# ONLINE COURSE REGISTRATION SYSTEM

**COURSE PROJECT REPORT**

**18CSC303J – DATABASE MANAGEMENT SYSTEMS**

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**By**

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# SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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## BONAFIDE CERTIFICATE

Certified that this project report titled "**ONLINE COURSE REGISTRATION SYSTEM**" is a bonafide work done by **YASHIKA(RA2111026010321)** who carried out the project work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project work or dissertation.


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# ABSTRACT

The advancement of technology has significantly transformed various aspects of education, including course registration processes. This project focuses on the design and implementation of an Online Course Registration System (OCRS) to streamline and enhance the efficiency of the registration process for students and administrators alike. The system aims to replace traditional paper-based methods with a user-friendly web-based platform accessible from anywhere with an internet connection.

Administrators have access to comprehensive dashboards where they can manage course offerings, set registration deadlines, monitor enrollment statistics, and generate reports. Additionally, the system incorporates automated notifications to remind students and administrators of important deadlines and updates.

The OCRS allows students to browse available courses, view course descriptions, prerequisites, and available slots. Upon selection, students can register for courses, drop courses, and modify their schedules within designated deadlines. The system employs secure authentication mechanisms to ensure data integrity and user privacy.

The design and implementation of OCRS involve utilizing modern web development technologies such as HTML, CSS, JavaScript for the frontend, and PHP, Python, or Java for the backend. A robust database management system like MySQL or PostgreSQL is employed to store and manage course data, student information, and registration records securely.

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# CHAPTER I

## INTRODUCTION

In the realm of education management, the Online Course Registration System (OCRS) represents a transformative leap forward, blending convenience, accessibility, and academic diversity. Harnessing the capabilities of digital platforms, OCRS offers students and administrators a streamlined and user-friendly solution to navigate the complexities of course registration processes. At its core, OCRS seeks to replace outdated paper-based methods with a dynamic web-based platform, empowering users to explore course offerings, manage schedules, and monitor enrolment status from any location with internet access.

Central to the efficacy of OCRS is its integration of modern web development technologies and robust database management systems. Employing a blend of HTML, CSS, JavaScript, and backend technologies such as PHP, Python, or Java, the system ensures a seamless user experience while prioritizing data security and integrity. Moreover, leveraging the power of database management systems like MySQL or PostgreSQL, OCRS efficiently stores and manages course data, student information, and registration records, facilitating accurate and reliable transactional processes.

Our project endeavours to bridge the gap between traditional course registration methods and cutting-edge technological solutions, aiming to redefine the academic experience for students and administrators alike. By harnessing the capabilities of modern technology and data-driven insights, OCRS seeks to optimize course selection, streamline administrative tasks, and enhance overall efficiency within educational institutions. Through a fusion of innovation, accessibility, and user-centric design principles, we aspire to shape the future of education management, one registration at a time.

## 1.1Software

**Database – MySQL**

The backbone of our Online Course Registration System (OCRS) relies on MySQL, serving as both the backend and frontend database solution. MySQL effectively manages data storage, retrieval, and processing, ensuring seamless interactions between users and the platform. Furthermore, MySQL Workbench offers an intuitive frontend interface, empowering developers with a user-friendly platform for database design, modeling, and administration. Together, these components integrate seamlessly to optimize performance, reliability, and scalability, enabling our system to deliver a streamlined and efficient registration experience for students and administrators.

## 1.2 Advantages of MySQL

1. **Data Integrity:** MySQL guarantees the integrity of stored data within the OCRS database, crucial for accurately managing course offerings, student registrations, and administrative records, thereby ensuring a reliable user experience.
2. **Scalability:** As the user base of OCRS grows, MySQL's scalability ensures it can handle increased data volumes and user interactions without compromising system performance.
3. **Performance:** MySQL's efficient query processing and indexing capabilities facilitate fast retrieval of course information, registration processing, and system responsiveness.
4. **Reliability:** Features such as ACID compliance and crash recovery mechanisms ensure the reliability of data storage and transaction processing, minimizing the risk of data loss or corruption.
5. **Security:** MySQL offers robust security features to safeguard sensitive user data, including secure authentication mechanisms and encryption protocols, ensuring the confidentiality and integrity of user information within OCRS.

# CHAPTER II

## 2.1MAIN FEATURES AND FUNCTIONALITY

1. User Management
2. Course Management
3. Registration Processing
4. Payment Integration
5. Rating
6. Feedback
7. Reporting and Analytics

## 2.2 OBJECTIVES

- Develop an intuitive Online Course Registration System.
- Enhance user satisfaction and streamline registration processing.
- Provide effective tools for course management and analysis.
- Ensure data security and compliance.
- Drive academic institution growth through student engagement and retention.
- Ensure user-friendly and efficient course registration.
- Facilitate effective communication between students and administrators.

## 2.3 IDENTIFICATION OF PROJECT MODULES

This includes a total of six modules and its descriptions are studied in detail.

- User Management Module
- Course Management Module
- Registration Processing Module
- Payment Integration Module
- Rating Module
- Feedback Module

## 2.4MODULE DESCRIPTION

### 2.4.1 User Management Module:

- Handles user registration, authentication, and profile management.
- Includes an admin panel for managing users and permissions.

### 2.4.2 Course Management Module:

- Allows administrators to add, edit, and delete courses, set registration deadlines, and Displays available courses, their descriptions, prerequisites, and available slots.
- monitor enrollment statistics.

### 2.4.3 Registration Processing Module:

- Facilitates course registration, modification, and withdrawal within designated deadlines.
- Sends automated notifications to remind users and administrators of important deadlines and updates.

### 2.4.4 Payment Integration Module:

- Integrates secure payment gateways, supports multiple payment methods, and ensures seamless transaction processing for course fees.

### 2.4.5 Rating Module:

- Enables students to rate courses and instructors.
- Aggregates ratings for courses and provides analytics on user ratings.

### 2.4.6 Feedback Module

- Allows students to provide feedback on overall system performance and course.
- Manages student inquiries and complaints, facilitating communication between students and administrators

# CHAPTER III

## 3.1 BACK-END DESIGN

The back-end design of the Online Course Registration System (OCRS) is fundamental for creating a reliable and efficient web application. It encompasses defining clear requirements, selecting the appropriate technology stack, and architecting the system for scalability, performance, and security. With meticulous planning and implementation, the back-end design establishes the groundwork for a stable and successful platform.

**Database:** The database schema for OCRS includes tables such as tblcourses, tblstudents, tblregistrations, tbladmins, tblfeedback, and tblpayments. These tables store essential information about courses, students, registrations, administrators, feedback, and payments, respectively, ensuring efficient data management and retrieval.

**APIs:** RESTful APIs can be developed using PHP, Python, or Java to facilitate seamless communication between the front-end and back-end of OCRS. These APIs enable functionalities such as course browsing, registration processing, user authentication, and payment integration, enhancing the overall user experience.

**Security:** Robust security measures are implemented to safeguard sensitive data and prevent unauthorized access. Encryption techniques are employed to protect confidential information, while input validation mechanisms are utilized to mitigate the risk of malicious inputs and SQL injection attacks.

