Queries with OUTPUT
Final Submission

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SQL Queries :

1. Insert a new elective course into the database

```
568 INSERT INTO Course (CourseID, CourseName, Branch, Credits, Lecture, Tutorial, Labs, Material)
569 VALUES ('CSE01', 'Data Science', 'CSE', 4, 3, TRUE, TRUE, 'Material content here');
570
```

Data Output | Messages | Notifications

```
INSERT 0 1

Query returned successfully in 107 msec.
```

2. Update the details of an existing elective course

```
571 UPDATE Course
572 SET CourseName = 'Advanced Data Science',
573     Credits = 5,
574     Material = 'Updated material content'
575 WHERE CourseID = 'CSE01';
576
```

Data Output | Messages | Notifications

```
UPDATE 1

Query returned successfully in 227 msec.
```

3. Delete an elective course from the database

```
577 DELETE FROM Course
578 WHERE CourseID = 'CSE01';
579
```

Data Output | Messages | Notifications

```
DELETE 1

Query returned successfully in 166 msec.
```

4.Retrieve a list of all elective courses

```
581  SELECT * FROM Course;
```

Data Output | Messages | Notifications

Showing rows: 1 to 54 | Page No: 1 of 1

	courseid [PK] character varying (5)	coursename character varying (100)	branch character varying (10)	credits integer	lecture integer	tutorial boolean	labs boolean	material text
1	GT01	Graph Theory and Algorithms	ICT	4	3	true	false	Basic graph concepts, algorithms
2	AA02	Approximation Algorithms	ICT	3	3	false	false	Approximation techniques
3	CC03	Computational Complexity	ICT	3	3	true	false	Complexity classes
4	RA04	Randomized Algorithms	ICT	3	3	false	false	Randomized computation
5	IC06	Introduction to Cryptography	ICT	3	3	false	false	Encryption methods
6	CD11	Compiler Design	ICT	4	3	true	true	Compiler construction
7	SE24	Software Engineering	ICT	4	3	true	true	Software development
8	SN31	System and Network Security	ICT	4	3	true	true	Security principles
9	NL22	Natural Language Processing	ICT	4	3	true	false	NLP techniques
10	DM21	Data Mining and Visualization	ICT	4	3	true	true	Data analysis

5. Retrieve details of a specific elective course by course ID

```
583  SELECT * FROM Course
584  WHERE CourseID = 'GT01';
585
```

Data Output | Messages | Notifications

Showing rows: 1 to 1 | Page No: 1

	courseid [PK] character varying (5)	coursename character varying (100)	branch character varying (10)	credits integer	lecture integer	tutorial boolean	labs boolean	material text
1	GT01	Graph Theory and Algorithms	ICT	4	3	true	false	Basic graph concepts, algorithms

6. Find all elective courses offered by a specific department (Branch)

```
586  SELECT * FROM Course
587  WHERE Branch = 'MNC';
588
```

Data Output | Messages | Notifications

Showing rows: 1 to 12 | Page No: 1 of 1

	courseid [PK] character varying (5)	coursename character varying (100)	branch character varying (10)	credits integer	lecture integer	tutorial boolean	labs boolean	material text
1	QC05	Quantum Computing	MNC	4	3	true	true	Quantum principles
2	AI37	Introduction to AI	MNC	4	3	true	false	AI fundamentals
3	DL35	Deep Learning	MNC	4	3	true	true	Neural networks
4	AM08	Adversarial Machine Learning	MNC	3	3	false	false	Security in ML
5	MS09	Machine Learning and Security	MNC	3	3	true	false	ML for security
6	RS36	Recommendation Systems	MNC	3	3	false	false	Recommender algorithms
7	CN40	Introduction to Complex Network	MNC	3	3	false	false	Network theory
8	IR39	Introduction to Robotics	MNC	4	3	true	true	Robotics principles
9	CT19	Control Theory	MNC	4	3	true	true	Control systems
10	OP25	Optimization	MNC	3	3	false	false	Optimization methods

