



# MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by 0NAAC & Affiliated to Anna University)

Rasipuram - 637 408, Namakkal Dist., Tamil Nadu



## MUST KNOW CONCEPTS

MKC

MDE

2021-22

Course Code & Course Name : 19MDC12-Medical Expert Systems

Year/Sem/Sec : III/V / -

S. No.	Term	Notation (Symbol)	Concept/Definition/Meaning/Units/Equation/Expression	Units
<b>Unit –I- Introduction To Data Structures</b>				
1.	Data structure	-	Data structure defines a way of organizing all data items	-
2.	Static data structures	-	A data structure formed when the number of data items are known in advance is referred as static data structure or fixed size data structure.	-
3.	Dynamic data structures	-	A data structure formed when the number of data items are not known in advance is known as dynamic data structure or variable size data structure.	-
4.	Types of data structures	-	<ul style="list-style-type: none"><li>• Linear data structure</li><li>• Non-linear data structure</li></ul>	-
5.	Linear data structure	-	Linear data structures are data structures having a linear relationship between its adjacent elements	-
6.	Non-linear data structure	-	Non-linear data structures are data structures that don't have a linear relationship between its adjacent elements but have a hierarchical relationship between the elements.	-
7.	Abstract Data Type(ADT)	-	An Abstract Data Type is a set of operations for which the implementation of the data structure is not specified anywhere in the program	-
8.	Array	-	Array is a collection of variables belonging to the same data type. Can store group of data of same data type in an array	-
9.	Stack	-	Stack is an ordered collection of elements in which insertions and deletions are restricted to one end called top	-
10.	Element	-	One of the values in a list (or other sequence), also called items.	-
11.	Queue	-	Queue is an ordered collection of elements in which insertions and deletions are restricted to one end.	-
12.	Tree	-	A tree is a non-linear data structure, which represents hierarchical relationship between individual data items	-
13.	Linked List	-	A linked list is a linear data structure, in which the elements are not stored at contiguous memory locations.	-
14.	Types of linked list	-	<ol style="list-style-type: none"><li>1.Singly linked list</li><li>2.Doubly linked list</li><li>3.Circular linked list</li></ol>	-
15.	Singly linked list	-	It is a linked list ,in which each node contains only one link field pointing to the next node in the list.	-

16.	Doubly linked list	-	It is a list in which each node has three fields namely data field, forward link and backward link	-
17.	Circularly linked list	-	Circular Linked list is a linked list where all nodes are connected to form a circle. There is no NULL at the end.	-
18.	Applications of a linked list	-	Manipulation of polynomials, sparse matrices, stacks and queues.	-
19.	Database Management System	DBMS	Database management system is a collection of interrelated data and a set of programs to access those data.	-
20.	Applications of DBMS	-	<ul style="list-style-type: none"> <li>• Banking</li> <li>• Airlines</li> <li>• Universities</li> <li>• Credit card transactions</li> <li>• Tele communication</li> <li>• Finance</li> </ul>	-
21.	Disadvantages of File Processing System	-	<ul style="list-style-type: none"> <li>• Data redundancy and inconsistency</li> <li>• Difficulty in accessing data</li> <li>• Data isolation</li> <li>• Integrity problems</li> <li>• Atomicity problems</li> <li>• Concurrent access anomalies</li> </ul>	-
22.	Advantages of DBMS	-	<ul style="list-style-type: none"> <li>• Controlling redundancy</li> <li>• Restricting unauthorized access</li> <li>• Providing multiple user interfaces</li> <li>• Enforcing integrity constraints.</li> <li>• Providing backup and recovery</li> </ul>	-
23.	Query Language	-	A query is a statement requesting the retrieval of information.	-
24.	Data Definition Language	DDL	Data base schema is specified by a set of definitions expressed by a special language	-
25.	Data Manipulation Language	DML	A language that enables users to access or manipulate data as organized by the appropriate data model	-

