CPE241: Database Systems

Student Registration Management System

Created By

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Submit to

Prof. Phond Phunchongharn & Arnatchai Techaviseschai

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King Mongkut's University of Technology Thonburi

Project Title	Student Registration Management System
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Program	Bachelor of Engineering
Field of Study	Computer Engineering
Department	Computer Engineering
Faculty	Engineering
Academic Year	2024

Abstract

This project involves creating a software application using knowledge about databases in a student registration system. The software uses Python on a relational database system and its features include different access logins for users and real-time data updates. A student registration system is necessary for each school and university, it helps keep the records of everything in the system and can be made automated. Administrators can check student progress and manage data. Students and Instructors can go to the interface to register for courses and view their records. The development of this application focuses on the practical implementation of the database design in projects.

Table of Content

Acknowledgments

Above all, we would like to express our gratitude to the teachers in particular for their lectures on all the topics that are relevant to this project and for motivating us to start working on it. We also sincerely appreciate the support, help, and input that each teacher assistant has given us on this endeavor.

Additionally, we would like to express our gratitude to each individual for their invaluable assistance, without which this project would not have been feasible.

Not to mention, we want to express our gratitude to all of the team members who put in a lot of effort to finish this project. We truly regret any mistakes we may have made on this project and will take it as a learning opportunity moving ahead.

Sincerely,
MeeTong Developers

Project Details

Project Description

A software program called a Student Registration Management System (SRMS) is made to manage the procedures related to student registration. They need this system for educational establishments like schools, colleges, and universities to effectively manage student data, course enrollments, scheduling, and administrative chores.

Project Goals

1.) Implement the knowledge of database systems achieved from CPE241
2.) Implement database design for Student Registration Management Systems using ER diagrams.
3.) Create user roles and accesses for Student Registration Management Systems.
4.) Create the data dictionary for Student Registration Management Systems.
5.) Implement working software with front-end and back-end.

Project Scope

The Student Registration Management System can be done in a very wide spectrum. However, due to the time issue and other factors, we have concluded that we have to scope down the project. We will focus on members' (students and instructors) information, the enrollment process, and course information.

In-scope Functions

- Allow administrators to create, edit, and remove members in the system
- Allow the administrators to view every detail in the system
- Allow the students to see the available courses
- Allow the instructors to edit their assigned courses
- Allow the students and instructors to edit their profile
- Allow the students to enroll or drop their courses

Out-scope Functions

- Plan and manage examination schedule, which includes room assignments and time slots
- Manage tuition fees, generate billing statements, process payments, and handle financial records
- Send automated notifications about important dates (such as deadlines and class changes)

Languages and Tools Used in the Project

- Python 3.0 (Language)
- SQL (Language)
- Streamlit (Library)
- Pandas (Library)
- numpy (Library)
- streamlit_navigation_bar (Library)
- streamlit_extras.stylable_container (Library)
- Snowflake (Database)
- MySQL (Database)

Database Design

Roles

There are 3 user roles in the Student Registration Management System:

1.) **Administrator:** This role is the one who will maintain and improve the system of the website. The administrator can access all relations and pages, they can also access all information on the website

