



**C. U. SHAH UNIVERSITY**  
**Wadhwan City**

**FACULTY OF:-** Computer Science

**DEPARTMENT OF:-** Master of Computer Applications

**SEMESTER:-** IV

**CODE:-** 5CS04MDB1

**NAME:-** ADVANCED DATABASE MANAGEMENT SYSTEM (ADBMS) – MAJOR ELECTIVE-I

**Teaching and Evaluation Scheme**

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme								
		Th	Tu	Pr	Total		Theory				Practical (Marks)				Total
							Sessional Exam		University Exam		Internal		University		
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr		
5CS04MDB1	ADVANCED DATABASE MANAGEMENT SYSTEM (ADMBS)	4	0	2	6	5	30	1.5	70	3	10	---	40	150	

**Objectives:**

- This course is designed to make student aware about advanced areas and concepts related to DBMS for designing and implementing database systems using the capabilities of PLSQL.

**Prerequisites:**

- Familiar with fundamental concepts of DBMS.
- Database designing and retrieving using SQL.

**Course Outline**

Sr. No.	Course Contents	Hours
1	<b>Database Architecture and Managing Data Storage</b> Database User and Administrators, DBMS Component Modules Database System Utilities, Memory Hierarchy and Storage Devices Storage of Databases, Buffering of Blocks, Placing File Record on Disk Files of Ordered Records and Unordered Records	08
2	<b>Indexing and Database Security</b> Types of Single Level Ordered Indexes, Primary Index, Cluster Index, Secondary Index, Multilevel Index, Database Security and its Issues, Granting and Revoking Privileges using SQL, Encryption , Public Key Infrastructure (PKI)	12
3	<b>Transaction Concepts and Concurrency</b> Introduction to transaction, overview of transaction execution, Transaction States, Transaction Properties, Transaction Log (Transaction Journal), Concurrency Control Transaction Execution and Problems of Concurrency, Transaction Execution and Control with SQL	10



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4	<b>Transaction Processing and Execution</b> Concurrent Execution of Transaction (Reasons of Concurrent Execution, Schedule, Serial and Non Serial Schedule), Serializability (Conflict and View Serializability) Recoverability of Schedules (Recoverable Schedule and Cascade-less Schedule) Locking: Lock Granularity, Levels of Locking, Types of Locking, Two-Phase Locking Protocol (2PL), Deadlock: Definition, Deadlock Prevention, Deadlock Detection and Deadlock Avoidance	10
5	<b>Database backup and Recovery</b> Need of Database backup, Database backup techniques, Types of Database failures Types of Database recovery (Forward recovery, Backward recovery, Media recovery), Recovery techniques (Deferred Update, Immediate update, Shadow Paging, Checkpoints)	08
	<b>Total hours</b>	<b>48</b>

**PRACTICAL LIST:**

1	<ul style="list-style-type: none"> <li>▪ Write a program to calculate the AREA and store that value in the table AREAS (RADIUS NUMBER (5), AREA NUMBER (14,2))</li> <li>▪ Write a program to calculate the square and cube of the given number</li> </ul>
2	<ul style="list-style-type: none"> <li>▪ Write a program that accepts a value from the user then print that value.</li> <li>▪ Write a program that accepts 2 numbers from the user and interchange the values of those 2 numbers.</li> </ul>
3	<ul style="list-style-type: none"> <li>▪ Write a program for input your R_NO, NAME, YEAR and name of 5 subjects then print them separately on the screen and also print them in the one line.</li> <li>▪ Write a program of mark sheet with displays the SEAT_NO, NAME, marks of 5 subjects, total of 5 subjects and percentage, also display the class of student.</li> </ul>
4	Write a program that will accept the a/c no. from the user and debit an amount of Rs.2000 from the a/c. If the a/c has the minimum balance of Rs.500 after the amount is debited. For this problem use ACCOUNT table.
5	<ul style="list-style-type: none"> <li>▪ Write a program that print 1 to 100 numbers using FOR LOOP.</li> <li>▪ Write a program that prints 1 to 100 number using LOOP Command.</li> <li>▪ Write a program that prints 1 to 100 number using WHILE LOOP Command.</li> </ul>
6	Write a program that displays the use of %TYPE variable. This program stores the values of the columns in the memory variables using %TYPE and %ROWTYPE variables.
7	<ul style="list-style-type: none"> <li>▪ Write a program to find out whether or not the given employee is eligible for bonus or not according to following condition. The bonus is granted if the salary is more than the average total salary of any one employee otherwise the bonus will be not granted.</li> </ul>



