GURUGRAM UNIVERSITY

SCHEME OF STUDIES AND EXAMINATION

M.TECH 1st YEAR (COMPUTER SCIENCE & ENGINEERING)

SEMESTER 1st

Sr. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)	No of hours/ week
			L	T	P	Total Credits	Marks of Class works	Theory	Practical	Total		
1	16CSE21C1	Data Communication and Computer Networks	4	0	-	4	50	100	-	150	3	4
2	16CSE21C2	Advanced Operating Systems	4	0	-	4	50	100	-	150	3	4
3	16CSE21C3	Advanced Database Management System	4	0	-	4	50	100	-	150	3	4
4	16CSE21C4	Data Warehouse and Mining	4	0	-	4	50	100	-	150	3	4
5	16CSE21C5	Mathematical Foundation of Computer Science	4	0	-	4	50	100	-	150	3	4
6	16CSE21C6	Seminar	-		-	2	50	-	-	50		2
7	16CSE21CL1	Advanced Operating Systems Lab	-	-	2	2	50	-	50	100	3	2
8	16CSE21CL2	Advanced Database Management System Lab	-	-	2	2	50	-	50	100	3	2
		TOTAL	**26**									

NOTE:

Examiner will set nine question in total. Question one will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

GURUGRAM UNIVERSITY

SCHEME OF STUDIES AND EXAMINATION

M.TECH 1st YEAR (COMPUTER SCIENCE & ENGINEERING)

SEMESTER 2nd

Sr. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)	No of hours /week
			L	T	P	Total Credits	Marks of Class works	Theory	Practical	Total		
1	16CSE22C1	Soft Computing	4	0	-	4	50	100	-	150	3	4
2	16CSE22C2	Algorithm Design	4	0	-	4	50	100	-	150	3	4
3	16CSE22C3	Seminar	-		2	2	50	-	-	50	-	2
4	16CSE22C4	Soft Computing Lab	-	-	2	2	50	-	50	100	3	2
5	16CSE22CL1	Algorithm Design Lab	-	-	2	2	50	-	50	100	3	2
6	16CSE22D1 or 16CSE22D2 or 16CSE22D3 or 16CSE22D4	Elective-1	4	0	-	4	50	100	-	150	3	4
7		Open Elective				3						3
8		Foundation Elective				2						2
			23									

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

Elective 1 : Choose any one from the following papers

16MCSE22D1 Mobile and Wireless Communication

16MCSE22D2 Optimization Techniques

16MCSE22D3 Discrete Mathematics

16MCSE22D4Internet and Web Development

Elective 2

A candidate has to select this paper from the pool of Open Electives provided by the University

Elective 3

A candidate has to select this paper from the pool of Foundation Electives provided by the University.

16CSE21C1 DATA COMMUNICATION AND COMPUTER NETWORKS

	Marks	Credits
L T P	**Exam:** 100	4
4 - -	**Sessional:** 50	
	Total: 150	4

Duration of Exam: 3 hrs.

Course Outcomes:

By the end of the course the students will be able to:

CO1. Independently understand basic computer network technology.

CO2. Understand and explain Data Communications System and its components.

CO3. Identify the different types of network topologies and protocols.

CO4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

CO5. Identify the different types of network devices and their functions within a network

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Data communication: Digital and analog communication, Transmission modes, serial and parallel communication, packet switching, circuit switching and message switching

Network models: OSI and TCP/IP model, OSI vs TCP/IP

MAC:ALOHA, CSMA, CSMA/CD

UNIT 2

Network Layer:-ARP, RARP, ICMP, IGMP, IPv4, IPv6, IPv4 addressing, classful addressing, CIDR –Introduction , CIDR addressing, CIDR address blocks and Bit masks, subnets and super netting, IPv6 addressing, address space allocation, global unicast addresses.

Routing Algorithms:- Distance vector Routing, Link State Routing, Path Vector Routing, Hierarchal Routing, RIP, OSPF, BGP.

UNIT 3

Transport Layer:-Transport Layer Services,UDP, TCP Protocol, TCP services, TCP features, connection management, congestion control SCTP Protocol, SCTP services, SCTP features, an SCTP association.

Application layer:-SMTP, POP, IMAP, and MIME,DHCP, DHCP operation, Configuration FTP, SSH.

UNIT 4

Network Management and Security:-Congestion control, Quality of services ,SNMP, , Ciphers- traditional, modern, asymmetric, public and private key, key management, digital signature, Network Layer Security, Transport Layer Security, Application Layer security, Firewall, VPN

References:

1. Computer Networks,Tanenbaum Andrew S, International edition,
2. TCP/IP protocol suite, Behrouz A. Forouzan , TMH publication
3. Data Communications and Networking, Behrouz A. Forouzan, TMH
4. Computer Networking: A Top-Down Approach, Kurose and Ross.
5. Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie,

16CSE21C2 ADVANCED OPERATING SYSTEMS

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Outcomes:

By the end of the course the students will be able to:
CO1. Demonstrate understanding of the concepts, structure and design of operating Systems
CO2. Demonstrate understanding of operating system design and its impact on application System design and performance
CO3. Demonstrate competence in recognizing and using operating system feature
CO4. solve various failure problems

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Introduction: Operating System Concept, Functions of an Operating System, Design Approaches, Types of Advanced Operating System - Synchronization Mechanisms, Concept of a Process, Concurrent Processes, The Critical Section Problem, Other Synchronization Problems, Language Mechanisms for Synchronization, Axiomatic Verification of Parallel Programs - Process Deadlocks - Preliminaries, Models of Deadlocks, Resources, System

State, Necessary and Sufficient conditions for a Deadlock, Systems with Single-Unit Requests, Consumable Resources, Re-usable Resources.

