M.D. UNIVERSITY, ROHTAK

Scheme of studies & Examination
Bachelor of Technology (Computer & Communication Engg.)
Semester-III
'F' scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1.	CC-311-F	Discrete Structure	3	1	-	4	50	100	-	150	3
2.	CC-312-F	Information Coding Theory	3	1	-	4	50	100	-	150	3
3.	CC-313-F	Numerical Methods	3	1	-	4	50	100	-	150	3
4.	CC-314-F	Object Oriented Programming	3	1	-	4	50	100	-	150	3
5.	CC-315-F	Data Structure and Algorithms	3	1	-	4	50	100	-	150	3
6.	CC-316-F	Digital Circuits and Logic Design	-	-	4	4	25	-	25	50	3
7.	CC-317-F	Object Oriented Programming Laboratory	-	-	4	4	25	-	25	50	3
8.	CC-318-F	Data Structure and Algorithm Laboratory	-	-	4	4	25	-	25	50	3
9.	CC-319-F	Digital Circuits and Logic Design Laboratory	-	-	4	4	25	-	25	50	3
		Total	**15**	**5**	**16**	**36**	**350**	**500**	**100**	**950**	

Note:-

1) **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2) **Assessment of Practical Training-1, undergone at the end of IV semester will be based on seminar, vice-voca, report and certificate of practical training obtained by the students from the industry. According to the performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

CC-311-F **DISCRETE STRUCTURES**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Set Theory, Functions and Relations: Subsets, Power Set, Null Set, Singleton, Finite Set, Infinite Set,Universal Set, Disjoint Sets, Operation on Sets, Venn Diagrams, Cartesian Product of Sets, Partition of Sets,Concept of Relation & Properties of Relations, Different types of Relations, Tabular and Matrix Representation ofRelations, Relations and Diagraphs, Composition of Relations, Functions and their different mappings, Compositionof Function, Recursion and Recurrence Relations.

Section - B

Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded I and complemented lattices.

Section - C

Boolean Algebra: Partial Ordering, Totally ordered Sets, Dual Order, Hasse Diagram Lexicographic Ordering, Cover of an Element, Least and Greatest Elements, Minimal and Maximal Elements ,Upper and Lower Bound ,Well-Order Set, Binary and n-Ary Operations, Lattices, Atoms of a Boolean Algebra, Boolean Expressions,Applications of Boolean Algebra to Switching Theory.

Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal.

Section - D

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions,Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

Combinatorics & Graphs: Recurrence Relation, Generating function., Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

REFERENCE BOOKS:

1. Liptschutz, Seymour, " Discrete Mathematics", McGraw Hill.
2. Trembley, J.P & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
5. Krishnamurthy, V., "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.

CC-312-F **INFORMATION CODING THEORY**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions

Section - A

Information, channel capacity, the concept of amount of information, entropy, Information rate, Conditional and joint entropies.

Section - B

Source coding : Noise less coding, Shannon's first fundamental theorem, Discrete memory less channel, Mutual information, Sources with finite memory, Markov sources, Shannon's second fundamental theorem on coding, Huffman coding, Lempel – Ziv algorithm, Shannon-Fano algorithm.

Section - C

Channel coding : Error detecting codes, Hamming distance, Error correcting codes, Repitition codes, Linear block codes, binary cyclic codes, BCH codes, Reed-Soleman codes, Golay codes.

Section - D

Convolution Coding: Code tree, state diagram, Trellis diagram, Maximum-Likelihood decoding – Viterbi's algorithm, sequential decoding.

Network Information theory, Introduction to Cryptography

REFERENCE BOOKS:

1. T M Gover, J M Thomos, "Elements of Information Theory", Wiley , 1991
2. Haykins S, "Digital Communications", Wiley
3. J G Proakis, " Digital Communications", Mc Graw Hill.
4. Ballard and C.M.Brown, Computer Vision , Prentice Hall, Englewood Cliffs
5. Roman, S. Coding and Information Theory. New York: Springer-Verlag, 1992

CC-313-F **NUMERICAL METHODS**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Roots of algebraic and transcendental equations, Bisection method, Regula – Falsi method, Newton –Raphson method, Bairstow's method and Graeffe's root squaring method.

Section - B

Solution of simultaneous algebraic equations, matrix inversion and eigen-value problems, triangularisation method, Jacobi's and Gauss-Siedel iteration method, partition method for matrix inversion, power method for largest eigen-value and Jacobi's method for finding all eigen-values.

Section - C

Finite differences, interpolation and numerical differentiation, forward, backward and central differences, Newton's forward, backward and divided difference interpolation formulas, Lagrange's interpolation formula, Stirling's and Bessel's central difference interpolation formulas, numerical differentiation using Newton's forward and backward difference formulas and numerical differentiation using Stirling's and Bessel's central difference interpolation formulas.

Section - D

Numerical integration, Trapezoidal rule, Simpson's one-third rule and numerical double integration using Trapezoidal rule and Simpson's one-third rule.

Taylor's series method, Euler's and modified Euler's methods, Runge-Kutta fourth order methods for ordinary differential equations, simultaneous first order differential equations and second order differential equations. Boundary value problems, finite difference methods for boundary value problems.

Partial differential equations, finite difference methods for elliptic, parabolic and hyperbolic equations.

REFERENCE BOOKS:

1. S S Sastry, Introductionary Methods of Numerical Analysis, 3rd Edition, Prentice Hall of India Pvt.Ltd., New India -1999

2. S C Chapra and R P Canale, Numerical Methods for Engineers, 2nd Edition, McGraw Hill Book Company, Singapore 1990.

3. Grewal, B S, "Numerical Methods", Khanna Publishers ,Delhi.

4. Kalavathy S., "Numerical Methods", Cengage Publishers, New Delhi.

5. Burden Richard L. , Faires J. Douglas, "Numerical Anlaysis" , Cengage Learning , New Delhi.

CC-314-F **OBJECT ORIENTED PROGRAMMING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam: 3Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Object oriented thinking: Need for oop paradigm, A way of viewing world – Agents, responsibility, messages,methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

Java Basics: History of Java, Java buzzwords, datatypes, variables, scope and life time of variables, arrays,operators, expressions, control statements, type conversion and costing, simple java program, classes and objects –concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding,abstract classes.

Section - B

Packages and Interfaces: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importingpackages, differences between classes and interfaces, defining an interface, implementing interface, applyinginterfaces, variables in interface and extending interfaces. Exploring packages – Java.io, java.util.

Exception handling and multithreading: Concepts of exception handling, benefits of exception handling,Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread lifecycle, creating threads, synchronizing threads, daemon threads, thread groups.

Section - C

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouseand keyboard events, Adapter classes, inner classes.The AWT class hierarchy, user interface components-labels,button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs,menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grib bag.

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets,creating applets, passing parameters to applets.

Section - D

Swing: Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing-JApplet,JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons,Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Networking: Basics of network programming, addresses, ports, sockets, simple client server program, multipleclients, Java .net package Packages – java.util,

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, PearsonEducation.

EE-315-F DATA STRUCTURES AND ALGORITHMS

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam: 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off.

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C++, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors.

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack:
Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Section - B

Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues**.**

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Section - C

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree,Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm**.**

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

Section - D

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting**.**

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

REFERENCE BOOKS:

1. Horowitz and Sahani, “Fundamentals of data Structures”, Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse etal, “Data Structures and Program Design in C”, Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, “Data Structures using C & C++”, Prentice-Hall of India Pvt. Ltd., New Delhi.
4. Bruno R Preiss, “Data Structures and Algorithms with Object Oriented Design Pattern in C++”, Jhon Wiley & Sons, Inc.
5. Gilberg Forozan , “Data Structure – A pseudo code approach with C++”, Cengage Learning, New Delhi.

EE-316-F **DIGITAL CIRCUITS AND LOGIC DESIGN**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam: 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Binary Systems: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, other logic operations, Digital logic gages, integrated circuits.

Section - B

Gate – Level Minimization: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementnations, Exclusive – Or function, Hardward Description language (HDL).

Combinational Logic: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

Section - C

Synchronous Sequential Logic: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, HDL for sequential circuits, State Reduction and Assignment, Design Procedure**.**

Registers and Counters: Registers, shift Registers, Ripple counters synchronous counters, other counters, HDL for Registers and counters.

Section - D

Memory, CPLDs, and FPGAs: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.

Asynchronous Sequential Logic: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduciton of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

REFERENCE BOOKS:

1. DIGITAL DESIGN – Third Edition , M.Morris Mano, Pearson Education/PHI.
2. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
3. John F Wakerly, "Digital Design Principles and Practices 3/e", Pearson Education 2001.
4. J P. Hayes, "Introduction to Digital Logic Design", Addison-Wesley Publishing Co
5. Charles H. Roth, Jr. Fundamentals of logic design, Cengage Learning, New Delhi

CC-317-F OBJECT ORIENTED PROGRAMMING LABORATORY

L T P
- - 2

Class work Marks : 25
Theory Marks : 25
Total Marks :50
Duration of Exam: 3 Hours

Objectives:

- To make the student learn a object oriented way of solving problems.
- To teach the student to write programs in Java to solve the problems

1.a) Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 -4ac is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule:
The fist two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2. a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

3.a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

4.a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file.

5. a) Write a Java program that:
   i) Implements stack ADT.
   ii) Converts infix expression into Postfix form
   iii) Evaluates the postfix expression

6. a) Develop an applet that displays a simple message.
   b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

7. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

8. Write a Java program for handling mouse events.

9. a) Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
   b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

10. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

11. Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)

12. a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.
    b) Write a Java program that allows the user to draw lines, rectangles and ovals.

13. a) Write a java program to create an abstract class named Shape that contains an empty method named number Of Sides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method number Of Sides ( ) that shows the number of sides in the given geometrical figures.
    b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are seperated by commas. Write a java program to display the table using JTable component.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-318-F DATA STRUCTURES AND ALGORITHM LABORATORY

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

Write Program in C or C++ for following.

1. Write a C+ program to the following operations on stack of integers:
   a> push b>pop c> display The program should print appropriate messages for stack overflow, stack Underflow & stack empty.
2. Write a C++ program to convert & print a given valid parenthesized in fix Arithmetic expression to postfix expression. The expression consists of single character operands & + , - ,*,/ operators .
3. Write a c program to evaluate a valid suffix / postfix expression using a Stack, assume that the suffix / postfix expression is read as a single line consisting of non negative single digit operands & binary arithmetic operands. The arithmetic operators are + (ADD), - (subtract), *(multiply) & / (divide).
4. Write a C++ program to simulate the working a queue of integers using an array. Provide the a) insert b) delete c) display
5. Write a C++ program to simulate the working of a circular queue of integers using an array. Provide the following operations: a) insert b) delete c)Display
6. Write a program to design a priority queue which is maintained as a set of queue (assume a maximum of 3 queues). The elements are inserted based upon the given priority. The deletion of an element is to be done starting from the 1st queue, if it is not empty .If it is empty ,The elements from the 2nd queue will be deleted & so on.
7. Write a C++ program using dynamic variable & pointers to construct a singly linked list consisting of the following information in each node. Student id (integer), student name(character string) & semester(integer). The operations to be supported are
   a) inserting in front of list
   b) Deleting a node based on student id, if the specified node is not present in the list, error message should be displayed
   c) Searching a node based on student id , if the specified node is not present in the list, error message should be displayed
   d) Displaying all the nodes in the list
8. Write a C++ program using dynamic variables & pointers to construct an ordered(ascending) singly linked list based on the rank of the student, where each node consists of the following information student id(integer)student name(character), rank(integer)
9. Write a C++ program using dynamic variables & pointers to construct a singly linked list to perform the operations of a stack of integers
   a) Push b) pop c) display
10. The program should print appropriate message for stack overflow & stack empty
11. Write a C++ program to support the following operations on a doubly linked where each node each node consists of integers
    a) Create a doubly linked list by adding each node front
    b) Insert a new node to the left of the node whose key value is read as a input
    c) Delete the node of a given data, if it is found, otherwise display appropriate message
    d) Display the content of the list
12. Write C++ program
    a) To construct a binary search tree of integers
    b) To traverse the tree using all the methods i.e. inorder, preorder & postorder to display the elements in the tree
13. Write C++ program for the following searching techniques over a list of integers.
    a> Linear search,
    b> Binary search
14. Write a C++ program to sort a list of N integers using the quick sort algorithm.
15. Write a C++ program to sort a list of N strings using the insertion sort algorithm.
16. Write a C++ program to sort a list of N integers using Heap sort algorithm.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

EE-319-F **DIGITAL AND ANALOG CIRCUITS LABORATORY**

L	T	P
-	-	2

Class work Marks : 25
Theory Marks : 25
Total Marks :50

1. Verification of Boolean Theorems - Implementation of Boolean Function - Adders / Subtractors - Decoders Encoders - Multiplexer - Demultiplexers - Comparators - Parity Checker/Generator.
2. Register Counters - Shift Registers - General-purpose shift registers - Data transmission.
3. Project - A mini project involving clocked sequential networks design.
4. To see the working of a BCD-to-7 Segment decoder and to verify the truth table.
5. To study the operation of Arithmetic and logic unit using 74181 IC.
6. To study the ckt. Of 16 line-to-1 line Multiplexer using 74150 and 7493IC, s with DEMO board.
7. To construct different types of flip-flops and verify their truth tables. Flip-flops like J-K flip-flops. S-R flip-flop. And D-flip-flops etc.
8. To construct and verify a Master-Slave flip-flop.
9. Construction and study of Modulo-N counter using IC's 7490 decade counter, 7493 binary counter.
10. Study of various Interfacing card
    - Stepper motor with voluntary unit.
    - 12-bit high-speed data acquisition card.
    - PC Bus Extension unit.
    - 16-bit channel Relay output card.
    - Digital IC tester.
    - 7-Segment display card.
    - Amplifier and multiplexer card.
    - IEEE 488 GPIB card.
    - Digital I/O and timer counter card.
11. EPROM Programming
12. Study & working of DMA controller.
13. Designing of Traffic control system.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

M.D. UNIVERSITY, ROHTAK

Scheme of studies & Examination
Bachelor of Technology (Computer & Communication Engg.)
Semester-IV
'F' scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1.	CC-411-F	Computer Architecture & Organization	3	1	-	4	50	100	-	150	3
2.	CC-412-F	System Programming	3	1	-	4	50	100	-	150	3
3.	CC-413-F	Microprocessor and Programming	3	1	-	4	50	100	-	150	3
4.	CC-414-F	Data Communication	3	1	-	4	50	100	-	150	3
5.	CC-415-F	Probability and Queuing Theory	3	1	-	4	50	100	-	150	3
6.	CC-416-F	Departmental Elective-I	3	1	-	4	50	100	-	150	3
7.	CC-417-F	System Programming Laboratory	-	-	4	4	25	-	25	50	3
8.	CC-418-F	Microprocessor and Programming Laboratory	-	-	4	4	25	-	25	50	3
9.	CC-419-F	Data Communication Laboratory Lab	-	-	4	4	25	-	25	50	3
		Total	**18**	**6**	**12**	**36**	**375**	**600**	**75**	**1050**	

Note:-

1. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2. **Assessment of Practical Training-1, undergone at the end of IV semester will be based on seminar, vice-voca, report and certificate of practical training obtained by the students from the industry. According to the performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

CC-411-F **COMPUTER ARCHITETURE AND ORGANIZATION**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Historical overview, economic trends, underlying technologies, Data Representation- Data Types, Complements. Fixed-Point Representation, Floating-Point Representation. Error Detection and Correction. Addition, Subtraction, Multiplication and Division algorithms and hardware.

Register Transfer and Micro operations: Register transfer language, Inter-Register Transfer, Arithmetic Micro-operations, Logic and Shift micro-operations Language, Control functions.

Section - B

Arithmetic Logic Unit: Arithmetic, logic and shift micro operations. Constructing an arithmetic logic shift unit.

Basic Computer Architecture and Design: Computer registers, Computer Instructions-Instruction Set Completeness. Classifying Instruction Set Architecture. Basic steps of Instruction Execution. Hardwired Control. Micro programmed Control. Horizontal and Vertical Microprogramming. Interrupts.

Central Processing Unit: General Register Organization. Stack Organized CPU. Instruction Formats, Addressing Modes. Data Transfer and Manipulation.RISC Vs CISC.

Section - C

Pipelining: Parallel and pipeline Processing, Pipeline Control, Pipeline Implementations, Conflicts Resolution, and Pipeline Hazards. Vector Processing, and Array Processors.

Memory Organization: Memory Systems: principle of locality, principles of memory hierarchy Caches, associative memory, main memory, Virtual memory, Paging and Segmentation, Memory Interleaving.

Section - D

Input Output Organization: I/O performance measures, types and characteristics of I/O devices, I/O Modes-Programmed I/O, Interrupt Initiated I/O and DMA.Buses: connecting I/O devices to processor and memory, interfacing I/O devices to memory, processor, and operating system.

Parallel Computers: Classification, SIMD, MIMD Organizations, Connection Networks, Data Flow Machines, and Multithreaded Architectures.

REFERENCE BOOKS:

1. M Moris Mano, “Computer System Architecture”, Pearson Education, 3rd Edition 1993.
2. David A. Patterson and John L. Hennessy, “Computer Organization & Design-The Hardware/Software Interface”, Morgan Kaufmann, 2nd Edition 1997.
3. William Stallings, “Computer Organisation and Architecture, Designing for Performance”, Pearson Education Asia, 6th Edition 2003.
4. Harry F. Jordan and Gita Alaghband, “Fundamentals of Parallel Processing”, Pearson Education, 1st Edition 2003.
5. Barry Wilkinson Michael Allen, “Parallel Programming”, prentice hall, 1999

CC-412-F **SYSTEM PROGRAMMING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Introduction to Software processors, Translators and Loaders, Interpreters

Assemblers: Elements of Assembly Language Programming, Design of Two-Pass assemblers

Section - B

Macros and Macro Processors: Macro Instructions, Features of a Macro facility, Implementation of Two pass Macro.