### Unit –II-Relational Database Design

26.	Normalization	-	<ul style="list-style-type: none"> <li>• Minimizing redundancy</li> <li>• Minimizing the insertion deletion update anomalies.</li> </ul>	-
27.	First normal form	1NF	Each column is unique in 1NF.	-
28.	Second normal form	2NF	The entity should be considered already in 1NF, and all attributes within the entity should depend solely on the unique identifier of the entity.	-
29.	Third normal form	3NF	The entity should be considered already in 2NF, and no column entry should be dependent on any other entry (value) other than the key for the table.	-
30.	File Organization	-	A file is organized logically as a sequence of records. These records are mapped on to disk blocks.	-
31.	Index-Sequential Files	-	The files that are ordered sequentially with a primary index on the search key.	-
32.	Primary Index	-	An ordered index whose search key is also the sort key used for the sequential file	-

33.	Dense index	-	An index record appears for every search-key value in the file.	-
34.	Sparse Index	-	An index record is created for only some of the Values.	-
35.	Instance	-	Collection of data stored in the data base at a particular moment is called an Instance of the database.	-
36.	Schema	-	The overall design of the data base is called the data base schema.	-
37.	Hashing	-	Hash File organization method is the one where data is stored at the data blocks whose address is generated by using Hash Function.	-
38.	Two Types of Hash File Organization	-	<ul style="list-style-type: none"> <li>• Static Hashing</li> <li>• Dynamic Hashing</li> </ul>	-
39.	Static Hashing	-	The resultant data bucket address will be always same.	-
40.	Dynamic Hashing	-	The data buckets grow or shrink as the records increase or decrease.	-
41.	Linear Probing	-	Linear probing is a type of open hashing. If a bucket is full the system inserts records in to the next bucket that has space.	-
42.	Fixed length records	-	Every record has the same fields and field lengths are fixed.	-
43.	Variable length records	-	File records are of same type but one or more of the fields are of varying size.	-
44.	Query Optimization	-	It is a process of selecting the most efficient query evolution plan for a query.	-
45.	Relational Database Management System	RDBMS	A relational database is organized into tables, records, and column and there is a well-defined relationship between database tables.	-
46.	Disk Storage		a) Data files b) Data dictionary c) Indices	-
47.	Compact Disc Read-Only Memory	CD-ROM	Type of computer memory in the form of a compact disc that is read by optical means It uses a low-power laser beam to read digitized (binary) data that has been encoded in the form of tiny pits on an optical disk.	-
48.	Optical Disk	-	A disk with a plastic coating on which information (such as music, visual images, or computer data) is recorded digitally (as in the form of tiny pits) and which is read by using a laser.	-
49.	Optical Jukebox	-	An optical jukebox is a robotic data storage device that can automatically load and unload optical discs, such as Compact Disc, DVD, Ultra Density Optical or Blu-ray and can provide terabytes (TB) or petabytes (PB) of tertiary storage.	-
50.	Miniature Magnetic Tape Devices	-	Magnetic tape data storage is a system for storing digital information on magnetic tape using digital recording.	-
<b>Unit –III -Expert systems</b>				
51.	Expert systems	-	An expert system is a computer program that is uses artificial technologies to stimulate the judgement and behavior of human Or organization.	-
52.	Basic concepts	-	A knowledge base <ul style="list-style-type: none"> <li>• The search or inference system</li> </ul>	-