UNIT 2

Distributed Operating Systems: Introduction, Issues, Communication Primitives, Inherent Limitations - Lamport's Logical Clock; Vector Clock; Causal Ordering; Global State; Cuts; Termination Detection. Distributed Mutual Exclusion, Non-Token Based Algorithms, Lamport's Algorithm - Token-Based Algorithms, Suzuki-Kasami's Broadcast Algorithm, Distributed Deadlock Detection, Issues, Centralized Deadlock-Detection Algorithms - Distributed Deadlock-Detection Algorithms. Agreement Protocols, Classification - Solutions, Applications.

Distributed Resource Management: Distributed File systems, Architecture, Mechanisms, Design Issues, Distributed Shared Memory, Architecture, Algorithm, Protocols - Design Issues. Distributed Scheduling, Issues, Components, Algorithms.

UNIT 3

Failure Recovery and Fault Tolerance : Basic Concepts-Classification of Failures, Basic Approaches to Recovery; Recovery in Concurrent System; Synchronous and Asynchronous Check-pointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Non-blocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols

UNIT 4

Multiprocessor and Database Operating Systems : Structures, Design Issues, Threads, Process Synchronization, Processor Scheduling, Memory Management, Reliability / Fault Tolerance; Database Operating Systems, Introduction, Concurrency Control, Distributed Database Systems, Concurrency Control Algorithms.

Recommended Books:

1. MukeshSinghal and N. G. Shivaratri, "Advanced Concepts in Operating Systems", McGrawHill, 2000

2. Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating System Concepts", Sixth Addison n Wesley Publishing Co., 2003.

3. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.

16CSE21C3 ADVANCED DATABASE MANAGEMENT SYSTEM

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course outcomes:-

By the end of the course the students will be able to:

CO1. The students will be able to understand DBMS Components, Advantages and Disadvantages.

CO2. The students will be able to understand Data modeling: ER, EER, Network, Hierarchical and Relational data models.

CO3. The students will be able to understand normalization, general strategies for query processing, query processor, syntax analyzer, Query decomposition, Heuristic Query optimization.

CO5. The students will be able to understand transaction concept, schedules, serializability, locking and concurrency control protocols.

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Introduction: Architecture, Advantages, Disadvantages, Data models, relational algebra, SQL, Normal forms. **Query Processing:** General strategies for query processing, transformations, expected size, statistics in estimation, query improvement. Query evaluation, view processing, query processor.

UNIT 2

Recovery: Reliability, Transactions, recovery in centralized DBMS, reflecting updates, Buffer management logging schemes, disaster recovery. **Concurrency:** Introduction, Serializability,

Concurrency control, Locking schemes, Timestamp based ordering, Optimistic, Scheduling, Multiversion techniques, Deadlocks.

UNIT 3

Object Oriented Database Development: Introduction, Object definition language, creating object instances, Object query language. **Distributed Database:** Basis concepts, options for distributing a database distributed DBMS.

UNIT 4

Data Warehousing: Introduction, basis concepts, data warehouse architecture, data characteristics, reconciled data layer, data transformation, derived data layer, user interface. **Object Relational Databases:** Basic Concepts, Enhanced SQL, Advantages of object relational approach.

References:

1. An introduction to database systems by Bipin C. Desai, Galgotia Publications.
2. Modern Database Management by Feffery A Liofer, Mary B. Prescotl, Fred R Mcfadden, 6th edition, Pearson Education.
3. Principles of distributed database systems, by M. Tamer &Valduriez, 2nd editon, LPE Pearson education.
4. Database system concepts by Korth.-

16CSE21C4 **DATAWAREHOUSE AND MINING**

L T P	Marks	Credits
4 - -	**Exam: 100**	4
	Sessional: 50	
	Total: 150	**4**

Duration of Exam: 3 hrs.

COURSE OUTCOMES:

On successful completion of this course, the learner will be able to

CO1. Describe the fundamental concepts, benefits and problem areas associated with data ware housing

CO2. Describe the various architectures and main components of a data warehouse.

CO3. Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.

CO4. Compare and contrast OLAP and data mining as techniques for extracting knowledge from a data warehouse.

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Data warehousing: Introduction, Operational data stores, ETL, Data warehouses – design guidelines for data warehouse implementation, Data warehouse metadata; OLAP – introduction, Characteristics, Multidimensional view and data cube, Data cube operations,

UNIT 2

Data mining: Introduction, association rules mining, Naive algorithm, Apriori algorithm, direct hashing and pruning (DHP), Dynamic Item set counting (DIC), Mining frequent pattern without candidate generation(FP, growth), performance evaluation of algorithms,

UNIT 3

Classification: Introduction, decision tree, tree induction algorithm – split algorithm based on information theory, split algorithm based on Gini index; naïve Bayes method; estimating predictive accuracy of classification method; classification software, software for association rule mining; case study; KDD Insurance Risk Assessment

UNIT 4

Cluster analysis: Introduction, partitional methods, hierarchical methods, and density based methods, dealing with large databases, cluster software.