Compilers: Aspects of Compilation, Phases of compilation, Scanning and Parsing, Compilation of Expressions, Compilation of Control Structures Code Generation and Code optimization techniques, Compiler Writing Tools

Section - C

Loaders & Linkage Editors: Loading Linking and Relocation, Overview of Linkage Editing, Linking for Program Overlay.

Editors and debuggers: introduction to editors, types of editor, design of an editor, debug monitors, introduction to various debugging techniques, turbo c++ debuggers.

Section - D

Grammar and automation: introduction to grammar, types of grammar, acceptability of grammar, introduction to automation, characteristics of automation, finite control, transition system, finite automation. Case study on LEX and YACC**.**

Introduction to Operating systems: Introduction, Operating System Structures, Process Management, Memory management, I/O systems, Distributed Operating Systems

REFERENCE BOOKS:

1. Beck L L, “Systems Software: An Introduction to Systems Programming”, Addison-Wesley 2001.
2. Donovan J J, “Systems Programming “, New York, Mc-Graw Hill 1972.
3. Dhamdhere, D M, “Introduction to Systems Software”, Tata Mc-Graw Hill 2000.
4. Glingaert P, “Assembles Loaders and Compilers”, prentice Hall 1972.
5. Aho A V and J D Ullman, “Principles of compiler Design”, Addison Wesley/ Narosa 1985.

CC-413-F **MICRO-PROCESSOR AND PROGRAMMING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Microcomputer structure and Operation, Microprocessor Evolution and types, The 8086 Microprocessor Family- Overview, Architecture of processor 8085 and 8086.

Assembly Language Programming: Introduction to 8085 and 8086, Programming Development steps, Constructing machine Development codes for 8085 and 8086 instructions, Assembly Language Program Development Tools, Implementation of 8086

Assembly Language: Simple sequence program Jumps, Flags, and Conditional jumps, Loops and Constructs, Instruction Timing and Delay Loops

Section - B

Strings, Procedure and Macros: String instructions, Writing and Using Procedures, Writing and using Assembler Macros.

Instruction Description and Assembler Directives: Instruction Descriptions, Assembler Directives Systems Connections, Timing and Trouble Shooting: Basic 8086 Microcomputer systems connections, logic Analyzer to Observe Microprocessor Bus Signals, Troubleshooting a Simple 8086-Based Microcomputer

Section - C

Interrupts: 8086 Interrupts and Types, 8254 Software-Programmable Timer/Counter, 8259A Priority Interrupt Controller, Software Interrupt Applications.

Digital and Analog Interfacing: Programmable Parallel Ports and Handshake Input/Output, Interfacing Keyboards and Alphanumeric Displays, Interfacing Microcomputer Ports to Devices, Developing the Prototype of a Microcomputer Based Instrument

Section - D

Memories, Coprocessors, and EDA Tools: 8086 Maximum Mode and DMA Data Transfer, Interfacing and Refreshing Dynamic RAMs, A Coprocessor- The 8087 Math Coprocessor, Computer Based Design and development Tools.

Case studies: Multi-user/Multitasking OS, Concepts, 80286 Microprocessor, 80386 Microprocessor, 80486 Microprocessor.

REFERENCE BOOKS:

1. Hall Douglas V, "Microprocessors and Interfacing", Tata McGraw-Hill 1989.
2. Berry B Brey ,"The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386 And 80486,Pentium and Pentium ProProcessor Architecture, Programming and Interfacing", Pearson Education 2003.
3. Mathur Aditya P, "Introduction to Microprocessors" Tata McGraw-Hill 1989.
4. Ray A Kbhurchandi, K M, "Advanced microprocessors and peripherals",Tata McGraw Hill 2000.
5. James L Antonakos, "An Introduction to the Intel Family of Microprocessors: A Hands-On Approach Utilizing the 80x86 Microprocessor Family", First Edition**.** Cengage Learning, New Delhi

CC-414-F **DATA COMMUNICATION**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Data Transmission/The Physical Layer: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Guided Transmission Media, Wireless Transmission, Communication Satellites, The Public Switched Telephone Network, The Mobile Telephone System, Cable Television

Data Encoding: Digital Data: Digital and Analog Signals, Analog Data: Digital and Analog Signals, Spread Spectrum

Section - B

Data Communication Interface: Asynchronous and Synchronous Transmission, Line Configurations, Interfacing

Multiplexing: Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing

Circuit Packet and Switching: Switched Networks, Circuit-Switching Networks, Switching Concepts, Routing in Circuit-Switched Networks, Control Signaling, Packet-Switching Principles, Routing, Congestion Control, X.25 282

Section - C

Frame Relay: Frame Relay Protocol Architecture, Frame Relay Call Control, User Data Transfer, Network Function, Congestion Control

LAN Technology and Systems: LAN Architecture, BusITree LANs, Ring LANs, Star LANs, Wireless LANs, Ethernet and Fast Ethernet (CSMAICD), Token Ring and FDDI, 100VG-AnyLAN, ATM LANs, Fibre Channel, Wireless LANs, Bridge Operation, Routing with Bridges

Section - D

Protocols and Architecture: Protocols, OSI, TCP/IP Protocol Suite

Examples of networks: Novell Netware, Arpanet, and Internet. Examples of Data Communication Services: X.25 Networks, Frame relay, Broad band ISDN and ATM. Physical Layer: Transmission media- Narrow band ISDN: Services-Architecture- Interface, Broad band ISDN and ATM- Virtual Circuits versus Circuit Switching – Transmission in ATM networks. FDDI

Link Layer and Local Area Networks Data link layer: Service provided by data link layer-Error detection and correction Techniques-Elementary data link layer protocols -Sliding Window protocols - Data link layer in HDLC, Internet and ATM . Multiple Access protocols: Channel partitioning protocols: TDM-FDM-Code Division Multiple Access(CDMA) .Random Access protocols : ALOHACSMA and CSMA/CD . Local area Network: LAN addresses- Address Resolution Protocol-Reverse Address Resolution Protocol. Ethernet: Ethernet Technologies-IEEE standards- Hubs-Bridges and Switches.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum “Computer Networks” Ed Pearson Education 4th Edition, 2003.
2. James F. Kurose and Keith W. Ross “Computer Networking” Pearson Education, 2002.
3. William Stalling, “Data and Computer Communication”, Pearson Education, 7th Edition, 2nd Indian Reprint 2004.
4. Miller “Data and Network Communication” Ed Thomson Learning, 2001.
5. Douglas E Comer, “Computer Networks and Internets”, Pearson Education 2nd Edition, 5th Indian Reprint 2001.

CC-415-F PROBABILITY AND QUEUING THEORY

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Probability: The concept of probability, The axioms of probability, Some important theorems on Probability,Assignment of Probabilities, Conditioal Probability, Theorems on conditional probability, Independent Event's, Bayes' Theorem.

Random Variables and Probability Distributions: Random variables, Discrete probability distributions, Distribution functions for discrete random variables, Continuous probability distribution, Distributions for continuous random variables, joint distributions, Independent random variables.

Section - B

Mathematical Expectation: Definition, Functions of random variables, some theorems on Expectation, The variance and Standard Deviation, Moments, Moment Generating Functions, Covariance, Correlation Coefficient.

Special Probability Distributions: The Binomial Distribution, The Normal Distribution, The Poisson Distribution, Relations between different distribution, Central limit theorem, Uniform distribution, Chi-square Distribution, Exponential distribution.

Section - C

Sampling Theory: Population and Sample, Sampling with and without replacement, the sample mean, Sampling distribution of means, proportions, differences and sums, The sample variance, the sample distribution of variances.

Tests of Hypotheses and Significance: Statistical Decisions, Statistical hypotheses, Null Hypotheses, Tests of hypotheses and significance, Type I and Type II errors, level of significance, Tests involving the Normal distribution, One-Tailed and Two-tailed tests, Special tests of significance for large and small samples, The Chi square test for goodness of fit.

Section - D

Curve Fitting Regression and Correlation: Curve Fitting, The method of least squares, The least squares line, multiple regression, the linear correlation coefficient, Rank correlation, Probability interpretation of regression and correlation.

Discrete-Parameter Markov Chains: Introduction, Computation of n-step Transition Probabilities, State Classification and Limiting Distributions, Distribution of times between state changes, Irreducible finite chains with aperiode states, The M/G/1 Queuing System, Discrete-parameter, Birth-Death processes, Finite Markov chains with absorbing states.

REFERENCE BOOKS:

1. Murray R. Spiegel, "Probability and Statistics", McGrawHll, Schaum's Outline Series (Chapters: 1,2,3,4,5,7,8)
2. Kishor S Trivedi, "Probability and Statistics with Reliability, Queuing and Computer Applications", Prentics Hall of India, 2000 (Chapter 7)
3. A. Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes, McGraw Hill, 4th Edition
4. Richard A Johnson, Probability and Statistics for Engineers. Prenticshall, India, 2002.
5. Mondenhall, "Introduction to probability and statistics", Cengage Learning, New Delhi

DEPARTMENTAL ELECTIVE (DE) –I

CC-420-F **WEB TECHNOLOGIES**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction to HTML: HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

Introduction to Java: Scripts, Objects in Java Script, Dynamic HTML with Java Script

Section - B

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB's

Section - C

Web Servers and Servlets: Tomcat web server, Introduction to Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,

Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

Section - D

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

Database Access : Database Programming using JDBC, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 25)
3. Java Server Pages –Hans Bergsten, SPD O'Reilly.
4. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia
5. Jocl Sklar, "Web Warrier guide to web design technologies", Cengage Learning, New Delhi

CC-421-F **MULTIMEDIA COMMUNICATION**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Multimedia Elements; Multimedia Applications; Multimedia Systems Architecture; Evolving Technologies for Multimedia Systems; Defining Objects for Multimedia Systems; Multimedia Data Interface Standards; The need for Data Compression; Multimedia Databases

Media and Data Streams: Media : Perception Media, Representation Media, Presentation Media, Storage Media, Transmission Media, Information Exchange Media, Presentation spaces & Values, and Presentation Dimensions; Key Properties of a Multimedia System : Discrete & Continuous Media Independence Media, Computer Controlled Systems, Integration; Characterizing Data Streams: Asynchronous Transmission Mode, Synchronous Transmission
Mode, Isochronous Transmission Mode; Characterizing Continuous Media Data Streams.

Section - B

Audio Technology: Sound: Frequency, Amplitude, Sound Perception and Psychoacoustics; Audio Representation on Computers; Three Dimensional Sound Projection; Music and MIDI Standards; Speech Signals; Speech Output; Speech Input; Speech Transmission.

Graphics and Images: Capturing Graphics and Images Computer Assisted Graphics and Image Processing; Reconstructing Image; Graphics and Image Output Options.

Video Technology & Computer-Based Animation: Basics; Television Systems; Digitalization of Video Signals; Digital Television; Basic Concepts; Specification of Animations; Methods of Controlling Animation; Display of Animation; Transmission of Animation; Virtual Reality Modeling Language.

Section - C

Data Compression: Storage Space; Coding Requirements; Source, Entropy, and Hybrid Coding; Basic Compression Techniques; JPEG: Image Preparation, Lossy Sequential DCT-based Mode, Expanded Lossy DCT-based Mode, Lossless Mode, Hierarchical Mode; H.261 (Px64) and H.263+ and H.263L; MPEG : Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG: Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG-4, MPEG-7; Fractal Compression.

Optical Storage Media: History of Optical Storage; Basic Technology; video Discs and other WORMs; Compact Disc Digital Audio; Compact Disc Read Only Memory; CD-ROM Extended Architecture; Further CD-ROM-Based Developments; compact Disc Recordable; Compact Disc Magneto-Optical; Compact Disc Read/Write; digital Versatile Disc.

Section - D

Content Analysis: Simple Vs Complex Features; Analysis of Individual Images; Analysis of Image Sequences; Audio Analysis; Applications.

Data and File Format Standards: Rich-Text Format; TIFF file Format; Resource Interchange File Format (RIFF); MIDI File Format; JPEG DIB File Format for Still and Motion Images; AVI Indeo File Format; MPEG Standards; TWAIN.

Mutimedia Application Design: Multimedia Application Classes; Types of Multimedia Systems; Virtual Reality Design; Components of Multimedia Systems; Organizing Multimedia Databases; Application Workflow Design Issues; Distributed Application Design Issues.

REFERENCE BOOKS:

1. Ralf Steinmetz, Klara Narstedt, “Multimedia Fundamentals : Vol 1- Media Coding and Content Processing”, PHI, 2ND Edition, 2003.(Chapters 2,3,4,5,6,7,8,9)
2. Prabhat K. Andleigh, Kiran Thakrar, “Multimedia Systems Design”, PHI,2003.(Chapters 1,3,7)
3. K.R Rao, Zoran S. Bojkovic and Dragorad A. Milovanovic, “Multimedia Communication Systems: Techniques, Standards, and Networks”, Pearson 2002.
4. Nalin K Sharad, “Multimedia information Networking”, PHI, 2002.
5. Iain E.G. Richardson, H.264 and MPEG-4 Video Compression, John Wiley

CC-422-F **WINDOWS PROGRAMMING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

The Windows Architecture: The Concept of Handlers, The concept of Windows class, Registering a Window class, Style like CS_HREDRAW, Instance handlers, Icon handlers, Cursor handlers, The concept of Windows class, Registering a Window class, Style like CS_HREDRAW, Instance handlers, Icon handlers, Cursor handlers, Menu name, Create a Window, Class names-predefined and user defined, Window name, Draw styles, Width Height etc., Parent-Child Windows, The concept of Window Messages, Messages Queue

Compiling and Linking for Windows: Compiling for Windows, Memory models in Windows, Linking, The stub file

I/O Techniques: Drawbacks of Windows, Screen printing, determining the size of Windows, The concept of device context, Device context handles, Text formatting, Using fonts, the concept of scroll bars, setting scroll bar range and position

Section - B

Keyboard: Keyboard messages, Virtual key codes, Parameters like repeat count, scan code etc, System keys like Alt-Tab, Ctrl-Esc etc.

Mouse: Mouse action, Mouse messages, Activating Windows, Change mouse cursors File I/O: Win 3.1 file functions, Buffered file I/O, Common dialog boxes, Open file name structure

Child Windows: The concept of child Windows, Child Window control, Child Window control classes, The static class, The button class, Button messages, Push buttons, Check boxes, Radio buttons, Edit class, Edit control messages, Edit styles, The list box class.

Menus: Creating menus, working of menus, Using menus Inputs, Creating pop-ups to top level menus, Menu messages, Menu templates, Using system menus, Messages from menus

Section - C

Dialog Boxes: Concept, Control state, working with dialog boxes.

Printing: Obtaining printer's driver content, determining the printer name, Notifying the print job, Page breaks, determining device capabilities, printing graphics, about printing.

Graphics: Fonts, Portrait of a character, Types of fonts, creating logical fonts, Font handle.

Graphical Device Interface: Need, The device context, determining device capabilities.

Drawing Graphics: Pixels, Lines, Rectangles, and Circles.

Bitmaps: Bitmap handle, Obtaining handles, internal representation of bitmaps, Creating bitmaps, Memory device context.

Section - D

Memory Management: Memory handles and locks, Problems of Windows memory handling, Intel's segmented memory architecture, 80286 protected mode, the memory API, Kernel Macros

Windows Resources: Accessing resources, loading techniques.

Windows Timer: Timekeeping on the PC, Windows interaction with 8259 chip, the timer API function.

Windows Chipboard: Concept, The clipboard API, Working of clipboard, the concept of clipboard viewers, Clipboard viewer message.

REFERENCE BOOKS:

1. Ben Ezzell with Jim Blaney, "NT4/Windows 95 Developer's Handbook", BPB Publications 1997.
2. Charies Petzold, "Programming Windows 95", Microsoft Press 1996.
3. Richard J Simson, "Windows NT Win 32, API Super Bible", SAMS 1997
4. James F Kurose and Keith W Ross, "Computer Networking", Pearson Education 2002.
5. Nance, "Introduction to Networking", PHI 4th Edition 2002.

CC-417-F **SYSTEM PROGRAMMING LABORATORY**

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. Design and Implementation of an Editor in any language.
2. Design and Implementation of One Pass Assembler in any language.
3. Design and Implementation of Two Pass Assembler in any language.
4. Implementation of various search techniques: Linear and Binary Search.
5. Implementation of various sorting techniques: Bucket sort, Merge Sort, Heap Sort
6. Implementation of Lexical Analyzer.
7. Implementation of Top Down Parser.
8. Implementation of Bottom Up Parser.
9. Design and Implementation of Two Pass Macro- Processor.
10. Study of LEX and YACC.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-418-F **MICRO-PROCESSOR AND PROGRAMMING LABORATORY**

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

I. Microprocessor 8086:

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing:

1. 8259 – Interrupt Controller: Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display: Write a small program to display a string of characters.
3. 8255 – PPI: Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART: Write a program in ALP to establish Communication between two processors.