**Business Logic**: Business logic is implemented in the backend to manage user sessions, handle registration processing, calculate course fees, and generate reports. This includes functionalities such as registration tracking, course availability management, and administrative tasks automation.

**Error Handling:** Robust error handling mechanisms are integrated to effectively manage exceptions and ensure uninterrupted operation of OCRS. This involves logging errors,

providing informative error messages to users, and implementing retry mechanisms for failed operations, enhancing system reliability and user satisfaction.

### 3.1.1 Conceptual Database Design (ER-Diagram)

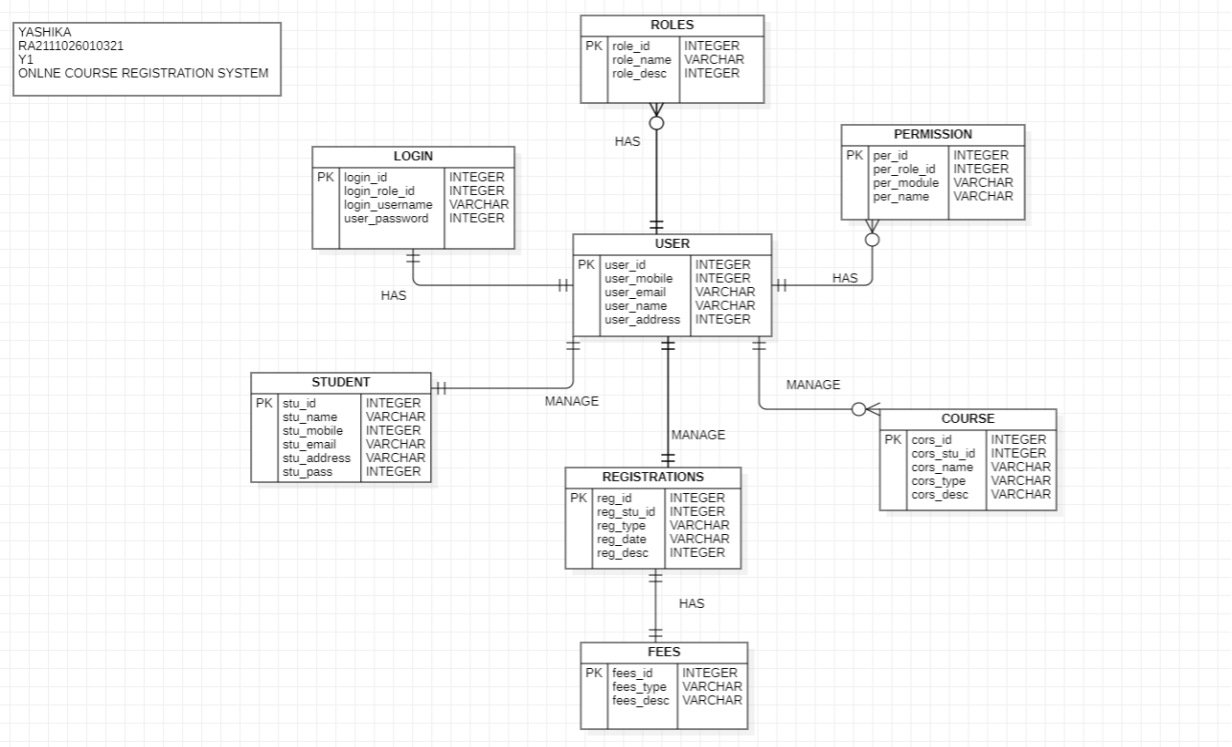



FIGURE 3.1.1 – ER DIAGRAM

**Entities –**

1. Roles
2. Login
3. Permission
4. User
5. Student
6. Registrations
7. Course
8. Fees

**Primary Key and Foreign Key :**

**Primary Key –** Course_id, Student_id, Registration_id, Administrator_id, Site_id, Payment_id, User_id, Course_type_id are primary keys.

**Foreign Key –** Course_id , Student_id, Administrator_id , Site_id, Payment_id, User_id, Course_type_id .

## 3.1.2 Logical Database Design (ER Mapping)

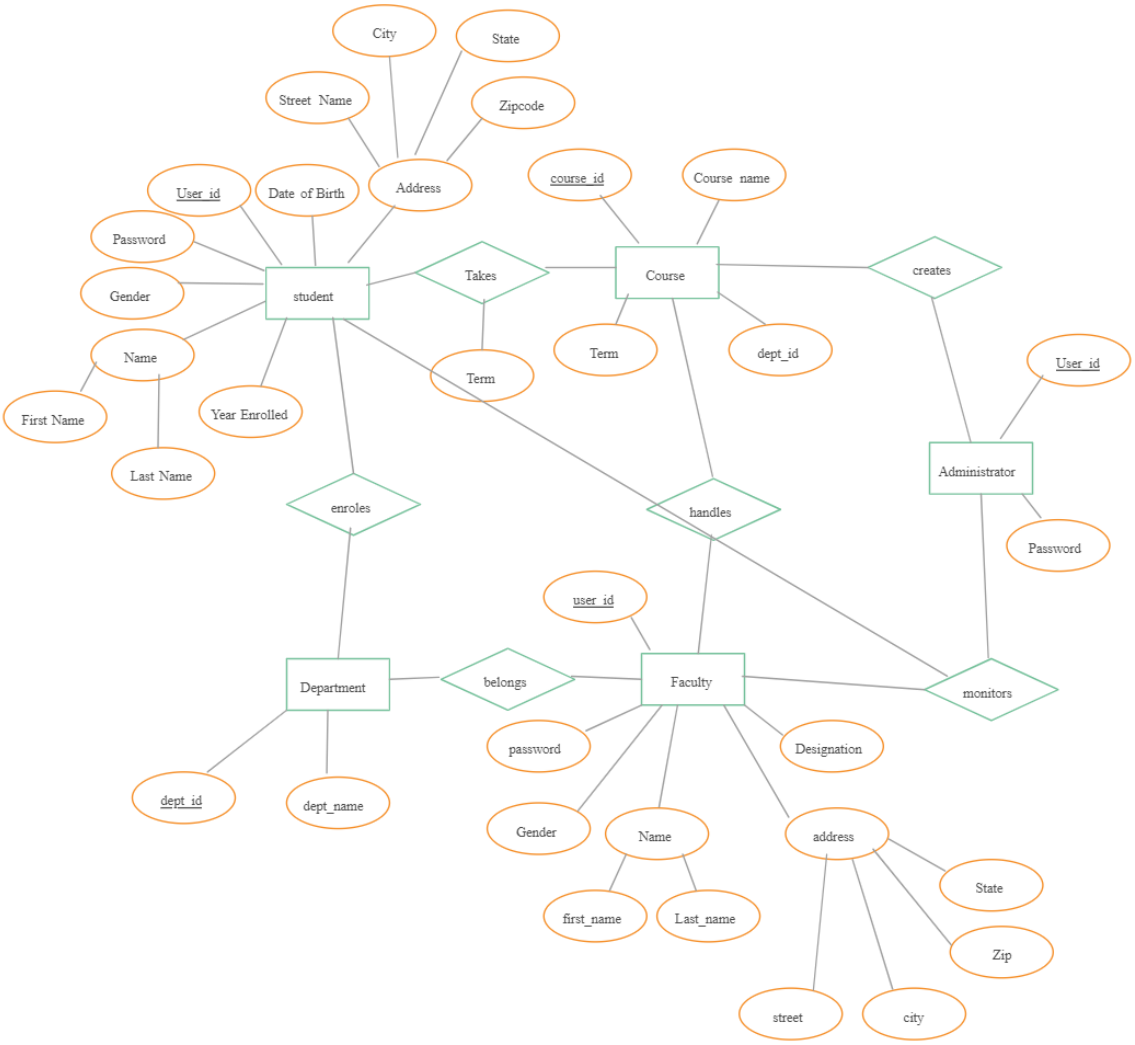



FIGURE 3.1.2 – SCHEMA DIAGRAM

- The entities are represented as tables.
- The tables contain the attributes.
- The attributes which are used to identify a entity is referred as primary keys.
- The referenced attributes from primary key are foreign key of that table.

