DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

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Experiment 1.1

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Semester: 5th **Date of Performance:** 22 July, 2025

Subject Name: ADBMS **Subject Code:** 23CSP-333

1. **Experiment Name:**
   To design and manipulate a University Database using SQL that involves creating relation Tables for Students, Courses, Enrollments and Professors, intserting and retrieving data Using JOINs, managing access control with GRANT/REVOKE, and handling transaction Control using COMMIT and ROLLBACK.

2. **Objective:**
   Easy-Level Problem
   Problem Title: Author-Book Relationship Using Joins and Basic SQL Operations
   Procedure (Step-by-Step):
   Design two tables — one for storing author details and the other for book details.

   Ensure a foreign key relationship from the book to its respective author.

   Insert at least three records in each table.

   Perform an INNER JOIN to link each book with its author using the common author ID.

   Select the book title, author name, and author's country.

   Sample Output Description:

When the join is performed, we get a list where each book title is shown along with its author's name and their country.

Medium-Level Problem
Problem Title: Department-Course Subquery and Access Control
Procedure (Step-by-Step):

Design normalized tables for departments and the courses they offer, maintaining a foreign key relationship.

Insert five departments and at least ten courses across those departments.

Use a subquery to count the number of courses under each department.

Filter and retrieve only those departments that offer more than two courses.

Grant SELECT-only access on the courses table to a specific user.

Sample Output Description:

The result shows the names of departments which are associated with more than two courses in the system.

Hard-Level Problem

3. **Code:**

```
-- Easy-Level Problem

create table author1(author_id int primary key ,author_name varchar(max),country varchar(max))
create table book1(book_id int primary key,book_tittle varchar(max),author_id int foreign key (author_id) references author1(author_id))
insert into author1(author_id,author_name,country)
values(1,'Rohit','India'),(2,'Harshdeep
Singh','Canada'),(3,'Riyan','USA'),(4,'Vishal','Austrila')
insert into book1(book_id,book_tittle,author_id)
values(100,'c++',1),(101,'Python',2),(102,'Java',3),(103,'SQL',4)
select * from author1
select * from book1
```

```
select book1.book_tittle,author1.author_name,author1.country
from author1
inner join book1
on author1.author_id=book1.author_id



-- Medium-Level Problem*

create table department(department_id int primary key,department_name
varchar(max))
create table courses(course_id int primary key,course_name
varchar(max),department_id int foreign key (department_id) references
department(department_id))
insert into department(department_id,department_name) values(1,'Computer
Science'),(2,'Mechenical Engineering'),(3,'Electrical Engineering'),(4,'Civil
Engineering'),(5,'Biotechnology')
insert into courses(course_id,course_name,department_id) values
(101, 'Data Structures', 1),
(102, 'Algorithms', 1),
(103, 'Database Systems', 1),
(201, 'Thermodynamics', 2),
(301, 'Circuit Theory', 3),
(302, 'Power Systems', 3),
(401, 'Structural Analysis', 4),
(402, 'Building Materials', 4),
(403, 'Surveying', 4),
(404, 'Geotechnical Engineering', 4),
(501, 'Molecular Biology', 5)
select * from department
select * from courses
SELECT department.department_name
FROM department
JOIN courses  ON department.department_id = courses.department_id
GROUP BY department.department_id, department.department_name
HAVING COUNT(*) >= 2;
GRANT select on courses to RohitKhola
```

6. **Output:**

	author_id	author_name	country
1	1	Rohit	India
2	2	Harshdeep Singh	Canada
3	3	Riyan	USA
4	4	Vishal	Austrila

	book_id	book_tittle	author_id
1	100	c++	1
2	101	Python	2
3	102	Java	3
4	103	SQL	4

	book_tittle	author_name	country
1	c++	Rohit	India
2	Python	Harshdeep Singh	Canada
3	Java	Riyan	USA
4	SQL	Vishal	Austrila

	department_id	department_name
1	1	Computer Science
2	2	Mechenical Engineering
3	3	Electrical Engineering
4	4	Civil Engineering
5	5	Biotechnology

	course_id	course_name	department_id
1	101	Data Structures	1
2	102	Algorithms	1
3	103	Database Systems	1
4	201	Thermodynamics	2
5	301	Circuit Theory	3
6	302	Power Systems	3
7	401	Structural Analysis	4
8	402	Building Materials	4
9	403	Surveying	4
10	404	Geotechnical E...	4
11	501	Molecular Biology	5

	department_name
1	Computer Science
2	Electrical Engineering
3	Civil Engineering

7. **Learning Outcomes:**
    - Understanding of Table Design and Relationships
    - Proficiency in SQL JOIN Operations
    - Mastery of Subqueries for Filtering Data