Web Data Mining: Web Terminology and Characteristics, Locality and Hierarchy in the web, Web Content Mining, Web Usage Mining, Web Structure Mining, Web mining Software.

References:

1. Han J., Kamber M. and Pei J., Data mining concepts and techniques, Morgan Kaufmann Publishers (2011) 3rd ed.
2. . Pudi V., Krishana P.R., Data Mining, Oxford University press, (2009) 1st ed.
3. Adriaans P., Zantinge D., Data mining, Pearson education press (1996), 1st ed.
4. Pooniah P., Data Warehousing Fundamentals,Willeyinterscience Publication, (2001), 1st ed

16CSE21C5 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Outcomes:

Upon completing the course, the student will:

CO1 Be familiar with the basics concepts in theory of computation;

CO2 Be able to construct finite state machines and the equivalent regular expressions.

CO3 Be able to construct pushdown automata and their equivalent context free grammars.

CO4 Be exposed to the advanced concepts of theory of automata computation.

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Regular Languages: Finite automata, DFA, NFA, Equivalence of DFA & NFA. An application, Mealy and Moore Models, Regular expressions and languages. Context free languages: CFGs, Applications, Ambiguity removal, CNF, GNF.

UNIT 2

PushDown Automata: Basics of PDA, Acceptance By PDA, PDA and CFL, Parsing and PDA: Top Down Parsing and Bottom up Parsing

UNIT 3

Turing Machine: Turing machines, variants of TMs, Restricted TMs, TMs and Computers.**Decidability:** Decidable languages, decidable problems concerning Context free languages, the halting problem, halting problem is undecidable.

UNIT 4

Reducibility and Computability: Undecidable problems from language theory – Regular expressions, Turing machines, Reduction. A simple undecidable problem (PCP), Primitive recursive functions, tractable decision problems, theory of Optimization, Church- Turing Thesis.

References:

1. Introduction to Theory of Computation – Michael Sipser (Thomson Nrools/Cole)
2. Introduction to Automata Theory, Languages and Computations – J.E. Hopcroft, Rajeev Motwani& J.D. Ullman (Pearson Education Asia), 2nd Edition.
3. Theory of Computation by Peter Linz
4. Introduction to languages and theory of computation – John C. Martin (MGH)

16CSE21C6 **SEMINAR**

L T P	**Marks**	**Credits**
- - 2	**Sessional :** 50	**2**
	Total : 50	

At the end of this course the student shall be able to
CO1 prepare the topic and contents on a technical topic
CO2 speak on a technical topic effectively
CO3 enhance communication skills

A candidate has to present a seminar on a recent topic/ technology/ research advancement and has to submit a seminar report. The marks will be given on the basis of seminar report, contents of the presentation, communication and presentation skills.

16CSE21CL1 **ADVANCE OPERATING SYSTEM LAB**

		Marks	Credits
L T P	**Exam**	**:** 50	2
- - 2	**Sessional**	**:** 50	
	Total	**:**100	

Course outcomes:

CO1 To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.

CO2 To provide students knowledge of memory management and deadlock handling algorithms.

CO3 At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system

A student has to perform 10-12 practicals based on theory paper.

Suggested list of experiments:

1.Execution of various file/directory handling commands.

2. To study the various commands operated in vi editor in LINUX.

3. To study the various File Acess Permission and different types users in LINUX.

4. Write programs in :

i. Write a shell script program to find the Maximum three numbers .
ii. Write a shell script program for comparison of strings
iii. Peform Arithmetic operation using CASE

5. Write programs in :

i. Calculate the factorial value of a number using shell script .
ii. To write a shell program to generate fibonacci series.
iii. Write a program to draw a Pascal's Triangle

6. Write programs in :

i. Write a program to demonstrates a one-way pipe between two Process .
ii. Write a program to illustrate IPC through pipe and fork system calls – Printing only odd numbers

7. Write programs in :

i. To write a program to create a process in LINUX.
ii. To study Dinning Philosophers Problem.

8. Simulation of scheduling algorithms: Write a program to implement the following process scheduling algorithms

i. First Come First Serve
ii. Shortest Remaining Job First
iii. Round Robin

9. Write a program To simulate banker's algorithm for deadlock avoidance.

10. Write programs in :

i. Page replacement algorithm for FIFO.
ii. Page replacement algorithm for LFU.
iii. Page replacement algorithm for LRU .

16CSE21CL2 ADVANCE DATABASE MANAGEMENT SYSTEM LAB

		Marks	Credits
L T P	**Exam**	**:** 50	2
- - 2	**Sessional**	**:** 50	
	Total	**:**100	

Course outcomes:

CO1. Students will get the practical concepts of DBMS, Data Models(like Entity-Relationship Model, relational Databases), and Database .
CO2. Students will get the practical implementation of Relational Algebra &l Calculus
CO3. Students will get the concepts of SQL and Integrity Constraints
CO4. Students will get the concepts Normalization using funtional dependencies

A student has to perform 10-12 practicals based on theory paper.