	of expert systems		<ul style="list-style-type: none"> <li>• A knowledge acquisition system</li> <li>• The user interface.</li> </ul>	
53.	Structure of expert systems	-	The knowledge base; the database; the rule entrepreneur are the structures of expert systems.	-
54.	Types of expert systems	-	<ul style="list-style-type: none"> <li>• Rule based expert systems</li> <li>• Frame based expert systems</li> <li>• Fuzzy expert systems</li> <li>• Neural expert systems</li> <li>• Neuro- fuzzy expert systems.</li> </ul>	-
55.	Rule based expert systems	-	A simplest form of artificial intelligence and uses prescribed knowledge based solved the problem.	-
56.	Frame based expert systems	-	It is widely used for representation for expert systems with large knowledge base.	-
57.	Fuzzy expert systems	-	It is a collection of membership functions and rules that are used to reason about data.	-
58.	Neural expert systems	-	It have neural network networks for their knowledge bases.	-
59.	Neuro fuzzy expert systems	-	It is uses a learning algorithms derived from inspired by neural network theory to determine its parameters.	-
60.	Knowledge engineering	-	It is a technology behind the creation of expert systems to assist with issues related to their programmed field of knowledge.	-
61.	Method of Knowledge acquisition	-	The methods are in various types like diagram, matrix, hierarchy , protocol analysis , generation analysis and sorting techniques.	-
62.	Difficulties in knowledge acquisition	-	Experts may not know how to articulate their knowledge or may be unable to do so. experts may luck time or may be unwilling to cooperate.	-
63.	Search	-	It is the process of navigating from a starting state to a goal state to a goal state by transitioning through intermediate states.	-
64.	Real time search	-	Real time search method for allow for fine grained control over how much planning to do between plan exe-cutions.	-
65.	constraint satisfaction	-	<ul style="list-style-type: none"> <li>• constraint enumerate the possible values a set of variables may takes in a given world.</li> <li>• In other words, a solutions is a way of assigning a value to each variable in such a way that all constraints are satisfied by these values.</li> </ul>	-
66.	Robot motion planning	-	It is a computational problem to find a sequence of valid configurations that moves the object from the source to designation	-
67.	Visual programming concepts	-	It is a type of programming languages that lets humans describe processes using illustrations.	-
68.	Visual basic environment	-	Is is an integrated development environmental of Microsoft .graphical user interface is used with a basic programming language.	-
69.	Tools and controls	-	It is simulation of human intelligence processes by machines ,especially computer systems.	-
70.	Dynamic data exchange	-	Dynamic data structures are designed to facilitate change of data structures in the run time.	-
71.	Visual basic project	-	It is a project that the group of all the files that makes up your program	-
72.	Expert system technology	-	High level symbolic ,programming languages such as list programming are included	-

73.	Shells	-	A shell is nothing but an expert system without knowledge base ,it provides the developes with knowledge acquisition.	-
74.	Application of expert systems	-	Camera lens design, automobile design. Finding out the faults of the vehicles and computers.	-
75.	Limitations of expert systems	-	No technology can offer easy and complete solution.large systems are costly.	-
<b>Unit IV- Basic concepts of Multimedia</b>				
76.	Multimedia	-	Multimedia is the form of communication that combines different content forms such as text,audio,images,animations or videos into a single interactive presentation.	-
77.	Multimedia information system	-	A multimedia system is a system capable of processing multimedia data and applications	-
78.	Virtual reality	-	Virtual reality(VR) is the use of computer technology to create a simulated environment which can be explored in 360 degrees	-
79.	VR application in medical	-	VR used in such as <ul style="list-style-type: none"> <li>• Surgical simulaters</li> <li>• Telepresencesurgery</li> <li>• complex medical database</li> <li>• visualization and rehabilitation</li> </ul>	-
80.	Medical informatics	-	Health informatics is a field of science and engineering that aims at developing methods and technologies for the acquisition.	-
81.	Medical informatics levels	-	<ul style="list-style-type: none"> <li>• information technology</li> <li>• artificial intelligence</li> <li>• bioinformatics</li> <li>• medical records</li> </ul>	-
82.	Components of VR	-	<ul style="list-style-type: none"> <li>• Sensory feedback</li> <li>• Interactivity</li> <li>• Comfort</li> <li>• Interaction</li> </ul>	-
83.	Integrated design concept	IDC	It is a comprehensive holistic approach to design which brings together specialisms usually considered separately.	-
84.	Aim of IDC	-	<ul style="list-style-type: none"> <li>• The aim of integrated building design is often to produce sustainable architecture.</li> <li>• Design of both a product and the assembly system that will produce it.</li> </ul>	-
85.	Interactive multimedia	-	Any computer delivered electronic system that allows the user to control ,combine ,manipulate different types.	-
86.	Virtual library	-	It is a collection of resources available on one or more computer systems,where a single interface or entry point to the collections is provided.	-
87.	Design library	-	A special library with a focused collection of digital objects that can include text, visual material ,audio material , video material stored as electronic media formats.	-
88.	Internet	-	The internet is a vast network that connects computers all over the world.	-
89.	Multimedia tools +	-	Multimedia tools using a combination of multimedia technologies or content forms such as text ,audio ,picture ,video or animation.	-
90.	Text	-	Text is words and symbols in any form,spoken or written are the most common system of communication.	-