## 3.2 FRONT-END DESIGN

### 3.2.1 Front-end web development details

The frontend design of the Online Course Registration System (OCRS) utilizes modern web development technologies and frameworks to create an intuitive and user-friendly interface. Here's an overview of the frontend design:

- User Interface Design: The frontend interface of OCRS is designed using HTML, CSS, and JavaScript to create visually appealing and responsive user interfaces. This includes designing layouts, navigation menus, forms, and interactive elements to enhance user experience.
- Frameworks and Libraries: Frameworks such as Bootstrap or Materialize CSS may be employed to streamline the frontend development process and ensure consistency in design across different pages and components. JavaScript libraries like jQuery may also be used to add dynamic functionalities and enhance user interactions.
- Dynamic Content Rendering: JavaScript frameworks like React.js or Vue.js may be utilized for dynamic content rendering, enabling seamless updates to the user interface without requiring full page reloads. This enhances the responsiveness and interactivity of the system.

- Form Validation: Client-side form validation techniques using JavaScript or specialized libraries such as Yup or Formik are implemented to ensure data integrity and provide real-time feedback to users during data entry.
- Integration with Backend APIs: Frontend components communicate with the backend server through RESTful APIs, enabling data exchange and interaction between the frontend and backend systems. This allows for functionalities such as user authentication, course browsing, registration processing, and data retrieval.
- User Experience Optimization: User experience (UX) design principles are applied to optimize the flow and usability of the frontend interface. This includes intuitive navigation, clear and concise messaging, and accessible design elements to accommodate users with diverse needs and preferences.

Overall, MySQL Workbench serves as a powerful frontend tool for database design, visualization, and administration, enabling efficient development and management of the online course registration system's database infrastructure.

# CHAPTER IV

## 4.1 CONSTRUCTION OF RELATIONAL TABLE FROM THE ER DIAGRAM

1. Admin Table –

```
SELECT * FROM online_course_reg.admin;
```

| id | username | password | creationDate | updationDate |
|---|---|---|---|---|
| 1 | admin | f925916e2754e5e03f75dd58a5733251 | 2022-01-31 21:51:18 | 2022-01-31 21:51:18 |
| 2 | admin2 | password2 | 2024-03-07 21:59:24 | 2024-03-07 21:59:24 |
| 3 | admin3 | password3 | 2024-03-07 21:59:24 | 2024-03-07 21:59:24 |
| 4 | admin4 | password4 | 2024-03-07 21:59:24 | 2024-03-07 21:59:24 |
| NULL | NULL | NULL | NULL | NULL |

2. Course Table –

```
SELECT * FROM online_course_reg.course;
```

| id | courseCode | courseName | courseUnit | noofSeats | creationDate |
|---|---|---|---|---|---|
| 1 | PHP01 | PHP | 5 | 10 | 2022-02-10 22:53:28 |
| 2 | C001 | C++ | 12 | 25 | 2022-02-11 06:22:46 |
| 3 | C001 | Data Structures | 5 | 30 | 2024-04-22 08:53:27 |
| 4 | C002 | Database Management | 5 | 25 | 2024-04-22 08:53:27 |
| 5 | C003 | Software Engineering | 5 | 35 | 2024-04-22 08:53:27 |
| 6 | C004 | Digital Marketing | 4 | 20 | 2024-04-22 08:53:27 |
| 7 | C005 | Supply Chain Management | 4 | 25 | 2024-04-22 08:53:27 |
| 8 | C006 | Networking | 4 | 30 | 2024-04-22 08:56:13 |
| 9 | C007 | Machine Learning | 5 | 25 | 2024-04-22 08:56:13 |
| 10 | C008 | Cyber Security | 4 | 35 | 2024-04-22 08:56:13 |

3. Courseenrolls Table –

```
SELECT * FROM online_course_reg.courseenrolls;
```

| id | studentRegno | pincode | session | department | level | semester | course | enrollDate |
|---|---|---|---|---|---|---|---|---|
| 1 | 10806121 | 822894 | 1 | 1 | 2 | 3 | 1 | 2022-02-11 06:29:33 |
| 2 | 10806121 | 822894 | 1 | 1 | 1 | 2 | 2 | 2022-02-11 06:31:07 |
| 3 | 10806122 | 400001 | 2022 | IT | 3 | 3 | 1 | 2024-04-22 08:54:49 |
| 4 | 10806123 | 400002 | 2022 | HR | 2 | 2 | 2 | 2024-04-22 08:54:49 |
| 5 | 10806124 | 400003 | 2022 | Finance | 4 | 4 | 3 | 2024-04-22 08:54:49 |
| 6 | 10806125 | 400004 | 2023 | Marketing | 3 | 3 | 4 | 2024-04-22 08:54:49 |
| 7 | 10806126 | 400005 | 2023 | Operations | 4 | 4 | 5 | 2024-04-22 08:54:49 |
| 8 | 10806127 | 400006 | 2022 | IT | 3 | 3 | 1 | 2024-04-22 08:55:13 |
| 9 | 10806128 | 400007 | 2022 | HR | 2 | 2 | 2 | 2024-04-22 08:55:13 |
| 10 | 10806129 | 400008 | 2022 | Finance | 4 | 4 | 3 | 2024-04-22 08:55:13 |

4. Department Table –

```
SELECT * FROM online_course_reg.department;
```

| id | department | creationDate |
|---|---|---|
| 1 | IT | 2022-02-10 22:53:04 |
| 2 | HR | 2022-02-10 22:53:09 |
| 4 | Finance | 2024-04-22 08:52:59 |
| 5 | Marketing | 2024-04-22 08:52:59 |
| 6 | Operations | 2024-04-22 08:52:59 |
| 7 | Accounts | 2024-04-22 08:55:55 |
| 8 | Legal | 2024-04-22 08:55:55 |
| 9 | Sales | 2024-04-22 08:55:55 |
| 10 | Customer Support | 2024-04-22 08:55:55 |
| 11 | Research | 2024-04-22 08:55:55 |

