		Total	-	-	-	**300**	**200**	**500**	-	-	**14**	**14**

DEAN (ACADEMICS)
M.I.T.S

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Syllabi
of
Departmental Core (DC) Courses
M.Tech I Semester
(Computer Science & Engineering/ Information Technology/ Cyber Security)

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Department of Computer Science & Engineering and Information Technology

DATABASE SYSTEMS
620111/630111

UNIT I

Review of Databases: Characteristics & Implications of Database Approach, Data Models, Architectures, Database Languages & Interfaces, Classification of DBMS, Data Independence, ER-Models, High Level Conceptual Data Models, Relationships, ER-Diagrams, Design Issues.

UNIT II

Object Oriented and Extended Relational Databases: Concepts of Object Oriented Databases, Object Identity, Object Structure and Type Constructors, Encapsulation of Operations, Methods & Persistence, Type Hierarchies and Inheritance, Object Database Standards, Object Definition Language, Object Query Language and Object Database Conceptual Design.

UNIT III

Distributed Databases: Concepts, Fragmentation, Replication, Allocation Techniques for Distributed Database Design, Types of Distributed Database Systems, Query Processing, Concurrency Control and Recovery, Distributed Databases in Oracle.

UNIT IV

Transaction Processing: Introduction, Transaction and System Concepts, Properties of Transactions, Schedules & Recoverability, Serializability of Schedules, Transaction Support in SQL, Concurrency Control Techniques: Locking Techniques, Time Stamp Ordering, Multi Version Concurrency, Validation Concurrency, Locks for Concurrency Control.

UNIT V

Image and Multimedia Databases: Modeling and Storage of Image and Multimedia Data, Data Structures- R-Tree, k-d Tree, Quad Trees, Content Based Retrieval: Color Histograms, Textures, etc., Image Features, Spatial and Topological Relationships, WEB Database: Accessing Databases through WEB, WEB Servers, XML Databases, Commercial Systems, Mobile Databases, Case Study: Oracle Xi

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Recommended Books:

1. Elmarsi, Navathe, Somayajulu, Gupta, "Fundamental of Database Systems", 4th Edition , Pearson Education, 2007
2. R. Ramakrishanan, "Database Management Systems", McGraw Hill International Editions, 1998
3. Date, Kannan, Swaminathan, "An Introduction to Database Systems", 8th Edition Pearson Education, 2007
4. Silberscatz, Korth, Sudarshan, "Database System Concepts", Mcgraw Hill, 6th Edition, 2006

COURSE OUTCOMES

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

CO1: recall the fundamental of RDBMS, DBMS storage structures and access techniques.

CO2: illustrate the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.

CO3: make use of various concurrency control mechanisms for error free transaction processing.

CO4: analyze various types of databases.

CO5: design ER-models to represent simple database application scenarios and improve the database design by normalization.

CO6: propose the improved data-intensive application using DBMS APIs program.

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Department of Computer Science & Engineering and Information Technology

DATABASE SECURITY AND PRIVACY
640111

UNIT I

DBMS concepts: introduction, Data Models, Entities and Attributes, Relationships, E-R Diagram, Relational Data Models: Domains, Tuples, Attributes, Keys, Relational Database, Schemas, Integrity Constraints, Relational Algebra and Relational Calculus, Functional Dependencies and Normalization for Relational Database. Hash-Based Indexing: Static Hashing; Extendible hashing, Linear hashing, Comparisons, Query Processing and Optimization. Distributed databases: Client/Server Database Fragmentation, Replication, Location & Fragment transparency, Distributed Query processing and Optimization.

UNIT II

Database Protection: Integrity, Constraints in Query-by-Example, Security in Query-by-Example. Concurrent Operations on the Database: Basic Concepts, Simple Transaction Model, Model with Read- and Write-Locks, Read-only, Write-only Model. Concurrence for Hierarchically Structured Items, Protection against Crashes, Optimistic Concurrency Control.

UNIT III

Security Principle. E-mail Security, Database Recovery Criteria, Database Security, Develop Continuity and Recovery Plans, Physical and Environmental Security, Security Plan for Implementation. Goals of Database Security, Access Control, Statistical Database Security.