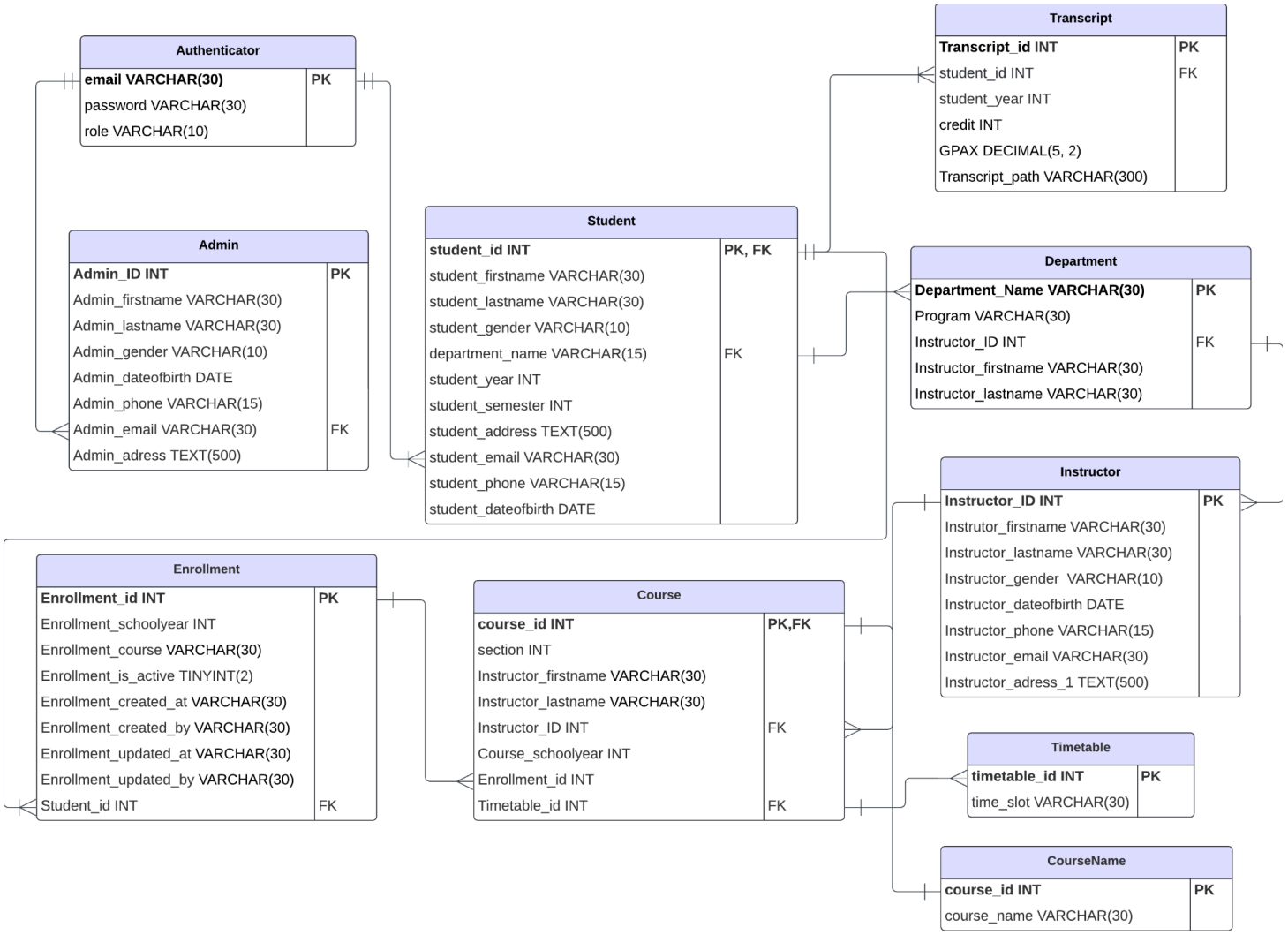
2.) **Student:** People who study in the university/school. They must create a new profile in order to access the university's website. Then, they have the ability to edit their own profile and the courses they want to enroll in, however, they cannot access the university's private information.

3.) **Instructor:** The individuals who teach in the university/school. They must create an account similar to the student role. However, they would have the ability to access certain internal data, but cannot edit them.

Relations	Administrator	Student	Instructor
Authenticator	Create, Edit, View, Delete	-	-
Admin	Create, Edit, View, Delete	-	View
Student	Create, Edit, View, Delete	Create, Edit, View	View
Transcript	Create, Edit, View, Delete	View	View
Department	Create, Edit, View, Delete	View	View
Enrollment	Create, Edit, View, Delete	Create, Edit, View, Delete	View
Course	Create, Edit, View, Delete	View	View
Instructor	Create, Edit, View, Delete	View	Create, Edit, View

Timetable	Create, Edit, View, Delete	View	View
CourseName	Create, Edit, View, Delete	View	View