III. Microcontroller 8051

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-419-F **DATA COMMUNICATION LABORATORY**

L	T	P
-	-	2

Class work Marks : 25
Theory Marks : 25
Total Marks :50

1. Making Straight, Rollover and Cross-Over cables
2. Cable & RJ-45 Jack outlet installation
3. Installation of NIC Card & using TCP/IP
4. Design, build & test a simple communication system
5. Overview and basic Configuration of Router
6. Router show Command
7. Basic LAN Setup
8. Designing & Implementing LAN using subnetting
9. Study of Amplitude Modulation
10. Study of frequency Modulation
11. Study of ASK Modulation
12. Study of FSK Modulation
13. Simple point-to-point communication & error detection
14. Implementation of STOP and Wait protocol
15. Implementation of Sliding Window protocol

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

M.D. UNIVERSITY, ROHTAK

Scheme of studies & Examination
Bachelor of Technology (Computer & Communication Engg.)
Semester-V
'F' scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1.	CC-511-F	Computer Networks	3	1	-	4	50	100	-	150	3
2.	CC-512-F	Database Management System	3	1	-	4	50	100	-	150	3
3.	CC-513-F	Operating Systems	3	1	-	4	50	100	-	150	3
4.	CC-514-F	Departmental Elective-II	3	1	-	4	50	100	-	150	3
5.	CC-515-F	Departmental Elective-III	3	1	-	4	50	100	-	150	3
6.	CC-516- F	Open Elective-I	3	1	-	4	50	100	-	150	3
7.	CC-517-F	Network Programming Laboratory	-	-	4	4	25	-	25	50	3
8.	CC-518-F	Operating Systems Laboratory	-	-	4	4	25	-	25	50	3
9.	CC-519-F	Database Management System Laboratory	-	-	4	4	25	-	25	50	3
10.	CC-520-F	Departmental Elective-III Lab	-	-	4	4	25	-	25	50	3
		Total	**18**	**6**	**16**	**36**	**350**	**600**	**100**	**1100**	

Note:-

1) **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2) **Assessment of Practical Training-1, undergone at the end of IV semester will be based on seminar, vice-voca, report and certificate of practical training obtained by the students from the industry. According to the performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

CC-511-F **COMPUTER NETWORKS**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions

Section - A

Introduction: Introduction to Computer Network and Physical Layer

Types of Networks: Broadcast and Point-to-point- LAN-MAN-WAN- Wireless networks. Layered

Architecture and Reference Models: Layered architecture- OSI reference model, TCP/IP reference model – Internet Protocol Stack – Network Entities in Layers- Connection oriented and Connection less services,

Section - B

ATM: Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Adaptation Layer, Traffic and Congestion Control, ATM LAN Emulation

Internetworking: Principles of Internetworking, Connectionless Internetworking, The Internet Protocol, Routing Protocol, IPv6 (IPng), ICMPv6

Section - C

Distributed Applications: Abstract Syntax Notation One (ASN.l), Network Management-SNMPV2, Electronic Mail-SMTP and MIME, Uniform Resource Locators (URL) and Universal Resource Identifiers (URI), Hypertext Transfer Protocol (HTTP)

Network Layer and Routing: Network Service model – Datagram and Virtual circuit service-Roting principles Link state routing-distantvector routing-hierarchical routing-multicast routing-IGMP Internet Protocol (IP): IPv4 addressing-routing and forwarding datagram-datagram format-datagram fragmentation- ICMP- DHCP- Network Address Translators (NATs)-IPv6 packet format-transition from IPv4 to IPv6-Mobile IP. Routing in the Internet:

Intra Autonomous System Routing : RIP and OSPF-Inter Autonomous System Routing : BGP – Network layer in ATM.

Section - D

Transport Layer: Transport Layer Services-Relationship between Transport Layer and Network Layer-Transport Layer in Internet-Multiplexing and De multiplexing. Connectionless Transport: UDP-Segment structure-Checksum Connection Oriented Transport: TCP-TCP connection-TCP Segment Structure-Round trip Time estimation and Time out-Reliable Data transfer-Flow control-TCP connection Management. Congestion Control: Causes and costs of congestion- Approaches to congestion control- TCP congestion control: Fairness-TCP delay modeling. ATM ABR congestion control. ATM AAL Layer protocols.

Application Layer and Network Security:

Application Layer Protocols - WWW and HTTP-File transfer Protocol: FTP Commands and Replies – Domain Name System (DNS)- SMTP - SNMP- multimedia. Remote Procedure Call. Security in Computer Networks: Principles of Cryptography-Symmetric key-Public key-authentication protocols -Digital Signatures – Firewa lls. Security in different Layers: Secure E-mail- SSL – IP security.

REFERENCE BOOKS:

1. James F. Kurose and Keith W. Ross, Computer Networking – A Top-Down ApproachFeaturing the Internet, 2/e Pearson Education ,2003
2. S. Keshav, An Engineering Approach to Computer Networking, Pearson education ,2002
3. F. Halsall, Data Communication, Computer Networks and Open Systems, Addison Wesley, 1996
4. Andrew S. Tanenbaum, Computer Networks , 4/e, Pearson education, 2003
5. Behrouz A. Fourouzan ,Data Communications and Networking, 2/e Tat McGrawhill,2000

CC-512-F **DATABASE MANAGEMENT SYSTEM**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions

Section - A

Introduction: An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

Data Modeling using the Entity Relationship Model:

ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Section - B

Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

Data Base Design & Normalization:

Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Section - C

Crash Recovery: Failure classification, recovery concepts based on deferred update, recovery concepts based on intermediate update, shadow paging, check points, on-line backup during database updates, case study from acontemporary database management software

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

Client/Server Databases: Client/Server concepts, approach, Client/Server environments, characterization of Client/Server computing, application partitioning, the two-layer, and the Three layer architecture, Client/Server communication, APIs in Client/Server computing, middleware technology, application developments, design concepts, Client application development tools, and database servers.

Section - D

Integrity, Security and Repositories: Needs for database integrity, integrity constraints, non-procedural integrity constraints, integrity constraints specifications in SQL, introduction to database security mechanism, security specification in SQL, system catalogues

Case Studies:

Oracle: Database Design and Querying Tools; SQL Variations and Extensions; Storage and Indexing; Query Processing and Optimization; Concurrency Control and Recovery; System Architecture; Replication, Distribution and External Data; Database Administration Tools.

IBM DB2: Universal database; Database Design and Querying Tools; SQL Variations and Extensions Storage and Indexing; Query Processing and Optimization; Concurrency Control and Recovery; System Architecture; Replication, Distribution and External Data; Database Administration Tools.

REFERENCE BOOKS:

1. Date C J, “An Introduction To Database System”, Addision Wesley
2. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
3. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley
4. Bipin C. Desai, “An introduction to Database Systems”, Galgotia Publication
5. Rob and Coronel, “Database Systems 5th Edition”,Cengage Learning, New Delhi

CC-513-F **OPERATING SYSTEMS**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions

Section - A

Operating systems objectives, services and functions: Characteristics of Modern Operating Systems, Characteristics of Batch and multiprogramming operating systems. Comparisons between real time systems and time-sharing systems, Operating system services and kernel features.

Section - B

I/O management, I/O devices: Introduction to I/O management, I/O devices, Concepts of threading, Organization
of I/O functions, polling, various modes of data transfer, Hardware/Software interface, I/O buffering.

Disk scheduling policies and processes: Motivation for disk scheduling policies, Introduction to processes management, operating system views of processes, various process transition states, Introduction to Processor scheduling, Introduction to various types of schedulers, Performance criteria in scheduling algorithms, Concept of
FCFS scheduling algorithm, Concept of priority scheduling algorithm like SJF, Concept of non-preemptive and preemptive algorithms, Concept of round-robin scheduling algorithm, , Concept of multi-level queues, feedback queues.

Concurrency control schemes: Various approaches to concurrency control schemes, Concept of prouder/consumer problem, Mutual Exclusion, Concept of mutual exclusion first and second algorithm, Concept of mutual exclusion third algorithm including introduction and characteristics of semaphores, Introduction to Mutual exclusion with semaphores, Introduction to Interprocess Communication and Synchronization, Critical regions and Conditional critical regions in a Semaphore. Introduction to monitors, various modes of monitors, Issues in message implementation, Concept of mutual exclusion with messages.

Dead Locks: Concept of Deadlocks, issues related to its prevention, avoidance and detection/recovery, Concept of deadlock prevention and its avoidance, Concept of deadlock detection and recovery.

Memory Management: Need of Memory management and its requirements, paging, segmentation, concept of fragmentation. Characteristics of contiguous & non-contiguous allocation techniques, Detail study of fragmentation, Virtual memory management, introduction to page-replacement, Need of various page-replacement policies, Concept of FIFO and optimal page-replacement algorithms, Concept of LRU approximation and its page- replacement algorithm, Concept of allocation algorithms.

File management System: Need of file management, its requirements, User's and operating system's view of file system, Concept of file directories and file sharing, Motivation for disk space management, Characteristics of file related system services, Generalization of file services**.**

REFERENCE BOOKS:

1. Peterson and Silberschatz, "Operating System Concepts", Addison-Wesley 4th Edition 1994.
2. Milenkoviac, "Operating Systems Concepts and Design", Tata McGraw-Hill 1992.
3. Charles Crowley, "Operating Systems a Design Oriented Approach", Tata McGraw-Hill 1996.
4. Andrews S. Tanenbaum, "Modern Operating Systems", Pearson Education, 2nd edition 2001.
5. W Richard Stevens, " Linux Network Programming" PHI, Ist Edition 2003

DEPARTMENTAL ELECTIVE (DE)-II

CC-521-F PRINCIPLES OF PROGRAMMING LANGUAGES

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions

Section - A

Introduction: Characteristics of programming Languages, Factors influencing the evolution of programming language, developments in programming methodologies, desirable features and design issues. Programming language processors: Structure and operations of translators, software simulated computer, syntax, semantics, structure, virtual computers, binding and binding time.

Section - B

Elementary and Structured Data Types: Data object variables, constants, data types, elementary data types, declaration, assignment and initialization, enumeration, characters, strings. Structured data type and objects: Specification of data structured types, vectors and arrays, records, variable size data structure, pointers and programmer constructed data structure, Sets files. Sub Program and programmer defined data types: Evolution of data types, abstractions, encapsulations, information hiding, sub programmes, abstract data types.

Section - C

Sequence Control; Implicit and Explicit sequence control, sequence control with within expression and statements, recursive sub programmes, exception handling, co routines, Scheduled sub programmes, concurrent execution. Data control referencing environments, static and dynamic scope, local data local data referencing environment, shared data: Explicit common environment dynamic scope parameter passing mechanism.

Section - D

Storage Management: Major run time requirements, storage management phases, static storage management, stack based, heap based storage management. Syntax and translation: General syntactic criteria, syntactic element of a language, stages in translation, formal syntax and semantics.

Operating and Programming Environment: Batch Processing Environments, Embedded system requirements, Theoretical models, Introduction to Functional Programming, Lambda calculus, Data flow language and Object Oriented language, Comparison in various general and special purpose programming languages e.g. Fortran, C, Pascal, Lisp, etc.

REFERENCE BOOKS:

1. Terrance W Pratt, "Programming Languages: Design and Implementation" PHI
2. Sebesta, "Concept of Programming Language", Addison Wesley
3. E Horowitz, "Programming Languages", 2nd Edition, Addison Wesley
4. "Fundamentals of Programming Languages", Galgotia.
5. Louden, “programming Languages-principles and practice”, Cengage Learning, New Delhi

CC-522-F SYSTEM ANALYSIS AND DESIGN

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions

Section - A

System definition and concepts: Characteristics and types of system, Manual and automated systems

Real-life Business sub-systems: Production, Marketing, Personal, Material, Finance

Systems models types of models: Systems environment and boundaries, Realtime and distributed systems, Basic principles of successful systems

Systems analyst: Role and need of systems analyst, Qualifications and responsibilities ,Systems Analyst as and agent of change,

Various phases of systems development life cycle: Analysis, Design, Development, Implementation, Maintenance

Systems documentation considerations: Principles of systems documentation, Types of documentation and their importance, Enforcing documentation discipline in an organization

Section - B

System Planning: Data and fact gathering techniques: Interviews, Group communication, Presentations, Site visits. Feasibility study and its importance Types of feasibility reports System, Selection plan and proposal Prototyping

Cost-Benefit and analysis: Tools and techniques

Systems Design and modeling: Process modeling, Logical and physical design, Design representation, Systems flowcharts and structured charts, Data flow diagrams, Common diagramming conventions and guidelines using DFD and ERD diagrams. Data Modeling and systems analysis, Designing the internals: Program and Process design, Designing Distributed Systems.

Section - C

Classification of forms: Input/output forms design, User-interface design, Graphical interfaces'

Modular and structured design: Module specifications, Module coupling and cohesion, Top-down and bottom-up design

System Implementation and Maintenance: Planning considerations, Conversion methods, producers and controls, System acceptance Criteria, System evaluation and performance, Testing and validation, Systems qualify Control and assurance, Maintenance activities and issues.

Computer system as an expensive resource: Data and Strong media Procedures and norms for utilization of computer equipment, Audit of computer system usage, Audit trails

Section - D

Types of threats to computer system and control measures: Threat to computer system and control measures, Disaster recovery and contingency planning

Object Oriented Analysis and design: Introduction to Object Oriented Analysis and design life cycle, object modeling: Class Diagrams, Dynamic modeling: state diagram, Dynamic modeling: sequence diagramming.

Case study of the following systems: (I) Inventory Control (II) Railway Reservation System (III) University Management System (IV) Hospital management System

REFERENCE BOOKS:

1. Perry Edwards, “System Analysis and Design”, McGraw Hill 1993.
2. Elias M Awad, “System Analysis and Design”, McGraw Hill 2002.
3. Kendall and Kendall, “System Analysis and Design” Prentice Hall 6th Ed 2005.
4. Joseph S Valacich, J F George, G Hoffer, “Modern System Analysis and Design”, Addison Wesley 1998.
5. Satzinger, ”System Analysis and Design”, Cengage Learning, New Delhi

CC-523-F PARALLEL COMPUTING

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous- MIMD, reduction paradigm.

Hardware taxonomy: Flynn's classifications, Handler's classifications.

Section - B

Software taxonomy: Kung's taxonomy, SPMD.

Abstract parallel computational models: Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one, Sorting network, Interconnection RAMs. Parallelism approaches - data parallelism, control parallelism.

Section - C

Performance Metrices: Laws governing performance measurements. Metrices - speedups, efficiency, utilization, communication overheads, single/multiple program performances, benchmarks.

Parallel Processors: Taxonomy and topology - shared memory mutliprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections. Embeddings and simulations.

Section - D

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

Scheduling and Parallelization: Scheduling parallel programs. Loop scheduling. Parallelization of sequential programs. Parallel programming support environments.

REFERENCE BOOKS:

1. M. J. Quinn. Parallel Computing: Theory and Practice , McGraw Hill, New York, 1994.
2. T. G. Lewis and H. El-Rewini. Introduction to Parallel Computing , Prentice Hall, New Jersey, 1992.
3. T. G. Lewis. Parallel Programming: A Machine-Independent Approach , IEEE Computer Society Press, Los Alamitos, 1994.
4. S.G. Akl, “Design and Analysis of Parallel Algorithms”
5. S.G. Akl, ”Parallel Sorting Algorithm” by Academic Press

DEPARTMENTAL ELECTIVE (DE)-III

CC-515-F COMPUTER GRAPHICS AND ANIMATION

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

Section - B

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

Section - C

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

Section - D

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

REFERENCE BOOKS:

1. "Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.
3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.,
5. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education

OPEN ELECTIVES (OE)-I

CC-524-F **MANAGEMENT INFORMATION SYSTEMS**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Management Information Systems: A Framework: Importance of MIS; Management Information System : A Concept (Management, Information, System); MIS : A Definition (Information Technology and MIS); Nature and Scope of MIS (MIS Characteristics, MIS Functions).

Structure and Classification of MIS : Structure of MIS (MIS Structure Bases on Physical Components, Information System Processing Functions, Decision Support, Levels of Management Activities, Organisational Functions); MIS Classification (Transaction Processing System, Management Information System (MIS), Decision Support System (DSS), Executive Support System, Office Automation Systems (OASs), Business Expert Systems
(BESs); Functional Information System (Financial Information System, Marketing Information System, Production/Manufacturing Information System, Human Resource Information System.

Decision Making and MIS : Decision-Making, Simon's Model of Decision-Making, Types of Decisions (Purpose of Decision-Making, Level of Programmability, Knowledge of Outcomes); Methods for Choosing Among Alternatives (Decision Theory or Decision Analysis, Utility, Decision Tree, Optimization Techniques); Decision Making and MIS.

Section - B

Information and System Concepts : Information : A Definition; Types of Information (Strategic Information, Tactical Information, Operational Information); Information Quality; Dimensions of Information (Economic Dimension, Business Dimension, Technical Dimension); System : Definition (Multiple Meaning of the Word 'System'); Kinds of Systems (Abstract and Physical Systems, Deterministic and Probabilistic Systems, Open and Closed Systems, User-Machine Systems); System Related Concepts (Boundary, Interface and Black Box, System Decomposition, Integration of Sub-Systems); Elements of a System; Human as an Information Processing System (Information Filtering, Human Differences in Information Processing, Implications for Information Systems).

System Development Approaches : System Development Stages (System Investigation, System Analysis, System Design, Construction and Testing, Implementation, Maintenance); System Development Approaches (Waterfall Model, Prototyping, Iterative Enhancement Model, Spiral Model.

Section - C

System Analysis : Introduction; Requirement Determination (Understand the Process, Identify Data Used and Information Generated, Determine Frequency, Timing and Volume, Know the Performance Controls); Strategies for requirement Determination (Interview, Questionnaire, Record Review, Observation); Structured Analysis Tools (Data Flow Diagram, Data Dictionary, Decision Tree and Structured English, Decision Table).

