UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Advanced DBMS Subject Code-MCSE201
Year:1st Year Semester: 2nd

Module Number	Topics	Number of Lectures
1	**OVERVIEW OF STORAGE AND INDEXING, DISKS AND FILES**	**6L**
	1. Data on external storage; File. Organizations and indexing;	2
	2. Index data structures; Comparison of file organizations; Indexes and	2
	3. Performance tuning. Memory hierarchy; RAID; Disk space management;	1
	4. Buffer manager; Files of records; Page formats and record formats.	1
2	**TREE STRUCTURED INDEXING**	**4L**
	1. Intuition for tree indexes;	1
	2. Indexed sequential access method;	1
	3. B+ trees, Search, Insert, Delete, Duplicates,	1
	4. B+ trees in practice.	1
3	**HASH-BASED INDEXING**	**4L**
	1. Static hashing;	2
	2. Extendible hashing, linear hashing, comparisons.	2
4	**OVERVIEW OF QUERY EVALUATION, EXTERNAL SORTING:**	**8L**
	1. The system catalog; Introduction to operator evaluation; Algorithms for relational operations;	2
	2. Introduction to query optimization; Alternative plans: A motivating example;	2
	3. What a typical optimizer does. When does a DBMS sort data? A simple two-way merge sort;	2
	4. External merge sort	2
5	**EVALUATING RELATIONAL OPERATORS**	**6L**
	1. The Selection operation; General selection conditions; The Projection operation;	2
	2. The Join operation; The Set operations; Aggregate operations;	1
	3. The impact of buffering Concurrency control and recovery system: Lock based protocol, dead lock handling, time stamp based and validation based protocol, failure classification, storage, recovery algorithm,	2
	4. Recovery and atomicity, backup.	1

6	**A TYPICAL RELATIONAL QUERY OPTIMIZER:**	**4L**
	1. Translating SQL queries in to Relational Algebra; 2. Estimating the cost of a plan; Relational algebra equivalences; Enumeration of alternative plans; Nested subqueries; 3. Other approaches to query optimization.	1 2 1
7	**PHYSICAL DATABASE DESIGN AND TUNING**	**6L**
	1. Introduction; Guidelines for index selection, examples; 2. Clustering and indexing; Indexes that enable index-only plans; Tools to assist in index selection; 3. Overview of database tuning; Choices in tuning the conceptual schema; 4. Choices in tuning queries and views; Impact of concurrency; DBMS benchmarking.	1 2 2 1
8	**MORE RECENT APPLICATIONS**	**3L**
	1. Mobile databases; Multimedia databases; 2. Geographical Information Systems; Genome data management.	1 2
Total Number Of Hours = 41		

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UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Advanced DBMS Subject Code-MCSE201
Year:1st Year Semester: 2nd

Assignment:

Module-I:

1. How do you organize file in a database?
2. What do you mean by RAID? What is indexing?

Module-II:

1. What do you mean by B+ trees
2. How do you Search, Insert, and Delete elements from B+ tree?

Module-III:

1. What do you mean by hashing? Explain Static hashing.
2. Differentiate Extendible hashing, linear hashing.

Module-IV:

1. How query optimization is done on database? Explain with proper example.
2. What a typical optimizer does in DBMS? When does a DBMS sort data? How two-way merge sort has done in DATABASE?

Module-V:

1. What is Lock based protocol? How dead lock is handled in DBMS?
2. Explain time stamp based and validation based protocol

Module-V:

1. How translation of SQL queries in to Relational Algebra is done? Explain with a example
2. What do you mean by Relational algebra equivalences?

Module-V:

1. Explain Clustering and indexing.
2. What do you mean by view and DBMS benchmarking.

Module-V:

1. What do you mean by mobile database?
2. Explain Geographical Information Systems and Genome data management.

UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Advanced Computer Network & Security **Subject Code-MCSE202**
Year: 1st Year **Semester: Second**

Module Number	Topics	Number of Lectures
Module-1	**INTRODUCTION TO INTERNETWORKING:**	**6L**
	How networks differ, how networks can be connected, connectionless internetworking, tunneling, fragmentation, overview of underlying technologies (ethernet, token ring, token bus, fddi, ppp).	
	NETWORK LAYER PROTOCOLS:	**4L**
	ipv4, ipv6, nat, arp, rarp, dhcp, icmp, ospf, bgp, igmp, cidr.	
	TRANSPORT LAYER PROTOCOLS:	**4L**
	udp, remote procedure call, rtp, tcp, tcp tahoe, tcp reno, tcp new reno, tcp sack	
Module-2	**TELEPHONE SYSTEMS:**	**4L**
	Introduction to wireless networks and cellular technology, amps, d-amps, gsm, gprs, cdma, bluetooth	
	WIRELESS INTERNET:	**4L**
	mipv4, mipv6, tcp performance, i-tcp, tcp snoop, freeze tcp, wwp, tcp real.	
Module-3	WIRELESS NETWORKS:	**4L**
	wlan: introduction, problems and solutions, protocol stack, access methods, services, wimax, wifi, zigbee. ad-hoc networks:	
	AD-HOC NETWORKS:	**4L**
	Introduction, routing challenges for ad-hoc networks, routing protocols (aodv, dsdv, dsr,), transport protocols (atcp, tcp-f, tcp bus).	
Module-4	CONGESTION CONTROL:	**4L**
	General principles, congestion prevention policies, choke packet, red, ecn, eln, eln-ack.	
	QOS PROVISIONING	**4L**
	Delay guarantees, network delay, delay jitter, play out delay, admission control, qos objectives, the rsvp approach.	
Module-5	SECURITY:	**6L**
	Introduction to cryptography, symmetric key and public key algorithms, diffie hellman key exchange algorithm, digital signatures, ipsec, firewall, vpn, vlan, wireless security, authentication protocols.	
Total Number Of Hours = 44		

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Lecture-wise Plan

Subject Name: Theory of Computation **Subject Code-MCSE203**
Year: 1st Year **Semester: Second**

Module Number	Topics	Number of Lectures
1	**Models of Computation:**	**1L**
	Models of computation-classification, properties and equivalences.	1
2	**Finite Automata:**	**3L**
	Formal definition of a Finite Automata (FA)-Examples of FA, Designing FA,DFA and NFA, regular operations	1
	Equivalence of NFA's and DFA's. FA with Epsilon-Transitions, Epsilon-Closures, Eliminating epsilon-Transitions. Applications of FAs. Mealy and Moore machine, Deadstate, Minimization of FA, Incompletely specified machine. FA on infinite inputs.	2
3	**Regular Language and Grammar:**	**4L**
	Definition of a Regular Expressions (RE), The Operators of RE – Building RE, Conversions DFA's to RE. Equivalence of RE and NFA with Epsilon-moves,- Application of RE's.	2
	Equivalence of regular grammar and FA; Properties of Regular Languages (RL), Proving Language's not to be Regular, Pumping Lemma for RL's. Applications of the Pumping Lemma. Closure Properties of RL's, Decision Properties of Rl's 1.	2
4	**Context Free Language and Grammar:**	**5L**
	Context free languages, Derivation and languages, Relationship between derivation and derivation trees, Leftmost and Rightmost Derivations. Simplification of context free grammars–Normal forms for context free grammar's, CNF and GNF.	3
	Applications of Context-Free Grammars. Non determinism vs. Ambiguity in CFLs. Closure properties of CFLs. Algorithmic properties about CFLs. Pumping Lemma for CFL.	2
5	**Push Down Automata:**	**4L**
	Definition, Acceptance by a Push Down Automata (PDA), DPDA & NPDA, example, Equivalence of PDA's and CFG's (conversion: PDA's to CFG's and reverse).	2
	Multi stack PDA. Non-determinism and power to PDAs.	2
	Turing Machine:	**6L**
	Unsolvable Problems. Definition, notation and Example	2