7. Find all elective courses with a specific credit count

```
589  SELECT * FROM Course
590  WHERE Credits = 4;
591
```

Data Output | Messages | Notifications

Showing rows: 1 to 25 | Page No: 1 of

	courseid [PK] character varying (5)	coursename character varying (100)	branch character varying (10)	credits integer	lecture integer	tutorial boolean	labs boolean	material text
1	GT01	Graph Theory and Algorithms	ICT	4	3	true	false	Basic graph concepts, algorithms
2	CD11	Compiler Design	ICT	4	3	true	true	Compiler construction
3	SE24	Software Engineering	ICT	4	3	true	true	Software development
4	SN31	System and Network Security	ICT	4	3	true	true	Security principles
5	NL22	Natural Language Processi...	ICT	4	3	true	false	NLP techniques
6	DM21	Data Mining and Visualizati...	ICT	4	3	true	true	Data analysis

Student Enrollment Queries:

1. Enroll a student in an elective course.

```
764 INSERT INTO Enrollment (StudentID, CourseID, GradeReceived)
765 VALUES ('202101001', 'AA02', NULL);
766
767
```

Data Output | Messages | Notifications

```
INSERT 0 1

Query returned successfully in 61 msec.
```

2. Remove a student from an elective course.

```
766
767 DELETE FROM Enrollment
768 WHERE StudentID = '202101001' AND CourseID = 'GT01';
```

Data Output | Messages | Notifications

```
DELETE 0

Query returned successfully in 349 msec.
```

3. Retrieve all courses a specific student has registered for.

```
770 SELECT c.CourseID, c.CourseName, e.GradeReceived
771 FROM Enrollment e
772 JOIN Course c ON e.CourseID = c.CourseID
773 WHERE e.StudentID = '202101002';
774
```

Data Output | Messages | Notifications

	courseid character varying (5)	coursename character varying (100)	gradereceived character varying (2)
1	GT01	Graph Theory and Algorithms	AA
2	SN31	System and Network Security	BC
3	DL35	Deep Learning	BB
4	DS38	Intro to Data Science	AB

4. Find the number of students enrolled in a specific elective course.

```
775 SELECT c.CourseName, COUNT(e.StudentID) AS EnrollmentCount
776 FROM Enrollment e
777 JOIN Course c ON e.CourseID = c.CourseID
778 WHERE e.CourseID = 'GT01'
779 GROUP BY c.CourseName;
```

Data Output | Messages | Notifications

	coursename character varying (100)	enrollmentcount bigint
1	Graph Theory and Algorithms	9

5. Find all students enrolled in a specific elective course.

```
781 SELECT u.Name AS StudentName, s.StudentID
782 FROM Enrollment e
783 JOIN Student s ON e.StudentID = s.StudentID
784 JOIN Users u ON s.StudentID = u.UID
785 WHERE e.CourseID = 'GT01';
```

Data Output | Messages | Notifications

	studentname character varying (50)	studentid character varying (10)
1	Diya Sharma	202101002
2	Ananya Reddy	202104001
3	Krish Malhotra	202104002
4	Ishaan Kumar	202111001
5	Aanya Verma	202201001
6	Aditi Nair	202211001
7	Advait Trivedi	202301001
8	Kabir Srinivasan	202311001
9	Pari Gupta	202401001

6. Retrieve all elective courses available for a particular semester.

```
787  SELECT DISTINCT c.CourseID, c.CourseName
788  FROM Offered o
789  JOIN Course c ON o.CourseID = c.CourseID
790  WHERE o.Year = 2024 AND o.Semester = 1;
```

Data Output | Messages | Notifications

	courseid [PK] character varying (5)	coursename character varying (100)
1	AA02	Approximation Algorithms
2	AM08	Adversarial Machine Learning
3	BC07	Blockchain and Cryptocurrencies
4	DI12	Digital Image Processing
5	GT01	Graph Theory and Algorithms

7. Retrieve students who have not enrolled in any elective course.

```
792  SELECT u.Name AS StudentName, s.StudentID
793  FROM Student s
794  JOIN Users u ON s.StudentID = u.UID
795  LEFT JOIN Enrollment e ON s.StudentID = e.StudentID
796  WHERE e.StudentID IS NULL;
```

Data Output | Messages | Notifications

	studentname character varying (50)	studentid character varying (10)

Faculty Related Queries:

1. Assign an instructor to a specific elective course.

```
738  INSERT INTO Offered (CourseID, ProfID, Year, Semester, Intake)
739  VALUES ('AA02', 'MAJO', 2024, 1, 60);
740
```

