

**DAYANANDA SAGAR COLLEGE OF ENGINEERING**  
 (An Autonomous Institute Affiliated to VTU, Belagavi) Approved by AICTE & ISO 9001:2008 Certified)  
 Accredited by National Assessment & Accreditation Council (NAAC) with 'A' grade  
 Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560078  
**DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING**  
**SCHEME 2018**

**Database Management Systems Laboratory with Miniproject**

**Course code: 18IS5DLDBL**

**Credits: 02**

**L: P: T: S: 0:2:1:0**

**CIE Marks: 50**

**Exam Hours: 03**

**SEE Marks: 50**

**Course objectives:**

1. Execute SQL commands.
2. Implement simple exercises on relational database schema.
3. Design a relational database schema for specific database application using SQL
4. Apply normalization procedure on relational database schema.

**Course Outcomes: At the end of the course, student will be able to:**

<b>CO1</b>	Interpret and use the fundamentals of database, transactions and related concepts.
<b>CO2</b>	Apply E-R and relational modeling techniques for a given problem
<b>CO3</b>	Develop and impose integrity constraints on a database
<b>CO4</b>	Build a database using SQL for the given requirements.
<b>CO5</b>	Analyze and query a database using SQL
<b>CO6</b>	Generate suitable reports from the database application

**Mapping of Course outcomes to Program outcomes:**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3	3	3	-	2	-	-	2	-	-	-	2
<b>CO2</b>	3	3	3	1	2	-	-	2	-	-	-	1
<b>CO3</b>	3	3	3	1	2	-	-	2	-	-	-	1
<b>CO4</b>	3	3	3	1	2	-	-	2	-	-	-	1
<b>CO5</b>	3	3	3	1	2	-	-	2	-	-	-	1
<b>CO6</b>	3	3	3	1	2	-	-	2	-	-	-	1

**Instructions:**

In the examination, one exercise from Part A is to be asked for a total of 20 marks. The mini project developed under Part B has to be evaluated for a total of 30 marks.

**For Part A:**

1. The exercises are to be solved in an RDBMS environment like Oracle / MySQL / DB2.
2. Suitable tuples have to be entered so that queries are executed correctly.
3. The results of the queries must be displayed directly.



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4. Relevant queries other than the ones listed along with the exercises may also be asked in the examination.

5. Questions must be asked based on lots.

**For Part B:**

1. Front end may be created using any of VB/HTML/JAVA/Python.
2. Back end may be Oracle/DB2/SQL/MYSQL.
3. Report should be prepared in a standard format prescribed for project work.
4. All applications must be demonstrated on desktop/laptop as a stand-alone or web based application. (Mobile apps on Android/IOS are not permitted.)

<b>Part A: Lab Experiments</b>			
<b>Program</b>	<b>Course Content</b>	<b>Hours</b>	<b>COs</b>
<b>1</b>	<p><b>Consider the following schema for a Library Database:</b>            BOOK (Book_id, Title, Publisher_Name, Pub_Year)            BOOK_AUTHORS (Book_id, Author_Name)            PUBLISHER (Pub_id, Name, Address, Phone)            BOOK_COPIES (Book_id, Branch_id, No-of_Copies)            BOOK_LENDING (Book_id, Branch_id, Card_No, Date_Out, Due_Date)            LIBRARY_BRANCH (Branch_id, Branch_Name, Address)</p> <p><b>Write SQL queries to</b>            i. Create the above tables by properly specifying the primarykeys and the foreign keys.            ii. Enter at least five tuples for each relation.            iii. Retrieve details of all books in the library – book-id, title, publisher name, authors, number of copies, etc.            iv. Get the details of borrowers who have borrowed more than 3 book from Jan 2019 to Jun 2019            v. Demonstrate the DELETE operation by deleting a book details in BOOK table.            vi. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.            vii. Create a view of all books and its number of copies that are currently available in the Library.</p>	<b>3</b>	<b>CO1, CO2, CO3, CO4, CO5</b>
<b>2</b>	<p><b>Consider the following schema for Order Database:</b>            SALESMAN (Salesman_id, Name, City, Commission)            CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id)            ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)</p> <p><b>Write SQL queries to</b>            i. Create the above tables by properly specifying the primarykeys and the foreign keys.            ii. Enter at least five tuples for each relation.            iii. Count the customers with grades above Bangalore's average.            iv. Find the name and numbers of all salesmen who had more than one customer.            v. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.)            vi. Create a view that finds the salesman who has the customer with the highest order of a day.</p>	<b>3</b>	<b>CO1, CO2, CO3, CO4, CO5</b>