Suggested list of experiments:

1. Create a student table and to manipulate with the DDL commands such as create, Alter, View, Truncate,Drop.

2. Create a student table and to manipulate with DML commands such as insert, update, select, Delete.

3. Create a student table and to manipulate with TCL commands such as Commit, Rollback, Save point

4. Create a student table and to manipulate with DCL commands such as Grant, Revoke.

5. Create a database and perform Join queries such as Simple join, Self Join, Outer Join.

6. Create a database view and Drop a view.

7. Create a student table and Insert, Delete, Alter, View using Nested Queries

8. Create a PL/SQL Program for addition, finding the maximum number, Sum of Numbers using Procedures.

9. Create a function to calculate the factorial, calculate the greatest among three numbers of a given number using PL/SQL.

10. Create a PL/SQL Program and perform Control Structure functions such as Loop, While, If, Else.

11. Create a Cursor procedure to calculate payroll process of an Employee.

12.Create a simple Trigger that does not allow INSERT, UPDATE and DELETE operations on the table

13.Create a trigger that raises an user defined error message and does not allow UPDATION and INSERTION

14.Create a form in VB for Simple calculator and also create menu based calculator.

16CSE22C1 **SOFT COMPUTING**

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Outcomes:

After the completion of the course the student will be able to:

CO1 Know and understand various fields of Soft computing:

CO2 Understanding principles of neural networks and fuzzy logic fundamentals;

CO3 Design the required and related systems.

CO4 achieve an understanding of the technical potential and the advantages and limitations of the learning and self organizing systems of today

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Neural Networks : History, Overview of Biological Neuro-System, Mathematical Models of Neurons, ANN architecture, Learning rules, Gradient Descent Algorithm, Learning Paradigms-Supervised, Unsupervised and Reinforcement Learning, ANN Training Algorithms-Perceptrons, Training Rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

UNIT 2

Fuzzy Logic: Introduction to fuzzy Logic, Classical and Fuzzy Sets,Overview of Classical Sets, Membership Function, Fuzzy Rule generation.

Operations on Fuzzy Sets: Compliment, Intersection, Union, Combination of Operations, Aggregation Operation.

UNIT 3

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Classical Logic, Multi-Valued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

UNIT 4

Uncertainty Based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

References:

1. Neural Networks Simon Haykin
2. Neural Networks-Kosko.
3. Principles of Soft Computing -Dr. S. N. Sivanandam and Dr. S. N. Deepa,
4. Fuzzy Logic & Fuzzy Sets Klir& Yuan
5. Neutral Networks-Satish Kumar

16CSE22C2 **ALGORITHM DESIGN**

L	T	P		Marks	Credits
4	-	-	**Exam:**	100	4
			Sessional:	50	
			Total:	150	4

Duration of Exam: 3 hrs.

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following:

CO1 Argue the correctness of algorithms using inductive proofs and invariants.
CO2 Analyze worst-case running times of algorithms using asymptotic analysis.
CO3 Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.
CO4 Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.
CO5 Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions

from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Foundation & Data Structure:

Foundation & Elementary Data Structure: Algorithms, Performance analysis: Space & time complexity, Growth of functions, Divide & Conquer, Recurrence Equations, Basic elements of data structure like Stacks & Queues, Trees, Graphs, Linked List, Sorting & Order statistics.

Data Structure: Dynamic sets & searching: Introduction, Array doubling, Amortized time analysis, R-B trees, Hashing, Dynamic equivalence relations & Union-Find programs, Priority queues with a decrease key operation.

Graph & graph traversals: DFS, strongly connected components, Bi-connected components.

UNIT 2

Advanced Design & Analysis Techniques:

Greedy & Dynamic Method: General methods, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Optimal merge patters, Single-source shortest path, 0/1 Knapsack, Multistage graphs, All-pair shortest path, Optimal binary search trees, Travelling salesperson problem, Flow shop scheduling.

Backtracking & Branch and Bound: General methods, 8 Queens problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem, Travelling salesperson problem, Efficiency consideration.

UNIT 3

NP-Hard & NP-Complete Problems: Basic concepts, Cook's Theorem, NP-hard graph problem, NP-Hard scheduling problems.

String Matching: Introduction, A straight forward solution, The Knuth-Morris-Pratt algorithm, The Boyer-Moore algorithm, approximate string matching.

UNIT 4

Parallel Algorithms: Introduction, Parallelism, The PRAM, and other models, some simple PRAM algorithms, Handling write conflicts, Merge and Sorting, Finding connected components.

Approximation algorithms: Introduction, Absolute approximations, ϵ- approximations, Polynomial time approximation schemes, Fully Polynomial time approximations schemes.

References:

1. Computer Algorithms: Introduction to design and analysis (3rd edition) by Sara Baase and Allen Van Gelder , Pearson, 2000.
2. Fundamentals of Algorithms by Gilles Brassard and Paul Bratley
3. Design and Analysis of Algorithms (Computer science Series) by Jeffrey D. Smith Publ.
4. Fundamentals of Computer algorithms, Ellis Horowitz and SratajSahnim 1978, Galgotia publ.
5. Algorithms Design (PIE) by Eva Tardos and Jon Klienberg, person.
6. Introduction to Algorithms, Thomas h Cormen, Harles E leiserson and Ronald Lrivest : 1990, TMH.