6	of Turing Machine(TM). Programming techniques-Computable languages and functions, Church Turing hypothesis.	
	Universal TM, Random Access TM. Multitape TM, Equivalence of One-Tape and Multitape TM's, Nondeterministic TM's.	2
	Conversion of RE to TM. Multi-stack PDA & TM.	2
7	**Computability and Decidability:**	**6L**
	Church-Turing Thesis, Decision Problems, Decidability and undecidability, unsolvable problems; Halting Problem of Turing Machines; Problem reduction (Turing and mapping reduction), Intractability (Hierarchy Theorems).	3
	Mapping reductions. More undecidable languages. Rice theorem. Reductions using controlled executions. RE Completeness. Reductions using computation histories.	2
	Linear Bounded Automata. Unrestricted grammars.	1
8	**Computational Complexity**:	**6L**
	Resource-constrained computation. Time Complexity-notion of complexity classes, classes P NP, NP-complete, Boolean satisfiability, NP-Completeness of CSAT and 3SAT, NP-Hard, Cooks Theorem.	2
	The concept of reduction, co- NP, polynomial Hierarchy. Some natural NP-complete problems. Space Complexity-Savich's Theorem.	2
	The class PSPACE. Optimization, search and decision problems. Approximate solutions to optimization problems.	2
9	**Logic:**	1
	Propositional and First-order logic and their applications to theorem proving and logic programming.	1
10	**Advanced/Emerging area's:**	**5L**
	Elementary introductions to DNA Computing.	1
	Quantum Computing	1
	Cellular Automata	1
	Circuit complexity, Structural Complexity, Parallel Complexity, Algorithmic Information.	2
Total Number Of Hours = 40		

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Assignment:

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Lecture-wise Plan

Module-1 (Model of computation):

1. Define model of computation and its types.

Module-2 (Finite Automata):

1. Suppose M = (Q, , q0, A, δ) is an FA accepting L. We know that if p, q ∈ Q and p ≡ q, then there is a string z such that exactly one of the two states δ∗(p, z) and δ∗(q, z) is in A. Show that there is an integer n such that for every p and q with p ≡ q, such a z can be found whose length is no greater than n, and say what n is.
2. Suppose L ⊆ {a, b} ∗ and IL has three equivalence classes. Suppose they can be described as the three sets [a], [aa], and [aaa], and also as the three sets [b], [bb], and [bbb]. How many possibilities are there for the language L? For each one, draw a transition diagram for an FA accepting it.

Module-3 (Regular Language and grammar):

1. Suppose w and z are strings in {a, b} ∗. Find regular expressions corresponding to each of the languages defined recursively below. a. ∈ L; for every x ∈ L, then wx and xz are elements of L. b. a ∈ L; for every x ∈ L, wx, xw, and xz are elements of L. c. ∈ L; a ∈ L; for every x ∈ L, wx and zx are in L.
2. The order of a regular language L is the smallest integer k for which Lk = Lk+1, if there is one, and ∞ otherwise. a. Show that the order of L is finite if and only if there is an integer k such that Lk = L∗, and that in this case the order of L is the smallest k such that Lk = L∗. b. What is the order of the regular language {}∪{aa}{aaa} ∗? c. What is the order of the regular language {a}∪{aa}{aaa}∗? d. What is the order of the language corresponding to the regular expression (+b∗a)(b + ab∗ab∗a)∗?

Module-4 (Context free language and grammar):

1. Consider the CFG with productions S → aSbScS | aScSbS | bSaScS | bScSaS | cSaSbS | cSbSaS | Does this generate the language {x ∈ {a, b, c}∗ | na(x) = nb(x) = nc(x)}? Prove your answer.
2. Suppose that G1 = (V1,{a, b}, S1, P1) and G2 = (V2,{a, b}, S2, P2) are CFGs and that V1 ∩ V2 = ∅. a. It is easy to see that no matter what G1 and G2 are, the CFG Gu = (Vu,{a, b}, Su, Pu) defined by Vu = V1 ∪ V2, Su = S1, and Pu = P1 ∪ P2 ∪ {S1 → S2} generates every string in L(G1) ∪ L(G2). Find grammars G1 and G2 (you can use V1 = {S1} and V2 = {S2}) and a string x ∈L(Gu) such that x /∈ L(G1) ∪ L(G2). b. As in part (a), the CFG Gc = (Vc,{a, b}, Sc, Pc) defined by Vc = V1 ∪ V2, Sc = S1, and Pc = P1 ∪ P2 ∪ {S1 → S1S2} generates every string in L(G1)L(G2). Find grammars G1 and G2 (again with V1 = {S1} and V2 = {S2}) and a string x ∈L(Gc) such that x /∈ L(G1)L(G2). c. The CFG G∗ = (V ,{a, b}, S,P) defined by V = V1, S = S1, and P = P1 ∪ {S1 → S1S1 | } generates every string in L(G1)∗. Find a grammar G1 with V1 = {S1} and a string x ∈L(G∗) such that x /∈ L(G)∗.
3. In each case below, show that the grammar is ambiguous, and find an equivalent unambiguous grammar. a. S → SS | a | b ; S → ABA A → aA |null;B → bB | null; S → aSb | aaSb | null;S → aSb | abS | null.

Module-5 (Push down automata):

1. Give transition tables for PDAs accepting each of the following languages. a. The language of all odd-length strings over {a, b} with middle symbol a. b. {anx | n ≥ 0, x ∈ {a, b}∗ and |x| ≤ n}. c. {aibjck | i, j, k ≥ 0 and j = i or j = k}.
2. Suppose L ⊆————————————————————————————∗

is accepted by a PDA M, and for some fixed k, and every x ∈————————————————————————————*, at least one choice of moves allows M to process x completely so that the stack never contains more than k elements. Does it follow that L is regular? Prove your answer.

