B. Ed. (Information and Communication Technology Education)

1. Course Title:	MIS, Data Structure and Recent Technologies	4: Full marks:	75 + 25
2. Course No:	ICTED 322(IVth Paper)	5. Pass marks:	35% + 40%
3. Nature of Course:	Theory and Practical	6. Period per week:	6 + 3

Course Description

The management information system deals with the introduction to information system, different basic components of information system, idea of conceptual and detailed system design, implementation, evaluation, and maintenance of information system, application of database management, design and implementation of management information system, process for system design methodology, and finally the basic concepts of internet and intranet. The course in data structure and algorithm lays out the principles data structuring, use of stack, queue, list, linked lists, recursion, trees, sorting, searching, graphs and their implementations. This course also deals with the comparison of different algorithms. It also introduces the concept of computer science teaching methodology.

General Objectives

(a) to introduce and apply the knowledge of computer based information systems.
(b) to help designing and setting up complex information system to the student.
(c) to provide fundamental knowledge on date structure designing and implementation for storing information.
(d) to provide the knowledge of various algorithms used in computer science.

S.N	Objectives	Contents	Periods	Teaching Strategies	References	Evaluation
1.	-Understand basic of information system and Planning.	**Introduction to Information System** Definition, Sources and types of IS, Manual and Computer based IS, Planning and Design, Feasibility Assessment, Implementation.	8	-Lecture -Discussion	Kanter Chap 1	-Short question -Multiple choice
2.	-Identify and understand	**Basic components of Information**	8	-Lecture	Kanter Chap 2	-Short

	different hardware and communication system. used in the information system.	**system** Hardware, Multi-Protocol Networks, Communication media, Standard User Interface, Markup Languages.		-Practical -Discussion -Group work		question -Long question -Multiple choice
3.	-Define a problem and constraints.	**Conceptual and Detailed System Design** Definition of Problems, Constraints, Alternative Design.	5	-Lecture -Discussion -Group work	Kanter Chap 4, 6	-Short question -Multiple choice
4.	-Implementation, control, and maintenance of information system.	**Implementation, Evaluation, and Maintenance of IS** Implementation Alternatives, Plan for Implementation, Evaluation of implemented system, Control and Maintenance.	7	-Lecture -Practical -Discussion -Group work	Kanter Chap 7	-Short question -Long question -Multiple choice
5.	-Implement the database concept in the design of information system.	**Parts of Information System** Database Management System, Management Information System, Automation Process, Geographical Information System.	7	-Lecture -Practical -Discussion -Group work	Rajaraman Chap 13	-Short question -Long question -Multiple choice
6.	-Design and implementation of management information system	**Management of Information system** MIS Planning, Design, and Implementation.	7	-Lecture -Discussion -Group work	Kanter Chap 9	-Short question -Long question -Multiple choice
7.	-Understand and implement the steps in the design	**System Design Methodology** Check list methodology, Process Oriented Methodology, Application	9	-Lecture -Practical -Discussion	Kanter Chap 7	-Short question -Long

		Generation, Structured Design.		-Group work		question -Multiple choice
8.	-Get familiarization of internet system and addressing techniques.	**Internet and Intranet** Internet versus Intranet, TCP/IP standard, E-mail, Internet and external, SMTP/POP, WWW and Hypermedia, Proxy servers and their configuration, Resource sharing, IP addressing, routing and sub-netting.	8	-Lecture -Discussion -Group work	Internet	-Short question -Long question -Multiple choice
9.	-Understand the basics of data structure.	**Introduction to Data Structure** Concept of data structure, Abstract date type Implementation of data structure.	4	-Lecture -Practical -Discussion -Group work	Baluja Chap 1	-Short question -Multiple choice
10.	-Use of stack and its implementation.	**The Stack** Definition, Stack as an ADT, POP and PUSH operation, Stack application: Evaluation of Infix Postfix and prefix expressions.	6	-Lecture -Practical -Discussion -Group work	Baluja Chap 4	-Short question -Long question -Multiple choice
11.	-Understand and implement queue.	**Queue** Definition, Queue as an ADT, Primitive operations in queue Linear and circular queue and their application, Enqueue and Dequeue, Priority queue.	6	-Lecture -Practical -Discussion -Group work	Baluja Chap 5	-Short question -Multiple choice
12.	-Understand and implement list.	**List** Definition , static and dynamic list structure , array implementation of lists, Queues as list.	7	-Lecture -Practical -Discussion -Group work	Baluja Chap 6	-Short question -Long question -Multiple choice