91.	Audio	-	A multimedia application may require the use of speech, music and sound effects.	-
92.	Picture	-	It is visual representation of something. A picture that has been created or copied and stored in electronic form.	-
93.	Multimedia contents	-	Text materials , photographs ,audio files ,video representation and other form of applications.	-
94.	Multimedia usages	-	It is used in the field of mass media and journalism, in various magazines and newspapers that are published periodically.	-
95.	Multimedia advantages	-	<ul style="list-style-type: none"> <li>• Easy to use</li> <li>• Multi sensorial</li> <li>• Integrated and interactive</li> </ul>	-
96.	Multimedia disadvantages	-	<ul style="list-style-type: none"> <li>• Very expensive</li> <li>• Takes time to compile</li> <li>• Not always ready to configure</li> </ul>	-
97.	Multimedia applications	-	It is an application which uses a collection of multiple , media sources	-
98.	Multimedia limitations	-	It is so` easy to use ,it can contain too much informations at once.it takes time to compile.	-
99.	Multimedia courses	-	Film making , cartoon designing , design technology , graphic design ,editing.	-
100.	Career of multimedia artists	-	3D animators , animators , level designers , motion designers , gameplay animators.	-

#### UNIT –V - Decision making methods for Biomedicine

101.	Bayesian statistics	-	Bayesian inference is a method of statistical inference in which bayes theorem is used to update the probability for a hypothesis as more evidence becomes available.	-
102.	Decision analysis(DA)	-	Decision analysis is a form of decision making ethical decision that involves identifying and assessing all aspects of a decision and taking action based on decision.	-
103.	Bayesian belief network	-	It is a probabilistic graphical model(PGM) that represents conditional dependencies between random variables through a directed acyclic graph (DAG).	-
104.	Directed acyclic graph (DAG)	-	In mathematics , particularly graph theory and computer science , a directed acyclic graph is a direct graph with no directed values.	-
105.	DAG data structure	-	A DAG is a data structure from computer science which can be used to model a wide variety of problems.	-
106.	Advantages of Bayesian statistics	-	It provides a natural and principled way of prior information with data ,within solid decision theoretical framework.	-
107.	Steps of Bayesian statistics	-	<ul style="list-style-type: none"> <li>• The coin flipping example</li> <li>• Identifying</li> <li>• Conclusions</li> <li>• References</li> <li>• R session.</li> </ul>	-
108.	Markov model	-	In probability theory, a Markov model is stochastic model used to model pseudo randomly changing systems.it is assumed that future states depend only on current state , not on the events that occurred before it.	-
109.	Markov decision process	-	In mathematics , a Markov decision process (MDP) is a discrete time stochastic control process used for mathematics frame	-