UNIT IV

Security Perimeter, Relationship between a Security Policy and Security Model, State Machine Models, Confidentiality and Integrity Models, Bell-laPadula Model, Biba Model, Bell-LaPadula ersus Biba, Clark-Wilson Model, Information Flow Model, Noninterference Model, Brewer and Nash Model, Graham-Denning and Harrison-Ruzzo-Ullman Models, Access Matrix Models.

UNIT V

Security Management, Data/ Information, Protecting Password File, Access Control Structure, Software Security, Element of Information Security, Steps for Better Security, Malicious Software, System Security Assurance Concepts, Importance of Information System.

Reference Books:

1. R. Elmasri, S. Navathe, Fundamentals of Database System, Pearson Education.
2. C. J. Date, An Introduction .to data base Systems, Volume I, Pearson Education.
3. Database Systems, SK Singh, pearson education.

4. H. F. Korth and A. Silberschatz. Database Cocepts, TMH.
5. Godbole, "Information system security", Willey.
6. Cole.Krutz & Conley "Network security" Willey.
7. CISSP Certification, "Security Models and Architecture", CISSP.

COURSE OUTCOMES

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

CO1: recall the basic concepts of database management system and indexing used in database management system.

CO2: explain various terminology used in database protection.

CO3: apply various database security principles like Email security, database recovery etc.

CO4: analyze the different security parameters used for database security.

CO5: evaluate different database security principles and parameters for database security measures.

CO6 design a secure and robust database for an information system.

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Department of Computer Science & Engineering and Information Technology

DISTRIBUTED COMPUTING
620112/630112/640112

UNIT I

Introduction To Distributed System, Communication: Layered Protocols, Client Server Protocols, RPC, Group Communication, Coordination, Synchronization & Consistency: Logical Clocks, Physical Clocks, Mutual Exclusion, Election Algorithms, Atomic Broadcast, Sequential Consistency Transaction Distributed Consensus, Threads: Thread Synchronization, Implementation Issues and Threads Vs RPC.

UNIT II

Models Of Distributed Computing: Client Server and RPC, RPC Architecture, Exceptions, Underlying Protocols, IDL, Marshalling Etc, Group Models and Peer to Peer: Groups for Service Replication/ Reliability, Groups For Parallelism/ Performance, Client/ Server Vs. Peer-To-Peer, Multicast, Atomic Broadcast.

UNIT III

Distributed File System: Security, Naming/ Location Transparency, R/W Semantics, Cache Coherence, Replication. Distributed Shared Memory: DSM Architecture, Consistency Models and Relation to Caching, Release Consistency, Comparison with Message Passing and RPC.

UNIT IV

Fault Tolerant Distributed Systems: Introduction, Dependability, Faults Vs. Errors Vs. Failure, Space Time and Value Redundancy, Fault Tolerant Architecture, Failure Detection Algorithms, Partitioning, FT Consensus.

UNIT V

Distributed Multimedia System: Introduction, Characteristics, And Resource Management Stream Adaptation, Security: Introduction, Security Techniques, Cryptographic Algorithms, Authentication and Access Control, Case Study: CORBA, MACH.

Recommended Books:

1. Andrew S Tanenbaum, Distributed Systems: Principles and Paradigms, Pearson
2. Pradeep K. Sinha, Distributed Operating Systems, PHI

COURSE OUTCOMES

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

CO1: demonstrate knowledge of the basic elements and concepts related to distributed system technologies

CO2: summarize various architectures used to design distributed systems.

CO3: build distributed systems using various inter process communication techniques.

CO4: analyze a problem and form a distributed system to work towards a solution.
CO5: explain various distributed algorithms, such as logical clocks and leader election.
CO6: propose own reflections and attitudes in regard to the area of research.

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Department of Computer Science & Engineering and Information Technology

HIGH-SPEED NETWORKS
620113/630113/640113

UNIT I

Review of Networking and Networking Protocols, TCP/IP Model, OSI Model, Internet Protocols and Addressing, Routing and Internetworking: Network–Layer Routing, Congestion Control at Network Layer, Logical Addressing: IPv4 Addresses, IPv6, Multicasting Techniques and Protocols.

UNIT II

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control, Application Layer: Principles of Network Applications, Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS).

UNIT III

Optical Networks and WDM Systems: Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocation in Networks. WDM Network elements: Optical line terminals and amplifiers.

UNIT- IV

ATM-based Services and Applications, ATM Switching, ATM Transmission, Wireless ATM and mobile ATM, Security in ATM network, VPNs: Introduction, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Overlay Networks – VoIP.