5. Level Table –

```
SELECT * FROM online_course_reg.level;
```

| id | level | creationDate |
|---|---|---|
| 1 | 1 | 2022-02-11 06:29:02 |
| 2 | 2 | 2022-02-11 06:29:02 |
| 3 | 3 | 2022-02-11 06:29:09 |
| 4 | 1 | 2024-04-22 08:53:16 |
| 5 | 2 | 2024-04-22 08:53:16 |
| 6 | 3 | 2024-04-22 08:53:16 |
| 7 | 4 | 2024-04-22 08:53:16 |

6. Semester Table –

```
SELECT * FROM online_course_reg.semester;
```

| id | semester | creationDate | updationDate |
|---|---|---|---|
| 1 | 1 | 2022-02-10 22:52:49 | NULL |
| 2 | 2 | 2022-02-10 22:52:55 | NULL |
| 3 | 3 | 2022-02-11 06:21:43 | NULL |
| NULL | NULL | NULL | NULL |

7. Session Table –

```
SELECT * FROM online_course_reg.session;
```

| id | session | creationDate |
|---|---|---|
| 1 | 2022 | 2022-02-10 22:40:59 |
| 3 | 2022 | 2024-04-22 08:53:16 |
| 4 | 2023 | 2024-04-22 08:53:16 |

8. Students Table –

```
SELECT * FROM online_course_reg.students;
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10806159 | NULL | NULL | Neha Verma | 400038 | 2022 | Sales | 8 | 8.60 | 2024-04-22 08:58:41 | NULL |
| 10806160 | NULL | NULL | Vivek Singh | 400039 | 2023 | Customer ... | 9 | 8.80 | 2024-04-22 08:58:41 | NULL |
| 10806161 | NULL | NULL | Monika Patel | 400040 | 2023 | Research ... | 10 | 9.10 | 2024-04-22 08:58:41 | NULL |
| 3 | NULL | NULL | sanchita | 1234 | NULL | NULL | NULL | NULL | 2024-04-22 14:27:21 | NULL |
| 321 | NULL | NULL | anjali | 1234 | NULL | NULL | NULL | NULL | 2024-04-26 01:10:43 | NULL |

9. Userlog Table –

```
SELECT * FROM online_course_reg.userlog;
```

| id | studentRegno | userip | loginTime | logout | status |
|---|---|---|---|---|---|
| 1 | 10806121 | BLOB | 2022-02-11 06:25:07 | NULL | 1 |
| 2 | 10806121 | BLOB | 2022-02-11 06:27:00 | NULL | 1 |
| 3 | 10806121 | BLOB | 2022-02-11 06:27:22 | 11-02-2022 06:31:26 AM | 1 |
| NULL | NULL | NULL | NULL | NULL | NULL |

## 4.1.1 DDL, DML, DCL, TCL of Online Course Registration System

**DDL –**

```
-- DDL (Data Definition Language) Commands

-- Creating table `admin`
CREATE TABLE `admin` (
  `id` int(11) NOT NULL,
  `username` varchar(255) DEFAULT NULL,
  `password` varchar(255) DEFAULT NULL,
  `creationDate` timestamp NULL DEFAULT current_timestamp(),
  `updationDate` timestamp NULL DEFAULT NULL ON UPDATE current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

-- Creating table `course`
CREATE TABLE `course` (
  `id` int(11) NOT NULL,
  `courseCode` varchar(255) DEFAULT NULL,
  `courseName` varchar(255) DEFAULT NULL,
  `courseUnit` varchar(255) DEFAULT NULL,
  `noofSeats` int(11) DEFAULT NULL,
  `creationDate` timestamp NULL DEFAULT current_timestamp(),
  `updationDate` varchar(255) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```
-- Creating table `courseenrolls`
CREATE TABLE `courseenrolls` (
  `id` int(11) NOT NULL,
  `studentRegno` varchar(255) DEFAULT NULL,
  `pincode` varchar(255) DEFAULT NULL,
  `session` int(11) DEFAULT NULL,
  `department` int(11) DEFAULT NULL,
  `level` int(11) DEFAULT NULL,
  `semester` int(11) DEFAULT NULL,
  `course` int(11) DEFAULT NULL,
  `enrollDate` timestamp NULL DEFAULT current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

-- Creating table `department`
CREATE TABLE `department` (
  `id` int(11) NOT NULL,
  `department` varchar(255) DEFAULT NULL,
  `creationDate` timestamp NULL DEFAULT current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```sql
-- Creating table `session`
CREATE TABLE `session` (
  `id` int(11) NOT NULL,
  `session` varchar(255) DEFAULT NULL,
  `creationDate` timestamp NULL DEFAULT current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

-- Creating table `students`
CREATE TABLE `students` (
  `StudentRegno` varchar(255) NOT NULL,
  `studentPhoto` varchar(255) DEFAULT NULL,
  `password` varchar(255) DEFAULT NULL,
  `studentName` varchar(255) DEFAULT NULL,
  `pincode` varchar(255) DEFAULT NULL,
  `session` varchar(255) DEFAULT NULL,
  `department` varchar(255) DEFAULT NULL,
  `semester` varchar(255) DEFAULT NULL,
  `cgpa` decimal(10,2) DEFAULT NULL,
  `creationdate` timestamp NULL DEFAULT current_timestamp(),
  `updationDate` varchar(255) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```sql
-- Adding primary key constraints for the tables
ALTER TABLE `admin` ADD PRIMARY KEY (`id`);
ALTER TABLE `course` ADD PRIMARY KEY (`id`);
ALTER TABLE `courseenrolls` ADD PRIMARY KEY (`id`);
ALTER TABLE `department` ADD PRIMARY KEY (`id`);
ALTER TABLE `level` ADD PRIMARY KEY (`id`);
ALTER TABLE `news` ADD PRIMARY KEY (`id`);
ALTER TABLE `semester` ADD PRIMARY KEY (`id`);
ALTER TABLE `session` ADD PRIMARY KEY (`id`);
ALTER TABLE `students` ADD PRIMARY KEY (`StudentRegno`);
ALTER TABLE `userlog` ADD PRIMARY KEY (`id`);

-- Modifying table structures (AUTO_INCREMENT)
ALTER TABLE `admin` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=2;
ALTER TABLE `course` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=3;
ALTER TABLE `courseenrolls` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREME
ALTER TABLE `department` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=
ALTER TABLE `level` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=4;
ALTER TABLE `news` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=4;
ALTER TABLE `semester` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=5;
ALTER TABLE `session` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=3;
ALTER TABLE `userlog` MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=4;
```

## DML -

```sql
-- DML (Data Manipulation Language) Commands

-- Inserting data into table `admin`
INSERT INTO `admin` (`id`, `username`, `password`, `creationDate`, `updationDate`) V
(1, 'admin', 'f925916e2754e5e03f75dd58a5733251', '2022-01-31 16:21:18', '2022-01-31

-- Inserting data into table `course`
INSERT INTO `course` (`id`, `courseCode`, `courseName`, `courseUnit`, `noofSeats`, `
(1, 'PHP01', 'PHP', '5', 10, '2022-02-10 17:23:28', NULL),
(2, 'C001', 'C++', '12', 25, '2022-02-11 00:52:46', '11-02-2022 06:23:06 AM');