16CSE22C3 **SEMINAR**

L T P	**Marks**	**Credits**
- - 2	**Sessional :** 50	**2**
	Total : 50	

At the end of this course the student shall be able to
CO1 prepare the topic and contents on a technical topic
CO2 speak on a technical topic effectively
CO3 enhance communication skills

A candidate has to present a seminar on a recent topic/ technology/ research advancement and has to submit a seminar report. The marks will be given on the basis of seminar report, contents of the presentation, communication and presentation skills.

16CSE22CL1 **SOFT COMPUTING LAB**

		Marks	Credits
L T P	**Exam**	**:** 50	2
- - 2	**Sessional**	**:** 50	
	Total	**:**100	

Course Outcomes:

After going through this course, a student shall be able

CO1 To know about the basics of soft computing techniques and also their use in some real life situations.
CO2 To solve the problems using neural networks techniques.
CO3 To find the solution using different fuzzy logic techniques
CO$ To use the genetic algorithms for different modelling

A student has to perform 10-12 practicals based on theory paper.

Suggested list of experiments:

1. WAP to implement Artificial Neural Network

2. WAP to implement Activation Functions

3. WAP to implement Adaptive prediction in ADALINE NN

4. WAP to implement LMS and Perceptron Learning Rule

5. WAP to implement ART NN

6. WAP to implement BAM Network

7. WAP to implement Full CPN with input pair

8. WAP to implement discrete Hopfield Network

9. WAP to implement Hebb Network

10. WAP to implement Hetro associate neural net for mapping input vectorsto output vectors

11. WAP to implement Delta Learning Rule

12. WAP to implement XOR function in MADALINE NN

13. WAP to implement AND function in Perceptron NN

14. WAP to implement Perceptron Network

15. WAP to implement Feed Forward Network

16. WAP to implement Instar learning Rule

17. WAP to implement Weight vector Matrix

16CSE22CL2 **ALGORITHM DESIGN LAB**

		Marks	Credits
L T P	**Exam**	**:** 50	2
- - 2	**Sessional**	**:** 50	
	Total	**:**100	

Course Outcomes:

Upon completion of this course, students will be able to do the following:

CO1	Analyze the asymptotic performance of algorithms.
CO2	Write rigorous correctness proofs for algorithms.
CO3	Demonstrate a familiarity with major algorithms and data structures.
CO4	Apply important algorithmic design paradigms and methods of analysis.
CO5	Synthesize efficient algorithms in common engineering design situations

A student has to perform 10-12 practicals based on theory paper.

Suggested list of experiments:

1. Write a program to search an element in a two -dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only
a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort Technique
5. Write a program to implement the various operations on string such as length ofstring concatenation, reverse of a string & copy of a string to another.
6.Write a program for swapping of two numbers using call by value and call by reference strategies.
7. Write a program to implement binary search tree.(Insertion and Deletion in Binary search Tree)
8.Write a program to create a linked list & perform operations such as insert, delete,update, reverse in the link list
9 .Write the program for implementation of a file and performing operations such asinsert,delete, update a record in the file.
10. Create a linked list and perform the following operations on it
a) add a node
b) Delete a node
11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
12. Write a program to simulate the various graph traversing algorithms.
13. Write a program which simulates the various tree traversal algorithms.

16CSE22D1 MOBILE AND WIRELESS COMMUNICATION

	Marks	Credits
L T P	**Exam:** 100	4
4 - -	**Sessional:** 50	
	Total: 150	4

Duration of Exam: 3 hrs.

Course Outcomes

CO1 Understand the cellular radio concepts such as frequency reuse, handoff and interference between mobiles and base stations.
CO2 Identify the techno-political aspects of wireless and mobile communications such as the allocation of the limited wireless spectrum by regulatory agencies.
CO3 Understand propagation effects such as fading, time delay spread, and Doppler spread, how to measure and model the impact that signal bandwidth and motion .
CO4 Understand the information theoretical aspects (such as the capacity) of wireless channels and basic spread spectrum techniques in mobile wireless systems
CO5 Describe current and future cellular mobile communication systems (GSM, IS95, WCDMA, etc), wireless LANs, adhoc and sensor networks

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Application, history, market, reference model and overview. Wireless Transmission-Frequencies, signals, antennae, signal propagation, multiplexing, modulation, spread spectrum, cellular system.

MAC and Telecommunication System: Specialized MAC, SDMA, FDMA , TDMA – Fixed TDM, classical ALOHA, Slotted, ALOHA, CSMA ,DAMA, PKMA, reservation TDMA. Collision avoidance, polling inhibit sense multiple access. CDMA, comparison, CSM-mobile services, architecture radio, interface, protocol, localization, calling handover, security, new data services, Introduction to W'LL.

UNIT 2

Satellite and Broadcast Systems: History, Applications, GEO, LEO, MEO, routing, localization, handover in satellite system. Digital audio and video broadcasting.**WIRELESS LAN:** IEEE 802 11- System and protocol architecture, physical layer. MAC layered management. Bluetooth- User scenarios, physical layer, MAC Layer, networking, security and link management.

UNIT 3

Mobile Network Layer: Mobile IP-goals, assumptions, requirement, entities, terminology, IP packet delivery. Agent advertisement and discovery, registration, tunneling, encapsulation, optimization, reserve tunneling, IPv6.DHCP.Adhoc Networks, Routing, destination sequence distance vector, dynamic source routing, hierarchical algorithm, algorithm, algorithm metric.