ER Diagram


Authenticator
email VARCHAR(30) PK
password VARCHAR(30)
role VARCHAR(10)
Transcript
Transcript_id INT PK
student_id INT FK
student_year INT
credit INT
GPAX DECIMAL(5, 2)
Transcript_path VARCHAR(300)
Admin
Admin_ID INT PK
Admin_firstname VARCHAR(30)
Admin_lastname VARCHAR(30)
Admin_gender VARCHAR(10)
Admin_dateofbirth DATE
Admin_phone VARCHAR(15)
Admin_email VARCHAR(30) FK
Admin_adress TEXT(500)
Student
student_id INT PK, FK
student_firstname VARCHAR(30)
student_lastname VARCHAR(30)
student_gender VARCHAR(10)
department_name VARCHAR(15) FK
student_year INT
student_semester INT
student_address TEXT(500)
student_email VARCHAR(30)
student_phone VARCHAR(15)
student_dateofbirth DATE
Department
Department_Name VARCHAR(30) PK
Program VARCHAR(30)
Instructor_ID INT FK
Instructor_firstname VARCHAR(30)
Instructor_lastname VARCHAR(30)
Instructor
Instructor_ID INT PK
Instrutor_firstname VARCHAR(30)
Instructor_lastname VARCHAR(30)
Instructor_gender VARCHAR(10)
Instructor_dateofbirth DATE
Instructor_phone VARCHAR(15)
Instructor_email VARCHAR(30)
Instructor_adress_1 TEXT(500)
Enrollment
Enrollment_id INT PK
Enrollment_schoolyear INT
Enrollment_course VARCHAR(30)
Enrollment_is_active TINYINT(2)
Enrollment_created_at VARCHAR(30)
Enrollment_created_by VARCHAR(30)
Enrollment_updated_at VARCHAR(30)
Enrollment_updated_by VARCHAR(30)
Student_id INT FK
Course
course_id INT PK,FK
section INT
Instructor_firstname VARCHAR(30)
Instructor_lastname VARCHAR(30)
Instructor_ID INT FK
Course_schoolyear INT
Enrollment_id INT
Timetable_id INT FK
Timetable
timetable_id INT PK
time_slot VARCHAR(30)
CourseName
course_id INT PK
course_name VARCHAR(30)

Data Dictionary

User Table

User				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
User_ID	INT	-2,147,483,648 to 2,147,483,647	Identification code of a user. Start with 1. The ID is sorted by a value of positive integer.	45
Password	VARCHAR	30	Login password for any role	tongrakmom1234
Role	VARCHAR	10	Use to log in to a different role	Administrator

Register Table

Register				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Registration_ID	INT	-2,147,483,648 to 2,147,483,647	Identification code of registration. Start with 1. The ID is sorted by a value of positive integer.	2
User_ID	INT	-2,147,483,648 to 2,147,483,647	Identification code of a user. Start with 1. The ID is sorted by a value of positive integer.	69
User_firstname	VARCHAR	10	First name of a user	Arm
User_lastname	VARCHAR	30	Last name of a user	Gearmua
registration_email	VARCHAR	30	Login Email for any role	armtear@gmail.com

Authenticator Table

Authenticator				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
email	VARCHAR	30	Login Email for any role	tong1234@gmail
password	VARCHAR	30	Login password for any role	tongrakmom1234
role	VARCHAR	10	Use to log in to a different role	Administrator

Admin Table

Admin				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Admin_ID	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the admin. Start with 1. The ID is sorted by a value of positive integer.	1
Admin_firstname	VARCHAR	30	First name of an admin	Preechar
Admin_lastname	VARCHAR	30	Last name of an admin	Utah nam non-Jazz
Admin_gender	VARCHAR	10	The gender of an admin consists of male, female, and other	Male
Admin_dateofbirth	DATE	3	date of birth of an admin	13/11/2003
Admin_phone	VARCHAR	15	Phone number of an admin	000-000-0000
Admin_email	VARCHAR	30	Email address of an admin	tongtale@gmail.com
Admin_address	TEXT	500	Address of an admin	130 Ekkachai Rd. Bangbon district Bangkok 10150