UNIT- V

Mobile Ad-Hoc Networks: Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks – Wireless Sensor Networks: Sensor Networks and Protocol Structures.

Recommended Books:

1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007
2. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall
3. Adhoc Wireless Networks: Architecture & protocols, Sivaram Murthy, PHI
4. Optical Networks: Third Generation Transport Systems, Uyless Black, Pearson
5. Optical Networks: A Practical Perspective, Rajeev Ramaswami and N. Sivarajan, Morgan Kaufmann
6. ATM Networks: Concepts, Protocols, Applications, Rainer Handel, Huber and Schroder, Pearson

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COURSE OUTCOMES

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

CO1: recall the understanding of network engineering principles for network, system and service management.

CO2: classify the theoretical and practical concepts behind the design of multi-constained applications and the need for service integration.

CO3: apply the knowledge of Advanced Network Engineering including design, routing, management, security, performance and ability to understand and use industry standard tools used.

CO4: solve the problems associated with network design, routing, management, security and performance.

CO5: analyze the concepts underlying different protocols, QoS architectures and mechanisms and their main characteristics and functionality.

CO6: assess the network management issues and devise adequate network management solutions using industry design techniques/possible research opportunities.

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Syllabi
of
Departmental Core (DC) Courses
M.Tech II Semester
(Computer Science & Engineering/ Information Technology/ Cyber Security)

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Department of Computer Science & Engineering and Information Technology

ALGORITHMS DESIGN TECHNIQUES AND ANALYSIS
620211/630211

UNIT I

Introduction: Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Recursive and Non-recursive Algorithms, Empirical Analysis of Algorithms, Brute Force and Exhaustive Search- Sequential Search and Brute-Force String Matching, Closest-Pair and Convex-Hull Problems.

UNIT II

Decrease-and-Conquer: Topological Sorting, Fake-Coin Problem, Russian Peasant Multiplication, Josephus Problem, Computing a Median and the Selection Problem, Game of Nim. **Transform-and-Conquer:** 2-3 Trees, Horner's Rule and Binary Exponentiation, Computing the Least Common Multiple, Counting Paths in a Graph.

UNIT III

Space and Time Trade-Offs: Sorting by Counting, Input Enhancement in String Matching, Boyer-Moore Algorithm, Open Hashing (Separate Chaining), Closed Hashing (Open Addressing), B-Trees

UNIT IV

Iterative Improvement: Simplex Method, Maximum-Flow Problem, Maximum Matching in Bipartite Graphs, Stable Marriage Problem. **Limitations of Algorithm Power:** Lower-Bound Arguments, Trivial Lower Bounds, Information-Theoretic Arguments, Adversary Arguments, Problem Reduction, Decision Trees, Decision Trees for Sorting, Decision Trees for Searching a Sorted Array.

UNIT V

Introduction to P, NP, NP-Hard and NP-Complete, P and NP Problems - Partition problem, Bin-packing problem, NP-Complete Problems.

Recommended Books:

1. Introduction to Design and Analysis of Computer Algorithms, 3rd Edition, Anany Levitin, Pearson Education
2. Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities press.
3. Introduction to Algorithms, Coremen Thomas, Leiserson CE, Rivest RL, PHI.
4. Design & Analysis of Computer Algorithms, Ullmann, Pearson.
5. Algorithm Design, Michael T Goodrich, Robarto Tamassia, Wiley India.

COURSE OUTCOMES

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

CO1: outline the basics of algorithms and data structures.

CO2: interpret mathematical foundation in analysis of algorithms.

CO3: describe the working of different algorithmic design techniques.
CO4: compare the various algorithm design techniques.
CO5: select appropriate algorithm design techniques for solving problems.
CO6: design algorithms to solve real world engineering problems.

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Department of Computer Science & Engineering and Information Technology

CYBER CRIME INVESTIGATIONS AND DIGITAL FORENSICS
640211

UNIT I

INTRODUCTION: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime: Social Engineering, Categories of Cyber Crime, Property Cyber Crime.

UNIT II

CYBER CRIME ISSUES: Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation ,Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses.

UNIT III

INVESTIGATION: Introduction to Cyber Crime Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Hands on Case Studies, Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT IV

DIGITAL FORENSICS: Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics.