Module-6 (Turing machine):

1. Let T = (Q, , , q0, δ) be a TM, and let s and t be the sizes of the sets Q and , respectively. How many distinct configurations of T could there possibly be in which all tape squares past square n are blank and T 's tape head is on or to the left of square n? (The tape squares are numbered beginning with 0.)
2. Given TMs T1 = (Q1, 1, 1, q1, δ1) and T2 = (Q2, 2, 2, q2, δ2), with 1 ⊆ 2, give a precise definition of the TM T1T2 = (Q, , , q0, δ). Say precisely what Q, , , q0, and δ are.

Module-7 (Computability and Decidability):

1. Let f : N → N be the function defined as follows: f (0) = 0, and for n > 0, f (n) is the maximum number of moves a TM with n non-halting states and tape alphabet {0, 1} can make if it starts with input 1n and eventually halts. Show that f is not computable.
2. Suppose we define b2(0) to be 0, and for n > 0 we define b2(n) to be the largest number of 1's that can be left on the tape of a TM with two states and tape alphabet {0, 1}, if it starts with input 1n and eventually halts. a. Give a convincing argument that b2 is computable. b. Is the function bk (identical to b2 except that "two states" is replaced by "k states") computable for every k ≥ 2? Why or why not?

Module-8 (Computational Complexity):

1. Let L1 and L2 be languages over 1 and 2, respectively. Show that if L1 ≤p L2, then L ≤p L 2.
2. Show that if there is an NP-complete language L whose complement is in NP, then the complement of every language in NP is in NP.
3. Suppose L1, L2 $\sum^*$ can be accepted by TMs with time complexity τ1 and τ2, respectively. Find appropriate functions g and h such thatL1 L2 and L1 ∩ L2 can be accepted by TMs with time complexity in O(g) and O(h), respectively.

Module-9 (Logic):

1. Prove that For every three positive integers i, j, and n, if ij = n, then i ≤ √n or j ≤ √n.
2. A principle of classical logic is modus ponens, which asserts that the proposition (p (p → q)) → q is a tautology, or that p (p q) logically implies q. Is there any way to define the conditional statement p → q, other than the way we defined it, that makes it false when p is true and q is false and makes the modus ponens proposition a tautology? Explain.

Module-10(Advanced/Emerging areas):

3. Write a short note on cellular automata, quantum computing.
4. Define Circuit complexity, Structural Complexity, Parallel Complexity.

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Lecture-wise Plan

Subject Name: Cluster, Grid, and Cloud computing **Subject Code-MCSE204A**
Year: 1st Year **Semester: Second**

Module Number	Topics	Number of Lectures
1	**Cluster Computing:**	**12L**
	A general introduction to the concept of cluster based distributed computing.	1
	Hardware technologies for cluster computing	1
	A survey of the possible node hardware and high-speed networking hardware and software.	1
	Software architectures for cluster computing including both shared memory (OpenMP) and message-passing (MPI/PVM) models MPI-2 extension, dynamic process creation, one-sided communication, parallel I/O	4
	Variants based on new low level protocols (MVAPICH).	2
	Evaluation and tuning of system and software performance evaluation tools.	1
	HINT, netperf, netpipe, ttcp, Iperf.	2
2	**Grid Computing:**	**12L**
	The Grid - Past, Present, Future, A New Infrastructure for 21st Century Science – The Evolution of the Grid - Grids and Grid Technologies.	2
	Programming models - A Look at a Grid Enabled Server and Parallelization Techniques – Grid applications.	2
	The concept of virtual organizations – Grid architecture – Grid architecture and relationship to other Distributed Technologies – computational and data Grids.	3
	Semantic grids Case Study: Molecular Modeling for Drug Design and Brain Activity Analysis.	2
	Resource management and scheduling, Setting up Grid.	2
	Deployment of Grid software and tools, and application execution.	1

	Cloud Computing:	**12L**
3.	Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider,	1
	SAAS,PAAS IAAS and Others, Organizational scenarios of clouds.	2
	Administering & Monitoring cloud services, benefits and limitations,Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms:	2
	Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure, Utility Computing.	2
	Elastic Computing Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo.	2
	Issues in cloud computing, Implementing real time application over cloud platform Issues in Inter cloud environments.	2
	QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment.	1
Total Number Of Hours = 42		

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Assignment:

Module-1:

1. Define Cluster computing? Why we need the cluster computing?
2. Describe system architecture for cluster computing.
3. How cluster can be formed?

Module-2:

1. How cluster computing differs from grid computing?
2. Describe the grid architecture
3. How grid computing involves in Molecular Modelling for Drug Design and Brain Activity Analysis?

Module-3:

1. Describe all the cloud services?
2. Is cloud a service? Justify your answer.
3. Discuss the security issues of cloud.

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Lecture-wise Plan

Subject Name: Mobile Computing Subject Code-MCSE204B

Year: 1st Year Semester: 2nd

Module Number	Topics	Number of Lectures
1	**Fundamentals of Cellular Communications**	**8L**
	1. Introduction, First- and Second-Generation Cellular Systems, Cellular Communications from 1G to 3G,	2L
	2. Tele-traffic Engineering, Radio Propagation and Propagation Path-Loss Models, Cellular Geometry, Interference in Cellular Systems,	2L
	3. Frequency Management and Channel Assignment Issues, Multiple Access Techniques,	2L
	4. GSM Logical Channels and Frame Structure, Privacy and Security in GSM, Mobility Management in Cellular Networks.	2L
2	**Wireless Transmission Fundamentals**	**8L**
	1. Spread Spectrum (SS) and CDMA Systems, Wireless Medium Access Control, IEEE 802.11 Architecture and Protocols,	2L
	2. Issues in Ad Hoc Wireless Networks (Medium Access Scheme), Routing, Multicasting, Transport Layer Protocols, QoS Provisioning,	2L
	3. Energy Management and Energy Consumption Models, Traffic Integration in Personal, Local, and Geographical Wireless Networks,	2L
	4. Bluetooth, Technologies for High-Speed WLANs, Third-Generation Cellular Systems: UMTS.	2L
3	**Mobile Adhoc Networks**	**10L**
	1. Introductory Concepts. Different models of operation, various applications of MANET,	1L
	2. Destination-Sequenced Distance Vector protocol - overview, Route Advertisement, Extending Base Station Coverage, Properties of DSDV protocol,	2L
	3. Dynamic Source Routing protocol - overview and properties, DSR Route Discovery, Route Maintenance, Support for Heterogeneous Networks and Mobile IP, Multicast routing with DSR,	2L
	4. Ad Hoc On-Demand Distance-Vector protocol - properties, Unicast Route Establishment, Multicast Route Establishment, Broadcast Optimizations and Enhancements,	2L
	5. Link Reversal Routing - Gafni-Bertsekas Algorithm, lightweight mobile routing algorithm, Temporally Ordered Routing Algorithm,	2L
	6. Preserving battery life of mobile nodes - Associativity Based Routing, Effects of	1L