			work.	
110.	Speech recognition	-	It is also known as automatic speech recognition (ASR) , speech to text is a capability which enables a program to process human speech into a written format.	-
111.	Medical diagnosis	-	MDS using in artificial intelligence for principles and perspectives abstract:disease diagnosis is the identify of an health issue , disease , disorder.	-
112.	Application of speech recognition	-	Speech recognition technologies such as Alexa ,Cortana ,Google assistant and Siri are changing the way people interact with their devices , homes , cars and jobs .	-
113.	Hospital information system	-	A hospital information (HIS) is an element of health informatics that focuses mainly on the administration needs of hospital.	-
114.	Basic parts of hospital system	-	<ul style="list-style-type: none"> <li>• Appointment management</li> <li>• Patient management</li> <li>• Facility management</li> <li>• Staff management</li> <li>• Supply management</li> </ul>	-
115.	Operational information	-	It is a term used in data warehousing to refer to a system that is used to process the day to day transactions of an organization.	-
116.	Artificial intelligence (AI)	-	AI is the simulations of human intelligence process by machines,especially computer systems.	-
117.	Principles of AI	-	AI systems should respect human rights , diversity and the autonomy of individuals.	-
118.	Applications of AI	-	<ul style="list-style-type: none"> <li>• Artificial general intelligence</li> <li>• Planning</li> <li>• Knowledge reasoning , machine learning</li> <li>• Computer vision</li> </ul>	-
119.	Pattern recognition	-	It is the automated recognition of patterns and regularities in data.it has used in statistical data analysis,signal processing,image analysis.	-
120.	Application of pattern recognition	-	It is used to give human recognition intelligence to machines which is in image processing and to extract meaningful features from given image.	-
121.	Neural network	-	A neural network is a network or circuit of neurons or in modern sense ,an AI neural is composed of neural network system.	-
122.	Application of neural network	-	In medicine preparing, electronic nose ,security and loan applications.	-
123.	Fuzzy logic	-	It is an approach to computing based on “degrees of truth” rather than usual true or false Boolean based and modern computer is based.	-
124.	Application of fuzzy logic	-	Fuzzy logic has been used in numerous applications such as facial pattern recognition , air conditions , washing , vaccum cleaners.	-
125.	Limitation of fuzzy logic	-	There is no single systematic approach to solve a problem using fuzzy logic and not widely accepted	-

**Placement Questions**

126.	Difference between file structure and storage structure	-	<p><b>Storage structure:</b> It is the representation of the data structure in the computer memory.</p> <p><b>File structure:</b> It is the representation of the storage structure in the auxiliary memory.</p>	-
127.	Applications of stack data structure	-	<ul style="list-style-type: none"> <li>• Expression evaluation</li> <li>• Backtracking</li> <li>• Memory Management</li> <li>• Function calling and return</li> </ul>	-
128.	Stack overflow condition.	-	Overflow occurs when <b>top = Maxsize - 1</b>	-
129.	Applications of Multilinked Structures	-	<ul style="list-style-type: none"> <li>• Sparse matrix,</li> <li>• Index generation.</li> </ul>	-
130.	Types of Virtual Reality	-	<ul style="list-style-type: none"> <li>• Fully-Immersive</li> <li>• Semi-Immersive</li> <li>• Non-Immersive</li> </ul>	-
131.	Augmented reality (AR)	-	Display systems that mix synthetic images with views of the real world.	-
132.	Simulation	-	A computer simulation is application designed to imitate a real-life situation.	-
133.	Ciliary muscles	-	Adjust the shape of the human eye's lens.	-
134.	VR military applications	-	VR is used by the military in all three major fields – ground, air and navy forces for flight and battlefield simulations, medical training, <b>vehicle simulation</b> , and virtual boot camps.	-
135.	VR Robotics applications	-	Virtual reality can control robots <i>in</i> telepresence and telerobotic systems	-
136.	Meissner's corpuscles	-	Receptors for measuring touch sensations in the fingertips.	-
137.	Laparoscopic simulator	-	A training simulator for 'key-hole' surgery	-
138.	Ergonomics	-	Using human dimensions in a design process	-
139.	Applications of augmented reality	-	<ul style="list-style-type: none"> <li>• Repair &amp; Maintenance</li> <li>• Design &amp; Modeling.</li> <li>• Business Logistics</li> <li>• Tourism Industry</li> <li>• Classroom Education</li> </ul>	-
140.	Knowledge base	-	Knowledge base is the central component of knowledge base agent and it is described as a set of representations of facts about the world	-
141.	Fuzzy Reasoning	-	Fuzzy Reasoning is based on the theory of fuzzy sets and it encompasses Artificial Intelligence, information processing and theories from logic to pure and Applied mathematics, like graph theory, topology and optimization	-
142.	Inference engine	-	Inference engine that consists of algorithms for manipulating the knowledge represented in the knowledge base to solve a problem presented to the system	-
143.	Application of Expert Systems	-	<ul style="list-style-type: none"> <li>• Diagnosis and Troubleshooting of Devices and Systems</li> <li>• Planning and Scheduling</li> <li>• Configuration of Manufactured Objects from sub-assemblies</li> </ul>	-