System Design : Design objectives; Conceptual Design (Define Problem, Set System Objectives, Identify constraints, determine information needs, determine information sources, develop various designs, documentation of the conceptual design, report preparation); Design Methods; Detailed System Design (Project Planning and Control, Involve the user, detailed subsystem definition, output/input design, feedback from the user, database design, procedure design, design documentation).

Implementation and Evaluation of MIS : Implementation process (planning and implementation, acquisition of facilities and space planning, MIS Organization and procedure development, User training, acquisition of hardware and software, Creation of forms and database, Testing, Change Over); Hardware and Software Selection (Requirements analysis, Preparation of Tender Specifications, Inviting Tenders, Technical scrutiny and short-listing, Detailed Evaluation, Negotiations and Procurement Decisions, Delivery and Installation, Post Installation Review); Evaluation of MIS (Evaluation Approaches, Evaluation Classes, Product Based MIS

Evaluation, Cost/Benefit Based Evaluation); System Maintenance (Corrective Maintenance, Adaptive Maintenance, Perfective Maintenance).

Section - D

Information System Planning : Information System Planning; Planning Terminology (Mission, Objectives, Strategies, Policies); The Nolan Stage Model; The Four Stage Model of IS Planning (Strategic Planning, Information Requirement Analysis, Resource Allocation, Project Planning); Selecting a Methodology; Information Resource Management (IRM); Organization Structure and Location of MIS.

Information System as an Enabler : Introduction; Changing Concepts of IS (Information as a necessary Evil, Information for General Management Support, Information for decision making, Information as a Strategic Resource); IS as an Enabler (Competitive advantage, Organizational Change, Organizational Learning).

BOOKS RECOMMENDED

1. D. Boddy, A. Boonstra, and G. Kennedy.," Managing Information Systems: An Organizational Perspective", 2nd Edition, Prentice Hall, 2004. D.
2. K.C. Laudon. and J.P. Laudon.," Management Information Systems: Managing the Digital Firm", 8th Edition, Prentice Hall, 2004.
3. E. Turban, E. McLean and J. Wetherbe," Information Technology for Management: Transforming Organizations in the Digital Economy", 4th edition, Wiley, 2004.
4. Mudricm, R G , Ross J E , Clogget J R,"Information system for Modern Management", Printce Hall
5. Effyoz, "Management Information System"Cengage Learning, New Delhi

CC-525-F **UNIX AND SHELL PROGRAMMING**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities , detailed commands to be covered are tail,head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, Cpio

Section - B

Introduction to Shells: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters : Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

Grep : Operation, grep Family, Searching for File Content.

Sed : Scripts, Operation, Addresses, commands, Applications, grep and sed.

Section - C

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

Interactive Korn Shell: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

Korn Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Section - D

Interactive C Shell: C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

File Management: File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

REFERENCE BOOKS:

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.
3. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Beginning shell scripting, E. Foster – Johnson & other, Wile Y- India.

CC-526-F UNIX AND SHELL PROGRAMMING LAB

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

To teach students various unix utilities and shell scripting

1. a) Login to the system
   b) Use the appropriate command to determine your login shell
   c) Use the /etc/passwd file to verify the result of step b.
   d) Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
   e) Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2) a) Write a sed command that deletes the first character in each line in a file.
   b) Write a sed command that deletes the character before the last character in each line in a file.
   c) Write a sed command that swaps the first and second words in each line in a file.

3. a) Pipe your /etc/passwd file to awk, and print out the home directory of each user.
   b) Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
   c) Repeat
   d) Part using awk

4. a) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
   b) Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
   c) Write a shell script that determines the period for which a specified user is working on the system.

5. a) Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the
   lines between the given line numbers.
   b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments
   to it.

6. a) Write a shell script that computes the gross salary of a employee according to the following rules:
   i) If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.
   ii) If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic. The basic salary is entered interactively
   through the key board.
   b) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to
   the power of the second number.

7. a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.
   b) Write shell script that takes a login name as command – line argument and reports when that person logs in
   c) Write a shell script which receives two file names as arguments. It should check whether the two file contents
   are same or not. If they are same then second file should be deleted.

8. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
   b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
   c) Write a shell script to perform the following string operations:
   i) To extract a sub-string from a given string.
   ii) To find the length of a given string.

9. Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:
i) File type
ii) Number of links
iii) Read, write and execute permissions
iv) Time of last access
(Note: Use stat/fstat system calls)

10. Write C programs that simulate the following unix commands:
a) mv
b) cp (Use system calls)

11. Write a C program that simulates ls Command (Use system calls / directory API)

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-527-F **TCP/IP**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

TCP/IP Fundamentals : Overview of OSI and TCP/IP Reference Model, Understand the functioning of TCP/IP layers and protocols. Concept of Physical, Internet & Port addresses .Understanding IP addressing scheme, Overview of emergence of sub networks and CIDR.

ARP and RARP: ARP Packet format, Encapsulation & Operation, Design of a simple ARP Package. RARP Packet Format, Encapsulation and alternative solutions to RARP.

Internet Protocol: Position of IP in the TCP/IP stack, IP Datagram format, Datagram Fragmentation, Options, Checksum, Design of a simple IP Package.

Section - B

Internet Control Message Protocol : Position of ICMP in the network layer, Different types of ICMP Messages, Message format, Error Reporting, Different types of Query Messages, Checksum, Design of a simple ICMP Package.

Internet Group Management Protocol: Group Management, IGMP Messages, IGMP Operation, Encapsulation, Design of a simple IGMP Package.

User Datagram Protocol: Position of UDP in the TCP/IP stack, Process to Process Communication, User Datagram, Checksum, UDP Operation, Use of UDP, Design of a simple UDP Package.

Section - C

Transmission Control Protocol: Difference between host-to-host and process-to-process communication, TCP Services, Flow Control, Silly Window Syndrome, Error Control, TCP Timers, Congestion Control, Options, Checksum, TCP Connection, Use of state transition diagram, TCP operation, Design of a simple TCP Package.
Routing Protocols: Detailed study of Interior and Exterior Routing protocols like RIP,OSPF & BGP, Multicasting and multicast routing protocols like DVMRP,MOSPF,CBT,PIM,MBONE

BOOTP and DHCP: BOOTP Packet format, Operation; DHCP Packet format ,DHCP Transition Diagram.

Domain Name System: Flat Name Space & Hierarchical Name Space, Domain Name Space, Distribution of Name Space, DNS in the Internet, Name Address Resolution, DNS Messages, Types of records used in DNS, Examples of DNS queries and responses, DDNS

TELNET and Rlogin: Concept of local and remote login, Network Virtual Terminal, NVT Character Set, TELNET Options, Option Negotiation, Mode of operation, Some examples of TELNET interaction between the client and the server. Difference between TELNET & Rlogin

.

Section - D

FTP and TFTP : Need of FTP and TFTP and difference between them, Basic model of FTP, FTP connections and command processing, Different types of TFTP messages, TFTP Connection and data transfer.

SMTP and SNMP : SMTP Concept , User agents and mail transfer agents, format of an e-mail, Complete process of sending and receiving mail, Use of Aliases, Mail Transfer Phases, Mail Access Protocols like POP3 and IMAP4.Multipurpose Internet Mail Extension Protocol. Role and details of SNMP, SMI & MIB in network management protocol .

HTTP and HTML : HTTP Transaction , Request and Response Messages, HTTP Headers and simple examples of HTTP request and response messages. World Wide Web, Hypertext and Hypermedia Browser Architecture, Static Documents, Hypertext Markup Language, Dynamic Documents, Common Gateway Interface, Active Documents, HTML Document.

REFERENCE BOOKS:

1. Karanjit and Tim Parker, "*TCP/IP Unleashed*", Ed Pearson Education (2002)
2. Douglas E Comer, "*TCP/IP Principles, Protocols, and Architecture*", Ed PHI (2000)
3. Douglas E Comer, "*TCP/IP Design, Implementation and Internals*", Ed PHI (2000)
4. James F Kurose and Keith W Ross, "*Computer Networking*", Pearson Education (2002)
5. Behrouz A. Forouzan " TCP/IP Protocol Suite", Tata McGRAW-HILL (2004)

CC-517-F **COMPUTER NETWORKS LABORATORY**

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. Introduction to Network Simulator OPNET/NS2.
2. Evaluate Ethernet Delay and Load Statics of Switched Ethernet
3. Comparative investigation on Hub and Switch as Interconnecting Device for verifying performance of LAN with various applications.
4. Evaluate the comparative investigations on the performance issues of switched Ethernet with VLAN based on Email and FTP applications.
5. Evaluate Internet connection choice for PC Network on different Data Rate for WAN based on Web Browsing and Email application.
6. Implementation of Firewall; in a Network.
7. Simulation of Wireless data Network with different with physical characteristics.
8. Implementation of CSMA/CD Protocol and its comparative investigation with ALOHA Protocol.
9. Design and Implementation of Simple Transfer Protocol in C/ C++.
10. Design of substitution Cipher in C/ C++.
11. Design of Transposition Cipher in C/ C++.
12. Design of Public Key Algorithm in C/ C++.

- Students are advised to use **OPNET/NS2** for above listed experiments.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-518-F OPERATING SYSTEMS LABORATORY

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. Simulation of the CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
2. Simulation of MUTEX and SEMAPHORES.
3. Simulation of Bankers Deadlock Avoidance and Prevention algorithms.
4. Implementation of Process Synchronization (Reader-Writer, Sleeping Barber and Dining Philosopher's Problem)
5. Simulation of page Replacement Algorithms a) FIFO b) LRU c) LFU
6. Simulation of paging techniques of memory management.
7. Simulation of file allocation Strategies a) Sequential b) Indexed c) Linked
8. Simulation of file organization techniques a) Single Level Directory b) Two Level c) Hierarchical d) DAG
9. To automate the allocation of IP addresses i.e. to set and configure the DHCP server and DHCP client.
10. To share files and directories between RedHat Linux operating systems i.e. To set and configure the NFS server and NFS clients.
11. To share files and directories between Red Hat Linux and Windows operating systems i.e. To set and configure the samba server.
12. To set and configure the DNS (Domain Name Server).
13. To set and configure the print server and to share printers between Windows and Red Hat Linux operating systems.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

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CC-519-F **DATABASE MANAGEMENT SYSTEM LABORATORY**

L	T	P
-	-	2

Class work Marks : 25
Theory Marks : 25
Total Marks :50

1. Write the queries for Data Definition and Data Manipulation language.
2. Write SQL queries using Logical operators (=,<,>,etc.).
3. Write SQL queries using SQL operators (Between…. AND, IN(List), Like, ISNULL and also with negating expressions).
4. Write SQL query using character, number, date and group functions.
5. Write SQL queries for Relational Algebra (UNION, INTERSECT, and MINUS, etc.).
6. Write SQL queries for extracting data from more than one table (Equi-Join, Non-Equi-Join , Outer Join)
7. Write SQL queries for sub queries, nested queries.
8. Write programs by the use of PL/SQL.
9. Concepts for ROLL BACK, COMMIT & CHECK POINTS.
10. Create VIEWS, CURSORS, and TRIGGRS & write ASSERTIONS.
11. Create FORMS and REPORTS.
12. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
13. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
14. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
15. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
16. i)Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
17. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
18. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
19. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
20. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
21. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
22. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
23. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

* Students are advised to use **Developer 2000/Oracle-10i** or higher version or other latest version for above listed experiments. However depending upon the availability of software's, students may use **Power Builder /SQL SERVER**. Mini Project may also be planned & carried out through out the semester to understand the important various concepts of Database.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

Departmental Elective- III Lab

CC-528-F **NETWORK PROGRAMMING LAB**

L	T	P
-	-	2

Class work Marks : 25
Theory Marks : 25
Total Marks :50

Objective:

To teach students various forms of IPC through Unix and socket Programming

1. Implement the following forms of IPC.
   a) Pipes
   b) FIFO
2. Implement file transfer using Message Queue form of IPC
3. Write a programme to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use senphores to avoid race conditions
4. Design TCP iterative Client and server application to reverse the given input sentence
5. Design TCP iterative Client and server application to reverse the given input sentence
6. Design TCP client and server application to transfer file
7. Design a TCP concurrent server to convert a given text into upper case using multiplexing system call "select"
8. Design a TCP concurrent server to echo given set of sentences using poll functions
9. Design UDP Client and server application to reverse the given input sentence
10. Design UDP Client server to transfer a file
11. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.
12. Design a RPC application to add and subtract a given pair of integers

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-529-F SYMBOLIC LOGIC AND LOGIC PROGRAMMING LABORATORY

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. Study of Propositional Logic
2. Study of First Order Predicate Logic
3. Introduction to prolog programming by a simple prolog program
4. Program to check whether input is alphabet or not
5. Program to find if given number is positive or negative.
6. Write a program to check whether a given person is a member of Club
7. Program in prolog showing mapping that is constructing new structure similar to old one.
8. Program illustrating the use of recursion that is finding sum of first N integers.
9. Program to find the length of a list using 'Recursion' and then using "recursion and Accumulators';
10. Program to find the factorial of a number using recursion and accumulators and cut.
11. Program to calculate average tax illustrating cut-fail combination usage.
12. Program showing use of cut in Terminating a 'generate and test'.
13. Program to play "Tic Tac Toe"
14. Write a program to generate fibonacci series upto the given no.
15. Write a program which accepts any number and checks whether it is prime or not.
16. To describe some basic predicates that are useful for manipulating lists.
17. .Program for Bubble Sort
18. Program for Insertion Sort

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-530-F **COMPUTER GRAPHICS AND ANIMATION LABORATORY**

L	T	P
-	-	2

Class work Marks : 25
Theory Marks : 25
Total Marks :50

1. To draw a line using DDA Algorithm.
2. To draw a line using Bresenham's Algorithm.
3. To draw a circle using trigonometric Algorithm.
4. To draw a circle using Bresenham's Algorithm.
5. To draw a circle using Midpoint Algorithm.
6. To draw an ellipse using Trigonometric Algorithm.
7. To draw an ellipse using Midpoint Algorithm.
8. To translate an object with translation parameters in X and Y directions.
9. To scale an object with scaling factors along X and Y directions.
10. To rotate an object with a certain angle.
11. To perform composite transformations of an object.
12. To clip line segments against windows.
13. Demonstrate the properties of Bezier Curve.
14. Run a sample session on Microsoft Windows including the use of Paintbrush.
15. Implementation of simple graphics animation.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

M.D. UNIVERSITY, ROHTAK

Scheme of studies & Examination
Bachelor of Technology (Computer & Communication Engg.)
Semester-VI
'F' scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1.	CC-611-F	Theory of Computation	3	1	-	4	50	100	-	150	3
2.	CC-612-F	Information Security Systems	3	1	-	4	50	100	-	150	3
3.	CC-613-F	Engineering Economics and Industrial Management	3	1	-	4	50	100	-	150	3
4.	CC-614-F	Software Engineering	3	1	-	4	50	100	-	150	3
5.	CC-615-F	Departmental Elective-IV	3	1	-	4	50	100	-	150	3
6.	CC-616-F	Open Elective-II	3	1	-	4	50	100	-	150	3
7.	CC-617-F	Information Security Systems Laboratory	-	-	4	4	25	-	25	50	3
8.	CC-618-F	Software Engineering Laboratory	-	-	4	4	25	-	25	50	3
9.	CC-619-F	Departmental Elective-IV Lab	-	-	4	4	25	-	25	50	3
		Total	**18**	**6**	**12**	**36**	**375**	**600**	**75**	**1050**	

Note:-

1) **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2) **Assessment of Practical Training-1, undergone at the end of IV semester will be based on seminar, vice-voca, report and certificate of practical training obtained by the students from the industry. According to the performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

CC-611-F THEORY OF COMPUTATION

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Basics in Theory of Computations: Basic concepts of strings, alphabets, languages, Principles of Mathematical Induction.

Languages and Grammars: Construct of a language, Grammar, Chomsky Classification of Formal Languages.

Section - B

Finite Automata: Automata and Applications of Automata Theory, Deterministic and Non-Deterministic FA, Comparison and Equivalence of DFA and NFA.

Regular Expressions: Regular Expression, Equivalence of Regular Expression and Finite Automata, Equivalence of Regular Grammar and Finite Automata, Regular and Non- Regular Languages, Pumping Lemma for Regular Sets

Section - C

Finite State Machines: Moore and Mealy Machines , Equivalence of Moore and Mealy Machines.

Context Free Language: Context Free Grammar, Derivation trees, Context Free Grammar Simplification, Chomsky & Greibach Normal forms, Ambiguities.

Section - D

Pushdown Automata: Definition, Equivalence of PDA by Empty Store and PDA by Final State. Construction of PDA for CFLs.

Turing Machines: Introduction and Turing Machine Model, Computable functions and languages. Techniques for construction of Turing machines, Church's Hypothesis.

Undecidability: Recursive and recursively enumerable languages, Rice theorem, Post's correspondence problem.

REFERENCE BOOKS:

1. J E Hopcroft And J D Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishers 2002.
2. K L P Mishra and N Chandrasekaran, "Theory of Computer Science", Prentice Hall Inc, .2002
3. Harry R Lewis and Chritos H Papadimitriou, "Elements of the Theory of Computation", Pearson Education 2001.
4. Peter Linz, "An Introduction to Formal Languages and Automata", Narosa Publishers 2002.
5. Michael Sipser, "Introduction to the theory of computation ", Cengage Learning, New Delhi

CC-612-F **INFORMATION SECURITY SYSTEMS**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Overview: Services, Mechanisms, and Attacks, the OSI Security Architecture, A Model for Network, Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Stegnography.