-- Inserting data into table `courseenrolls`
INSERT INTO `courseenrolls` (`id`, `studentRegno`, `pincode`, `session`, `department
(1, '10806121', '822894', 1, 1, 2, 3, 1, '2022-02-11 00:59:33'),
(2, '10806121', '822894', 1, 1, 1, 2, 2, '2022-02-11 01:01:07');

-- Inserting data into table `department`
INSERT INTO `department` (`id`, `department`, `creationDate`) VALUES
(1, 'IT', '2022-02-10 17:23:04'),
(2, 'HR', '2022-02-10 17:23:09');
```

```sql
-- Inserting data into table `level`
INSERT INTO `level` (`id`, `level`, `creationDate`) VALUES
(1, '1', '2022-02-11 00:59:02'),
(2, '2', '2022-02-11 00:59:02'),
(3, '3', '2022-02-11 00:59:09');

-- Inserting data into table `news`
INSERT INTO `news` (`id`, `newstitle`, `newsDescription`, `postingDate`) VALUES
(2, 'Test News', 'This is for testing. This is for testing.This is for testing.This
(3, 'New Course Started C#', 'This is sample text for testing.', '2022-02-11 00:54:3

-- Inserting data into table `semester`
INSERT INTO `semester` (`id`, `semester`, `creationDate`, `updationDate`) VALUES
(1, '1', '2022-02-10 17:22:49', NULL),
(2, '2', '2022-02-10 17:22:55', NULL),
(3, '3', '2022-02-11 00:51:43', NULL');

-- Inserting data into table `session`
INSERT INTO `session` (`id`, `session`, `creationDate`) VALUES
(1, '2022', '2022-02-10 17:10:59');
```

**TCL –**

```
-- TCL (Transaction Control Language) Commands

-- Starting a transaction
START TRANSACTION;

-- Committing the transaction
COMMIT;

-- Rolling back the transaction
ROLLBACK;
```

## 4.1.2 In- Built functions of Online Course Registration System

MYSQL has several built-in functions that can be used to manipulate data.

```
mysql> INSERT INTO students (StudentRegno, studentName, pincode) VALUES ('10806122', 'John Doe', '123456');
ERROR 1062 (23000): Duplicate entry '10806122' for key 'students.PRIMARY'
mysql> UPDATE students SET studentName = 'Jane Smith' WHERE StudentRegno = '10806121';
Query OK, 0 rows affected (0.00 sec)
Rows matched: 1  Changed: 0  Warnings: 0

mysql> DELETE FROM students WHERE StudentRegno = '10806122';
Query OK, 1 row affected (0.01 sec)

mysql> SELECT COUNT(*) FROM students WHERE department = 'IT';
+----------+
| COUNT(*) |
+----------+
|        4 |
+----------+
1 row in set (0.00 sec)

mysql> SELECT MAX(cgpa) FROM students;
+-----------+
| MAX(cgpa) |
+-----------+
|      9.20 |
+-----------+
1 row in set (0.01 sec)
```

```
mysql> SELECT department, COUNT(*) FROM students GROUP BY department;
+--------------------------+----------+
| department               | COUNT(*) |
+--------------------------+----------+
| NULL                     |        1 |
| HR                       |        5 |
| Finance                  |        5 |
| Marketing                |        5 |
| Operations               |        5 |
| IT                       |        4 |
| Accounts                 |        1 |
| Legal                    |        1 |
| Sales                    |        1 |
| Customer Support         |        1 |
| Research & Development   |        1 |
+--------------------------+----------+
11 rows in set (0.00 sec)
```

## 4.1.3 Nested Queries of Online Course Registration System

```
mysql> SELECT * FROM students WHERE department = (SELECT department FROM department WHERE department = 'IT');
ERROR 1242 (21000): Subquery returns more than 1 row
mysql> SELECT * FROM students WHERE department IN (SELECT department FROM department WHERE department = 'IT');
+-------------+-------------+----------+-------------+---------+---------+------------+----------+------+---------------------+-------------+
| StudentRegno | studentPhoto | password | studentName  | pincode | session | department | semester | cgpa | creationdate        | updationDate |
+-------------+-------------+----------+-------------+---------+---------+------------+----------+------+---------------------+-------------+
| 10806137    | NULL         | NULL     | Amit Patel   | 400016  | 2022    | IT         | 3        | 7.90 | 2024-04-22 08:56:26 | NULL         |
| 10806142    | NULL         | NULL     | Rahul Sharma | 400021  | 2022    | IT         | 3        | 7.70 | 2024-04-22 08:56:26 | NULL         |
| 10806147    | NULL         | NULL     | Nisha Sharma | 400026  | 2022    | IT         | 3        | 8.40 | 2024-04-22 08:58:41 | NULL         |
| 10806152    | NULL         | NULL     | Rohan Sharma | 400031  | 2022    | IT         | 3        | 8.20 | 2024-04-22 08:58:41 | NULL         |
+-------------+-------------+----------+-------------+---------+---------+------------+----------+------+---------------------+-------------+
4 rows in set (0.01 sec)
```

```
mysql> SELECT courseName, (SELECT COUNT(*) FROM courseenrolls WHERE course = course.id) AS num_students
    -> FROM course;
+----------------------------------------+----------------+
| courseName                             | num_students   |
+----------------------------------------+----------------+
| PHP                                    |              4 |
| C++                                    |              4 |
| Data Structures                        |              3 |
| Database Management                    |              3 |
| Software Engineering                   |              3 |
| Digital Marketing                      |              1 |
| Supply Chain Management                |              1 |
| Networking                             |              1 |
| Machine Learning                       |              1 |
| Cyber Security                         |              1 |
| Digital Marketing                      |              1 |
| Supply Chain Management                |              1 |
| Database Systems                       |              1 |
| Web Development                        |              1 |
| Business Analytics                     |              1 |
| Artificial Intelligence                |              1 |
| Software Testing                       |              1 |
| Data Analysis                          |              1 |
| Project Management                     |              1 |
| Digital Design                         |              2 |
| Mobile App Development                 |              2 |
| Cloud Computing                        |              2 |
| Marketing Strategies                   |              2 |
| Supply Chain Optimization              |              2 |
| Web Design                             |              2 |
| Artificial Neural Networks             |              1 |
| Quality Control                        |              1 |
| Financial Accounting                   |              1 |
| Legal Compliance                       |              1 |
| Sales Management                       |              1 |
| Customer Relationship Management       |              0 |
| Research Methodology                   |              0 |
+----------------------------------------+----------------+
32 rows in set (0.01 sec)
```