UNIT V

LAWS AND ACTS: Laws and Ethics, Digital Evidence Controls, Evidence Handling Procedures, Basics of Indian Evidence ACT IPC and CrPC , Electronic Communication Privacy ACT, Legal Policies.

Recommended Books:

1. Nelson Phillips and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.
2. Kevin Mandia, Chris Prosise, Matt Pepe, "Incident Response and Computer Forensics ", Tata McGraw -Hill, New Delhi, 2006.
3. Robert M Slade," Software Forensics", Tata McGraw - Hill, New Delhi, 2005.
4. Bernadette H Schell, Clemens Martin, "Cybercrime", ABC — CLIO Inc, California, 2004.
5. "Understanding Forensics in IT ", NIIT Ltd, 2005.

COURSE OUTCOMES

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

CO1: list various cyber crimes and various categories.
CO2: explain different cybercrime issues and investigation techniques.
CO3: identify various tools used in digital forensics.
CO4: discover cyber laws and acts.
CO5: determine the limitations imposed by data privacy laws.
CO6: design tools for faithful preservation of data on disks for analysis.

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Department of Computer Science & Engineering and Information Technology

ADVANCED TOPICS IN DATA MINING & WAREHOUSING
620212/630212/640212

UNIT I

Introduction- Motivation, Importance, Functionalities, Basic DM (Data Mining) Vs KDD, DM Applications, Data Warehousing, Evolution of Data Warehousing, Data Warehousing Concepts, Benefits of Data Warehousing, Comparison of OLTP and Data Warehousing, Data Warehousing, Data Warehousing Architecture, Distributed Data Warehouse, Problems of Data Warehousing.

UNIT II

Data Pre-Processing: Data Cleaning, Missing Values, Noisy Data, Data Cleaning, Data Integration and Transformation, Data Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT III

Mining Frequent Patterns, Association, Correlation: Basic Concepts, Efficient Frequent Itemset Mining Method- Apriori Algorithm, Its Variants & other Algorithm for finding Frequent Itemsets using Candidate Generation, Generating Association Rules from Frequent Itemsets, Representative Rules, Improving the Efficiency of Apriori & other Algorithms, Mining Frequent Itemsets without Candidate Generation, Mining Frequent Itemsets using Vertical Data Layout, Maximal Frequent Item Set Mining, Issue Related to the Design of Efficient & Flexible Algorithms.

UNIT IV

Mining Various Kinds of Association Rules, Constraint-Based Association Mining, Classification and Prediction, Cluster Analysis, Graph Mining, Social Network Analysis, Knowledge Discovery through Statistical Techniques, and Knowledge Discovery through Neural Networks, Fuzzy Technology & Genetic Algorithms.

UNIT V

Web Content Mining, Web Structure Mining, Web Usage Mining, Spatial Mining, and Temporal Mining. Social Impacts of Data Mining, Data Mining System Products and Associated Design issues, future trends in Data Mining, Emerging Scenario of Pattern Warehousing System, Case Study –WEKA, SPSS.

Recommended books:

1. Jiwei han and micheline kamber, "data mining: concept and techniques ", harcout india private limited, 2001.
2. Margaret h. Dunham, "data mining: introductory and Advanced topic" pearson education, 2003.

COURSE OUTCOMES

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

CO1: explain the concepts of data warehousing and data mining.
CO2: translate the data needed for data mining using pre- processing techniques.
CO3: apply appropriate data mining methods like classification, clustering or frequent pattern mining on large data sets.
CO4: analyse advanced data mining topics like Web Mining, Spatial and Temporal Mining.
CO5: measure the performance of various data mining algorithms.
CO6: test real data sets using popular data mining tools such as WEKA, SPSS.

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Department of Computer Science & Engineering and Information Technology

IMAGE PROCESSING AND RETRIEVAL TECHNIQUES
620213/630213

UNIT I

Introduction to Image Processing Systems, Digital Image Fundamentals: - Image model, Relationship between Pixels, Imaging Geometry, Camera Model, Introduction to FT, DFT and FFT, Walsh Transformation, Hadamard Transformation, Histogram.

UNIT II

Image Preprocessing, Images Transformations, Brightness Transformation, Geometric Transformations, Image Smoothing, Neighborhood Averaging, Median Filtering, Low Pass Filters, Average of Multiple Images, Image Sharpening by Differentiation Technique, High Pass Filtering.