	beaconing on battery life.	
4	**Wireless Sensor Networks**	**9L**
	1. Sensor networks overview: introduction, applications, design issues, requirements, Sensor node architecture, Network architecture: optimization goals, evaluation metrics, network design principles, 2. Sensor network operating systems and brief introduction to sensor network Programming, Network protocols: MAC protocols and energy efficiency, 3. Routing protocols: data centric, hierarchical, location-based, energy efficient routing etc, Sensor deployment, scheduling and coverage issues, 4. Self-Configuration and Topology Control, Querying, data collection and processing, collaborative information processing and group connectivity, 5. Target tracking, localization and identity management, Power management, Security and privacy.	2L 2L 2L 2L 1L
5	**Topology Control and Clustering in Adhoc Networks**	**5L**
	1. Algorithms for Graphs Modeling Wireless Ad Hoc Networks, 2. Clustering and Network Backbone, Dominating Set Based Routing in Ad Hoc Wireless Networks, 3. Formation of a Connected Dominating Set, Backbone-Formation Heuristics.	2L 2L 1L
6	**Mobile, Distributed and Pervasive Computing**	**5L**
	1. Pervasive Computing Applications, 2. Architecture of Pervasive Computing Software, 3. Indoor Wireless Environments, Challenges for the Future: Nomadic Computing.	1L 2L 2L
Total Number Of Lectures = 45		

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UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Mobile Computing Subject Code-MCSE204B
Year: 1st Year Semester: 2nd

Assignment:

Module-1(Fundamentals of Cellular Communications):

1. What is digital modulation?What is FSK, PSK, and QAM?What is 'handover' in mobile system? How it is effected in GSM?
2. A. Define BTS.What is a MSC? What are the functions of MSC in network and switching subsystem?
   B. A certain city has an area of 1300 square miles and is covered by a cellular system using a seven cell reuse pattern. Each cell has a radius of 4 miles and the city has 40 MHz spectrum with a full duplex channel bandwidth of 60KHz. Find:
   (i) The number of cells in the service area.
   (ii) The number of channels per cell.
   (iii) Total number of subscribers that can be served.

Module-2 (Wireless Transmission Fundamentals):

1. State the modes possible when the slave is in connection state in Bluetooth.Explain the concepts of CDMA. What are its merits and demerits? Explain the working principle of RAKE receiver.
2. Explain the TDMA frame structure and derive the efficiency of a TDMA system.What are the different types of Hand over?

Module-3(Mobile Adhoc Networks):

1. What is the necessity of MANET in mobile computing? What do you mean by Mobile Ad hoc Network?Explain DSDV protocol. How route advertisement is occurs in DSDV?Explain the power consumption mechanism in Ad hoc network.
2. Explain AODV protocol. How unicast route establishment, multicast route establishment happens in AODV.Explain Link Reversal Routing algorithm with proper diagram.

Module-4(Wireless Sensor Networks):

1. What do you mean by node in WSN? Write down its architecture.How you manage the security of a WSN node?
2. Explain MAC in WSN. How power of a node should be managed in WSN?How self-configuration should be done in WSN node? How data packets are transmitted through WSN nodes? How connection is done in all the nodes of WSN?

Module-5(Topology Control and Clustering in Adhoc Networks):

1. What do you mean by backbone of a network? How clustering is happens in Ad hoc nodes?How you can manage heuristic backbone node formation?
2. What do you mean by Dominating Set Based Routing in Ad Hoc Wireless Networks?What do you mean by clustering? By using which approach clustering is done in WSN?

Module-6 (Mobile, Distributed and Pervasive Computing):

1. What do you mean by Pervasive Computing? Explain its applications.
2. Explain the Architecture of Pervasive Computing Software.How you can set the indoor wireless environment?

UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR

Lecture-wise Plan

Subject Name: Advanced Web Technology **Subject Code-MCSE204C**

Year: 1st Year Semester: Second

Module Number	Topics	Number of Lectures
1	**Introduction:**	**6L**
	1. Overview, Computer Network, Intranet, Extranet and Internet. Types of Networks (LAN, MAN, WAN), Network Topologies .Definition of Internet, Internet organization. Growth of Internet, Internet Application.	2
	2. Review of TCP/IP: OSI Reference model, TCP/IP Model, IP addressing, Classful and Classless Addressing, Subnetting, Features and services of TCP/IP, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram. Routing - Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast. Electronic Mail-POP3, SMTP.	2
	3. World Wide Web: Evolution of distributed computing. Core distributed computing technologies – Client/Server Architecture & its Characteristics, JAVA RMI. Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services. Web Server Concept and Architecture. Definition of DNS (Domain Name System). Domain and Sub domain, Address Resolution, FTP & its usage, Telnet Concepts, Remote Logging, HTTP & HTTPs.	2
2	**Client Side Application Development**	**12L**
	1. HTML & CSS: Introduction, Editors, Elements, Tags, Attributes, Heading, Paragraph. Formatting, Link, Image, Table, List, Block, Form, Frame Layout, DHTML, Basic Web Page Development, CSS- Create Class Styles, Create ID Styles ,Span, Colors.HTML5 in brief.	3L
	2. Extensible Markup Language (XML): Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation, Tree, Syntax, Elements, Attributes, Validation, and Viewing. XHTML in brief.	3L

	3. JavaScript: Introduction, JavaScript in Web Pages, The Advantages of JavaScript Writing JavaScript into HTML; Building Up JavaScript Syntax; Basic Programming Techniques ; Operators and Expressions in JavaScript; JavaScript Programming Constructs; Conditional Checking Functions in JavaScript, Dialog Boxes, Statements, comments, variable, comparison, condition, switch, loop, break. Object – string, array. Function, Errors, Validation. The JavaScript Document Object Model-Introduction (Instance, Hierarchy); The JavaScript Assisted Style Sheets DOM; Understanding Objects in HTML (Properties of HTML objects, Methods of HTML objects); Browser Objects, Handling Events Using JavaScrip	6L
3	**Server Side Programming with PHP & MySQL**	**16L**
	1. Installing and Configuring : Current and Future Versions of MySQl and PHP, How to Get MySQL, Installing MySQL on Windows, Trouble Shooting your Installation, Basic Security Guidelines, Building PHP on Windows with Apache, Windows, php.ini.Basics,The Basics of PHP scripts.	2L
	2. The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output.	3L
	3. Functions: What is function? Calling functions, Defining Functions. Variable Scope, more about arguments. Working with Arrays and Some Array-Related Functions.	3L
	4. Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.	2L
	5. Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads.	2L

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Lecture-wise Plan

Subject Name: Advanced Web Technology **Subject Code-MCSE204C**

Year: 1st Year Semester: Second

	6. Learning basic SQL Commands: Learning the MySQL Data types, Learning the Table CreationSyntax, Using Insert Command, Using SELECT Command, Using WHERE in your Queries,Selecting from Multiple Tables, Using the UPDATE command to modify records, Using the DELETE Command, Frequently used string functions in MySQL, Using Date and Time Functions in MySQL.	2L
	7. Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data.	2L
4	**Multimedia for WEB**	**6L**
	1. Multimedia Application Development: Pixel, Image Resolution, Image Editing using Photoshop, 2D & 3D Animation, Logo Design, Banner. Animated Component Preparation using Flash & Action script.	4L
	2. Multimedia Web Applications: Multimedia over IP: RTP, RTCP. Streaming media, Codec and Plugins, VoIP, Text and Voice Chat.	2L