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	vii. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.		
3	<b>Consider the schema for Movie Database:</b> ACTOR (Act_id, Act_Name, Act_Gender) DIRECTOR (Dir_id, Dir_Name, Dir_Phone) MOVIES (Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id) MOVIE_CAST (Act_id, Mov_id, Role) RATING (Mov_id, Rev_Stars) <b>Write SQL queries to</b> i. Create the above tables by properly specifying the primarykeys and the foreign keys. ii. Enter at least five tuples for each relation. iii. List the titles of all movies directed by 'Mr. Dwarakesh'. iv. Find the movie names where actors acted in two or more movies. iv. List all actors who acted in a movie before 2005 and also in a movie after 2015 (use JOIN operation). v. Find the title of movie and number of stars rated for each movie that has at least one rating and also find the highest number of stars that movie received. Sort the result by movie title. vi. Update rating of all movies directed by 'Lankesh' to 3.	3	CO1, CO2, CO3, CO4, CO5
4	<b>The following relations keep track of airline flight information:</b> FLIGHTS ( <i>no</i> : integer, <i>from</i> : string, <i>to</i> : string, <i>distance</i> : integer, <i>Departs</i> : time, <i>arrives</i> : time, <i>price</i> : real) AIRCRAFT ( <i>aid</i> : integer, <i>aname</i> : string, <i>cruisingrange</i> : integer) Certified ( <i>eid</i> : integer, <i>aid</i> : integer) EMPLOYEES ( <i>eid</i> : integer, <i>ename</i> : string, <i>salary</i> : integer) Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft and only pilots are certified to fly. <b>Write each of the following queries in SQL.</b> i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80, 000. ii. For each pilot who is certified for more than three aircrafts, find the <i>eid</i> and the maximum <i>cruisingrange</i> of the aircraft for which she or he is certified. iii. Find the names of pilots whose <i>salary</i> is less than the price of the cheapest route from Bengaluru to Frankfurt. iv. For all aircraft with <i>cruisingrange</i> over 1000 Kms, Find the name of the aircraft and the average salary of all pilots certified for this aircraft. v. Find the names of pilots certified for some Boeing aircraft. vi. Find the <i>aids</i> of all aircraft that can be used on routes from Bengaluru to New Delhi.	3	CO1, CO2, CO3, CO4, CO5
5	<b>Consider the following database for a banking enterprise</b> BRANCH (branch-name:string, branch-city:string, assets:real) ACCOUNT (accno:int, branch-name:string, balance:real) DEPOSITOR (customer-name:string, accno:int) CUSTOMER (customer-name:string, customer-street:string, customer-city:string)	3	CO1, CO2, CO3, CO4, CO5

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	<p>LOAN(loan-number:int, branch-name:string, amount:real) BORROWER(customer-name:string, loan-number:int) <b>Write each of the following queries in SQL.</b> i. Create the above tables by properly specifying the primary keys and the foreign keys ii. Enter at least five tuples for each relation iii. Find all the customers who have at least two accounts at the <i>Main</i> branch. iv. Find all the customers who have an account at <i>all</i> the branches located in a specific city. v. Demonstrate how you delete all account tuples at every branch located in a specific city. vi. Find the names of all depositors of a specific branch. vii. Find the details of all loan holder of a specific branch.</p>		
<b>Part B: Mini project</b>			
<p>Each student has to carry out a mini project on the problem identified individually. For the problem identified:</p> <ol style="list-style-type: none"> <li>1) List the set of requirements</li> <li>2) Design an ER Diagram by identifying the following: <ol style="list-style-type: none"> <li>i. Entities(Minimum 5) and attributes</li> <li>ii. Entity Types, Entity Sets, keys and Value Sets.</li> <li>iii. Relationship types, Relationship Degree.</li> <li>iv. Relationship Constraints: Cardinality Ratio and Participation.</li> <li>v. Attributes of Relationship Types.</li> <li>vi. Weak Entity Types if any.</li> </ol> </li> <li>3) Draw the Schema Diagram with Referential Integrity Constraints displayed.</li> <li>4) Normalize the relations up to BCNF or 3rd Normal Form.</li> <li>5) Create the database.</li> <li>6) Insert suitable records in the database.</li> <li>7) Execute any two distinctive queries on the database.</li> <li>8) Create and execute any two triggers on the database.</li> <li>9) Create and execute any one stored procedures on the database.</li> <li>10) Generate any two typical reports on the database.</li> </ol> <p>The code developed during the project will be reviewed by internal faculties during the semester. At the completion of a project the student will submit a project report, which will be evaluated by duly appointed examiner(s).</p>			<p><b>CO1, CO2, CO3, CO4, CO5, CO6</b></p>

**TEXT BOOKS:**

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7<sup>th</sup> Edition, 2017, Pearson.
2. Database management systems, Ramakrishnan, and Gehrke, 3<sup>rd</sup> Edition, 2014, McGraw Hill

**REFERENCE BOOKS:**

1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012