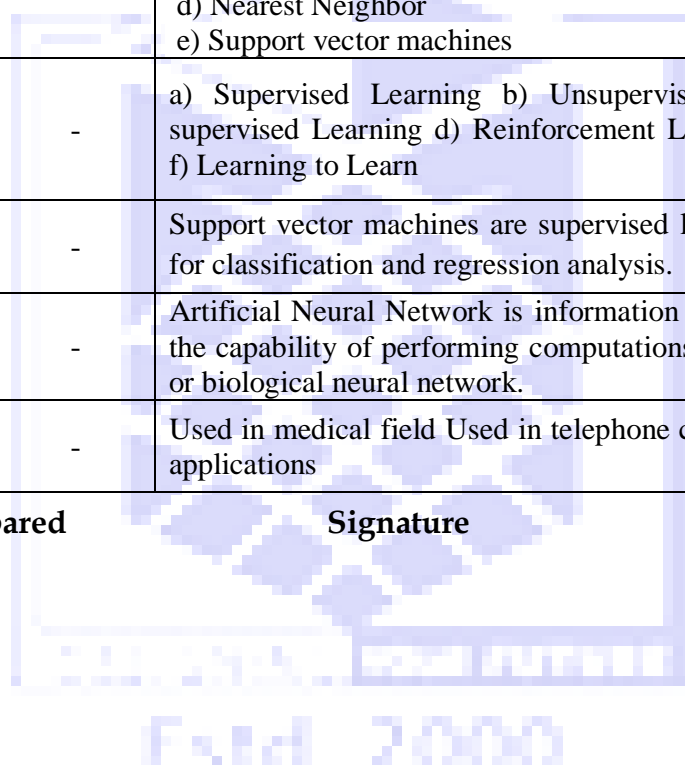


			<ul style="list-style-type: none"> <li>• Financial Decision Making</li> <li>• Knowledge Publishing</li> <li>• Process Monitoring and Control</li> <li>• Design and Manufacturing</li> </ul>	
144.	MYCIN & PUFF	-	MYCIN was the first large expert system to perform at the level of a human expert and to provide users with an explanation of its reasoning technique for diagnosing blood disorders and PUFF for diagnosis of respiratory disease	-
145.	Machine learning	-	Machine learning is a branch of computer science which deals with system programming in order to automatically learn and improve with experience. For example: Robots are programmed so that they can perform the task based on data they gather from sensors. It automatically learns programs from data. 2	-
146.	five popular algorithms of Machine Learning	-	a) Decision Trees b) Neural Networks (back propagation) c) Probabilistic networks d) Nearest Neighbor e) Support vector machines	-
147.	Algorithm techniques in Machine Learning	-	a) Supervised Learning b) Unsupervised Learning c) Semi-supervised Learning d) Reinforcement Learning e) Transduction f) Learning to Learn	-
148.	Support vector machine	-	Support vector machines are supervised learning algorithms used for classification and regression analysis.	-
149.	ANN	-	Artificial Neural Network is information processing devices with the capability of performing computations similar to human brain or biological neural network.	-
150.	Applications of neural networks	-	Used in medical field Used in telephone communication Business applications	-

**Faculty Team Prepared**

**Signature**

1. **P.Kaviya**



**HoD**