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Assignment:

Module-1 (Introduction):

1. Internet Application.

Module-2 (Client Side Application Development):

1. Design a web site for student management system using HTML, CSS and JavaScript.

Module-3 (Server Side Programming with PHP & MySQL):

1. Use php and MySql in the previous student management system to make the site complete.

Module-4 (Multimedia for WEB):

1. Use some multimedia applications in student management system.

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Lecture-wise Plan

Subject Name: Soft Computing Subject Code-MCSE204D

Year: 1st Year Semester: 2nd

Module Number	Topics	Number of Lectures
1	**Introduction to Soft Computing:**	**8L**
	1. Evolution of Computing	2
	2. Soft Computing Constituents	2
	3. From Conventional Artificial Intelligence to Computational Intelligence	2
	4. Machine Learning Basics.	2
2	**Fuzzy Logic:**	**8L**
	1. Fuzzy sets and Fuzzy logic: Introduction, Fuzzy sets versus crisp sets, operations on fuzzy sets, Extension principle	2
	2. Fuzzy relations and relation equations, Fuzzy numbers, Linguistic variables	2
	3. Fuzzy logic, Linguistic hedges, App lications, fuzzy controllers	2
	4. Fuzzy pattern recognition, fuzzy image processing, fuzzy database.	2
3	**Artificial Neural Networks:**	**8L**
	1. Artificial Neural Network: Introduction, basic models,	2
	2. Hebb's learning, Adaline, Perceptron, Multilayer feed forward network, Back propagation	2
	3. Different issues regarding convergence of Multilayer Perceptron, Competitive learning	2
	4. Self-Organizing Feature Maps, Adaptive Resonance Theory, Associative Memories, Applications.	2
4	**Genetic Algorithms:**	**8L**
	1. Evolutionary and Stochastic techniques: Genetic Algorithm (GA), different operators of Genetic Algorithm,	2
	2. Analysis of selection operations, Hypothesis of building Blocks, Schema theorem and convergence of Genetic Algorithm, Simulated annealing and Stochastic models,	3
	3. Boltzmann Machine, Applications. Rough Set: Introduction, Imprecise Categories Approximations and Rough Sets, Reduction of Knowledge, Decision Tables, and Applications.	3
5	**Hybrid Systems:**	**8L**
	1. Neural-Network-Based Fuzzy Systems,	2
	2. Fuzzy Logic-Based Neural Networks, Genetic Algorithm for Neural Network Design andLe arning,	3
	3. Fuzzy Logic and Genetic Algorithm for Optimization, Applications.	3
Total Number Of Lectures = 40		

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Lecture-wise Plan

Subject Name: Soft Computing Subject Code-MCSE204D
Year: 1st Year Semester: 2nd

Assignment:

Module-1(Introduction to Soft Computing):

1. Explain Soft Computing Constituents.
2. How evaluation is done from Conventional Artificial Intelligence to Computational Intelligence. Define Machine Learning Basics.

Module-2 (Fuzzy Logic):

1. Explain Fuzzy relations and relation equations.What do you mean by Linguistic variables?
2. Define Linguistic hedges and App lications.

Module-3(Artificial Neural Networks):

1. What do you mean by Artificial Neural Network? Explain its basic models.
2. Explain the different issues regarding convergence of Multilayer Perceptron andCompetitive learning. What is Self-Organizing Feature Maps?

Module-4(Genetic Algorithms):

1. Explain the Schema theorem and convergence of Genetic Algorithm.
2. What issimulated annealing and stochastic models and Boltzmann Machine?

Module-5(Hybrid Systems):

1. Explain Neural-Network-Based Fuzzy Systems with proper example. What is Fuzzy Logic-Based Neural Networks?
2. Explain any one Genetic Algorithm for Neural Network Design.

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Lecture-wise Plan

Subject Name: Cryptography & Computer SecuritySubject Code-MCSE204E
Year: 1st Year, M.Tech.Semester: Second

Module Number	Topics	Number of Lectures
1	**Introduction:**	**8L**
	1. Linear algebra: non linearity, echelon form of matrix, Galois Field, vector space, Modular arithmetic	**3**
	2. Coding Theory : Huffman coding, Hamming Coding,	**2**
	3. Number Theory : Prime Numbers, Modular Arithmetic and Discrete Logarithms, Fermet's Thoerem, Eulers Theorem, Chinese Remainder Theorem, Quadratic Reciprocity Theorem Information Theory : Entropy and Uncertainty	**3**
2.	**Various Types of Attacks:**	**4L**
	1. Attacks on Computers & Computer Security	2
	2. Need for Security, Security approaches,	1
	3. Principles of Security, Types of attack	1
3.	**Cryptography: Concepts & Techniques**	**6L**
	1. Introduction, Plaintext & Cipher text, Substitution Techniques	2
	2. Transposition Techniques, Encryption & Decryption,	2
	3. Symmetric & Asymmetric key Cryptography, Key Range & Key Size	2
4.	**Symmetric Key Algorithm**	**6L**
	1. Introduction, Algorithm types & Modes, Overview of Symmetric Key Cryptography	2
	2. DES(Data Encryption Standard) algorithm,	2
	3. IDEA(International Data Encryption Algorithm) algorithm, RC5(Rivest Cipher 5) algorithm.	2
5.	**Asymmetric Key Algorithm, Digital Signature and RSA**	**6L**
	1. Introduction, Overview of Asymmetric key Cryptography	2
	2. RSA algorithm, Symmetric & Asymmetric key Cryptography together,	2
	3. Digital Signature, Basic concepts of Message Digest and Hash Function	2
6.	**Internet Security Protocols, User Authentication**	**6L**
	1. Internet Security Protocols, User Authentication	2
	2. Authentication Basics, Password, Authentication Token	2
	3. Certificate based Authentication, Biometric Authentication	2

7.	**Electronic Mail Security**	**4L**
	1. Basics of mail security	2
	2. Pretty Good Privacy, S/MIME	2
8.	**Firewall**	**4L**
	1. Introduction, Types of firewall	2
	2. Firewall Configurations, DMZ Network	2
Total Number Of Hours = 44		

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Assignment :

Module -1 (Introduction)

Module -2 (Various Types of Attacks)

Module -3 (Cryptography: Concepts & Techniques)

Module -4 (Symmetric Key Algorithm)

Module -5 (Asymmetric Key Algorithm, Digital Signature and RSA)

Module -6 (Internet Security Protocols, User Authentication)

Module -7 (Electronic Mail Security)

Module -8 (Firewall)

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Lecture-wise Plan

Subject Name: Image ProcessingSubject Code-MCSE205A
Year: 1st Year, M.Tech.Semester: Second