UNIT 4

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping; TCP, Mobile TCP fast retransmission, Transaction oriented TCP. **Support for Mobility:** File, system, WWW-HIT, HTML, system architecture. WAP-architecture, Wireless datagram, protocol, wireless transport layer security, wireless transaction protocol, application environment, telephony application.

References:

1. Jochen Schiller,"MobileCommunication",Pearson Education,2002
2. LEE,"Mobile Cellular Telecommunications " McGRAW-Hill,2nd Edition.
3. Wireless Communications : Theodore S Rappaport; Pearsons

16CSE22D2 **OPTIMIZATION TECHNIQUES**

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Outcomes:

Upon successful completion of this course, students will be able to

CO1. Formulate optimization problems;

CO2. Understand and apply the concept of optimality criteria for various type of optimization problems;

CO3. Solve various constrained and unconstrained problems in single variable as well as multivariable;

CO4. Apply the methods of optimization in real life situation.

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprise of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Linear Programming: Simplex Method, Big M-Method, Duality in Linear Programming, Sensitivity Analysis, Revised Simplex Method, Two-Phase Simplex Method, Dual Simplex Method. Integer Linear Programming: Branch and Bound Algorithms, Gomory Cutting Plane Method.

UNIT 2

Transportation Problems: Types of Transportation Problems, Mathematical Models, Transportation Algorithms. **Assignments:** Definition, Differences between Transportation and Assignment Models, Representation Assignment Problem as Transportation Problem and as Linear Programming, Assignment Algorithm -Hungarian Method

UNIT 3

Non-Linear Programming: Classical optimization Techniques, NLP with constraints: Graphical Solution, Multivariable Optimization with Equality constraints (Lagrange Multipliers Method), with inequality constraints-Kuhn-Tucker conditions, Quadratic Programming and Separable Programming: Standard form, Wolf's Method, Beale's Method .Search Method for Unconstrained Non-Linear Programming Problems.

UNIT 4

Reliability: Basic concepts, conditional failure rate function, Failure time distributions, certain life Models, Reliability of a system in terms of the reliability of its components, series system, parallel system. Queuing Theory: Introduction, elements or Parameters of Queuing system, Steady state Balance Equation, Kendall's Notation for Representing Queuing Models, Model!:Single server Model(M/M/1/∞/∞/FCFS), Model 2:M/M/1/∞/N/FCFS) Finite Capacity Queue System,Model3:Multi-server Model, Model4: Machine Servicing Model.

References:

1. Optimization Techniques by C.Mohan and Kusum Deep, New Age International
2. Operations Research by K.Rajagopal, PHI, Inida.
3. Reliability Engineering by K KAggarwal, Springer.

16CSE22D3 **DISCRETE MATHEMATICS**

		Marks	Credits
L T P	**Exam:**	100	4
4 - -	**Sessional:**	50	
	Total:	150	4

Duration of Exam: 3 hrs.

Course Outcomes:

After the completion of the course the student will be able to:
CO1 To appreciate the basic principles of Boolean algebra, Logic, Set theory
CO2 understand Permutations and combinations and Graph Theory.
CO3 Be able to construct simple mathematical proofs
CO4 Be able to understand logical arguments and logical constructs. Have a better understanding of sets, functions, and relations.
CO5 Acquire ability to describe computer programs in a formal mathematical manner**.**

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Propositions, Logical Connectives, Conditionals and Biconditionals, Tautologies, Logical Equivalences, Predicates, Quantifiers, Inference theory, Validity Probability, Information and Mutual Information

UNIT 2

Poset, Lattices, Principle of Duality, Basic Properties of Lattices, Some Special Lattices, Boolean Algebras, Identities of Boolean Algebra, Uniqueness of Finite Boolean Algebras, Boolean Functions and Boolean Expressions, Normal Forms, The Karnaugh Map method, Application of Boolean Algebra to Switching Circuits

UNIT 3

Introduction to Graphs, Types of Graphs, Representation of graphs, Paths and Circuits, Graph Traversals, Shortest Path in Weighted Graphs, Dijkstra Algorithm, Euler Graphs, Fleury's Algorithm, Hamiltonian Graphs, Travelling Salesman Problem, Planar Graphs, Kuratowski's Two Graph, Euler's Theorem, Colouring of Graphs, Transport Networks Trees,

Rooted Trees, Representation of Algebraic Expressions by Binary Trees, Binary Search Trees, Spanning Trees and Cut-Sets, Minimum Spanning Tree, Kruskal's Algorithm, Prim's Algorithm

UNIT 4

Languages, Phrase Structure Grammars, Types of Grammars and Languages, Finite State Machines, Equivalent Machines, Finite State Machines as Language Recognizers, Finite State Languages and Type-3 Languages, Turing Machine

References:

1. Elements of Discrete Mathematics: A Computer Oriented Approach,C. L. Liu and D. P.Mohapatra, McGraw Hill Education
2. Discrete Mathematical Structures with Applications to Computer Science, J. P Tremblay and R.Manohar, Tata McGraw Hill Edition
3. Mathematical Structures for Computer Science, J. L. Gersting, Computer Science Press, New York
4. Discrete Mathematical Structures, B. Kolman, R. C. Busby and S Ross, PHI
5. Discrete Mathematics, Babu Ram, Vinayak Publishers and Distributors, Delhi
6. Discrete Mathematics, SemyourLipschutz and Marc Lipson, Schaum's outline
7. Discrete Mathematics, R.K. Bisht and H. S. Dhami, Oxford University Press

16CSE22D4 **INTERNET AND WEB DEVELOPMENT**

	Marks	Credits
L T P	**Exam:** 100	4
4 - -	**Sessional:** 50	
	Total: 150	4

Duration of Exam: 3 hrs.