```
mysql> SELECT * FROM students WHERE StudentRegno IN (SELECT studentRegno FROM courseenrolls WHERE course IN (SELECT id FROM course WHERE noofSeats > 20));
+-------------+-------------+----------------------------------+--------------+---------+---------+----------------------+----------+------+---------
----------+-------------+
| StudentRegno | studentPhoto | password                         | studentName  | pincode | session | department           | semester | cgpa | creationd
ate       | updationDate |
+-------------+-------------+----------------------------------+--------------+---------+---------+----------------------+----------+------+---------
----------+-------------+
| 10806121    |              | f925916e2754e5e03f75dd58a5733251 | Jane Smith   | 822894  | NULL    | NULL                 | NULL     | 7.10 | 2022-02-1
1 06:23:31 | NULL        |
| 10806123    | NULL         | NULL                             | Suresh Gupta | 400002  | 2022    | HR                   | 2        | 8.20 | 2024-04-2
2 08:53:16 | NULL        |
| 10806124    | NULL         | NULL                             | Deepak Singh | 400003  | 2022    | Finance              | 4        | 7.80 | 2024-04-2
2 08:53:16 | NULL        |
| 10806125    | NULL         | NULL                             | Priya Sharma | 400004  | 2023    | Marketing            | 3        | 8.50 | 2024-04-2
2 08:53:16 | NULL        |
| 10806126    | NULL         | NULL                             | Rajesh Patel | 400005  | 2023    | Operations           | 4        | 8.00 | 2024-04-2
2 08:53:16 | NULL        |
| 10806138    | NULL         | NULL                             | Sneha Sharma | 400017  | 2022    | HR                   | 2        | 8.30 | 2024-04-2
2 08:56:26 | NULL        |
| 10806139    | NULL         | NULL                             | Vikram Singh | 400018  | 2022    | Finance              | 4        | 8.10 | 2024-04-2
2 08:56:26 | NULL        |
| 10806140    | NULL         | NULL                             | Neha Gupta   | 400019  | 2023    | Marketing            | 3        | 9.20 | 2024-04-2
2 08:56:26 | NULL        |
| 10806141    | NULL         | NULL                             | Manish Jain  | 400020  | 2023    | Operations           | 4        | 8.80 | 2024-04-2
2 08:56:26 | NULL        |
| 10806143    | NULL         | NULL                             | Priyanka Reddy | 400022 | 2022    | HR                   | 2        | 8.50 | 2024-04-2
2 08:56:26 | NULL        |
| 10806144    | NULL         | NULL                             | Rajendra Kumar | 400023 | 2022    | Finance              | 4        | 8.20 | 2024-04-2
2 08:56:26 | NULL        |
| 10806145    | NULL         | NULL                             | Pooja Singh  | 400024  | 2023    | Marketing            | 3        | 9.00 | 2024-04-2
2 08:56:26 | NULL        |
| 10806146    | NULL         | NULL                             | Kavita Patel | 400025  | 2023    | Operations           | 4        | 8.90 | 2024-04-2
2 08:56:26 | NULL        |
| 10806152    | NULL         | NULL                             | Rohan Sharma | 400031  | 2022    | IT                   | 3        | 8.20 | 2024-04-2
```

```
mysql> SELECT department, AVG(cgpa) AS avg_cgpa
    -> FROM (SELECT * FROM students) AS s
    -> GROUP BY department;
+------------------------+-----------+
| department             | avg_cgpa  |
+------------------------+-----------+
| NULL                   | 7.100000  |
| HR                     | 8.500000  |
| Finance                | 8.200000  |
| Marketing              | 8.960000  |
| Operations             | 8.760000  |
| IT                     | 8.050000  |
| Accounts               | 7.800000  |
| Legal                  | 8.200000  |
| Sales                  | 8.600000  |
| Customer Support       | 8.800000  |
| Research & Development | 9.100000  |
+------------------------+-----------+
11 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM course WHERE EXISTS (SELECT * FROM courseenrolls WHERE courseenrolls.course = course.id);
+----+------------+--------------------------+------------+-----------+---------------------+----------------------+
| id | courseCode | courseName               | courseUnit | noofSeats | creationDate        | updationDate         |
+----+------------+--------------------------+------------+-----------+---------------------+----------------------+
|  1 | PHP01      | PHP                      | 5          |        10 | 2022-02-10 22:53:28 | NULL                 |
|  2 | C001       | C++                      | 12         |        25 | 2022-02-11 06:22:46 | 11-02-2022 06:23:06 AM |
|  3 | C001       | Data Structures          | 5          |        30 | 2024-04-22 08:53:27 | NULL                 |
|  4 | C002       | Database Management      | 5          |        25 | 2024-04-22 08:53:27 | NULL                 |
|  5 | C003       | Software Engineering     | 5          |        35 | 2024-04-22 08:53:27 | NULL                 |
|  6 | C004       | Digital Marketing        | 4          |        20 | 2024-04-22 08:53:27 | NULL                 |
|  7 | C005       | Supply Chain Management  | 4          |        25 | 2024-04-22 08:53:27 | NULL                 |
|  8 | C006       | Networking               | 4          |        30 | 2024-04-22 08:56:13 | NULL                 |
|  9 | C007       | Machine Learning         | 5          |        25 | 2024-04-22 08:56:13 | NULL                 |
| 10 | C008       | Cyber Security           | 4          |        35 | 2024-04-22 08:56:13 | NULL                 |
| 11 | C009       | Digital Marketing        | 4          |        20 | 2024-04-22 08:56:13 | NULL                 |
| 12 | C010       | Supply Chain Management  | 4          |        25 | 2024-04-22 08:56:13 | NULL                 |
| 13 | C011       | Database Systems         | 5          |        30 | 2024-04-22 08:56:13 | NULL                 |
| 14 | C012       | Web Development          | 4          |        25 | 2024-04-22 08:56:13 | NULL                 |
| 15 | C013       | Business Analytics       | 5          |        35 | 2024-04-22 08:56:13 | NULL                 |
| 16 | C014       | Artificial Intelligence  | 5          |        20 | 2024-04-22 08:56:13 | NULL                 |
| 17 | C015       | Software Testing         | 4          |        25 | 2024-04-22 08:56:13 | NULL                 |
| 18 | C016       | Data Analysis            | 4          |        25 | 2024-04-22 08:58:25 | NULL                 |
| 19 | C017       | Project Management       | 5          |        30 | 2024-04-22 08:58:25 | NULL                 |
| 20 | C018       | Digital Design           | 4          |        20 | 2024-04-22 08:58:25 | NULL                 |
| 21 | C019       | Mobile App Development   | 4          |        25 | 2024-04-22 08:58:25 | NULL                 |
| 22 | C020       | Cloud Computing          | 5          |        30 | 2024-04-22 08:58:25 | NULL                 |
| 23 | C021       | Marketing Strategies     | 4          |        20 | 2024-04-22 08:58:25 | NULL                 |
| 24 | C022       | Supply Chain Optimization| 5          |        25 | 2024-04-22 08:58:25 | NULL                 |
| 25 | C023       | Web Design               | 4          |        20 | 2024-04-22 08:58:25 | NULL                 |
| 26 | C024       | Artificial Neural Networks| 5         |        30 | 2024-04-22 08:58:25 | NULL                 |
| 27 | C025       | Quality Control          | 4          |        25 | 2024-04-22 08:58:25 | NULL                 |
| 28 | C026       | Financial Accounting     | 5          |        20 | 2024-04-22 08:58:25 | NULL                 |
| 29 | C027       | Legal Compliance         | 4          |        20 | 2024-04-22 08:58:25 | NULL                 |
| 30 | C028       | Sales Management         | 5          |        25 | 2024-04-22 08:58:25 | NULL                 |
+----+------------+--------------------------+------------+-----------+---------------------+----------------------+
30 rows in set (0.00 sec)
```

## 4.1.4 Set Operators & Views of Online Course Registration System

The SET Operators in MySQL are basically used to combine the result of more than 1 select statement and return the output as a single result set.