Block Ciphers And The Data Encryption Standard: Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation.

Section - B

Introduction To Finite Fields: Groups, Rings, and Fields, Modular Arithmetic, Euclid's Algorithm, Finite Fields of the Form GF(p), Polynomial Arithmetic, Finite Fields of the Form GF(2n).

Advanced Encryption Standard: Evaluation Criteria for AES, The AES Cipher.

Contemporary Symmetric Ciphers: Triple DES, Blowfish, RC5, Characteristics of Advanced Symmetric Block Ciphers, RC4 Stream Cipher.

Confidentiality Using Symmetric Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.

Public-Key Encryption and Hash Functions: Introduction to Number Theory: Prime Numbers, Format's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms.

Section - C

Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA Algorithm, Recommended Reading and Web Site, Key Terms, Review Questions, and Problems.

Key Management and Other Public-Key Cryptosystems: Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs.

Hash Algorithms: MD5 Message Digest Algorithm, Secure Hash Algorithm, RIPEMD-160, and HMAC.

Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

Section - D

Network Security Practice: Authentication Applications: Kerberos, X.509 Authentication Service, Electronic Mail Security: Pretty Good Privacy, S/MIME. IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management, Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

System Security: Intruders: Intruders, Intrusion Detection, Password Management, Malicious Software: Viruses and Related Threats, Virus Countermeasures, Firewalls: Firewall Design Principles, Trusted Systems.

REFERENCE BOOKS:

1. William Stallings, "Cryptography and network Security", Pearson Education 2003.
2. Trappe & Washington, "Introduction to Cryptography with Coding Theory", Prentice-Hall 2001
3. D Stinson, "Cryptography: Theory and Practice", Second Edition Chapman & Hall 2002.
4. Kaufman, Perlman, and Speciner, "Network Security", Prentice-Hall Second Edition 2001.
5. Michael E. Whitman, "Principles of information Security" , Cengage Learning, New Delhi

CC-613-F ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Definition and Scope of Engineering Economics: Concept of revenue and costs, break-even analysis. Law of demand & supply, time value of money, present and future worth methods.

Decision Making: Decision making process, decision making under risk certainty, uncertainty and conflict.

Section - B

Replacement and maintenance Analysis: Types of maintenance, determination of economic life of an asset, replacement of items that fail suddenly and that fail over a period of time.

Methods of depreciation: straight line method, sum-of-the year's digest method, declining balance method, sinking fund method and service output method of depreciation.

Section - C

Inventory control: Introduction and objective of inventory control, purchase model with instantaneous replenishment, model with shortages, price break model, ABC analysis.

Forecasting: Demand forecasting by quantitative and qualitative techniques, applications of demand forecasting.

Make or Buy Decision: Criteria for make or buy, approaches for make or buy decision.

Section - D

Value Engineering Analysis: Value analysis vs. value engineering function, aims and value engineering procedure, advantages & applications.

Linear Programming: Linear programming as a tool of decision making, graphical and Simplex Methods and applications in decision making.

Books Recommended

1. Panaeerselvam, R., (2001), 'Engineering Economics', Prentice Hall of India: New Delhi
2. Grant, E.L., Irevan, W.G. and Leanenworh, R.S., (1976), 'Principles of Engineering Economy'. Ronald Press: New York
3. Jaha, H.A , (2005), 'Operations Research: An Introduction', Prentice-Hall of India: New Delhi
4. Vohra , N.D., (2006), 'Quantitative Techniques in Managerial Decision Making'. Tata McGraw Hill: New Delhi
5. Dougherty, Christopher (2007), 'Introduction to Econometrics', Oxford University Press: New Delhi.

CC-614-F SOFTWARE ENGINEERING

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

Section - B

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Section - C

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Section - D

Metrics for Process and Products: Software Measurement, Metrics for software quality.

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

CASE Tools: Types of CASE tools, advantages and components of CASE tools, Unified Modelling Language (UML)

REFERENCE BOOKS:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
5. Software Engineering- Sommerville, 7th edition, Pearson education.

DEPARTMENTAL ELECTIVE (DE)-IV

CC-620-F DATA MINING AND WAREHOUSING

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Data Mining Concepts, Input, Instances, Attributes and Output, Knowledge Representation & Review of Graph Theory, Lattices, Probability & Statistics

Machine learning concepts and approaches: Supervised Learning Framework, concepts & hypothesis, Training & Learning, Boolean functions and formulae, Monomials, Disjunctive Normal Form & Conjunctive Normal Form, A learning algorithm for monomials

Section- B

Data Preparation: Data Cleaning, Data Integration & Transformation, Data Reduction

Mining Association Rules: Associations, Maximal Frequent & Closed Frequent item sets, Covering Algorithms & Association Rules, Linear Models & Instance-Based Learning, Mining Association Rules from Transactional databases, Mining Association Rules from Relational databases & Warehouses, Correlation analysis & Constraint-based Association Mining.

Section- C

Classification and Prediction: Issues regarding Classification & Prediction, Classification by Decision Tree induction, Bayesian classification, Classification by Back Propagation, k-Nearest Neighbor Classifiers, Genetic algorithms, Rough Set & Fuzzy Set approaches

Cluster Analysis: Types of data in Clustering Analysis, Categorization of Major Clustering methods, Hierarchical methods, Density-based methods, Grid-based methods, Model-based Clustering methods

Section- D

Mining Complex Types of Data: Multidimensional analysis & Descriptive mining of Complex data objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-series & Sequence data, Mining Text databases, Mining World -Wide Web

Data Mining Applications and Trends in Data Mining: Massive Datasets/Text mining, Agent-Based Mining

REFERENCE BOOKS:

1. Jiawei Han and Micheline Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers, 2000 (ISBN: 1-55860-489-8).
2. Ian H. Witten and Eibe Frank, “Data Mining: Practical Machine Learning Tools and Techniques with Java implementations”, Morgan Kaufmann Publishers, San Fransisco, CA (2000).
3. Dorian Pyle, “Data Preparation for Data Mining”, Morgan Kaufmann, (1999)
4. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
5. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley

CC-621-F WIRELESS NETWORKS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Networking Fundamentals: Analog vs. digital data, Data representation, Open Systems Interconnectivity (OSI), Elements of networks (hardware & software), Network topology, Network protocols, Performance Metric

Basis of Wireless Communications: What is mobile computing?,The driving forces to wireless, Advantages vs. disadvantages of wireless, Key elements of wireless networks or systems, Spectrum of mobile technologies – mobile phone 2/3/4 G; palm; pocket PC; tablet, Potential applications of mobile computing, Mobile challenges and limitations, Determinants of successful applications.

Section- B

Overview of Mobile Technology: Types of wireless transmission, Basic components – filter, mixer, amplifier, antenna, Infrared light transmission, Radio frequency transmission – AM / FM / PM, Factors impact radio transmission, Bluetooth technology, IEEE 802.11 a/b/g technology, Comparison and selection of technology

Comparison of Mobile Technologies: Spread spectrum transmission - FHSS (Frequency Hopping Spread Spectrum) - DSSS (Direct Sequence Spread Spectrum), FDMA - Frequency Division Multiple Access, TDMA – Time Division Multiple Access, CDMA – Code Division Multiple Access, Comparison of wireless technology – AMPS, TDMA, GSM, GPRS, UMTS, etc.

Section- C

Wireless Application Protocols (WAP) (Brief):, Bearsers – SMS, USSD, CSD, IS-136, CDMA, CDPD, PDC, etc.,WPD – wireless datagram protocol, WTLS – wireless transport layer security, WTP – wireless session protocol, WSP – Wireless session protocol, WAE - Wireless Application environment, Versions of WAP – WAP 1.1, WAP 1.2, WAP 2.0, WAP network architecture,MAC - Media Access Control, LLC – Logical Link Control,PHY – Physical Layer, IrDA standards and protocol, Bluetooth standards and protocol, 802.11x standards and protocol

Life Cycle of Wireless Network Design: Life Cycle of Network Design – Planning, Analysis, Design, Implementation,Planning – wireless strategic planning,Planning – challenges, threats, and trends,Analysis – current network / systems status (strengths and weaknesses), Analysis – market gap analysis, Analysis – requirements analysis,Analysis – costs / benefits analysis,Implementation – project management,Implementation – change management

Section- D

Peer to Peer (Ad Hoc) Network Design Type of wireless network,P-P network topology,IrDA network design and configuration, Bluetooth network design and configuration, 802.11x network design and configuration, Comparison of P-P network,Implementation related issues

Infrastructure Network Design Mobile wave propagation,Factors impact wave propagation,Propagation models, Site surveying techniques,Optimal network design (number and location of AP),802.11x network design and configuration,Implementation related issues

Wireless Wide Area Network Design (Brief) Design of mesh network,Digital cellular telephony,Mobile gateway, Mobile bridge,Fixed wireless,VPN – virtual private network

REFERENCE BOOKS:

1. Pahlavan and Krishnamurthy," Principles of Wireless Networks", Prentice Hall, 2002.
2. Schiller J," Mobile Communications", Addison-Wesley, 2000.
3. Jerry D. Gibson," TheMobileCommunicationsHandbook", CRCPress, 1999.
4. G.Held," Data over Wireless Networks", McGraw-Hill, 2001
5. Blake, "Wireless Communication Systems", Cengage Learning, New Delhi

CC-622-F HIGH PERFORMANCE COMMUNICATION NETWORKS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Basics of Networks: Telephone ,computer, Cable television and Wireless network, networking principles ,Digitilization: Service intergration ,network services and layered architecture ,traffic characterization and QOS ,networks services :network elements and network mechanisms.

Section- B

Packet Switched Networks: OSI and IP models: Ethernet (IEEE 802.3);token ring(I EEE 802.5),FDD I,DQ DB,fra me relay,: SMDS :Internetworking with SMDS.

Internet and TCP/IP Networks: Overview; internet protocol; TCP and VDP; performance of TCP/IP networks circuit switched networks: SONET; DWDM, Fibre to home, DSL. Intelligent networks, CATV.

Section- C

ATM and Wireless Networks: Main features-adressing, signalling and routing ;ATM header structure-adaptation layer, management and control;BISDN;I nterworking with ATM ,Wireless channe l,link level design, channel access;Network designn and wireless networks.

Section- D

Optical Networks and Switching: Optical links- WDM systems,cross-connects ,optical LAN's, optical paths and networks;TDS and SDS:modular switch designs-Packet switching,distributed,shared,input and output buffers.

REFERENCE BOOKS:

1. Jean warland and Pravin Varaiya, " High Performance Communication Networks ", 2nd
2. Edition, Harcourt and Morgan Kauffman, London, 2000.
3. Leon Gracia, Widjaja, " Communication networks ", Tata McGraw-Hill, New Delhi, 2000.
4. Sumit Kasera, Pankaj Sethi, " ATM Networks ", Tata McGraw-Hill, New Delhi, 2000.
5. Behrouz.a. Forouzan, " Data Communication and Networking ", Tata McGraw-Hill, New Delhi, 2000

OPEN ELECTIVES(OE)-II

CC-626-F DECISION SUPPORT SYSTEMS

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: What is a DSS? The Components of a DSS.

Decision Making: Rational Decisions, Definitions of Rationality, Bounded Rationality and Muddling Through, The Nature of Managers, Appropriate Data Support, Information Processing Models, Group Decision Making

Decisions and Decision Modeling: Types of Decisions, Human Judgment and Decision Making, Modeling Decisions, Components of Decision Models

Section- B

Normative Systems: Normative and Descriptive Approaches, Decision-Analytic Decision Support Systems, Equation-Based and Mixed Systems

Data Component: Characteristics of Information, Databases to Support Decision Making, Database Management Systems, Data Warehouses, Data Mining and Intelligent Agents

Section- C

Model Component: Models, Representation, Methodology, Model Based Management Systems, Access to Models, Understandability of Results, Integrating Models, Sensitivity of a Decision

Intelligence and Decision Support Systems: Programming Reasoning - Backward Chaining Reasoning and Forward Chaining Reasoning, Knowledge Representation for Decision Support Systems, Computational Intelligence for Decision Support, Expert Systems and Artificial Intelligence in Decision Support Systems

Section- D

User Interfaces to Decision Support Systems: Support for Model Construction and Model Analysis, Support for Reasoning about the Problem Structure in Addition to Numerical Calculations, Support for Both Choice and Optimization of Decision Variables, Graphical Interface, The Action Language, Menus

Mail Component: Integration of Mail Management, Implications for DSS Design.

REFERENCE BOOKS:

1. Marakas, G.M. Decision Support Systems in the 21st Century. Prentice Hall, Upper Saddle River, NJ, 2003.
2. Moore, J.H.,and M.G.Chang.Design of Decision Support Systems" Data Base,Vol.12, Nos.1 and 2. Fall, 1980.
3. Power, D. J. Decision support systems: concepts and resources for managers. Westport, Conn., Quorum Books, 2002.
4. Power, D. J. Web-based and model-driven decision support systems: concepts and issues. Proceedings of the Americas Conference on Information Systems, Long Beach, California, 2000.
5. Silver, M. Systems that support decision makers: description and analysis. Chichester ; New York, Wiley, 1991.

CC-627-F **NEURAL NETWORKS AND FUZZY LOGIC**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Neural networks : introduction, neural networks, supervised or unsupervised learning, feed forward network, Hopfield network

Neural network models: neural network models, layers in neural network and their connections. Instar , outstar, weights on connections, threshold function, application- Adaline and madaline

Section- B

Backpropagation: feed forward back propagation network- mapping, layout, training, BPN applications

Learning and training: objectives of learning, Hebb's rule, delta rule, supervised learning, unsupervised networks, learning vector quantizer, associative memory models , one-shot learning, resonance, stability, training and convergence

Section- C

Fuzzy Logic: Introduction, fuzzy sets, fuzzy operations, fuzziness in neural networks, neural trained fuzzy system
BAM- bidirectional associative memory, inputs and outputs, weights and training. FAM-fuzzy associative memory, association, FAM neural networks, encoding

Section- D

Adaptive Resource theory- network for ART , processing in ART
Kohen Self Organizing Map- Competitive learning , lateral inhibition, training law for Kohen network, implementation, applications to pattern recognition

Application of fuzzy Logic: Fuzzy databases and quantification, fuzzy control , designing fuzzy logic controller

REFERENCE BOOKS:

1. Rao, Vallinu B.,and Rao, Hayagriva . Neural networks and fuzzy Logic, second edition, BPB Publication
2. Berkan C. Riza, Trubatch L, Sheldon, Fuzzy Systems design Principlea. IEEE Press , standard publishers distributers
3. Freeman A. James, Skapura M. David- neural networks algorithms, applications and programming Techniques, Pearson Education
4. Introduction to neural N/W : James A. Anderson PHI
5. Neural N/W : Freeman Publisher (Addison Wesley)

CC-628-F PERVASIVE COMPUTING

L T P	
3 1 -	Theory : 100 Marks
	Class work : 50 Marks
	Total : 150 Marks
	Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Pervasive Computing, location privacy in Pervasive Computing, Relationship between Context and privacy, Pervasive Services Discovery (UPnP and JINI) and Personal Server Concept.

Architectures for Pervasive Computing: Software architecture and technology for Pervasive computing, Knowledge of state-of-the-art pervasive computing architectures, Wearable Computing Architectures

Section-B

Pervasive Computing Devices and Operating System: Devices and communications, Biometrics in Pervasive Computing, Operating System issues in Pervasive Computing, Device Connectivity Issues and Protocols, Device Connectivity Security Issues

Section- C

Personal Digital Assistants in Pervasive Computing: PDA Operating Systems, PDA Device Characteristics, PDA Software Components, Standards

Integrating the physical and the virtual world: User Interface in Pervasive Computing, Sensing and actuation; Interactions between humans and pervasive computers, Awareness and Perception

Section- D

Pervasive Systems Development: Tools and techniques used in the development of pervasive computing applications, Designing Distributed Applications with Mobile Code Paradigms, Appreciation of limitations in communication network protocols for pervasive computing, Java in Pervasive Computing, Web-enabled Pervasive
Computing Application Development Issues and Mechanisms

REFERENCE BOOKS:

1. Uwe Hansmann, et al, “Pervasive Computing Handbook “, Second Edition, Springer-Verlag, Berlin, 2003.

2. Burkhardt J., Henn H., Hepper S., Rintdorff K., Schack T,”Pervasive Computing: Technology and Architecture of Mobile Internet applications” , Addison Wesley 2002.

3. The Race to Mobility, R. Kalakota, M. Robinson,” M-business”, McGraw-Hill, 2002

4. Frank Adelstein, S K S Gupta, G G Richard & L Schwiebert: Fundamentals of Mobile and Pervasive Computing, Tata McGraw-Hill, New Delhi, 2005.

5. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff,” Pervasive Computing: Technology and Architecture of Mobile Internet Applications”, Pearson Education, New Delhi, 2004

CC-617-F INFORMATION SECURITY SYSTEM LABORATORY

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

Implementation of the followings in any High Level Programming Language:

1. Transposition Techniques, Stegnography.
2. Block Ciphers And The Data Encryption Standard
3. Random Number Generation.
4. Testing for Primality, The Chinese Remainder Theorem
5. The RSA Algorithm.
6. Elliptic Curve Cryptography.
7. Hash Algorithms: MD5 Message Digest Algorithm, Authentication Protocols.
8. System Security: Firewalls: Firewall Design Principles

Note:- Ten experiments are to be performed. Remaining experiments may either be design and set up by the concerned institution at per the scope of the syllabus.