Data Output | Messages | Notifications

```
INSERT 0 1

Query returned successfully in 63 msec.
```

2. Retrieve all elective courses taught by a specific instructor.

```
740
741  SELECT c.CourseID, c.CourseName, o.Year, o.Semester
742  FROM Offered o
743  JOIN Course c ON o.CourseID = c.CourseID
744  WHERE o.ProfID = 'MAJO';
```

Data Output | Messages | Notifications

	courseid character varying (5)	coursename character varying (100)	year integer	semester integer
1	GT01	Graph Theory and Algorithms	2024	1
2	GT01	Graph Theory and Algorithms	2023	1
3	GT01	Graph Theory and Algorithms	2022	1
4	GT01	Graph Theory and Algorithms	2021	1

3. Find the instructor assigned to a specific elective course.

```
746  SELECT u.Name AS ProfessorName
747  FROM Offered o
748  JOIN Professor p ON o.ProfID = p.ProfID
749  JOIN Users u ON p.ProfID = u.UID
750  WHERE o.CourseID = 'GT01' AND o.Year = 2024 AND o.Semester = 1;
```

Data Output | Messages | Notifications

	professorname character varying (50)
1	Manjunath V. Joshi

4. Find all elective courses that do not have an assigned instructor.

```
752  SELECT c.CourseID, c.CourseName
753  FROM Course c
754  LEFT JOIN Offered o ON c.CourseID = o.CourseID
755  WHERE o.ProfID IS NULL;
756
757
```

Data Output | Messages | Notifications

	courseid [PK] character varying (5)	coursename character varying (100)
1	OB53	Organisational Behaviour
2	EP43	Einstein Physics
3	CN40	Introduction to Complex Network
4	NC23	Natural Computing
5	AI47	Analog IC Design
6	OP25	Optimization
7	MC30	Models of Computation
8	AP50	Art: Ideas and Perspectives
9	NT42	Computational Number Theory
10	SP28	Software Project Management
11	MS09	Machine Learning and Security
12	NS32	No SQL Database

5. Retrieve a list of instructors who have not been assigned any elective courses.

```
757  SELECT u.Name AS ProfessorName
758  FROM Professor p
759  JOIN Users u ON p.ProfID = u.UID
760  LEFT JOIN Offered o ON p.ProfID = o.ProfID
761  WHERE o.ProfID IS NULL;
```

Data Output | Messages | Notifications

	professorname character varying (50)
1	Arpit Rana
2	Mukesh Tiwari
3	Amit Mankodi
4	Ratna Bharati Bhamidipati
5	Minal Bhise
6	Biswajit Mishra
7	Nabin Kumar Sahu
8	P S Kalyan Sasidhar
9	Jenson Joseph
10	Manoj Raut
11	Sunitha V
12	Tathagata Bandyopadhy...

Course Related Queries:

1. Retrieve the total number of elective courses offered in a semester.

```
798  SELECT COUNT(DISTINCT CourseID) AS TotalElectiveCourses
799  FROM Offered
800  WHERE Year = 2024 AND Semester = 1;
```

Data Output | Messages | Notifications

	totalelectivecourses bigint
1	5

2. Retrieve the total number of students enrolled in electives across all departments.

```
802  SELECT COUNT(DISTINCT StudentID) AS TotalStudentsEnrolled
803  FROM Enrollment;
```

Data Output | Messages | Notifications

	totalstudentsenrolled bigint
1	27

3. Retrieve the average number of students per elective course.

```
805  SELECT ROUND(AVG(student_count), 0) AS AvgStudentsPerCourse
806  FROM (
807      SELECT CourseID, COUNT(StudentID) AS student_count
808      FROM Enrollment
809      GROUP BY CourseID
810  ) AS course_enrollments;
```

Data Output | Messages | Notifications

	avgstudentspercourse numeric
1	3

4. Find students who have registered for the maximum number of electives allowed.

```
812  SELECT s.StudentID, u.Name, COUNT(e.CourseID) AS ElectivesTaken
813  FROM Enrollment e
814  JOIN Student s ON e.StudentID = s.StudentID
815  JOIN Users u ON s.StudentID = u.UID
816  GROUP BY s.StudentID, u.Name
817  ORDER BY ElectivesTaken DESC
818  LIMIT 10;
```