Module Number	Topics	Number of Lectures
1.	**Introduction:**	**4L**
	1. Background, Digital Image Representation,	1
	2. Fundamental steps in Image Processing	1
	3. Elements of Digital Image Processing – Image Acquisition, Storage, Processing, Communication, Display.	2
2.	**Digital Image Formation**	**6L**
	1. A Simple Image Model, Geometric Model- Basic Transformation (Translation, Scaling, Rotation),	3
	2. Perspective Projection,	1
	3. Sampling& Quantization - Uniform & Non-uniform	2
3.	**Mathematical Preliminaries**	**8L**
	1. Neighbour of pixels, Connectivity, Relations, Equivalence & Transitive Closure;	2
	2. Distance Measures, Arithmetic/Logic Operations, Fourier Transformation,	3
	3. Properties of The Two Dimensional Fourier Transform, Discrete Fourier Transform, Discrete Cosine & Sine Transform	3
4.	**Image Enhancement**	**10L**
	1. Spatial Domain Method, Frequency Domain Method, Contrast Enhancement –Linear& Nonlinear Stretching	3
	2. Histogram Processing; Smoothing - Image Averaging, Mean Filter, Low-pass Filtering; Image Sharpening. High-pass Filtering, High-boost Filtering	4
	3. Derivative Filtering, Homomorphic Filtering; Enhancement in the frequency domain - Low pass filtering, High pass filtering.	3
5.	**Image Restoration**	**6L**
	1. Degradation Model, Discrete Formulation, Algebraic Approach to Restoration – Unconstrained & Constrained	2
	2. Constrained Least Square Restoration, Restoration by Homomorphic Filtering,	2
	3. Geometric Transformation - Spatial Transformation, Gray Level Interpolation	2
6.	**Image Segmentation**	**8L**
	1. Point Detection, Line Detection, Edge detection, Combined detection, Edge Linking & Boundary Detection - Local Processing	3
	2. Global Processing via The Hough Transform; Thresholding - Foundation, Simple Global Thresholding, Optimal Thresholding	3
	3. Region Oriented Segmentation - Basic Formulation, Region Growing by Pixel Aggregation, Region Splitting & Merging	2
Total Number Of Hours = 42		

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Assignment :

Module -1 (Introduction)

Module -2 (Digital Image Formation)

Module -3 (Mathematical Preliminaries)

Module -4 (Image Enhancement)

Module -5 (Image Restoration)

Module -6 (Image Segmentation)

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Lecture-wise Plan

Subject Name: ***Pattern Recognition*** Subject Code: ***MCSE205B***
Year:1st **Year** Semester: **2nd**

Module Number	Topics	Number of Lectures
1	**INTRODUCTION TO PATTERN RECOGNITION:**	**6L**
	1. Basic concepts- Definitions, data sets for Pattern Recognition	1L
	2. Structure of a typical pattern recognition system.	1L
	3. Different Paradigms of Pattern Recognition.	1L
	4. Representations of Patterns and Classes.	1L
	5. Metric and non-metric proximity measures.	2L
2	**FEATURES SELECTION:**	**5L**
	1. Feature vectors - Feature spaces	2L
	2. Different approaches to Feature Selection-Branch and Bound Schemes.	2L
	3. Sequential Feature Selection.	1L
3	**FEATURES EXTRACTION :**	**4L**
	1. Principal Component Analysis (PCA)	2L
	2. Kernel PCA	2L
4	**PATTERN CLASSIFICATION:**	**12L**
	1. Pattern classification using Statistical classifiers - Bayes' classifier.	2L
	2. Classification performance measures – Risk and error probabilities.	2L
	3. Linear Discriminant Function, Mahalanobis Distance.	2L
	4. K-NN Classifier, Fisher's LDA	2L
	5. Single Layer Perceptron, Multi-layer Perceptron	2L
	6. Training set, test set; standardization and normalization	2L
5	**CLUSTERING**	**8L**

	1. Basics of Clustering; similarity / dissimilarity measures; clustering criteria.	3L
	2. Different distance functions and similarity measures.	2L
	3. K-means algorithm, K-medoids, DBSCAN	3L
6	**RECENT ADVANCES IN PATTERN RECCOGNITION**	**3L**
	1. Structural PR, SVMs, FCM	1L
	2. Soft-computing and Neuro-fuzzy techniques, and real life examples.	2L
Total Number Of Hours = 38L		

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Lecture-wise Plan

Subject Name: Real-Time Embedded System and Programming Subject Code: MCSE205C
Year:1st Year **Semester: 2nd**

Module Number	Topics	Number of Lectures
1	**Introduction to Embedded Systems**	**3L**
	1. Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems	1
	2. Classification, Major Application Areas, Purpose of Embedded Systems	1
	3. characteristics and Quality Attributes of Embedded Systems	1
2	**Typical Embedded System**	**9L**
	1. Core of the Embedded System: General Purpose and Domain Specific Processors	1
	2. ASICs, PLDs, Commercial Off-The-Shelf Components (COTS)	2
	3. Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems	3
	4. Sensors and Actuators	2
	5. Communication interface : onboard and external communication interface	1
3	**Embedded Firmware**	**5L**
	1. Reset Circuit, Brown-out Protection Circuit	1
	2. Oscillator Unit, Real Time Clock	2
	3. Watchdog Timer	1
	4. Embedded Firmware Design Approaches and Development Languages	1
4	**RTOS Based Embedded System Design**	**5L**
	1. Operating System Basics, Types of Operating Systems	1
	2. Tasks, Process and Threads	2
	3. Multiprocessing and Multitasking	1
	4. Task Scheduling	1
5	**Task Communication**	7L
	1. Shared Memory, Message Passing	2
	2. Remote Procedure Call and Sockets	2
	3. Task Communication/Synchronization Issues	1
	4. Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.	2
Total Lecture Hours – 29		

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Lecture-wise Plan

Subject Name: Real-Time Embedded System and Programming Subject Code: MCSE205C
Year: 1st Year **Semester: 2nd**

Assignment:

Module-I: Introduction to Embedded Systems

1. Explain Embedded System. What is the differences between Embedded Systems and General Computing Systems?
2. What are the purposes of using embedded system? Explain the Quality Attributes of Embedded Systems.

Module-II: Typical Embedded System

1. Explain Memory Shadowing and Memory selection for Embedded Systems.
2. What do you mean by Domain Specific Processors of Embedded systems?

Module-III: Embedded Firmware

1. Explain different Embedded Firmware Design Approaches and Development Languages.
2. What is the purpose of using Brown-out Protection Circuit?

Module-IV: RTOS Based Embedded System Design

1. What is threads? How Task Scheduling is happens in embedded system?
2. Explain real time operating system with a proper example.