CC-618-F SOFTWARE ENGINEERING Lab

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. System Requirement Specification (SRS) and related analysis documents Design documents representing the
2. complete design of the software system.

3. Use of CASE Tools

4. Analysis and design for the same problem should be done using Object-Oriented approach.

5. Simple exercises in effort and cost estimation in COCOMO model.

6. Application of COCOMO and Function Point (FP) model for the actual project that has been chosen.

7. Familiarization of SCM tools with some public domain software .

8. Familiarization of some reverse engineering tools available in the public domain.

Note:- Ten experiments are to be performed. Remaining experiments may either be design and set up by the concerned institution at per the scope of the syllabus.

Departmental Elective- IV Lab

CC-623-F Data Mining and Data Warehousing Lab

L	T	P
-	-	2

Class work Marks : 25
Theory Marks : 25
Total Marks :50

Students are required to perform practical's in Oracle/MS SQL Server and *STATISTICA Data Miner*

1. Building a Database Design using ER Modeling and Normalization Techniques
2. Implementation of functions ,Procedures, Triggers and Cursors
3. Load Data from heterogenous sources including text files into a predefined warehouse schema.
4. Design a data mart for a bank to store the credit history of customers in a bank .Use this credit profiling to process future loan applications.
5. Feature Selection and Variable Filtering (for very large data sets)
6. Association Mining in large data sets
7. Interactive Drill-Down, Roll up, Slice and Dice operations
8. Generalized EM & *k*-Means Cluster Analysis
9. Generalized Additive Models (GAM)
10. General Classification and Regression Trees (GTrees)
11. General CHAID (Chi-square Automatic Interaction Detection) Models
12. Interactive Classification and Regression Trees
13. Goodness of Fit Computations

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-624-F **Wireless Networks Lab**

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. Design an 802.11 network of mesh topology, using set of suitable inputs check the performance parameters like: Battery Energy consumed, Bit error Rate, Busy, Signal to Noise ratio, Throughput, Utilization.
2. Design Wireless network using Carrier Sensing Multiple Access Technique, Check the performance parameters like: Channel Throughput, Signal to Noise Ratio etc.
3. Design a Project having two scenarios: (a) Star Topology Wireless Network using rapid configuration method. (b) Ring Topology Wireless network also using rapid configuration method, Compare the performance parameters like: End to End Delay for data, Traffic Received, Queue size etc.
4. Design a Star shaped Wireless network, and suggest a way to configure a Physical layer of selected nodes.
5. Design a Project having two scenarios: (a) Bus Topology Wireless Network (b) Ring Topology Wireless network, make use of the Web Reporting to compare the result of two different scenarios.
6. Design a Wireless model having four networks which are ten meters apart from each other, connected to each other wirelessly and are susceptible to delays etc.
7. Create a radio network and observe variations in the quality of received signal that results from radio noise at the receiving node in a dynamic network topology.
8. Designs a Star shaped Wireless topology and suggest a suitable way to import traffic.
9. Performance analysis of wireless mesh backhaul network with 802.11 a/b/g technologies using OPNET.
10. Performance analysis of wireless mesh backhaul network with 802.11 a/p technologies using OPNET.
11. Development of a new CDMA based MAC on top of 802.11p Physical layer

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

CC-625-F High Performance Communication Networks Lab

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

1. Design an 802.3 network of mesh topology, using set of suitable inputs check the performance parameters like: Battery Energy consumed, Bit error Rate, Busy, Signal to Noise ratio, Throughput, Utilization.
2. Design 802.5 network using Carrier Sensing Multiple Access Technique, Check the performance parameters like: Channel Throughput, Signal to Noise Ratio etc.
3. Design a Project having two scenarios: (a) Star Topology 802.3 Network using rapid configuration method. (b) Ring Topology 802.3 network also using rapid configuration method, Compare the performance parameters like: End to End Delay for data, Traffic Received, Queue size etc.
4. Design a Star shaped ATM network, and suggest a way to configure a Physical layer of selected nodes.
5. Design a Project having two scenarios: (a) Bus Topology TCP/IP Network (b) Ring Topology TCP/IP network, make use of the Web Reporting to compare the result of two different scenarios.
6. Design a Wireless model having four networks, which are ten meters apart from each other, connected to each other wirelessly and are susceptible to delays etc.
7. Create a radio network and observe variations in the quality of received signal that results from radio noise at the receiving node in a dynamic network topology.
8. Designs a Frame Relay Network and suggest a suitable way to import traffic.
9. Performance analysis of FDDI networks using OPNET.
10. Performance analysis of Enterprise Network with ATM using OPNET.
11. Emulate LAN over ATM using OPNET.

Note:- Ten experiments are to be performed, out of which atleast seven experiments should be performed from above list remaining three experiments may either be performed from the above list in design and set up by the concerned institution at per the scope of the syllabus.

M.D. UNIVERSITY, ROHTAK

Scheme of studies & Examination
Bachelor of Technology (Computer & Communication Engg.)
Semester-VII
'F' scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1.	CC-711-F	System simulation & Modeling	3	1	-	4	50	100	-	150	3
2.	CC-712-F	Compiler Design	3	1	-	4	50	100	-	150	3
3.	CC-713-F	Departmental Elective-V	3	1	-	4	50	100	-	150	3
4.	CC-714-F	Departmental Elective-VI	3	1	-	4	50	100	-	150	3
5.	CC-715-F	Departmental Elective-VII	3	1	-	4	50	100	-	150	3
6.	CC-716-F	Open Elective-III	3	1	-	4	50	100	-	150	3
7.	CC-717-F	System simulation & Modeling Laboratory	-	-	4	4	25	-	25	50	3
8.	CC-718-F	Industrial Practical Training	-	-	4	4	25	-	25	50	3
9.	CC-719-F	Project(Phase-I)	-	-	4	4	25	-	25	50	3
		Total	**18**	**6**	**12**	**36**	**375**	**600**	**75**	**1050**	

Note:-

1) **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2) **Assessment of Practical Training-1, undergone at the end of IV semester will be based on seminar, vice-voca, report and certificate of practical training obtained by the students from the industry. According to the performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

CC-711-F SYSTEM SIMULATION AND MODELING

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction to Simulation: System & System Environment, Components of a System, Discrete and Continuous Systems, Model of a System and Types of Models,. Discrete Event System Simulation, Advantages and Disadvantages of Simulation, Areas of Application

Techniques of Simulation: Monte Carlo Method, Types of System Simulations, Real Time Simulation, Stochastic Variables, Discrete Probability Functions

Section- B

General Principles: Concepts in Discrete Event Simulation, Event Scheduling /Time Advance Algorithm, List Processing, Using Dynamic Allocation & Linked List

Simulation Software: History of Simulation Software, Selection of Simulation Software, Simulation in C++, GPSS, Simulations Packages, Trends in simulation Software.

Statistical Models in Simulation: Useful Statistical Models, Discrete Distribution s, Continuous Distributions, Poisson Process, Empirical Distributions

Section- C

Queuing Models: Characteristics of Queuing systems, Queuing Notation, Long Run Measures of performance of Queuing Systems, Steady State Behavior of infinite Population Markovian Models, Steady State Behavior of finite Population Models, Networks of Queues

Random Number Generation: Properties of Random Numbers, Generation of Pseudo-Random Numbers, Techniques for Generating Random Numbers, Tests for Random Numbers, Inverse transform Techniques, Convolution Methods, and Acceptance –Rejection Techniques

Section- D

Input Modeling: Data Collection, Identifying the Distribution with Data, Parameter Estimation, Chi – Square Test, Selecting Input Models with Data

Verification & Validation of simulation Modeling: Model Building, Verification & Validation, Verification of simulation Models, Calibration & Validation of Models**.**

REFERENCE BOOKS:

1. Gordon G, “System Simulation”, PHI 2nd Edition 1998.
2. Deo Narsingh, “System Simulation with Digital Computers”, PHI, New Delhi 1993.
3. K S Trivedi, “Probability and Statistics with Reliability, Queuing and Computer Science Application”, PHI
4. Subranranian, K R V and Sudaresan R Kadayam, “System simulation: Introduction to GPSS”, CBS, New Delhi 1993.
5. W Feller, ”An introduction to Probability Theory and its Applications,” Val 182, Wiley Eastern Ltd. ND.

CC-712-F **COMPILER DESIGN**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.

Lexical analysis: interface with input, parser and symbol table, token, lexeme and patterns. Difficulties in lexical analysis. Error reporting. Implementation. Regular definition, Transition diagrams, LEX.

Section- B

Syntax analysis: CFGs, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC.

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions.

Section- C

Type checking: type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions.

Run time system: storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation.

Section- D

Intermediate code generation: intermediate representations, translation of declarations, assignments, control flow, boolean expressions and procedure calls. Implementation issues.

Code generation and instruction selection: issues, basic blocks and flow graphs, register allocation, code generation, dag representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine.

REFERENCE BOOKS:

1. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Addison-Wesley, 1988.
2. Fischer and R. LeBlanc. Crafting a Compiler , Benjamin Cummings, 1991..
3. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
4. Appel. Modern Compiler Implementation in C: Basic Design , Cambridge Press.
5. Fraser and Hanson. A Retargetable C Compiler: Design and Implementation , Addison-Wesley.

DEPARTMENTAL ELECTIVE (DE)-V

CC-720-F **NATURAL LANGUAGE PROCESSING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax. Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.

Section- B

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top-Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

Section- C

Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

Computational morphology: Lemmatization, Part-of-Speech Tagging, Finite-State Analysis.

Section- D

Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

Application of NLP: Intelligent Work Processors: Machine Translation; User Interfaces; Man-Machine Interfaces: Natural language Querying Tutoring and Authoring Systems. Speech Recognition Commercial use of NLP.

REFERENCE BOOKS:

1. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, NLP: A Paninian Perspective, Prentice Hall, New Delhi
2. James Allen, Natural Language Understanding, 2/e, Pearson Education, 2003
3. D. Jurafsky, J. H. Martin, Speech and Language Processing, Pearson Education, 2002
4. L.M. Ivansca, S. C. Shapiro, Natural Language Processing and Language Representation
5. T. Winograd, Language as a Cognitive Process, Addison-Wesley

CC-721-F INFORMATION RETRIEVAL SYSTEMS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Information Retrieval System Capabilities: Search, Browse, Miscellaneous

Section- B

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

Section- C

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

Section- D

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext. Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

REFERENCE BOOKS:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
3. Modern Information Retrival By Yates Pearson Education.
4. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.
5. Soumen Charabarti, Mining the Web, Morgan-Kaufmann

CC-722-F DATA COMPRESSION

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Compression Techniques: Loss less compression, Lossy Compression, Measures of prefonnance, Modeling and coding, Mathematical *Preliminaries* for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

Section- B

Huffman coding: The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression.

Section- C

Arithmetic Coding: Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF),Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to- front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression.

Section- D

Mathematical Preliminaries for Lossy Coding: Distortion criteria, Models, Scalar Ouantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

Vector Quantization: Advantages of Vector Quantization *over* Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers. Structured *Vector* Quantizers.

REFERENCE BOOKS:

1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers
2. Mark Nelson," The data compression book: Featuring fast, efficient data compression techniques in C", M&T Books
3. Mark Nelson and Jean-loup Gailly," The Data Compression Book 2nd edition ",M&T Books
4. D. Hankerson, P. D. Johnson, and G. A. Harris, Introduction to Information Theory and Data Compression
5. G. Held and T. R. Marshall, Data and Image Compression: Tools and Techniques.

DEPARTMENTAL ELECTIVE (DE)-VI

CC-723-F SOFTWARE QUALITY ENGINEERING

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Defining Software Quality, Software Quality Attributes and Specification, Cost of Quality, Defects, Faults, Failures, Defect Rate and Reliability, Defect Prevention, Reduction, and Containment, Overview of Different Types of Software Review, Introduction to Measurement and Inspection Process, Documents and Metrics.

Section- B

Software Quality Metrics: Product Quality Metrics: Defect Density, Customer Problems Metric, Customer Satisfaction Metrics, Function Points, In-Process Quality Metrics: Defect Arrival Pattern, Phase-Based Defect Removal Pattern, Defect Removal Effectiveness, Metrics for Software Maintenance: Backlog Management Index, Fix Response Time, Fix Quality, Software Quality Indicators.

Section- C

Software Quality Management and Models: Modeling Process, Software Reliability Models: The Rayleigh Model, Exponential Distribution and Software Reliability Growth Models, Software Reliability Allocation Models, Criteria for Model Evaluation, Software Quality Assessment Models: Hierarchical Model of Software Quality Assessment.

Section- D

Software Quality Assurance: Quality Planning and Control, Quality Improvement Process, Evolution of Software Quality Assurance (SQA), Major SQA Activities, Major SQA Issues, Zero Defect Software, SQA Techniques, Statistical Quality Assurance, Total Quality Management, Quality Standards and Processes.

Software Verification, Validation & Testing: Verification and Validation, Evolutionary Nature of Verification and Validation, Impracticality of Testing all Data and Paths, Proof of Correctness, Software Testing, Functional, Structural and Error-Oriented Analysis & Testing, Static and Dynamic Testing Tools, Characteristics of Modern Testing Tools.

REFERENCE BOOKS:

1. Jeff Tian, Software Quality Engineering (SQE), Wiley-Interscience, 2005; ISBN 0-471-71345-7.
2. Metrics and Models in Software Quality Engineering, Stephen H. Kan, Addison-Wesley (2002), ISBN: 0201729156
3. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
4. Software Engineering- Sommerville, 7th edition, Pearson education.
5. Gillies, "Software Quality Theory and Practice" , Cengage Learning, New Delhi

CC-724-F BIOINFORMATICS

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Fundamentals of Bioinformatics and Information Technology: Introduction to bioinformatics, Experimental sources of biological data, publicly available databases, Operating systems - including Windows and UNIX, Networks - including the Intranets and the Internet

Analytical Science and Bioinformatics: High throughput sequencing, Experimental determination of protein structures, Gene expression monitoring, Proteomics, Metabolomics

Section- B

Applications and Commercial Aspects of Bioinformatics: Visualization of sequence data, Drug discovery, Genetic basis of disease, Personalized medicine and gene-based diagnostics, Legal, ethical and commercial ramifications of bioinformatics

Section- C

Bioinformatics: The Business of Research: Research methodology (focusing on computer-based research), Case studies of areas of current bioinformatics research Routes to research funding (academic and commercial), Bioinformatics business models, Intellectual property rights

Software Engineering in Bioinformatics: Advanced programming using Java and BioJava, Advanced database work using SQL, Interfacings programs with databases. Data interoperability using XML

Section- D

Principles of Programming and Databases using Java and SQL: Fundamental principles of programming, Object-oriented programming using Java, Introduction to databases using Oracle.

PERL programming: Data manipulation, File maintenance, Pipelining Packaging and interfacing system facilities

REFERENCE BOOKS:

1. Bioinformatics for Dummies, Jean-Michel Claverie, Cedric Notredame, 2003, John Wiley & Sons
2. Bioinformatics Computing, Bryan P. Bergeron, 2002, Prentice Hall
3. Introduction to Bioinformatics, Teresa Attwood, David Parry-Smith, 2001, Prentice Hall
4. Beginning Perl for Bioinformatics, James Tisdall,2001, O'reilly
5. Developing Computer Skills , Cynthia Gibas, PerJambeck, 2001, O'reilly

CC-725-F MULTIMEDIA DATABASES

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: An introduction to Object-oriented Databases; Multidimensional Data Structures: k-d Trees, Point Quadtrees, The MX-Quadtree, R-Trees, comparison of Different Data Structures

Image Databases: Raw Images, Compressed Image Representations, Image Processing: Segmentation, Similarity-Based Retrieval, Alternative Image DB Paradigms, Representing Image DBs with Relations, Representing Image DBs with R-Trees, Retrieving Images By Spatial Layout, Implementations

Section- B

Text/Document Databases: Precision and Recall, Stop Lists, Word Stems, and Frequency Tables, Latent Semantic
Indexing, TV-Trees, Other Retrieval Techniques

Video Databases: Organizing Content of a Single Video, Querying Content of Video Libraries, Video Segmentation, video Standards

Audio Databases: A General Model of Audio Data, Capturing Audio Content through Discrete Transformation, Indexing Audio Data

Section- C

Multimedia Databases: Design and Architecture of a Multimedia Database, Organizing Multimedia Data Based on The Principle of Uniformity, Media Abstractions, Query Languages for Retrieving Multimedia Data, Indexing SMDSs with Enhanced Inverted Indices, Query Relaxation/Expansion

Creating Distributed Multimedia Presentations: Objects in Multimedia Presentations, Specifying Multimedia Documents with Temporal Constraints, Efficient Solution of Temporal Presentation Constraints, Spatial Constraints.

Section- D

Spatial Concepts and Data Models: Models of spatial information, Design extending the ER model with spatial concepts, Extending the ER model pictograms, Object oriented data model with UML.

Spatial Query Languages: Extending the SQL for spatial data, Examples of queries that emphasis spatial data, Object relational schema examples querries.

REFERENCE BOOKS:

1. Principles of Multimedia Database Systems, V.S. Subrahmanian, Elseveir(Morgan Kauffman).
2. Spatial Databases, Shashi Shekhar, Sanjiv Chawla, Pearson Education.
3. Multimedia Databases: An object relational approach, Lynne Dunckley, Pearson Education.
4. Multimedia Database Systems, Prabhakaram, Springer.
5. Maheshwari Jain, “DBMS: Complete Practical Approach”, Firewall Media, New Delhi

DEPARTMENTAL ELECTIVE (DE)-VII

CC-726-F **SOFTWARE PROJECT MANAGEMENT**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

Section- B

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Model based software architectures: A Management perspective and technical perspective.