UNIT III

Image Restoration:- Degradation Models for Continuous Function, Effect of Diagonalization, on-Degradation, Algebraic approach to Restoration, Interactive Restoration, Gray Level Interpolation, Inverse & Weiner Filter, FIR Wiener Filter, Filtering using Image Transforms.

UNIT IV

Image Encoding, Mapping, Quantizer and Coder, Image Segmentation, Detection of Discontinuation, Point Detection, Line Detection, Edge Detection, Boundary Extraction, Region Representation.

UNIT V

Object Recognition, Pattern Recognition, Knowledge Representation, Statistical Pattern Recognition, Classification Principles, Classifier Learning, Neural Nets, Syntactic Pattern Recognition, Recognition as Graph Matching, Optimization Techniques in Recognition.

Recommended Books:

1. "Digital Image Processing" by Gonzalez & Wood.
2. "Digital Image Processing" by A. K. Jain.

COURSE OUTCOMES

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

CO1: recall the fundamental concepts of a digital image processing system.
CO2: categorize various compression techniques.
CO3: compare various compression techniques.
CO4: evaluate the techniques for image enhancement and image restoration.
CO5: interpret image segmentation and representation techniques.
CO6: elaborate image segmentation and representation techniques.

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Department of Computer Science & Engineering and Information Technology

INFORMATION SECURITY & SYSTEMS
640213

UNIT I

Security goals, security Attacks (Interruption, Interception, Modification and Fabrication), security services (Confidentiality, Authentication, Integrity, Non-repudiation, access control and Availability) and mechanisms. A model for inter-network security, Internet standards and RFCs, mathematical tools for cryptography: Introduction to number theory, prime & relative prime numbers, modular arithmetic,Fermat's & Euler's Theorems, testing for primality, Chinese remainder theorem, Discrete logarithms.

UNIT II

Conventional encryption, Principles & Algorithms (DES, AES, RC4), Block Cipher Modes of operation, Location of encryption devices, Key Distribution, public key cryptography principles, Public key cryptography Algorithms (RSA, RABIN, ELGAMAL, Diffie-Hellman, ECC), Key Distribution.

UNIT III

Approaches for Message Authentication, Secure Hash function (SHA-512, WHIRLPOOL) and HMAC, Digital Signatures: Comparison, Process, Need for Keys, Signing the Digest, Services, Attacks on Digital Signatures, Kerberos, X.509, Directory Authentication Services.

UNIT IV

Network Management: Basic concepts of SNMP, SNMPv1, Community facility and SNMPv3, OS Security, OS security functions, separation, memory protection, Access control, Trusted Operating system, MAC, DAC, Trusted Path, Trusted Computing Base.

UNIT V

Viruses and related threats, Anatomy of virus, Virus conter-measures, Software Flaws: Buffer Overflow, Incomplete Mediation, Race conditions, Malware Brain, Morris Worms, Code Red, Malware Detection, Firewalls: Design Principles, Types of Firewalls, Firewall Architectures, Trusted Systems, Operating system security, Network security, security for network servers, web security and security for mobile code technologies such as Java and JavaScripts. Intrusion Detection Techniques to provide privacy in Internet Application and protecting digital content (music, video, software) from unintended use.

Recommended Books:

1. Network security essentials (Applications and Standards) by William Stallings, Pearson Education.

2. Information security principles & Practice, Mark Stamp, WILEY INDIA, 2006.
3. Cryptography and Network security, Fourth Edition, Stallings, PHI/Pearson.
4. Cryptography and Network security by Behrouz A. Forouzan, TMH 2007.
5. Network Security: the complete reference, Robert Bragg, Mark Rhodes, TMH.
6. Computer Security Basics by Rick Lehtimen, Deborah Russell & G.T. Gamgemi Sr. SPD O' REILLY 2006.
7. Modern Cryptography by Wenbo Mao, Pearson Education 2007.

COURSE OUTCOMES

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

CO1: define computer security and basics of cryptography.

CO2: demonstrate different data encryption algorithms and keys used during encryption techniques.

CO3: identify the various security attacks and threats.

CO4: analyse evaluation criteria for AES, Triple DES and Traffic Confidentiality.

CO5: explain SSL and TSL, Firewall, Digital Signatures and its standards & schemes, and the enhancements made to IPv4 by IPsec.

CO6: discuss various web security considerations.