Student Table

Student				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
student_ID	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the student. Start with 1. The ID is sorted based on a positive integer.	1
student_firstname	VARCHAR	30	First name of a student	Tongrak
student_lastname	VARCHAR	30	Last name of a student	talemak
student_gender	VARCHAR	10	The gender of a student consists of male and female	other
department_name	VARCHAR	15	Department of a student	CPE
student_year	INT	-2,147,483,648 to 2,147,483,647	It is a student class year	1
student_semester	INT	-2,147,483,648 to 2,147,483,647	It is a semester of study for student	2
student_address	TEXT	500	Address of a student	130 Ekkachai Rd. Bangbon district Bangkok 10150
student_email	VARCHAR	30	Email address of a student	tongtale@gmail.com
student_phone	VARCHAR	15	Phone number of a student	000-000-0000
student_dateofbirth	DATE	3	Date of birth of an admin	07/07/2003

Enrollment Table

Enrollment				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Enrollment_id	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the enrollment. Start	1

			with 1. The ID is sorted based on a positive integer.	
Enrollment_schoolyear	INT	-2,147,483,648 to 2,147,483,647	It is the year can take this course.	2
Enrollment_course	VARCHAR	30	Name of course registered for study	CPE 241
Enrollment_is_active	TINYINT	2	A status to display whether a user is active or not	True
Enrollment_created_at	VARCHAR	2	A date when enrollment is created	2024/05/22
Enrollment_created_by	VARCHAR	2	A name of user who created enrollment	Billy191
Enrollment_updated_at	VARCHAR	2	A date when enrollment is updated	2023/04/20
Enrollment_updated_by	VARCHAR	2	A name of user who updated enrollment	Toi
Student_id	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the student. Start with 1. The ID is sorted based on a positive integer.	5

Course Table

Course				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Course_id	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the course. Start with 1. The ID is sorted based on a positive integer.	7
Section	INT	-2,147,483,648 to 2,147,483,647	It is the number of a group in a course.	6
Instructor_firstname	VARCHAR	30	An instructor first name	Ratchanon
Instructor_lastname	VARCHAR	30	An instructor last name	Tarawan

Instructor_ID	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the instructor. Start with 1. The ID is sorted based on a positive integer.	44
Course_schoolyear	INT	-2,147,483,648 to 2,147,483,647	It is the index which displays the course of each school year.	4
Enrollment_id	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the enrollment. Start with 1. The ID is sorted based on a positive integer.	1
Timetable_id	INT	-2,147,483,648 to 2,147,483,647	It is the identification code of the timetable. Start with 1. The ID is sorted based on a positive integer.	11

Transcript Table

Transcript				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Transcript_id	INT	-2,147,483,648 to 2,147,483,647	It is the transcription code of the course. Start with 1. The ID is sorted based on a positive integer.	77
Student_id	INT	-2,147,483,648 to 2,147,483,647	It is the transcription code of the student. Start with 1. The ID is sorted based on a positive integer.	52
Student_year	INT	-2,147,483,648 to 2,147,483,647	The year of students who study in the school.	4
Credit	INT	-2,147,483,648 to 2,147,483,647	The amount of study time in a course per week.	3
GPAX	DECIMAL	(5,2)	the average grade of a student which is calculated since the	3.25

			first semester of the first year.	
Transcript_path	VARCHAR	30	the path of the image of the transcript	‘transcript/transcript1.jpg’'

Department Table

Department				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Department_Name	VARCHAR	30	A name of a department	Faculty of Engineering
Program	VARCHAR	30	A name of a program in a department	International Program
Instructor_ID	INT	-2,147,483,648 to 2,147,483,647	It is the transcription code of the instructor. Start with 1. The ID is sorted based on a positive integer.	23
Instructor_firstname	VARCHAR	30	First name of an instructor	Gunn
Instructor_lastname	VARCHAR	30	Last name of an instructor	Wangwichit

Instructor Table

Instructor				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Instructor_ID	INT	-2,147,483,648 to 2,147,483,647	It is the transcription code of the instructor. Start with 1. The ID is sorted based on a positive integer.	23
Instructor_firstname	VARCHAR	30	First name of an instructor	Gunn
Instructor_lastname	VARCHAR	30	Last name of an instructor	Wangwichit
Instructor_gender	VARCHAR	30	The gender of an instructor consists of male, female, and other	Other

Instructor_dateofbirth	DATE	3	Date of birth of an instructor	11/12/2003
Instructor_phone	VARCHAR	30	Phone number of an instructor	000-000-0000
Instructor_email	VARCHAR	30	Email address of an instructor	tongtale@gmail.com
Instructor_address	TEXT	500	Address of an instructor	130 Ekkachai Rd. Bangbon district Bangkok 10150