Module-V: Task Communication

1. What do you mean by Remote Procedure Call?
2. What are the Task Synchronization issues required to design RTESP?

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Lecture-wise Plan

Subject Name: Complex Systems **Subject Code-MCSE205D**
Year: 1st Year **Semester: Second**

Module Number	Topics	Number of Lectures
1	**Introduction:**	**4L**
	Non-linear complex systems.	2
	mathematical description in the shape of subsystems and interactions between them	2
2	**Special matrices:**	**6L**
	Special matrices	3
	Special matrices and their use for analysis of complex systems	3
3.	**Eigen Value:**	**4L**
	Estimation of eigen values of aggregation matrices	2
	Estimation of border interactions	2
4	**Decomposition and Aggregation:**	**4L**
	Principles of Decomposition	2
	Principles of Aggregation	2
5	**Lyapunov method:**	**4L**
	The direct Lyapunov method overview	1
	Problem solving and case studies on Lyapunov method	3
6	**Stability analysis:**	**4L**
	Stability analysis of complex nonlinear systems	1
	Stability analysis of complex nonlinear systems by the method of vector Lyapunov function	3
Total Number Of Hours = 26L		

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Assignment:

Module-1:

1. Define Complex System
2. Write down the features of Complex System.

Module-2:

1. Why we need special matrices?
2. How Special matrices are defer from normal matrices.

Module-3:

1. How we estimate the eigen values of aggregation matrices

Module-4:

1. State the principle of decomposition.
2. State the principle of aggregation.

Module-5:

1. Discuss Lyapunov method in brief.

Module-6:

1. How we can analysis the stability of non linear complex system.
2. How vector Lyapunov function helps to analyze the stability of complex system.

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Lecture-wise Plan

Subject Name: Distributed System **Subject Code-MCSE205E**

Year: 1st Year **Semester: Second**

Module Number	Topics	Number of Lectures
1	**Basic concepts:**	**13L**
	Models of computation: shared memory and message passing systems, synchronous and asynchronous systems.	2
	Logical time and event ordering.	2
	Global state and snapshot algorithms, mutual exclusion, clock synchronization	2
	Leader election, deadlock detection,	4
	Termination detection, spanning tree construction.	3
2	**Programming models:**	**3L**
	Remote procedure calls,	1
	Distributed shared memory.	2
3.	**Fault tolerance and recovery:**	**12L**
	Basic concepts, fault models,	2
	Agreement problems and its applications,	4
	Commit protocols, voting protocols,	3
	Check pointing and recovery, reliable communication.	3
4	**Security and Authentication:**	**4L**
	Basic concepts, Kerberos. Resource sharing and load balancing.	2
	Resource sharing and load balancing.	**2**
5	**Special topics:**	**4L**
	Distributed objects, distributed databases, directory services,	2
	Directory services,	2
Total Number Of Hours = 36L		

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Lab Manual

Title of Course: Computer Networking & DBMS Laboratory Lab
Course Code: MCSE291
L-T-P Scheme: 0-0-3 Course Credits: 2

Objective:

- To get familiar with basic EER concepts (generalization and specialization)
- Study of ODL schema.
- Implement Abstract data type.
- To study varying array.
- Implement object Table.
- To study implementation of nested tables.
- To understand use of objects in member procedure.
- To study horizontal Partitioning
- To study horizontal Partitioning.
- To study semistructureddata.

Learning Outcomes:

- Ability to build normalized databases.
- Knowledge of Entity Relationship Modelling.
- Familiarity with SQL, embedded SQL and PLSQL, ODL schema.
- Familiarity with query processing and query optimization techniques.
- Understanding of Member procedure.,Partitioning on the tables.
- Ability to handle recovery and concurrency issues.
- Familiarity with XML commands.

Course Contents:

Exercises that must be done in this course are listed below:

Exercise No.1: Study of EER diagram.
Exercise No. 2: Study of ODL schema.
Exercise No. 3: Implement Abstract data type.
Exercise No. 4: Implement Varrays.
Exercise No. 5: Implement object Table.
Exercise No. 6: Implement Nested table.
Exercise No. 7: Implement Member procedure.
Exercise No. 8: Implement Member Function.
Exercise No. 9: Implement Partitioning on the tables.
Exercise No. 10: Study of XML commands.

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Lab Manual

Lab Assignment 1	
Title	Study of EER diagram.
Objective	To get familiar with basic EER concepts (generalization and specialization)
References	Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition Database Systems, design, Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition Introduction to database systems C.J Date Addison Wesley Longman
Pre-requisite	Knowledge of ➔basic ER model. ➔Specialization and generalization.
Theory	A case study is being considered for studying EER concepts. The EER model includes all modeling concepts of ER model, in addition to that it includes concepts of subclass, superclass, specialization and generalization. Another concept included is that of a category or union type which is used to represent a collection of objects.
Sample Output	A detailed EER diagram and information related to all the entity sets.
Post Lab Assign ment	Explain Generalization and specialization? Constraints on Generalization and specialization?

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Lab Manual

Lab Assignment 2	
Title	Study of ODL schema.
Objective	To get familiar object structure, naming mechanism and ODL.
References	Fundamentals of Database Systems Elmari and NavatheAddison-WesleyFouth edition Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔ EER model. DDL. Rules for converting EER to ODL.
Theory	Object is a triple (i,c,v) where i is unique identifier, c is type constructor and v is object state. A type constructor may be an atom, tuple, set, list, bag and array. There are 2 types of objects-transient and persistent objects. Persistent object are stored in database and persist after program termination. The typical mechanism for making an object persistent are naming and reachability. The naming mechanism involves giving an object a unique persistent name through which it can be retrieved in this and future programs.
Sample Output	A ODL schema is written with reference to the case study.
Post Lab Assignment	Explain object identity and structure? explain naming mechanism?

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Lab Manual

Lab Assignment 3	
Title	Implement Abstract data type.
Objective	To get familiar User defined data types.
References	1. Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔basic data types. ➔basic DDL commands.
Theory	ADT are the data types created by the programmer having sub-types. An ADT of address may contain may attributes such as street_no, street_name, city, State. Syntax for creating ADT is create or replace type as object (attr1 datatype, attr2 datatype ...) Steps to implement ADT 1. Create ADT for address. 2. Create table employee using ADT. 3. Describe structure of table and ADT. 4. Display all employees staying in mumbai. 5. Display address of all employees whose age is greater than 40. 6. Display cities of all employees.
Sample Output	create or replace type addr as object(street_no number(3), street_name varchar2(20),city varchar2(10), state varchar2(10)); Type created
Post Lab Assignment	1. write short note on ADT?

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Lab Manual

Lab Assignment 4	
Title	Implement Varrays.
Objective	To study varying array.
References	1. Fundamentals of Database Systems Elmari and Navathe Addison- Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔ADT.
Theory	V arrays help in storing repeating attributes of a record in a single row. V arrays have a defined lower value 0 and maximum could be any valid number. collector such as varying array allows repetition of only those column values that change potentially storage values. collectors are used to accurately represent relationship between data type in the database object. syntax is create type type_name as varray(5) of datatype Steps to implement Varray 1. Create varray for the item_code. 2. Create a table with attributes order_no and item. 3. Describe varray structure. 4. Display item code for order_no=1 .
Sample Output	create type item_code as varray(5) of varchar2(20); Type created. create table order1(order_no number(5), item item_code); table created.
Post Lab Assignment	1. Short note on collector andvarray. 2. Short note on in-built interfaces.