Course outcomes:

At the end of the course the students will be able to: -

CO1 Employ fundamental computer theory to basic programming techniques.

CO2 Use fundamental skills to maintain web server services required to host a website.

CO3 Select and apply markup languages for processing, identifying, and presenting of information in web pages.

CO4 Use scripting languages and web services to transfer data and add interactive components to web pages.

CO5 Create and manipulate web media objects using editing software.

NOTE: Examiner will set nine question in total. Question One will be compulsory and will comprises of all section and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT 1

Introduction: Internet protocol model, Internet addresses, IP Routing concepts, Table Driven and next hop routing, other routing related protocols, Internet Access through PPP, SLIP, WWW

UNIT 2

Router technology: Hubs, Bridges, Routers, Routing Protocols, Routing security, Switch based routing, Routing in unicast environment, multicasting, mobile routing.

UNIT 3

Web server and Browser: Web Servers (IIS/PWS & Apache),HTTP request types, system architecture, client-side scripting, accessing web servers, HTTP, secure HTTP, Secure Sockets Layer, WWW Proxies, Web Browser, Bookmarks, Cookies, Progress Indicators, Customization of Browsers, Browsing Tricks, Next Generation Web Browsing, Search Engines, Architecture of Search Engines, Search Tools, Web Crawlers

UNIT 4

Website Development: DHTML, XHTML, AJAX, XML: Structuring data, XML namespaces, DTD and schemas, XML variables, DOM methods, simple API for XML, web services, and application of XML.
Active Server Pages (ASP): How ASP works, ASP objects, file system, objects, ASP.NET

References:

1. Fundamentals of the Internet and the World Wide Web, Raymond GreenLaw and Ellen Hepp-2011, TMH.
2. Internet and World Wide Web Programming, Deitel, Deitel and Neito, 2000, Pearson Education.
3. Beginning XHTML by Frank Boumpery, Cassandra Greer, Dave Ragett, Jenny Ragett, SubastiaSchintenbaumer and Ted Wugofski 2000,WROX Press(Indian Shroff Publication SPD)1st Edison.
4. Complete Reference Guide to Java Script, Aron Weiss,QUIE,1977.
5. Intranet and Internet Engg. By Minoli.

GURUGRAM UNIVERSITY

SCHEME OF STUDIES AND EXAMINATION

M.TECH 2nd YEAR (COMPUTER SCIENCE & ENGINEERING)

SEMESTER 3rd

Sl. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)	No of hours/ week
			L	T	P	Total credits	Marks of Class works	Theory	Practical	Total		
1	17CSE23C1	Knowledge Based System	4	0	-	4	50	100	-	150	**3**	**4**
2	17CSE23C2	Network Security	4	0	-	4	50	100	-	150	**3**	**4**
3	17CSE23C3	Literature Survey (Dissertation Stage 1)	-	-	2	2	100	-	-	100		**4**
4	17CSE23C4	Seminar	-		2	2	50	-	-	50		**2**
5	17CSE23CL1	Knowledge Based System Lab	-	-	2	2	50	-	50	100		**2**
6	17CSE23CL2	Project	-	-	2	2	50	-	50	100		**2**
		TOTAL	**16**									

NOTE:

Examiner will set nine questions in total. Question One will be compulsory and will comprises of all sections and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

GURUGRAM UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
M.TECH 2nd YEAR (COMPUTER SCIENCE & ENGINEERING)
SEMESTER 4th

Sl. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				No of Credits
			L	T	P	Total	Marks of Class works	Theory	Practical	Total	
1.	17CSE24C1	Dissertation and viva (Dissertation Stage 2)	-	-	-	-	250	-	500	750	**20**
		TOTAL	**-**	**-**	**-**	**-**					

NOTE:

1. **Students have to publish a research paper in a journal / conference of the research work done in the semester.**

17CSE23C1 KNOWLEDGE BASED SYSTEM DESIGN

	Marks	Credits
L T P	**Exam:** 100	4
4 - -	**Sessional:** 50	
	Total: 150	4

Duration of Exam: 3 hrs.

Course Outcomes:
At the end of the course the student will:
CO1. Be able to understand the knowledge-based systems representation.
CO2. Be able to understand automatic reasoning.
CO3. Be able to understand inductive and deductive learning.
CO4. Be able to implement a small knowledge- based system

NOTE:
Examiner will set nine questions in total. Question One will be compulsory and will comprises of all sections and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

UNIT-I
Introduction to Logic, Propositional Logic concepts, SemanticTebleaux and Resolution in Propositional Logic, FOPL, SemanticTebleaux in Predicate Logic, and Resolution in Predicate Logic, Logic Programming in Prolog.