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Syllabi
of
Departmental Elective (DE) Courses
M.Tech I Semester
(Computer Science & Engineering)

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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Department of Computer Science & Engineering and Information Technology

MOBILE COMPUTING & M-COMMERCE
620114

UNIT I

Review Of Personal Communication Services (PCS), Basic Concepts of Cellular Systems, Global System for Mobile Communication (GSM), Protocols, Handover, Data Services, and Multiple Division Techniques.

UNIT II

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: Wlans (Wireless Lans) IEEE 802.11 Standard, Mobile IP, Wireless Application Protocol (WAP): Mobile Internet Standard, WAP Gateway and Protocols, Wireless Markup Languages (WML).

UNIT III

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA), And CDMA 2000, Quality Of Services In 3G.

UNIT IV

Wireless Local Loop (WLL): Introduction to WLL Architecture, WLL Technologies. Global Mobile Satellite Systems: Case Studies of IRIDIUM and GLOBALSTAR Systems. Bluetooth Technology, Wi-Fi and Wi-Max.

UNIT V

M-Commerce: Introduction, Emerging Applications, Different Players in M-Commerce, M-Commerce Life Cycle, Mobile Financial Services, Mobile Entertainment Services, Management of M-Commerce Services, Emerging Issues in M-Commerce, Future Trends in M-Commerce Services.

Recommended Books:

1. "Wireless and Mobile Networks Architecture," by Yi –Bing Lin & Imrich Chlamatac, John Wiley & Sons, 2001.
2. "Mobile & Personnel Communication Systems and Services", By Raj Pandya, Prentice Hall India, 2001.
3. "Wireless Communication- Principles and practices," 2nd Ed., Theodore S. Rappaport, Pearson Education Pvt. Ltd, 2003.
4. "Mobile communications," J. Schiller, Pearson Education Pvt. Ltd., 2002.
5. "The Wireless Application Protocol," Singhal & Bridgman et. al.,Pearson Education, 2004.

COURSE OUTCOMES

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

CO1: define the basic concepts and principles in mobile computing.
CO2: explain the concept of General Packet Radio Services, Wireless LANs, Wireless Application Protocol (WAP).
CO3: identify vision, services of third generation mobile communication and its quality.
CO4: analyze the architecture, technologies inter-networking challenges and solutions in wireless local loop.
CO5: evaluate the concepts of M- commerce for applicability to selected examples and business cases.
CO6: discuss the services, emerging issues and future trends in M-Commerce.

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Department of Computer Science & Engineering and Information Technology

ADHOC & SENSOR BASED NETWORKS
620115

UNIT I

Introduction to Mobile Adhoc Networks, Technologies for Ad Hoc Network, Issues in Ad hoc wireless Networks, IEEE 802.11 Architecture and protocols, Protocol for Adhoc Wireless Network, Issues and classification of MAC protocol.

UNIT II

Transport layer & Security protocols: Issues in designing transport layer protocols, TCP over Adhoc Wireless Networks, Network Security Attacks and Key management.

UNIT III

Wired Sensor Networks: Basic Sensor Network Architectural Elements, Applications of Sensor Networks, Comparison with Adhoc Wireless Networks, Challenges and Hurdles, Architecture of WSNs, Hardware components, Operating systems and execution environments, some examples of sensor nodes, Network Architecture, Sensor networks scenarios, Optimization goals, Design principles for WSNs.

UNIT IV

Communication protocols: Physical Layer and Transceiver design considerations in WSNs, Fundamentals of (wireless) MAC protocol, Address and name management in wireless sensor networks, Localization and positioning.

UNIT V

Routing Protocols-Dynamic Source Routing (DBR), Adhoc Distance Vector (AoDV) routing, Multicasting Routing issues, Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless Environment, Routing Strategies in Wireless Sensor Networks, QoS in wireless sensor networks, Coverage and deployment.

Recommended Books:

1. Ad HOC Wireless Networks: Architectures & Protocols by C Siva Ram Murty & BS Manoj 2nd Ed, Pearson Education.
2. Adleshein & Gupta, "Fundamentals of Mobile and Pervasive Computing", TMH, 2005.
3. Handbook of Ad Hoc wireless network, By Mohamed Illayas, CRC press.
4. Protocols and Architectures for Wireless Sensor Networks, By Holger Karl, John Wiley & Sons.
5. Wireless Sensor Networks Technology, Protocols, and applications by Kazem Sohraby, Daniel Minoli, Taieb Znati, John Willey & Sons.