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Lab Manual

Lab Assignment 5	
Title	Implement object Table.
Objective	To study object creation and object structure.
References	1. Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔object identity ➔object structure
Theory	Each row within the object table has OID-an object identifier value. This is system generated identifier which is being assigned at the time of a new row insertion. create type type_name as object(list of attributes) create table table_name of type_name To view OID of each row select ref(a) from table_name a
Sample Output	select ref(a) from emp a; ref(a) 00002802093B090D8F236BB39 CE 04000
Post Lab Assignment	1. Explain object structure and object identity? 2. Different object structures?

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Lab Manual

Lab Assignment 6	
Title	Implement Nested tables.
Objective	To study implementation of nested tables.
References	1. Fundamentals of Database Systems Elmari and NavatheAddison-WesleyFouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔ Object table. ➔Varray.
Theory	Varying array have a limited no. of entries, whereas nested tables have no limit on the no. of entries per row. A nested table is a table within a table. create type type_name as object (attribute1,attribute2,...) create type tablename as table of type_name create table table_name(attribute data type, attribute1 tablename) nested table attribute1 store as project
Sample Output	Create type proj as object(proj_code varchar2(20),proj_name varchar2(20),remarks varchar2(20)); Type created. Create type pront as table of proj; type created create table dept(dept_no number(5),dept_name varchar2(20),dept_loc varchar2(20),projects pront) nested table projects as project1; Table created.
Post Lab Assignment	1. Short note on concept of nested tables? 2. Compare nested table and varrays?

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Lab Manual

Lab Assignment 7	
Title	Implement Member procedure.
Objective	**To understand use of objects in member procedure.**
References	1. Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of **➔PL/SQL**
Theory	Creating a member procedure create or replace typename as object (attribute datatype member procedure procedure_name (attribute in datatype) ...); Defining a member procedure create or replace type body typename as member procedure procedure_name(attribute in datatype) is begin Definition partitioning end; end;
Sample Output	step 1: create or replace type T1 as object(ssn number(5),name varchar2(20), member procedure change_name(name1 in varchar2)); Type created step 2: Create table tab of T1; Type created step 3: create or replace type body T1 as member procedure change_name(name1 in varchar2) is begin name:=name1; end; end;
Post Lab Assignment	**1. Write short on member procedure.**

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Lab Manual

Lab Assignment 8	
Title	Implement Member Function.
Objective	**To study horizontal Partitioning**
References	1. Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of **➔features of functions**

Theory	Syntax for creating function create or replace objectname as
	object (attribute1,attribute 2... member function functionname
	(parameter list) return datatype);
	
	CREATE OR REPLACE FUNCTION[SCHEMA.]FUNCTIONNAME
	(ARGUMENT IN DATATYPE,...)RETURN DATATYPE {IS,AS}
	VARIABLE DECLARATIONS;
	CONSTANT DECLARATIONS;
	BEGIN
	PL/SQL SUBPROGRAM BODY;
	EXCEPTION
	EXCEPTION PL/SQL BLOCK;
	END;

Sample Output	Create or replace type animal_by as object (breed varchar2(25),name varchar2(25),birthdate date member function AGE(bithdate in date) return number); type created.
	Create or replace AGE(birthdate date)
	return number is
	begin
	return round(sgs_date_bithdate);
	end; end;
	function created

Post Lab Assignment	**1 .short note on functions**

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Lab Assignment 9	
Title	Implement Partitioning on the tables.
Objective	**To study horizontal Partitioning .**
References	1. Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔**distributed databases** ➔**horizontal and vertical partitioning**
Theory	Partition improves overall performance but increases overhead on database to search in each partition. Tables are easier to manage. Backup and recovery operations may perform better. Create table table_name(atrribute1,attribute2 ...) partition by range(attribute) (partition partitionname values less than(maxvalue),partition partition values less than(maxvalue));
Sample Output	Create table emp(emp_id varchar2(10),name varchar2(20)) partition by range(emp_id) (partition part_id1 values less than(5),partition part_id2 values less than(10)); table created
Post Lab Assignment	**1 .write short note on distributed databases.**

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Lab Assignment 10	
Title	Implement XML command.
Objective	**To study semi-structured data.**
References	1. Fundamentals of Database Systems Elmari and Navathe Addison-Wesley Fouth edition 2. Database management Systems Raghu Ramakrishnan and johannes Gehrke TMH 3. Database System concepts Korth,Siberchatz,sudarshanMc-Graw-HillFouth edition 4. Database Systems,design,Implementation and management Peter Rob and Carlos Coronel Thomson learning. Fifth edition 5. Introduction to database systems C.J Date Addison-Wesley Longman
Pre-requisite	Knowledge of ➔**database** ➔**applets** ➔**html**
Theory	DTD(document type definition) Any valid document conforming to DTD should follow the specified structure: 1. name is given to the root tag and then to the elements and their nested structure are specified. 2. a * means element can be repeated 0 or more times 3.A + element can be repeated one or more times 4.Any element appearing without any of the preceding symbols must appear exactly once in the document. eg <! DOCTYPE projects [<!ELEMENT projects(project+)> <ELEMENT project(pname,number,dept_no,workers)> <ELEMENT pname(#PCDATA)> <ELEMENT number(#PCDATA)> <ELEMENT dept_no(#PCDATA)> <ELEMENT workers(worker *)> <ELEMENT eno(#PCDATA)> <ELEMENT ename(#PCDATA)>]> XSD(XML schema definition) W3 specifies how to formally describe the element in XML document. It helps to verify that each item of content in a document adheres to the description of the element in which the content is to be placed. <xsd:schemaxmnls:xsd=”http://www.w3c.org/2001/XMLschema”> <xsd:element name=”country” type=”country” > <xsd:complex type name=”country” > <xsd:sequence> <xsd:element name=”name” type=”xsd:string” > < /xsd:sequence> < /xsd:complex type > <xsd:schema>
Sample Output	DTD and XSD studied

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Course Description

Title of Course: Seminar
Course Code: MCSE281
L-T-P scheme: 0-2-0 **Course Credit: 1**

The overall aim of the seminar series is to help develop an emerging field at the intersection of multi-disciplinary understandings of culture and education. It will build on the existing body of work on education and culture, but its aim is explore and develop new perspectives in this area.
The objectives of the six exploratory seminars are:

- **to explore new research from a range of academic disciplines which sheds light on the questions outlined above**
- **to showcase cutting edge research on education and culture from outstanding academic researchers from the UK and internationally**
- **to bring together seminar participants from different disciplines such as Sociology, Philosophy, Psychology, Human Geography, Media Studies as well as Education and Cultural Studies**
- **to encourage and financially support the participation of PhD students**
- **to actively involve practitioners and users from each venue**
- **to engage a core group of policy makers**
- **to use the seminars to develop links between academics and stakeholders in the arts, library, media, community and educational sectors**