UNIT-II
Knowledge Representation, Semantic Nets, Partitioned Nets, Parallel Implementation of Semantic Nets. Frames, Common Sense Reasoning and Thematic Role Frames, Architecture of Knowledge Based System, Rule Based Systems,Framebasedsystems. Forward and Backward Chaining,

UNIT-III
Search Techniques. Uninformed Search: DFS, BFS, Iterative Deepening, Heuristic Search: A*, Hill Climbing etc.

UNIT-IV
Uncertainty Management in Expert Systems, Fuzzy Logic, ProbabilisticMethods, Bayesian Theory, Dempster Shafer Theory, Bayes Network,
Introduction to Agents and their Application in Intelligent Systems.

References:
1. Artificial Intelligence-Nilsl J Nilson
2. Artificial Intelligence-Elain Rich and Kevin Knight
3. Artificial Intelligence: A modern approach-Staurt Russel and Peter Norvig
4. Artificial Intelligence-Patrick Henry Winston
5. The Essence of Logic- John Kelly

17CSE23C2 **NETWORK SECURITY**

	Marks	Credits
L T P	**Exam:** 100	4
4 - -	**Sessional:** 50	
	Total: 150	4

Duration of Exam: 3 hrs.

Course Outcomes:
After completing this course the student must demonstrate the knowledge and ability to:
CO1. Independently understand basic computer network technology.
CO2. Understand and explain Data Communications System and its components.
CO3. Identify the different types of network topologies and protocols.
CO4. Understand and explain OSI architecture, cryptography and internet security protocols
CO5. Identify the different types of network devices and their functions within a network

NOTE:
Examiner will set nine questions in total. Question One will be compulsory and will comprises of all sections and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

Unit -1
Introduction: Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).Plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography.

UNIT -II
BLOCK CIPHERS &PUBLIC KEY CRYPTOGRAPHY : Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm.
Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management – Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

Unit-III
Internet security protocols: basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, Electronic Money, Email Security.

UNIT -IV
SECURITY PRACTICE & SYSTEM SECURITY : Authentication applications – Kerberos – X.509 Authentication services – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats –

Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

Reference :

1. Cryprotography and Network Security, 2nd Edition by AtulKahate, TMH
2. Network Management Principles & Practices by Subramanian, Mani (AWL)
3. SNMP, Stalling, Willian (AWL) SNMP: A Guide to Network Management (MGH)
4.Network Management by U. Dlack (MGH)
5. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.

17CSE23C3 LITERATURE SURVEY

(DISSERTATION STAGE-1)

L	T	P		Marks	Credits
-	-	2	Sessional Exam :	100	2

COURSE OUTCOMES:

By the end of this course every student is expected to be able to

CO1 understand the process of research.
CO2 do literature survey to identify a research problem.
CO3 communicate and discuss research ideas.
CO4 plan and write dissertation synopsis.

A candidate has to prepare a report covering identification of research topic, literature review, planning of research scheme and systematic documentation. The marks will be given on the basis of a report prepared covering the above said contents, contents of the presentation, communication and presentation skills.

16CSE23C4 **SEMINAR**

		Marks	Credits
L T P	Sessional Exam:	50	2
- - 2			

At the end of this course the student shall be able to
CO1 prepare the topic and contents on a technical topic
CO2 speak on a technical topic effectively
CO3 enhance communication skills

A candidate has to present a seminar on a recent topic/ technology/ research advancement and has to submit a seminar report. The marks will be given on the basis of seminar report, contents of the presentation, communication and presentation skills.

17CSE23CL1 **KNOWLEDGE BASED SYSTEM LAB**

		Marks	Credits
L T P	Exam:	50	2
- - 2	Sessional :	50	

Course Outcomes:
Upon successful completion of this course student will:
CO1. Able to design a knowledge based system,
CO2. Familiar with terminology used in this topical area,
CO3. Read and analyzed important historical and current trends addressing artificial intelligence.

Practical's based on theory paper

Experiment-1
Turbo Prolog features and format.
Experiment-2
Write a program using variables in Prolog.
Experiment-3
Write a program for usage of rules in Prolog.
Experiment-4
Write a program for using Input, Output and fail predicates in prolog.
Experiment-5
Write program for studying Usage of Arithmetic operators in Prolog.
Experiment-6
Write program to study usage of Cut, Not, Fail predicates in Prolog.
Experiment-7
Write program to study usage of Recursion in prolog.
Experiment-8
Write programs to study usage of Logical , Arithmetic ,String operators in Prolog.
Experiment-9
WAP for studying usage of Compound Object and List in prolog.
Experiment-10
Write a program for studying usage of Dynamic Database in prolog.

17CSE23CL2 **Project**

L	T	P		Marks	Credits
-	-	2	Exam :	50	2
			Sessional :	50	

At the end of this course the student shall be able to
CO1 have an understanding how software is to be developed
CO2 utilise different models for SDLC
CO3 write detailed project reports
CO4 implement project in a suitable platform

A student has to make a Project based on latest technology.

17CSE24C1 DISSERTATION and Viva (Stage-II) (IV sem)

COURSE OUTCOMES:

By the end of this course every student is expected to be able to

CO1 handle research problems and use modern research tools/methods.
CO2 analyse and review the existing literature on a research problem.
CO3 design and conduct experiments.
CO4 write dissertation and technical reports.
CO5 publish research papers.