Data Output | Messages | Notifications

	studentid character varying (10)	name character varying (50)	electivestaken bigint
1	202101001	Aarav Patel	4
2	202201001	Aanya Verma	4
3	202201002	Arjun Joshi	4
4	202301002	Kiara Mehta	4
5	202301001	Advait Trivedi	4
6	202101002	Diya Sharma	4
7	202203001	Myra Bhatt	3
8	202211001	Aditi Nair	3
9	202203002	Reyansh Desai	3
10	202303001	Shaurya Rao	3

5. List course with labs / tutorials.

```
820  SELECT
821      CourseID,
822      CourseName,
823      CASE WHEN Tutorial THEN 'Yes' ELSE 'No' END AS HasTutorial,
824      CASE WHEN Labs THEN 'Yes' ELSE 'No' END AS HasLab
825  FROM Course
826  WHERE Tutorial = TRUE OR Labs = TRUE;
```

Data Output | Messages | Notifications

	courseid [PK] character varying (5)	coursename character varying (100)	hastutorial text	haslab text
1	GT01	Graph Theory and Algorithms	Yes	No
2	CC03	Computational Complexity	Yes	No
3	CD11	Compiler Design	Yes	Yes
4	SE24	Software Engineering	Yes	Yes
5	SN31	System and Network Security	Yes	Yes
6	NL22	Natural Language Processing	Yes	No
7	DM21	Data Mining and Visualization	Yes	Yes
8	QC05	Quantum Computing	Yes	Yes
9	AI37	Introduction to AI	Yes	No
10	DL35	Deep Learning	Yes	Yes

Rating Related Queries :

1. Top rated course with professor list in a particular semester and year

Query | Query History

```
554  SELECT
555      c.CourseName,
556      p.Name AS ProfessorName,
557      ROUND(AVG(r.Overall_Rating)::numeric, 2) AS AverageRating
558  FROM Rating r
559  JOIN Course c ON r.CourseID = c.CourseID
560  JOIN Professor pr ON r.ProfID = pr.ProfID
561  JOIN Users p ON pr.ProfID = p.UID
562  JOIN Offered o ON r.CourseID = o.CourseID AND r.ProfID = o.ProfID
563  WHERE o.Year = 2023 AND o.Semester = 1
564  GROUP BY c.CourseName, p.Name
565  ORDER BY AverageRating DESC
566  LIMIT 2;
```

Data Output | Messages | Notifications

	coursename character varying (100)	professorname character varying (50)	averagerating numeric
1	Graph Theory and Algorithms	Manjunath V. Joshi	7.86
2	Quantum Computing	Pratim Roy	5.00

2. Most Difficult Course List

```
592  SELECT
593      c.CourseName,
594      ROUND(AVG(r.Course_Difficulty)::numeric, 2) AS AvgDifficulty
595  FROM Rating r
596  JOIN Course c ON r.CourseID = c.CourseID
597  GROUP BY c.CourseName
598  ORDER BY AvgDifficulty DESC
599  LIMIT 10;
600
```

Data Output | Messages | Notifications

	coursename character varying (100)	avgdifficulty numeric
1	Quantum Computing	9.00
2	Introduction to Cryptography	8.00
3	Wireless System Design	8.00
4	Deep Learning	8.00
5	Operating Systems	7.00
6	Modern Algebra	6.67
7	Graph Theory and Algorithms	6.14

3. Most Useful Courses

```sql
SELECT c.CourseName, COUNT(p.CourseID) AS NumOfDependentCourses
FROM Prerequisite p
JOIN Course c ON p.Preq_CourseID = c.CourseID
GROUP BY c.CourseName
ORDER BY NumOfDependentCourses DESC
LIMIT 5;
```

Data Output | Messages | Notifications

	coursename character varying (100)	numofdependentcourses bigint
1	Graph Theory and Algorithms	4
2	Introduction to AI	3
3	Modern Algebra	3
4	Digital Signal Processing	2
5	Intro to Data Science	1