Work Flows of the process: Software process workflows, Iteration workflows,

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Section- C

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building blocks, The Project Environment.

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Section- D

Tailoring the Process: Process discriminants.

Standards: Introduction to standards - ISO 9002 and ISO 9003 - Quality system development, SO 9000 standard for software, Understanding ISO 900-3 clauses, SEI model – capability Maturity model - Five levels Bootstrap method, Implementing ISO 9000, Analysis the Quality system, Documenting & Auditing quality system, ISO 9000 registration process & Accreditation System, Total Quality Management

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

REFERENCE BOOKS:

1. Software Project Management, Walker Royce: Pearson Education, 2005.
2. Software Engineering – Somerv ille (Addison Wesley)
3. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
4. Software Project Management, Joel Henry, Pearson Education.
5. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

CC-727-F **MOBILE COMPUTING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

Section- B

(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

Section- C

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

Section- D

Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, pushbased mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

REFERENCE BOOKS:

1. Jochen Schiller,"Mobile Communications",*Addison-Wesley*. (Chapters 4,7,9,10,11),second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", *Wiley*, 2002, ISBN 0471419028. (Chapters 11, 15, 17, 26 and 27)
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004,
4. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
5. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", *Springer*, second edition, 2003.

CC-728-F HIGH SPEED AND BROADBAND NETWORKS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Introduction to modern networking trends

Optical networking: principles and challenges; evolution of optical networks, wavelength routed network, wavelength division multiplexing (WDM) network technology, sub-carrier multiplexing optical networks. Enabling technologies: optical transmitter, optical fiber, optical receivers, optical amplifiers, optical switching elements, optical cross-connects (OXC), multiplexers/demultiplexers, wavelength routers, optical wavelength converters, WDM network test beds. Network architecture, IP over WDM.

Section- B

Broadcast optical networks: single and multiple hop networks, channel sharing and multi-casting, shared channel multicasting network-GEMNET, performance evaluation for unicast and multicast traffic, experimental WDM networks.

Wavelength routed networks: virtual topology design, routing and wavelength assignment, circuit switched and packet switched approaches, performance evaluation.

Section- C

Reconfiguration in WDM network, network control and management, network optimization, design considerations. Multi wavelength star and ring networks. Photonic switching, optical TDM (OTDM) and optical CDMA (O-CDMA) networks, next generation optical networks

Section- D

Protection and Restoration on WDM networks
Network Flow problem and Simulations
Control and signaling schemes in WDM networks
GMPLS
Deeper Protection/Restoration issues on WDM networks
Optical Network Security

REFERENCE BOOKS:

1. Multiwavelength Optical Networks: A Layered Approach by Thomas E. Stern, Krishna Bala
2. Optical Networking by Debra Cameron, Wiley, December 2001
3. Optical Network Design and Implementation by Vivek Alwayn, Cisco Press
4. DWDM Network Designs and Engineering Solutions by Ashwin Gumaste, Tony Antony, Tony Anthony, Pearson Education.
5. Mohan Gurusamy, C. Siva Murthy, WDM Technology and Issues in WDM Optical Networks, Prentice Hall Publications, 2002.

CC-729-F EMBEDDED SYSTEMS

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Introduction to Embedded Systems, Classification of Embedded System, Concept of Embedded System Design, and Design challenges: Processor technology, IC technology, Design technology and Trade-offs.

Section- B

Hardware and Software Co-Design in Embedded System: Buffers and latches, Reset circuit, Chip, Timers and counters and watch dog timers, Universal asynchronous receiver, transmitter (UART), Pulse width modulators, LCD controllers. Development of fixed ROM image, Code generation tools: Emulator, Simulator and Debugger.

Embedded software development environments: Challenges and issues in embedded software development, Device drivers, System calls and Programming languages: assembly languages, high level languages like C/C++, Source Code Engineering tool for Embedded C/C++. Introduction to Embedded Java.

Section- C

Processor and memory Organization: Custom Single Purpose Processor Hardware, General-Purpose Processor: Introduction, Basic Architecture, Application Specific Instruction Set Processors (ASIPS), Microcontrollers and Digital Signal Processors. Memory writes ability, Storage performance, Tradeoff s, Memory hierarchy and cache.

Section- D

Software Engineering in Embedded System: Software Engineering practice in the embedded Software development process. Software models used in designing, Unified Modeling language, Software maintenance.

Embedded Operating System: Operating system services, Embedded Operating system, Real Time Operating system, Interrupt latency and Response time, Interrupts Routines in RTOS, Introduction to VxWorks and Micro OS-II

REFERENCE BOOKS:

1. David E Simon, “An Embedded Software Primer”, 1/e Pearson Education 1999.

2. Raj Kamal, “Embedded Systems”, Tata McGraw-Hill 2004.

3. Bruce Powel Douglass, “Real-Time UML: Developing Efficient Objects for Embedded Systems”, 2/E Addison Wesley 2004.

4. Muhammad Ali Mazidi, Janice Gillispie Mazidi, “The 8051 Micro controller & Embedded Systems”, 1/e Pearson Education 2000.

5. Valvano, “Embedded Microcomputer Systems : A real time interfacing”,Cengage Learning, New Delhi

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CC-730-F NETWORK MANAGEMENT SYSTEMS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Data communications and Network Management Overview: Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

SNMPV1 Network Management: Organization and Information and Information Models.

Section- B

Managed network: Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

SNMPv1 Network Management: Communication and Functional Models. The SNMP Communication Model, Functional model

SNMP Management: SNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1

Section- C

SNMP Management: RMON: What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

Telecommunications Management Network: Why TMN?, Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, Implementation Issues.

Section- D

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

Web-Based Management: NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network: , Future Directions

REFERENCE BOOKS:

1. Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.
2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
3. Distributed Network Management, Paul, John Wiley.
4. William Stallings, Data and Computer Communication, Prentice Hall of India
5. Satzinger, Jackson and Burd, “Object oriented analysis and design with the unified process ”,Cengage Learning, New Delhi

CC-731-F OBJECT-ORIENTED ANALYSIS AND DESIGN

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction:Introduction to the Design Process Improvement Model ,Six-Level Improvement Process

UML Structural Modeling Techniques:Basic Building Blocks -- objects and classes,Structural Composition Techniques,Design Scaling Issues

Section- B

UML Behavioral Modeling Techniques :Use Case Diagrams,Interaction Diagrams,Event State Diagrams,Action Matrices,Business Lifecycle Diagrams,Activity Diagrams,Collaboration Diagrams,Rule Specification Techniques,Behavioral Model-Based Reference Architecture for Component Specification

Design Standards :Architectural Patterns ,Design Patterns,Program Patterns,Behavioral Design Units,Component-Based Specification Techniques

Section- C

DPIM - Level One:Requirements Analysis Techniques,Ad Hoc Approach to Design

DPIM - Levels Two, Three and Four:Design Methodology Deployment

Section- D

Design Quality Control Properties and Analysis Techniques:Automatic Convertability,Traceability,Standardizability (Design Units/Reusable Patterns) Modularity,Changeability (Change Management),Scalability of Design,Reliability

DPIM - Levels Five and Six:Design Process Management and Optimization,Design Metric Models,Testing Maturity Model,Extended V-Model ,Testing Techniques

REFERENCE BOOKS:

1. Grady Booch, “Object Oriented Analysis and Design Principles ”, Addison Wesley Professional
2. Case Studies in Object-Oriented Analysis and Design by Edward Yourdon, Carl Argila
3. Ali Bahrami, “Object Oriented System Development “, McGraw Hill.
4. J. Rambaugh, etal,, “Object Oriented Modeling and Design”
5. Andrew Haigh, “Object Oriented Analysis and Design”, Tata McGrawHill

CC-717-F SYSTEM SIMULATION AND MODELING LABORATORY

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

Implementation of the followings Simulation problems in GPSS or any High Level Programming Language

1. Computer Generation of Random Numbers.
2. Testing Random Number Generators.
3. Monte-Carlo Simulation.
4. Simulation of Single Server Queuing System.
5. Simulation of Two-Server Queuing System.
6. Simulation of Inventory System.
7. Simulation of Telephone System.

Note:- Ten experiments are to be performed. Remaining experiments may either be design and set up by the concerned institution at per the scope of the syllabus.

CC-719-F **MAJOR PROJECT (Phase-I)**

L	T	P
-	-	2

Class work Marks	: 25
Theory Marks	: 25
Total Marks	:50

This is project work (phase-I) to be done by the students in the seventh semester. The evaluation committee of the department shall evaluate the project for 2 credits assigned for the project. A report of the project work carried out during the semester shall be submitted at the end of the semester approved by the project guide and HOD.

M.D. UNIVERSITY, ROHTAK

Scheme of studies & Examination
Bachelor of Technology (Computer & Communication Engg.)
Semester-VIII
'F' scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
			L	T	P	Total		Theory	Practical		
1.	CC-811-F	Departmental Elective-VIII	3	1	-	4	50	100	-	150	3
2.	CC-812-F	Departmental Elective-IX	3	1	-	4	50	100	-	150	3
3.	CC-813-F	Departmental Elective-X	3	1	-	4	50	100	-	150	3
4.	CC-814-F	Departmental Elective-XI	3	1	-	4	50	100	-	150	3
5.	CC-815-F	Open Elective-IV	3	1	-	4	50	100	-	150	3
6.	CC-816-F	Project(Phase-II)	-	-	4	4	100	-	50	150	3
		Total	**15**	**5**	**4**	**24**	**275**	**500**	**25**	**900**	

Note:-

1) **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2) **Assessment of Practical Training-1, undergone at the end of IV semester will be based on seminar, vice-voca, report and certificate of practical training obtained by the students from the industry. According to the performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

DEPARTMENTAL ELECTIVE (DE)-VIII

CC-817-F SYSTEM DESIGN USING IC'S

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Designing with Analog ICs : Designing with op-amps: Zero-crossing detector, logarithmic amplifier, VCO, Instrumentation amplifier with 1 and 3 op-amps, Designing of timing circuits with IC 555 for sinking & sourcing load current, Design of temperature controllers and small DC motor speed controllers using ICs such as SL 440, CA 3059, PA 436.

Section- B

Combinational logic design : Using gates: lowest chip count design, comparison of reduced SOP & POS forms for given function, gate sharing in multi-function minimization, Using MSI chips and programmable devices: review of multiplexers, Shannon's expansion theorem, mux trees, type 1 & type 2 mux-based design techniques, proper choice of select inputs using K-maps for lowest chip count, designing with decoders using additional AND/NAND gates for lowest chip count, implementation of logic functions using PROM, PAL and PLA.

Section- C

Synchronous sequential logic design : Moore, Mealy & mixed synchronous state machines, analysis of synchronous sequential circuits, timing diagrams, state diagrams, present state / next state tables, state reduction, state assignment, design steps leading to next-state decoders, use of D, JK, T flip-flops, conversion of one flip-flop type to another, Design of single- and multi- mode counters.

Section- D

Designing with shift registers: universal diagrams, design of counters and sequence generators using shift registers.

Introduction to Controller Design : Concept of multi-input state m/c, flow and MDS diagrams, design concept and steps, use of combinational MSI/LSI circuits and programmable devices in the design of sequential multiple-input state machines.

REFERENCE BOOKS:

1. William Fletcher, "An Engineering Approach to Digital Design", Morris Mano.
2. "Digital Design" N.K. Jog -- "Logic Circuits", other books by S.R. Bhutiyani, Hill & Peterson, Samuel Lee, Gayakwad, etc...
3. Austin Texas, "Design-For-Test For Digital IC's and Embedded Core Systems", Pearson Education
4. Palnitkar, "Design Verification with e", Pearson Education
5. Crouch, "Design-For-Test For Digital IC's and Embedded Core Systems", Pearson Education

CC-818-F INTERNETWORKING TECHNOLOGIES

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction to Internetworking: Internetworking Basics, Ethernet Protocol, FDDI Protocol, Token Ring / IEEE 802.5 Protocol

WAN Technologies: Frame Relay, High Speed Serial Interface, Point to Point Protocol, Switched Multimegabit Data Service, Asymmetric Digital Subscriber Line, Synchronous Data Link Control & Derivatives

Section- B

Bridging and Switching: ATM Switching, Data-Link Switching, LAN Switching, Tag Switching, Mixed Media Bridging, Source- Route Bridging, Transparent Bridging

Network Protocols: Apple Talk, DECNET, SNA, NETWARE, Banyan Vines, Xerox Network Systems

Section- C

Routing Protocols: Border Gateway, IGRP & Enhanced IGRP, Internet Protocol Multicast, NLSP, OSPF, Resource Reservation Protocol, RIP, Simple Multicast Routing Protocol

Network Management Basics: IBM Network Management, Remote Monitoring, Simple Network Management Protocol

Section- D

Introduction to Troubleshooting: Symptoms, Problems and Solutions, General Problem Solving Models, Preparing for Network Failures, Use of Some Troubleshooting Tools

Handling Troubleshooting for Some Important Components: Ethernet, FDDI and Token Ring, TCP/IP, Apple talk, DECNET, SNA & NETWARE, Banyan Vines & XNS, Serial lines & WAN Connections, Bridging and Switching.

REFERENCE BOOKS:

1. Merilee Ford, "Internetworking Technologies Handbook", Ed Cisco Press (2004)
2. Kevin Downes, "Internetworking Troubleshooting Handbook", Ed Cisco Press (2004)
3. Andrew S. Tanenbaum, "Computer Networks", Pearson Education 4th Edition (2003)
4. James F Kurose and Keith W Ross, "Computer Networking", Pearson Education (2002)
5. Nance, "Introduction to Networking", PHI 4th Edition (2002)

CC-819-F MODELING AND SIMULATION OF NETWORKS

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Delay Models in Data Networks: Queuing Models, M/M/1, M/M/m, M/M/ M/M/m/m and other Markov System, M/G/1 System, Networks of Transmission Lines, Time Reversibility, Networks of Queues.

Section- B

Multi-access Communication: Slotted Multi-access and the Aloha System, Splitting Algorithms, Carrier Sensing, Multi-access Reservations, Packet Radio Networks.

Section- C

Routing in Data Networks: Introduction, Network Algorithms and Shortest Path Routing, Broadcasting Routing Information: Coping with Link Failures, Flow models, Optimal Routing, and Topological Design, Characterization of Optimal Routing, Feasible Direction Methods for Optimal Routing, Projection Methods for Optimum Routing, Routing in the Codex Network.

Section- D

Flow Control: Introduction, Window Flow Control, Rate Control Schemes, Overview of Flow Control Practice, Rate Adjustment Algorithms.

REFERENCE BOOKS:

1. Dimitri Bertsekas and Robert Gallager, “Data Networks," 2nd edition, Prentice Hall of India, 2003.
2. William Stallings, “High-Speed Networks and Internets,” Pearson Education (Asia) Pte. Ltd, 2004.
3. J. Walrand and P. Varaya,”High Performance Communication Networks,” 2nd edition, Harcourt India Pte. Ltd. & Morgan Kaufman, 2000.
4. Jean Walrand, Kallol Bagchi,George W. Zobrist “Network performance modeling and simulation”, Gordon and Breach Science Publishers, Inc. Newark, NJ, USA
5. Nader F. Mir, “Computer and Communication”, Prentice hall.

DEPARTMENTAL ELECTIVE (DE)-IX

CC-820-F **SOFTWARE TESTING METHODOLOGIES**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section- A

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Section- B

Transaction Flow Testing: Transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

Section- C

Paths, Path products and Regular expressions: Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: Overview, decision tables, path expressions, kv charts, specifications.

Section- D

State, State Graphs and Transition testing: State graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. Usage of JMeter and Winrunner tools for functional / Regression testing, creation of test script for unattended testing, synchronization of test case, Rapid testing, Performance testing of a data base application and HTTP connection for website access.

REFERENCE BOOKS:

1. Software testing techniques - Baris Beizer, Dreamtech, second edition.
2. The craft of software testing - Brian Marick, Pearson Education.
3. Software Testing Techniques – SPD(Oreille)
4. Software Testing in the Real World – Edward Kit, Pearson.
5. Software Testing – Dorothy Graham, Cengage Learning, New Delhi

CC-821-F DISTRIBUTED SYSTEMS

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges.

System Models: Architectural models, Fundamental Models

Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, and termination detection.

Section - B

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

Section – C

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.

Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent.

Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Section – D

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault -tolerant services, highly available services, Transactions with replicated data.

Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to wave & traversal algorithms, Election algorithm.

CORBA Case Study: CORBA RMI, CORBA services.

REFERENCE BOOKS:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Ed.
3. Gerald Tel, "Distributed Algorithms", Cambridge University Press
4. Nancy Lynch, Distributed Algorithms, Morgan Kaufmann.
5. Andrew S. Tanenbaum, Distributed Operating Systems, ACM Press.

CC—822-F OPTICAL NETWORK DESIGN AND IMPLEMENTATION

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction to optical networking : Introduction to SONET/SDH, SONET/SDH, Legacy SONET/SDH Multiservice Provisioning Platforms, Improving SONET/SDH Bandwidth Efficiency, Qos, SONET/SDH Encapsulation of Ethernet, Packet Ring Technologies, Provisioning, Signaling, Dense Wavelength-Division Multiplexing, The future of SONET/SDH and DWDM.