```
mysql> SELECT studentName FROM students
    -> UNION
    -> SELECT courseName FROM course;
+-----------------------------------+
| studentName                       |
+-----------------------------------+
| Jane Smith                        |
| Suresh Gupta                      |
| Deepak Singh                      |
| Priya Sharma                      |
| Rajesh Patel                      |
| Amit Patel                        |
| Sneha Sharma                      |
| Vikram Singh                      |
| Neha Gupta                        |
| Manish Jain                       |
| Rahul Sharma                      |
| Priyanka Reddy                    |
| Rajendra Kumar                    |
| Pooja Singh                       |
| Kavita Patel                      |
| Nisha Sharma                      |
| Rajesh Kumar                      |
| Meena Patel                       |
| Alok Singh                        |
| Anita Gupta                       |
| Rohan Sharma                      |
| Anjali Verma                      |
| Rakesh Patel                      |
| Seema Singh                       |
| Kunal Gupta                       |
| Sarika Sharma                     |
| Arjun Kumar                       |
| Neha Verma                        |
| Vivek Singh                       |
| Monika Patel                      |
| PHP                               |
| C++                               |
| Data Structures                   |
| Database Management               |
```

```
mysql> SELECT studentName FROM students
    -> INTERSECT
    -> SELECT studentName FROM courseenrolls;
ERROR 1054 (42S22): Unknown column 'studentName' in 'field list'
mysql> SELECT studentName
    -> FROM students
    -> WHERE EXISTS (
    ->     SELECT 1
    ->     FROM courseenrolls
    ->     WHERE students.StudentRegno = courseenrolls.studentRegno
    -> );
+---------------+
| studentName   |
+---------------+
| Jane Smith    |
| Suresh Gupta  |
| Deepak Singh  |
| Priya Sharma  |
| Rajesh Patel  |
| Amit Patel    |
| Sneha Sharma  |
| Vikram Singh  |
| Neha Gupta    |
| Manish Jain   |
| Rahul Sharma  |
| Priyanka Reddy |
| Rajendra Kumar |
| Pooja Singh   |
| Kavita Patel  |
| Anita Gupta   |
| Rohan Sharma  |
| Anjali Verma  |
| Rakesh Patel  |
| Seema Singh   |
| Kunal Gupta   |
| Sarika Sharma |
| Arjun Kumar   |
| Neha Verma    |
| Vivek Singh   |
| Monika Patel  |
```

```
mysql> CREATE VIEW student_courses AS
    -> SELECT students.studentName, course.courseName
    -> FROM students
    -> JOIN courseenrolls ON students.StudentRegno = courseenrolls.studentRegno
    -> JOIN course ON courseenrolls.course = course.id;
Query OK, 0 rows affected (0.01 sec)

mysql> SELECT * FROM student_courses;
+----------------+----------------------------+
| studentName    | courseName                 |
+----------------+----------------------------+
| Jane Smith     | PHP                        |
| Jane Smith     | C++                        |
| Suresh Gupta   | C++                        |
| Deepak Singh   | Data Structures            |
| Priya Sharma   | Database Management        |
| Rajesh Patel   | Software Engineering       |
| Amit Patel     | Digital Marketing          |
| Sneha Sharma   | Supply Chain Management    |
| Vikram Singh   | Networking                 |
| Neha Gupta     | Machine Learning           |
| Manish Jain    | Cyber Security             |
| Rahul Sharma   | Digital Marketing          |
| Priyanka Reddy | Supply Chain Management    |
| Rajendra Kumar | Database Systems           |
| Pooja Singh    | Web Development            |
| Kavita Patel   | Business Analytics         |
| Anita Gupta    | Digital Design             |
| Rohan Sharma   | Mobile App Development     |
| Anjali Verma   | Cloud Computing            |
| Rakesh Patel   | Marketing Strategies       |
| Seema Singh    | Supply Chain Optimization  |
| Kunal Gupta    | Web Design                 |
| Sarika Sharma  | Artificial Neural Networks |
| Arjun Kumar    | Quality Control            |
| Neha Verma     | Financial Accounting       |
| Vivek Singh    | Legal Compliance           |
| Monika Patel   | Sales Management           |
+----------------+----------------------------+
27 rows in set (0.00 sec)
```

## 4.1.5 PL/SQL Procedures and Functions of Online Course Registration System

PL/SQL subprograms are named PL/SQL blocks that can be invoked with a set of parameters.

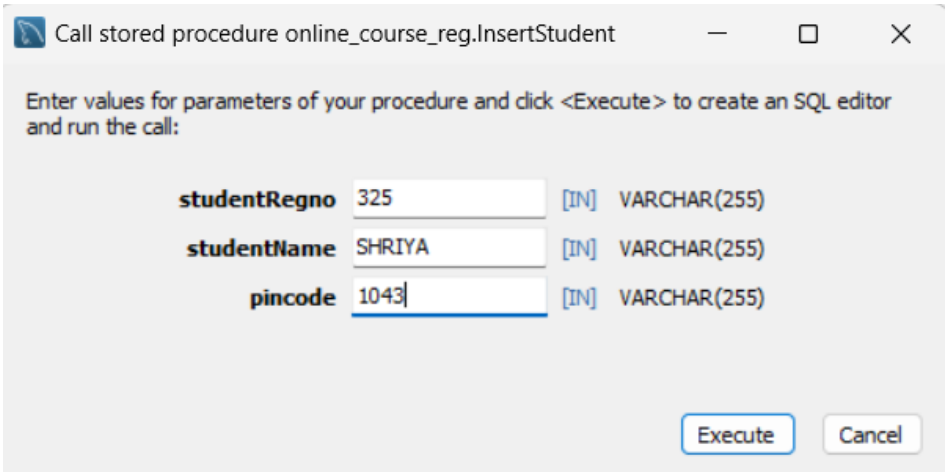
```
mysql> DELIMITER //
mysql>
mysql> CREATE PROCEDURE GetStudentNames()
    -> BEGIN
    ->     SELECT studentName FROM students;
    -> END //
Query OK, 0 rows affected (0.03 sec)

mysql>
mysql> DELIMITER ;
mysql> CALL GetStudentNames();
+-----------------+
| studentName     |
+-----------------+
| Jane Smith      |
| Suresh Gupta    |
| Deepak Singh    |
| Priya Sharma    |
| Rajesh Patel    |
| Amit Patel      |
| Sneha Sharma    |
| Vikram Singh    |
| Neha Gupta      |
| Manish Jain     |
| Rahul Sharma    |
| Priyanka Reddy  |
| Rajendra Kumar  |
| Pooja Singh     |
| Kavita Patel    |
| Nisha Sharma    |
| Rajesh Kumar    |
| Meena Patel     |
| Alok Singh      |
| Anita Gupta     |
| Rohan Sharma    |
| Anjali Verma    |
| Rakesh Patel    |
| Seema Singh     |
| Kunal Gupta     |
| Sarika Sharma   |
```