COURSE OUTCOMES

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

CO1: list various design and implementation issues and available solutions of mobile adhoc

networks.

CO2: summarize the basics of infrastructure less networks and their importance in the future directions for wireless communications.

CO3: model different adhoc and sensor networks.

CO4: analyze various technologies associated with adhoc networks.

CO5: determine various parameters associated with adhoc & sensor based networks.

CO6: develop adhoc and sensor networks using network simulation tools.

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NETWORK SECURITY
620116

UNIT I

Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption: Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals. Shannon's theory of confusion and diffusion. fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality

UNIT II

Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat's and Euler's theorem, primality testing, Euclid's Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffle-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, ElGamal encryption.

UNIT III

Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS. MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS).

UNIT IV

IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, Secure Electronic Transaction (SET). System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems.

UNIT V

Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP). S/MIME. Security in WLAN: Security mechanisms: WEP, WPA, Radius, CHAP, EAP, 802.11i

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Recommended Books:

1. William Stallings, "Cryptography and Network Security", Second edition, Prentice Hall, 1999.
2. Atul Kahate, "Cryptography and Network Security," TMH
3. William Stallings, "Cryptography and Network Security", Third Edition, Pearson Ed.

4. Introduction to network Security, Krawetz, Cengage.

COURSE OUTCOMES

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

CO1: define computer security and basics of cryptography.

CO2: demonstrate different data encryption algorithms and keys used during encryption techniques.

CO3: identify the various security attacks and threats.

CO4: analyse evaluation criteria for AES, Triple DES and Traffic Confidentiality.

CO5: explain SSL and TSL, Firewall, Digital Signatures and its standards & schemes and the enhancements made to IPv4 by IPsec.

CO6: discuss various web security considerations.

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Department of Computer Science & Engineering and Information Technology

COMPUTER ARCHITECTURE AND PARALLEL PROCESSING
620117

UNIT I

Review: Evolution of computer architecture Needs of parallelism. Parallelism in Uniprocessor system. Parallel Computer Structures: Pipeline computers, Array Computers, Multiprocessor Systems, Performance of Parallel computers, Dataflow and new trends, Architectural Classification schemes, Application of Parallel Processing.

UNIT II

Conditions of Parallelism, Program Partitioning and Scheduling, Program flow Mechanisms, System Interconnect Architectures, Performance metrics and Measures, Scalability, Analysis and approaches. Linear Pipeline processors, Nonlinear Pipeline processors, Instruction pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT III

Advanced processor technology, Superscalar and vector processors, Memory hierarchy technology, Bus system, Cache Memory Organization, Shared-Memory organization, Sequential and weak consistency models, Weak consistency models.

UNIT IV

Multiprocessor system interconnects, Cache coherence and synchronization mechanism, Message-passing mechanism, Vector processing principles, Multivector multiprocessors, compound vector processing, SIMD computer organizations, latency-Hiding techniques, Principles of multithreading, Scalable and multithreaded architectures, Dataflow and hybrid architectures.

UNIT V

Parallel programming models, Parallel languages and compilers, Dependence analysis of data arrays, code optimization and scheduling, Loop parallelization and pipelining, Trends in parallel systems: Overview of technology, Forms of parallelism, Case studies: Cray line Sun UltraSparc T2 processor, AMD Opteron, Intel Pentium processors.

Recommended Books:

1. Kai Hwang & Naresh Jotwani, "Advanced Computer Architecture", TMH
2. J.P. Hayes, "Computer Architecture and Organization", MGH
3. Hwang & Briggs, "Computer Architecture and Parallel Processing", MGH
4. Kain, "Advance Computer Architecture:- A System Design Approach"' PHI Learning
5. M.J. Flynn, "Computer Architecture, Pipelined and Parallel Processor Design", Narosa Publishing
6. V. Rajaraman & C.S.R. Murthy," Parallel Computer", PHI Learning

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COURSE OUTCOMES

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

CO1: compare the organization and operation of current generation parallel computer systems.

CO2: explain pipelining and its speed advantage and pipelined logic.

CO3: apply concept and principle of cache memory and virtual memory to high- performance computer architecture.

CO4: examine the challenges faced in the implementation of high performance system.

CO5: evaluate various multiprocessing configurations.

CO6: design the overall organization of cache and virtual memories.