13.	-Understand and implement linked list.	**Linked lists** Definition and link list as an ADT, Dynamic implementation, basic operations in `linked list: node insertion deletion, insertion and deletion after and before nodes linked stacks and Queues, Doubly linked lists and its advantages.	7	-Lecture -Practical -Discussion -Group work	Baluja Chap 6	-Short question -Long question -Multiple choice
14.	-Understand and implement recursive process with reference to Tower-of- Hanoi problem.	**Recursion** Principle of recursion, Comparison between recursion and iteration, recursion example, TOH and Fibonacci sequence, Applications of recursion, Search tree.	6	-Lecture -Practical -Discussion -Group work	Baluja Chap 2	-Short question -Long question -Multiple choice
15.	-Understand the concept and implementation of tree structure.	**Trees** Concept and definitions, basic operation in binary tree, tree search and insertion /deletions binary tree traversals (preorder , post order and in order) tree height level and depth , balanced trees : AVL balanced trees , Balancing algorithm, The Huffman algorithm , Game tree, B- Tree.	7	-Lecture -Practical -Discussion -Group work	Baluja Chap 7	-Short question -Long question -Multiple choice
16.	-Identify different sorting algorithm and implement it.	**Sorting** Internal and external sort, Insertion and selection sort, Exchange sort Bubble and quick sort Merge and Radix sort Shall sort , Binary sort, Heap sort as priority queue Efficiency of sorting big 'O' notation.	7	-Lecture -Practical -Discussion -Group work	Baluja Chap 8	Short question -Long question -Multiple Choice
17.	-Identify different searching algorithm and	**Searching** Search technique essential of search,	7	-Lecture -Practical	Baluja Chap 8	Short question

	implement it.	Sequential search binary search, tree search General search, Tree search , General search tree , Hashing : Hash function and hash tables , collision resolution technique , Efficiency comparisons of different search technique.		-Discussion -Group work		-Long question -Multiple Choice
18.	-Represent and implement graphs.	**Graphs** Representation and applications, Graphs as an ADT , Transitive closure, Wars hall's algorithm , Graphs types, Graphs traversal and spanning forests, Kruskal 's and Round Robin algorithms, Shortest-path algorithm , Greedy algorithm , Dijkstra's Algorithm	7	-Lecture -Practical -Discussion -Group work	Baluja Chap 9	Short question -Long question -Multiple Choice
19.	-Understand different types of algorithms and demonstrate its applications.	**Algorithms** Deterministic and no-deterministic algorithm, Divide and conquer algorithm, Series and Parallel algorithm, Heuristic and Approximate algorithm	5	-Lecture -Discussion -Group work	Internet	Short question -Multiple Choice
20.	-Get familiar with multimedia techniques and its applications.	**Multimedia** Introduction to Multimedia, Component of Multimedia: Text, Graphics, Audio, Video and Animation, Application of Multimedia	8	-Lecture -Discussion -Group work	Ralf Chap 1, 2, 17	Short question -Multiple Choice
21.	-State artificial intelligence techniques and perform its applications.	**Artificial Intelligence** Concept of AI, Component of AI, Uses of AI, Ethical Aspect of AI	6	-Lecture -Discussion -Group work	Russel chap 1	Short question -Multiple Choice
22.	-Identify contemporary technology and perform	**Contemporary Technology** e- Business, e-Learning, e-Governances,	8	-Lecture -Discussion	Internet	Short question

	its applications.	e-Medicine, Virtual Reality, Robotics		-Group work		-Multiple Choice

Laboratory:

The laboratory exercises shall include projects on designing of Information system using Object oriented methodology. Case study shall be included. The data structure and algorithms should include following laboratory exercises based on C or C++:

1. Implementations of stack.
2. Implementations of linear and circular queues.
3. Solutions of TOH and Fibonacci Recursion.
4. Implementation of linked list: singly and double linked.
5. Implementation of trees : AVL tree Balancing of ALV
6. Implementation of merge sort.
7. Implementation of search: sequential tree and binary.
8. Implementation of Graphs: Graph traversals.
9. Implementation of hashing.
10. Implementation of heap.

Text Book:

1. J. Kanter, "*Managing with Information System*", Fourth edition, Prentice Hall of India Limited, 2004.
2. V. Rajaraman, "*Analysis and design of Information Systems"*, Prentice Hall of India, 1998.
3. G. S. Baluja, "*Data structure Through C, A Practical Approach"*, Dhanpat Rai & Co., 2003.
4. Ralf Steinmetz and Klara Nahrstedt, "*Multimedia: Computation, Communication and Application"*, Pearson Education, 2001.
5. Russel and Peter Norvig, "*Artificial Intelligence, A Modern Approach"*, Pearson Education, 2006.

Reference Books:

1. Y Langsam , MJ , Augenstein and A.M , Tanenbaum Data Structures using C and C++ , Prentice Hall India.
2. G.W Rowe , Introduction to Data Structure and Algroithms with C and C++ , prentice Hall India .
3. Lippman, S.B., Lajoie. J., *C++ Primer*, 3rd Ed., Addison Wesley, 1998.
4. Eckel, B., *Thinking in C++*, 2nd Edition, Prentice Hall, 2000.
5. R.L Kruse, B.P. Leung, C.L. Tondo, data structure and program Design in C Prentice-Hall India.
6. G. Brassard and P. Bratley fundamentals of Algroithms, Prentice-Hall India.