4. Course offering average grade above 8

```sql
SELECT
    c.CourseName,
    ROUND(AVG(
        CASE
            WHEN e.GradeReceived = 'AA' THEN 10
            WHEN e.GradeReceived = 'AB' THEN 9
            WHEN e.GradeReceived = 'BB' THEN 8
            WHEN e.GradeReceived = 'BC' THEN 7
            WHEN e.GradeReceived = 'CC' THEN 6
            WHEN e.GradeReceived = 'CD' THEN 5
            WHEN e.GradeReceived = 'DD' THEN 4
            WHEN e.GradeReceived = 'DE' THEN 3
            WHEN e.GradeReceived = 'F' THEN 0
            ELSE NULL
        END
    )::numeric, 2) AS AvgGrade
FROM Enrollment e
JOIN Course c ON e.CourseID = c.CourseID
GROUP BY c.CourseName
HAVING AVG(
    CASE
        WHEN e.GradeReceived = 'AA' THEN 10
        WHEN e.GradeReceived = 'AB' THEN 9
        WHEN e.GradeReceived = 'BB' THEN 8
        WHEN e.GradeReceived = 'BC' THEN 7
        WHEN e.GradeReceived = 'CC' THEN 6
        WHEN e.GradeReceived = 'CD' THEN 5
        WHEN e.GradeReceived = 'DD' THEN 4
```

```
635             WHEN e.GradeReceived = 'DD' THEN 4
636             WHEN e.GradeReceived = 'DE' THEN 3
637             WHEN e.GradeReceived = 'F' THEN 0
638             ELSE NULL
639         END
640     ) > 8
641     ORDER BY AvgGrade DESC;
```

Data Output | Messages | Notifications

	coursename character varying (100)	avggrade numeric
1	Logic for Computer Science	10.00
2	Quantum Computing	9.00
3	Randomized Algorithms	9.00
4	Introduction to Robotics	9.00
5	Digital Signal Processing	9.00
6	Modern Algebra	9.00
7	Compiler Design	8.75

5. All ratings given by a particular student

```
644
645 SELECT c.CourseName, u.Name AS ProfessorName,
646        r.Course_Difficulty, r.Tutorial_Lab_Difficulty,
647        r.Project_Difficulty, r.Overall_Rating
648 FROM Rating r
649 JOIN Course c ON r.CourseID = c.CourseID
650 JOIN Professor p ON r.ProfID = p.ProfID
651 JOIN Users u ON p.ProfID = u.UID
652 WHERE r.StudentID = '202101001'
653 ORDER BY r.Overall_Rating DESC;
654
655
656
657
658
659
```

Data Output | Messages | Notifications

Showing rows: 1 to 3

	coursename character varying (100)	professorname character varying (50)	course_difficulty integer	tutorial_lab_difficulty integer	project_difficulty integer	overall_rating integer
1	Graph Theory and Algorithms	Manjunath V. Joshi	6	5	7	8
2	Modern Algebra	Gopinath Panda	8	6	[null]	7
3	Introduction to AI	Prasenjit Majumder	7	6	8	7

6. All ratings of a particular course with its average rating

```sql
SELECT
    c.CourseName,
    u.Name AS ProfessorName,
    r.Course_Difficulty,
    r.Tutorial_Lab_Difficulty,
    r.Project_Difficulty,
    r.Overall_Rating
FROM Rating r
JOIN Course c ON r.CourseID = c.CourseID
JOIN Professor p ON r.ProfID = p.ProfID
JOIN Users u ON p.ProfID = u.UID
WHERE r.CourseID = 'GT01'

UNION ALL

-- Average rating for course GT01 (rounded to 2 decimal places)
SELECT
    'Average for GT01' AS CourseName,
    NULL AS ProfessorName,
    NULL AS Course_Difficulty,
    NULL AS Tutorial_Lab_Difficulty,
    NULL AS Project_Difficulty,
    ROUND(AVG(Overall_Rating)::numeric, 2) AS Overall_Rating
FROM Rating
WHERE CourseID = 'GT01'

ORDER BY ProfessorName NULLS LAST;
```

	coursename character varying	professorname character varying	course_difficulty integer	tutorial_lab_difficulty integer	project_difficulty integer	overall_rating numeric
1	Graph Theory and Algorithms	Manjunath V. Joshi	4	3	5	10
2	Graph Theory and Algorithms	Manjunath V. Joshi	7	6	8	7
3	Graph Theory and Algorithms	Manjunath V. Joshi	6	5	7	8
4	Graph Theory and Algorithms	Manjunath V. Joshi	8	7	9	6
5	Graph Theory and Algorithms	Manjunath V. Joshi	7	6	8	7
6	Graph Theory and Algorithms	Manjunath V. Joshi	5	4	6	9
7	Graph Theory and Algorithms	Manjunath V. Joshi	6	5	7	8
8	Average for GT01	[null]	[null]	[null]	[null]	7.86