Time Division Multiplexing : An Introduction to Time-Division Multiplexing, Analog Signal Processing, Analog Signal Generation and Reception, Analog To Digital Conversion - Filtering, Sampling, Quantization, M-law and A-Law coding, Echo Cancellation ; Circuit-Switched Networks - TDM Signaling, Channel –Associated Signaling(CAS), Common Channel Signaling(CCS) ; The T-carrier - DS Framing, DS Multiframing, D4 Superframe, D5 extended Superframe, SF and ESF Alarms ; The E-carrier - E1 Frame Alignment Signal, E1 Multiframe Alignment Signal, E1 CRC Error Checking, E1 Errors and Alarms ; ISDN – ISDN BRI, ISDN PRI, ISDN Layer 1, ISDN Layer 2, ISDN Link Layer Establishment ; ISDN Layer 3 - ISDN Call setup ; TDM networks Elements - Repeaters, CSU/DSU, Digital Access and Cross-Connect Systems, Channel Bank ;

Section - B

Fiber –Optic Technologies : A brief history of Fiber Optics Communications; Fiber Optic Applications; Performance Considerations; Optical –Power Measurement ,Glass fiber-optic cable, Plastic fiber optic cable, Plastic clad Silica Fiber-optic cable, Multifiber cable systems; Propagation Modes , Fiber-optic Characteristics :- Interference, Linear Characteristics - Attenuation, Chromatic Dispersion, Polarization Mode Dispersion, Optical Signal to noise Ratio ; Non-linear characteristics - Self –phase Modulation, Cross- phase Modulation, Four-Wave Mixing, Stimulating Raman Scattering, Stimulating brillouin Scattering;

Section - C

Wavelength Division Multiplexing : The need for Wavelength-Division Multiplexing; Wavelength-Division Multiplexing; Wavelength-Division Multiplexing Fundamentals; Unidirectional WDM; Bidirectional WDM :- Band-Separation Method, Interleaving –Filter Method, Circulator Method, Channel spacing; Coarse Wavelength- Division Multiplexing; Dense wavelength-Division Multiplexing; The ITU Grid; Wavelength-Division Multiplexing Systems; Transmitter :- Distributed Feedback Lasers, Distributed Bragg Reflector, Tunable Lasers,
Vertical Cavity Surface Emitting Lasers; Chirp; Modulators; Optical Multiplexers and Multiplexers :- Thin film Filter, Fiber Bragg Grating, Arrayed Waveguide, Fabry Perot Cavity Filter, Acousto Optical Tunable Filter, Mach- Zehnder Interferometers, Couplers,circulators and Isolators, Periodic Filters, Frequency Slicers and Interleavers; Amplifiers :- Erbium-Doped Fiber Amplifiers, Raman fiber Amplifiers, Hybrid and Distributed Amplifiers;Optical-fiber Media; Receivers

Section - D

WDM characteristics and Impairments to transmission : Forward Error Correction, In-band FEC, Out-of-band FEC; Optical Signal-to-noise ratio :- OSNR Calculations; Dispersion and Compensation in WDM :- Chromatic Dispersion, Chromatic Dispersion Compensation, Polarization Mode Dispersion, Polarization Mode Dispersion Compensation;

REFERENCE BOOKS:

1. Alwayn," Optical Network Design and Implementation", Cisco Press.
2. Dutton, "Understanding Optical Communication", IBM publications.
3. Myneav, "Optical Fibre Technology", Pearson.
4. G.P. Agarwal, " Fiber optic communication systems ", 2nd Edition, John Wiley & Sons, New York.
5. G.Keiser, " Optical fiber communication ", Systems, McGraw-Hill, New York, 2000.

CC-823-F DATABASE ADMINISTRATION

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction to Database and SQL Server 2000: Client/Server Concept, Types of Databases, Relational Vs. Flat File Database. Background of SQL Server, Versions of SQL Server and Clients Supported by SQL Server. Installation & Configuring SQL Server: Installing SQL Server 2000, Unattended Installations, SQL Server Services. Configuring SQL Server Network Protocol Settings. Installing SQL Server Clients.

SQL Server Tools and Utilities: Managing SQL Server with Enterprise Manager, Query Analyser, SQL Server Groups. Tools Menu, Action Menu. Introduction to Transact – SQL(T-SQL)

Section - B

Managing Database: Creating Database, Database File Placement(RAID 0, RAID 1 RAID 5), Creating Database using T-SQL and Enterprise Manager. Altering, Renaming, Dropping Database. Creating Objects in Database: Tables, Views, Constraints, Indexes.

Section - C

Managing Security: Understanding Security Modes, Windows Authentication Modes, Mixed Mode, SQL Server Logins, Windows Logins, Fixed Server Logins, Creating Users, Database Roles, (Grant,Revoke ,Deny) N-Tier Security. Database Backups and Restore: Copying Database with Copy Database Wizard. SQL Database Backup

Modes(Full, Differential, Transactional Log Backup). Backing Up of the Database. Restoring Database. DTS: Its meaning, DTS Packages. DTS Storage and Designer.

Section - D

SQL Server Agent: Configuring Understanding Alerts, Jobs and Events. Creating Jobs: Multi Server Jobs, Creating, Editing and Deleting of Jobs. SQL Server and IIS. Understanding the Static Page and Dynamic Pages of the Internet. Internet Database Connector. Replication and Performance Optimization: Overview of Replication. Installing. Types of Replication : Merge Replication, Snapshot Replication, Transactional Replication. Using Windows System Monitor: Monitor with SQL Profiler and Query Analyser. Optimization Techniques: Queries and Stored Procedure, Proper Indexing, Locks and Defragmentation.

REFERENCE BOOKS:

1. David C. Kreines, Brian Laskey,"Oracle Database Administration ", Oreilly Media
2. Craig S Mullins," Database Administration: The Complete Guide to Practices and Procedures",Powell's books
3. Claire Rajan," Oracle 10g Database Administrator II: Backup/recovery & Network Administration",by Thomson
4. Sam R. Alapati," Expert Oracle9*i* Database Administration", Apress
5. Dan wood, "Begininig SQL Server 2005 Administration", Wrox publication

CC-824-F HUMAN COMPUTER INTERACTION

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Interactive systems: defining the problem; identifying tasks, activities and processes; defining usability; examples.

The human user: channels of communication (visual, auditory, manipulative); theories of human memory (short-term, long- term); variability and limits of human capabilities; theories of human reasoning and problem-solving; tasks and strategies.

Section - B

Interactive devices and technologies: survey of current technologies (keyboards, pointing devices, displays, hardcopy, audio, etc); use of graphics, color, presentation of text.

Section - C

Design of interfaces: system structure (applications, interface management, presentation or device control); design methods; dialogue design and styles (menu systems, direct manipulation, command languages, etc); windowing systems; new ideas in interfaces (eg virtual reality). Tools and techniques for the construction of interfaces.

Section - D

Evaluation: testing and evaluating interactive systems; evaluation and the design process; methods of evaluation (observation and monitoring, interviews and questionnaires, benchmarking, etc).

Organizational issues: users and their environment; design methodologies (user participation); cooperative work; case studies.

REFERENCE BOOKS:

1. Dix, Finlay, Aboud & Beale, Human-Computer Interaction. Pearson Prentice-Hall, 2004
2. Preece et al, Human-Computer Interaction, Addison-Wesley, 1994.
3. Hans-Jorg Bullinger," Human-Computer Interaction", Lawrence Erlbaum Associates, Publishers
4. Jakob Nielsen," Advances in Human-computer Interaction",Ablex Publishing Corporation
5. Thomas S. Huang," Real-Time Vision for Human-Computer Interaction", Springer

CC-825-F **GRID COMPUTING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: Fundamentals of Grid Computing, Types of resources, Problems in Grid computing, Global Distribution System for Grid Computing, Ecosystem of the Grid, Early Grid Activities

Grid Architecture: Autonomic Computing, Service-Oriented Architecture and Grid, Semantic Grids, Merging the Grid Services Architecture with the Web Services Architecture. Open Grid Services Architecture (OGSA)

Section - B

Grid Computing in Business: Grid-specializing vendors and niche vendors, Grid resource providers, Departmental grids, Enterprise grids, Partner grids, Open grids.

Grid software components: Management components, Donor software, Submission software, Distributed grid management, Schedulers, Enrolling and installing grid software, Logging onto the grid, Logging onto the grid

Section - C

Grid administration: Planning, Installation, Managing enrollment of donors and users, Certificate authority, Resource management, Data sharing

Section - D

Technical and Management Issues: Building and selling Grid business case, transition period management, Role of consultants, Risk Mitigation, Organizational security requirements and firewalls, Authorization scalability and federations

Case Study: The MCNC Enterprise Grid: Service, Customers, Financials, Resources, Location

REFERENCE BOOKS:

1. Joshy Joseph, Craig Fellenstein," Grid Computing", IBM Press
2. Maozhen Li, Mark Baker," The Grid: Core Technologies", John Wiley & Son's Publisher
3. Ahmar Abbas ,"Grid Computing: Practical guide to technology and applications",Publisher:Charles River Media
4. Pawel Plaszczak and Rich Wellner," Grid Computing: The Savvy Manager's Guide Morgan Kaufmann Publishers
5. Marios D. Dikaiakos," Grid Computing", Spinger

DEPARTMENTAL ELECTIVE (DE)-XI

CC-826-F ADVANCED OPERATING SYSTEM

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Process Synchronization: Concepts of processes, Concurrent processes, Threads, Overview of different classical synchronization problems, Monitors, Communicating Sequential processes (CSP)

Process deadlocks: Introduction, causes of deadlocks, Deadlock handling strategies, Models of deadlock

Section - B

Distributed operating system: Architectures, Issues in Distributed operating systems, Limitations of Distributed Systems, Lamport's logical clock, Global states, Chandy-Lampert's global state recording algorithm,Basic concepts of Distributed Mutual Exclusion ,Lamport's Algorithm, Ricart-Agrawala Algorithm; Basic concepts of Distributed deadlock detection, Distributed File system, Architecture, Design issues, SUN Network File system Basic concepts of Distributed shared memory, Basic concepts of Distrubuted Scheduling, Load balancing, Load sharing.

Distributed OS Implementation: Models, Naming, Process migration, Remote Procedure Calls.

Section - C

Multiprocessor System: Motivation, Classification, Multiprocessor Interconnections, Types, Multiprocessor OS functions & requirements; Design & Implementation Issue; Introduction to parallel programming; Multiprocessor Synchronization.

Performance, Coprocessors, RISC & data flow: Introduction, Necessity, Measures, Techniques, Bottlenecks & Saturation, Feedback loops, Coprocessors, RISC.

Section - D

Analytic Modeling: Introductions, Queuing Theory, Markov Process.

Security & Protection: Security-threats & goals, Penetration attempts, Security Policies & mechanisms, Authentication, Protections & access control Formal models of protection, Cryptography, worms & viruses.

BOOK REFERENCE BOOKS:

S RECOMMENDED

1. Operating Systems Concepts & design - Milan Milenkovic, TMH
2. Operating System - H.M. Deitel, Pearsons.
3. Advanced Concepts in operating Systems - Mukesh Singhal and Niranjan G. Shivaratri, TMH
4. Maurice Bach, Design of the Unix Operating Systems, Prentice-Hall of India.
5. Charles Crowley, Operating System: A Design-oriented Approach, Irwin Publishing

CC-827-F **VIRTUAL REALITY**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Introduction: The three I's of virtual reality, commercial VR technology and the five classic components of a VR system.

Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces.

Section - B

Output Devices: Graphics displays, sound displays & haptic feedback.

Modeling: Geometric modeling, kinematics modeling, physical modeling, behaviour modeling, model management.

Section - C

Human Factors: Methodology and terminology, user performance studies, VR health and safety issues.

Applications: Medical applications, military applications, robotics applications.

Section - D

VR Programming-I: Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes.

VR Programming-II: 3D Sprites, animated 3D sprites, particle systems.

REFERENCE BOOKS:

1. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc.,
2. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier(Morgan Kaufmann).
3. 3D Modeling and surfacing, Bill Fleming, Elsevier(Morgan Kauffman).
4. 3D Game Engine Design, David H.Eberly, Elsevier.
5. Virtual Reality Systems, John Vince, Pearson Education.

CC-828-F **IT FOR FORENSIC SCIENCE**

L T P	
3 1 -	Theory : 100 Marks Class work : 50 Marks Total : 150 Marks Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Overview: Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric, System Security.

Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, uthentication Methods, Authentication Protocols, Matching Biometric Samples, Verification by humans.

Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification, Positive and Negative of Biometrics.

Section - B

Matching: Two kinds of errors, Score distribution, Estimating Errors from Data, Error Rate of Match Engines, Definition of FAR and FRR.

Introduction to Information Hiding: Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography

Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

Section - C

A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques.

Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.

Section - D

Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.

Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

REFERENCE BOOKS:

1. Katzendbisser, Petitcolas, " Information Hiding Techniques for Steganography and Digital
2. Watermarking", Artech House.
3. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and
4. Watermarking 2/e", Elsevier
5. Bolle, Connell et. al., "Guide to Biometrics", Sp ringer

INTER DISCPILINARY (ID)-IV

CC-829-F **COMPUTER VISION**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, Matching. Edge detection, Gradient based operators, Morphological operators, Spatial operators for edge detection. Thinning, Region growing, region shrinking, Labeling of connected components.

Binary Machine Vision: Thresholding, Segmentation, Connected component labeling, Hierarchal segmentation, Spatial clustering, Split & merge, Rule-based Segmentation, Motion-based segmentation.

Section - B

Area Extraction: Concepts, Data-structures, Edge, Line-Linking, Hough transform, Line fitting, Curve fitting (Least-square fitting).

Region Analysis: Region properties, External points, Spatial moments, Mixed spatial gray-level moments, Boundary analysis: Signature properties, Shape numbers.

Section - C

Facet Model Recognition: Labeling lines, Understanding line drawings, Classification of shapes by labeling of edges, Recognition of shapes, Consisting labeling problem, Back-tracking, Perspective Projective geometry, Inverse perspective Projection, Photogrammetry – from 2D to 3D, Image matching : Intensity matching of ID signals, Matching of 2D image, Hierarchical image matching.

Object Models and Matching: 2D representation, Global vs. Local features.

Section - D

General Frame Works for Matching: Distance relational approach, Ordered- structural matching, View class matching, and Models database organization.

General Frame Works: Distance –relational approach, Ordered –Structural matching, View class matching, Models database organization.

Knowledge Based Vision: Knowledge representation, Control-strategies, Information integration.

REFERENCE BOOKS:

1. David A. Forsyth, Jean Ponce, *"Computer Vision: A Modern Approach"*
2. R. Jain, R. Kasturi, and B. G. Schunk, *"Machine Vision"*, McGraw-Hill.
3. Milan Sonka,Vaclav Hlavac, Roger Boyle, "*Image Processing, Analysis, and Machine Vision*" Thomson Learning
4. Robert Haralick and Linda Shapiro, *"Computer and Robot Vision"*, Vol I, II, Addison-Wesley, 1993.
5. Ballard and C.M.Brown, Computer Vision , Prentice Hall, Englewood Cliffs

CC-830-F **SOFT COMPUTING**

L T P
3 1 -

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Artificial Neural Networks: Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning – Back propagation networks - Kohnen's self organizing networks - Hopfield network.

Fuzzy Systems: Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition -Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.

Section - B

Neuro - Fuzzy Modeling: Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls -Simulated annealing – Evolutionary computation.

Section - C

Genetic Algorithms: Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction -Rank method - Rank space method.

Section - D

Softcomputing And Conventional AI: AI search algorithm - Predicate calculus - Rules of interference – Semantic networks -Frames - Objects - Hybrid models - Applications.

REFERENCE BOOKS:

1. Jang J.S.R., Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Prentice Hall 1998.
2. Laurene Fausett, "Fundamentals of Neural Networks", Prentice Hall, 1994.
3. George J. Klir and Bo Yuan, "Fuzzy sets and Fuzzy Logic", Prentice Hall, USA 1995.
4. N. J. Nelsson, "Artificial Intelligence - A New Synthesis", Harcourt Asia Ltd., 1998.
5. D.E. Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y, 1989.

CC-831-F **IMAGE PROCESSING AND PATTERN RECOGNITION**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

Note: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt5 questions out of 9 questions.

Section - A

Fundamentals: Introduction, Origin, Areas of Image Processing, steps in Digital Image Processing, Components of Image Processing System, Image Sensing, Sampling and Quantization, Neighboring of Pixels, Mathematical and perceptual preliminaries, human visual system model, image signal representation, imaging system specification building image quality, role of computers, image date formats.

Section - B

Image Enhancement and Restoration: Enhancement: Spatial Filtering, Introduction to Fourier Transformation, Restoration: A model of the Image Degradation/ Restoration Process.

Hardware architecture for image processing: Color image signal representation, color system transformations, extension of processing techniques to color domain.

Section - C

Wavelets: Wavelet functions, Wavelet transformations in one and two dimensions, fast wavelet transform.

Image Compression: Image compression models, Error free compression, Lossy compression. Image segmentation: Line detection, Edge Detection, Edge linking and Boundary Detection, and Region-based segmentation

Section - D

Object Recognition: Pattern and pattern classes, Recognition based on Decision Theoretic Methods, Structural Methods.

Applications of Image processing: Picture data archival, machine vision, medical image processing.

REFERENCE BOOKS:

1. Pratt, W. K. Digital Image Processing, John Wiley, N. Y.
2. Jain, A.K. fundamentals of Digital Image Processing, Englewood Cliffs, Prentice Hall
3. Rosenfield, A and Kak, A.C., Picture Processing, Academic Press N. Y.
4. Digital Image Processing by Rafael C. Gonzalez, Richard E. Woods
5. Digital Image Processing by Kenneth R. Castleman