Timetable Table

Timetable				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
timetable_id	INT	-2,147,483,648 to 2,147,483,647	It is the transcription code of the timetable. Start with 1. The ID is sorted based on a positive integer.	1
time_slot	VARCHAR	30		9.30-12.30

CourseName Table

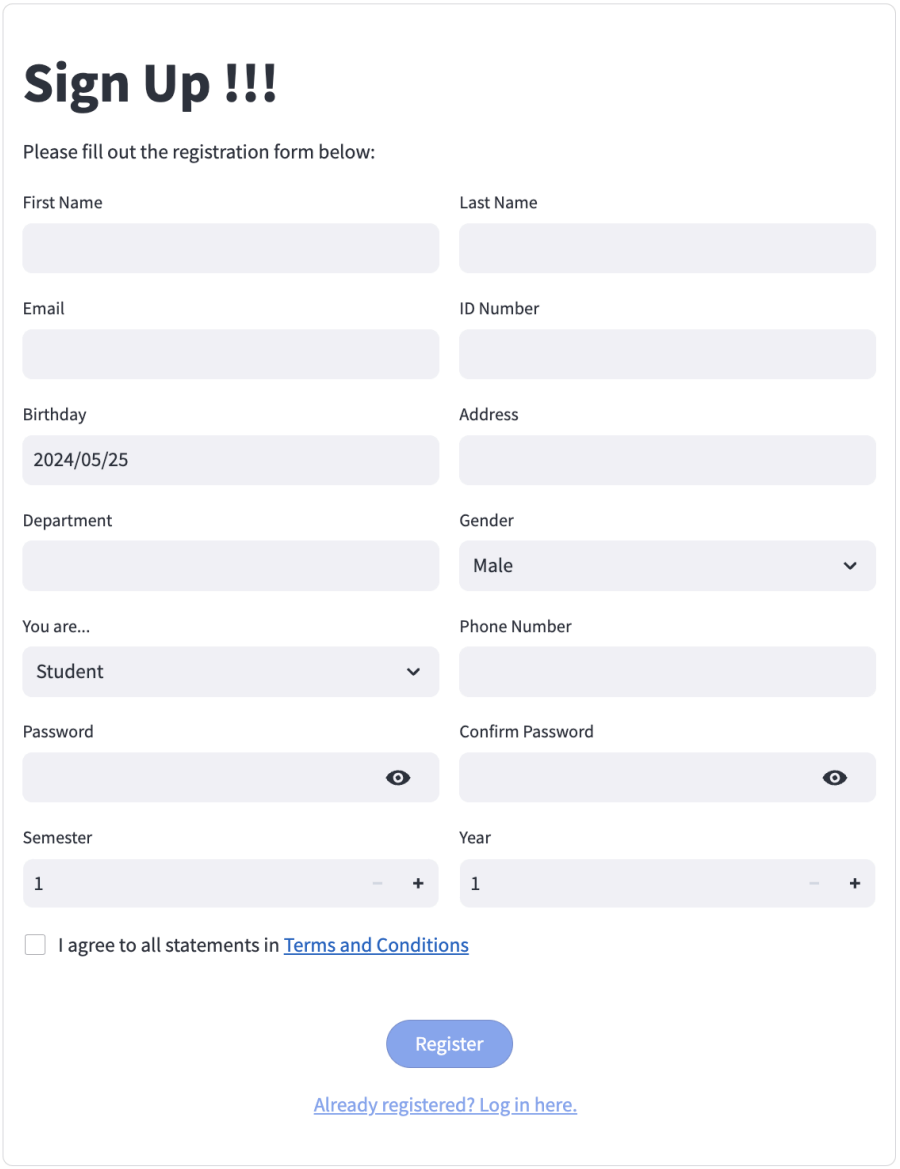
CourseName				
Field Name	**Data Type**	**Field Size**	**Description**	**Example**
Course_id	INT	-2,147,483,648 to 2,147,483,647	It is the transcription code of the course. Start with 1. The ID is sorted based on a positive integer.	2
Course_name	VARCHAR	30	A name of a course	GEN 111