7. Three most loved professors

```
684 SELECT
685     u.Name AS ProfessorName,
686     ROUND(AVG(r.Overall_Rating)::numeric, 2) AS AvgRating
687 FROM Rating r
688 JOIN Professor p ON r.ProfID = p.ProfID
689 JOIN Users u ON p.ProfID = u.UID
690 GROUP BY u.Name
691 ORDER BY AvgRating DESC
692 LIMIT 3;
```

Data Output | Messages | Notifications

SQL

	professorname character varying (50)	avgrating numeric
1	P M Jat	9.00
2	Prasenjit Majumder	8.33
3	Manjunath V. Joshi	7.86

8. Number of students with a particular grade in a specified course

Query | Query History

```
694 SELECT
695     GradeReceived,
696     COUNT(*) AS NumberOfStudents
697 FROM Enrollment
698 WHERE CourseID = 'GT01' AND GradeReceived IS NOT NULL
699 GROUP BY GradeReceived
700 ORDER BY
701     CASE
702         WHEN GradeReceived = 'AA' THEN 1
703         WHEN GradeReceived = 'AB' THEN 2
704         WHEN GradeReceived = 'BB' THEN 3
705         WHEN GradeReceived = 'BC' THEN 4
706         WHEN GradeReceived = 'CC' THEN 5
707         WHEN GradeReceived = 'CD' THEN 6
708         WHEN GradeReceived = 'DD' THEN 7
709         WHEN GradeReceived = 'DE' THEN 8
710         WHEN GradeReceived = 'F' THEN 9
711         ELSE 10
712     END;
713
```

Data Output | Messages | Notifications

SQL

	gradereceived character varying (2)	numberofstudents bigint
1	AA	5
2	AB	2
3	BB	1
4	F	1

SKILLS and PreRequisite Related Queries :

1. Skills acquired from a particular course

```
714  SELECT s.Skill_name
715  FROM Required r
716  JOIN Skills s ON r.Skill_ID = s.Skill_ID
717  WHERE r.CourseID = 'GT01';
```

Data Output | Messages | Notifications

	skill_name character varying (40)
1	Algorithm Design
2	Mathematical Modeling

2. Prerequisite required for a particular course

```
718
719  SELECT c.CourseName
720  FROM Prerequisite p
721  JOIN Course c ON p.Preq_CourseID = c.CourseID
722  WHERE p.CourseID = 'AA02';
```

Data Output | Messages | Notifications

	coursename character varying (100)
1	Graph Theory and Algorithms

3. List Courses based on Particular Skill

```
724  SELECT c.CourseName
725  FROM Required r
726  JOIN Course c ON r.CourseID = c.CourseID
727  JOIN Skills s ON r.Skill_ID = s.Skill_ID
728  WHERE s.Skill_name = 'Algorithm Design';
```

Data Output | Messages | Notifications

	coursename character varying (100)
1	Graph Theory and Algorithms

Specialization Related Queries :

1. Professors with most specialization:

```
730 SELECT u.Name AS ProfessorName, COUNT(ps.Specialization) AS NumOfSpecializations
731 FROM Professor_Specialization ps
732 JOIN Professor p ON ps.ProfID = p.ProfID
733 JOIN Users u ON p.ProfID = u.UID
734 GROUP BY u.Name
735 ORDER BY NumOfSpecializations DESC
736 LIMIT 5;
737
738
```

Data Output | Messages | Notifications

SQL | Showin

	professorname character varying (50)	numofspecializations bigint
1	Bharani Kollipara	2
2	Tapas Kumar Maiti	2
3	Vinay Palaparthy	2
4	Madhumita Mazumdar	2
5	Prosenjit Kundu	2