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	<ul style="list-style-type: none"> <li>▪ Write a program that finds the reverse number of inputted number.</li> </ul>
<b>8</b>	<ul style="list-style-type: none"> <li>▪ Write a program that uses a cursor attribute SQL%FOUND to raise the salary of employees by 20% and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor)</li> <li>▪ Write a program that uses a cursor attribute SQL%NOTFOUND to raise the salary of employees by 15% and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor)</li> </ul>
<b>9</b>	Write a program that uses a cursor attribute SQL%ROWCOUNT to raise the salary of employees by 10% that are working in department number 10 and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor)
<b>10</b>	Write a program that displays the deletion of records using an IMPLICIT CURSOR. (Use Implicit Cursor)
<b>11</b>	Write a program that uses a cursor attribute %ISOPEN and %NOTFOUND to raise the salary of employees of department number 20 by 5% and also display the appropriate message based on the existence to the record in the EMP table. Whenever any such raise is given to the employees, a record for the same is maintained in the emp_update table. (Use Explicit Cursor)
<b>12</b>	Write a program that uses a cursor attribute %ROWCOUNT to display the name, department and salary of first 10 employees getting the highest salary. (Use Explicit Cursor)
<b>13</b>	Write a program using a cursor to raise the salary of employees of department number 20 by 5% and also display the appropriate message based on the existence to the record in the EMP table. Whenever any such raise is given to the employees, a record for the same is maintained in the emp_update table. (Use Cursor For Loop)
<b>14</b>	Write a program using a cursor FOR loop to display name and the basic salary of 3 highest paid employees. (Use Cursor For Loop)
<b>15</b>	Write a program using a parameterized cursor that displays the department wise salary of each employee and department wise total gross salary. (Parameterized Cursor and Use Cursor For Loop)
<b>16</b>	<ul style="list-style-type: none"> <li>▪ Write a program that explains the use of NO_DATA_FOUND exception. (Use System Exception)</li> <li>▪ Write a program that explains the use of TOO_MANY_ROWS exception. (Use System Exception)</li> </ul>
<b>17</b>	<ul style="list-style-type: none"> <li>▪ Write a program that explains the use of INVALID_NUMBER exception. (Use System Exception)</li> <li>▪ Write a program that explains the use of ZERO_DIVIDE exception. (Use System Exception)</li> </ul>
<b>18</b>	Write a program that explains the use of exception trapping functions SQLCODE and SQLERRM.
<b>19</b>	Write a program using a cursor to insert the records of employee in EMP_BACKUP table for given DEPT_NO, also raise a user defined exception NO_DEPT_FOUND when no records are found for entered DEPT_NO. .



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	(Use User Defined Exception)
<b>20</b>	Write a program using an implicit cursor display the commission of given EMP_NO, also raise a user defined exception NULL_COMMISSION when no value (NULL) is available for commission. (Use User Defined Exception)
<b>21</b>	<ul style="list-style-type: none"> <li>▪ Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is deleted from EMP table.</li> <li>▪ Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is updated in EMP table.</li> <li>▪ Write a trigger to insert the values into the NEWEMP table when the records are inserted into the EMP table.</li> </ul>
<b>22</b>	<ul style="list-style-type: none"> <li>▪ Write a trigger for INSERT, UPDATE and DELETE operation in one program</li> <li>▪ Write a trigger to restrict user form using the table on Sunday.</li> </ul>
<b>23</b>	<ul style="list-style-type: none"> <li>▪ Write a trigger that identifies the gender of the employee and according to the gender sets MR. in front of MALE employees and MS. in front of FEMALE employee.</li> <li>▪ Write a trigger that restricts the entry of record if salary is greater than 8000 Rs.</li> </ul>
<b>24</b>	<ul style="list-style-type: none"> <li>▪ Write a simple procedure without any parameter that updates the values in the EMP table.</li> <li>▪ Write a simple procedure that increases by the salary of employees for the given department no by percentage inputted by the user using IN parameter.</li> </ul>
<b>25</b>	Write a procedure that search's whether the given employee number is present or not in the table. (Use both IN and OUT mode variables) and also Write a PL/SQL block to call the SEARCH_EMP procedure.
<b>26</b>	<ul style="list-style-type: none"> <li>▪ Write a function that returns the square of the given number.</li> <li>▪ Write a function that calculates the factorial of the given number.</li> <li>▪ Execute both the functions using block and without using PL/SQL block.</li> </ul>
<b>27</b>	<ul style="list-style-type: none"> <li>▪ Write a function that calculates the binary value for the given number.</li> <li>▪ Write a function that check where the given year is leap year or not</li> <li>▪ Execute both the functions using block and without using PL/SQL block.</li> </ul>
<b>28</b>	Write a function that returns balance for given account number.
<b>29</b>	Write a package that executes procedures that given in practical no. 24
<b>30</b>	Write a package that executes functions that given in practical no. 26



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### **Learning Outcomes:**

- To familiarize the students with advance concepts of DBMS.
- To give overview of emerging database technologies.
- Knowledge of handing multiple transactions effectively.
- Database backup and recovery techniques.

### **Teaching & Learning Methodology:**

- Class room and laboratory teaching using teaching and learning tools like multimedia projector, overhead projectors etc.

### **Books Recommended:**

- “Fundamentals of Database Systems”, **Elmsari, Navathe**, 5th Edition, Pearson Education (2008)
- “Database System Concepts”, **Silberschatz, Korth, Sudarshan**, 5th Edition, McGraw Hill Publication

### **Additional Reference Book(s)**

- “An Introduction to Database Systems”, **C J Date, A Kannan, S Swaminathan**, 8th Edition, Pearson Education (2006)
- Database Management Systems, **Ramakrishnan, Gehrke**, , McGraw Hill, Third Edition.