```
mysql> DELIMITER //
mysql>
mysql> CREATE FUNCTION TotalSeatsAvailable() RETURNS INT
   -> BEGIN
   ->     DECLARE total_seats INT;
   ->     SELECT SUM(noofSeats) INTO total_seats FROM course;
   ->     RETURN total_seats;
   -> END //
ERROR 1418 (HY000): This function has none of DETERMINISTIC, NO SQL, or READS SQL DATA in i
 use the less safe log_bin_trust_function_creators variable)
mysql>
mysql> DELIMITER ;
mysql> SELECT TotalSeatsAvailable();
ERROR 1305 (42000): FUNCTION online_course_reg.TotalSeatsAvailable does not exist
mysql> CREATE OR REPLACE FUNCTION TotalSeatsAvailable() RETURNS INT
   -> BEGIN
   ->     DECLARE total_available INT;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds
UNCTION TotalSeatsAvailable() RETURNS INT
BEGIN
```

```
mysql> DELIMITER ;
mysql> SELECT TotalSeatsAvailable();
ERROR 1305 (42000): FUNCTION online_course_reg.TotalSeatsAvailable does not exist
mysql> CREATE OR REPLACE FUNCTION TotalSeatsAvailable() RETURNS INT
    -> BEGIN
    ->     DECLARE total_available INT;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'F
UNCTION TotalSeatsAvailable() RETURNS INT
BEGIN
    DECLARE total_available INT' at line 1
mysql>
mysql>     -- Calculate total available seats, for example:
mysql>     SELECT SUM(noofSeats) INTO total_available FROM course;
ERROR 1327 (42000): Undeclared variable: total_available
mysql>
mysql>     RETURN total_available;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'R
ETURN total_available' at line 1
mysql> END;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'E
ND' at line 1
mysql> CREATE FUNCTION TotalEnrolledStudents(course_id INT) RETURNS INT
    -> BEGIN
    ->     DECLARE total_students INT;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near ''
 at line 3
mysql>
mysql>     -- Calculate total enrolled students for the given course ID
mysql>     SELECT COUNT(*) INTO total_students
    ->     FROM courseenrolls
    ->     WHERE course = course_id;
ERROR 1327 (42000): Undeclared variable: total_students
mysql>
mysql>     RETURN total_students;
```

## 4.1.6 INSERT STUDENT DETAILS




```
call online_course_reg.InsertStudent('325', 'SHRIYA', '1043');
```

| | | | | |
|---|---|---|---|---|
| 325 | NULL | NULL | SHRIYA | 1043 |

Action Output

| # | Time | Action | Message |
|---|---|---|---|
| 8 | 00:48:32 | SELECT * FROM online_course_reg.students LIMIT 0, 1000 | 33 row(s) returned |
| 9 | 00:49:45 | SELECT * FROM online_course_reg.userlog LIMIT 0, 1000 | 3 row(s) returned |
| 10 | 01:14:39 | call online_course_reg.GetStudentNames() | 33 row(s) returned |
| 11 | 01:14:42 | call online_course_reg.GetStudentNames() | 33 row(s) returned |
| 12 | 01:17:01 | call online_course_reg.InsertStudent('325', 'SHRIYA', '1043') | 1 row(s) affected |
| 13 | 01:17:50 | SELECT * FROM online_course_reg.students LIMIT 0, 1000 | 34 row(s) returned |

# CHAPTER V

# APPLICATIONS

An Online Course Registration System (OCRS) serves as a transformative tool in the realm of education management, providing a comprehensive platform for academic institutions to streamline administrative tasks and meet the needs of students. Here's how it plays a crucial role:

**Course Management:** OCRS enables academic institutions to efficiently manage their course offerings. Administrators can easily add, edit, or remove courses, update course descriptions, and set registration deadlines, ensuring that students have access to accurate and up-to-date information about available courses.

**Student Information Management:** OCRS allows institutions to maintain comprehensive records of student information. It stores data such as student demographics, academic history, and registration status, providing administrators with valuable insights for academic planning and resource allocation.

**Communication and Notifications:** The system includes features for effective communication between students and administrators. It sends automated notifications to remind students of upcoming registration deadlines, notify them of course changes or cancellations, and provide important updates and announcements.

**Reporting and Analytics:** OCRS offers robust reporting and analytics capabilities to support data-driven decision-making. It generates reports on course enrollment trends, student demographics, registration statistics, and other key metrics, empowering administrators to assess the effectiveness of academic programs and identify areas for improvement.

**Security and Data Privacy:** The system prioritizes the security and privacy of student data. It implements secure authentication mechanisms, encryption protocols, and access controls to protect sensitive information and ensure compliance with data protection regulations.

Overall, an Online Course Registration System serves as a central hub for academic institutions to effectively manage course offerings, streamline registration processes, and enhance communication with students, ultimately contributing to the success and efficiency of educational operations.

# CHAPTER VI

# CONCLUSION

Throughout the development journey of the Online Course Registration System (OCRS), the utilization of MySQL and MySQL Workbench has been indispensable. MySQL, recognized for its reliability and efficiency, served as the cornerstone for managing the project's database. Its robust features facilitated seamless data storage, retrieval, and manipulation, ensuring the smooth operation of the system.

MySQL Workbench emerged as an invaluable tool for database development and management. Its user-friendly interface and comprehensive functionalities streamlined the process of designing, implementing, and optimizing the database schema. With MySQL Workbench, tasks such as database modeling, defining relationships, and executing SQL queries were executed efficiently, facilitating effective database management throughout the project lifecycle.

Together, MySQL and MySQL Workbench formed a potent combination, enabling the creation of a resilient and scalable database infrastructure for OCRS. Their integration facilitated seamless communication between the backend and frontend components, ensuring a cohesive user experience and efficient data flow.

In conclusion, the utilization of MySQL and MySQL Workbench played a pivotal role in the successful development of the Online Course Registration System. They provided a solid foundation for database management, contributing significantly to the functionality, performance, and overall success of the application.

# BIBLIOGRAPHY

It has been a matter of immense pleasure, honour and challenge to have this opportunity to take up this project and complete it successfully.

I have obtained information from various resources to design and implement our project.

I have acquired most of the knowledge from the Internet.

The following are some of the resources:


- Letkowski, Jerzy. (2015). Doing database design with MySQL. Journal of Technology Research. Volume 6.
- D. K. Hatch and C. E. Garcia, Academic advising and the persistence intentions of community college students in their first weeks in college, vol. 40, no. 3. 2017.
- R. Morsomme and S. V. Alferez, “Content-based course recommender system for liberal arts education,” EDM 2019 - Proc. 12th Int. Conf. Educ. Data Min., no. Edm, pp. 748–753, 2019.
- V. Vaidhehi and R. Suchithra, “An enhanced approach using collaborative filtering for generating under graduate program recommendations,” 2019 2nd Int. Conf. Adv. Comput. Commun. Paradig. ICACCP 2019, pp. 1–6, 2019. [15] E. S. Khorasan