User Interface Design

Complex Transaction Form

The complex transaction form is a type of form that will include modifications in 2 or more tables. In our database system, there are a total of 8 complex transaction forms. The list of the forms are as follows:

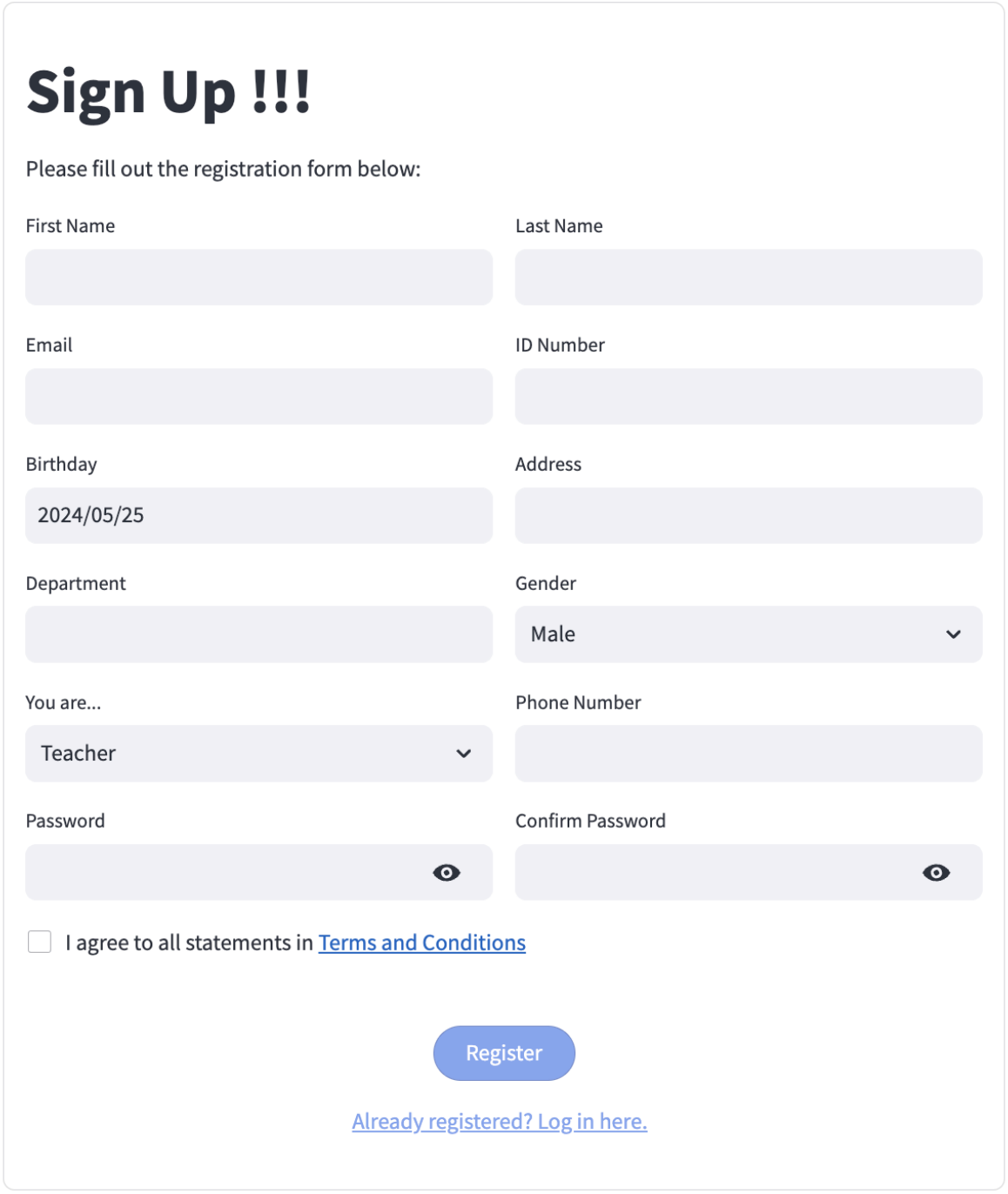
1) Student Registration Form



This form can be accessed by the students, this form will occur when the users choose "Student" in the "You are…". By this, it will modify 2 tables namely:

- Student Table: (Created Student Registration record)
- Authenticator Table: (Created Authentication record)

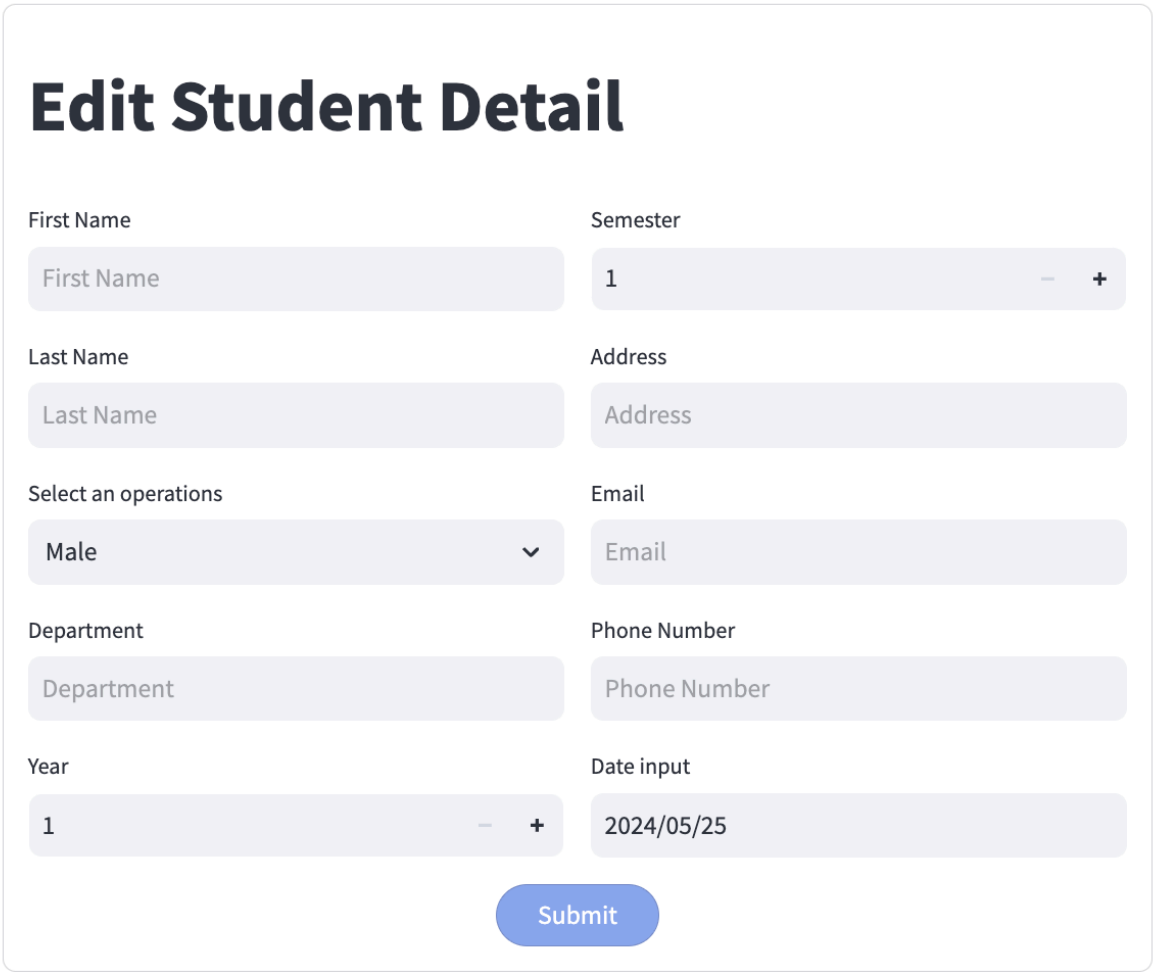
2) Teacher Registration Form



On the other hand, when compared to the previous form, this form can be accessed by the instructor when the users select "Teacher" in the "You are…" box. This form modified 3 tables:

- Department Table (Created Department record)
- Instructor Table (Created Instructor record)
- Authenticator Table (Created Authentication record)

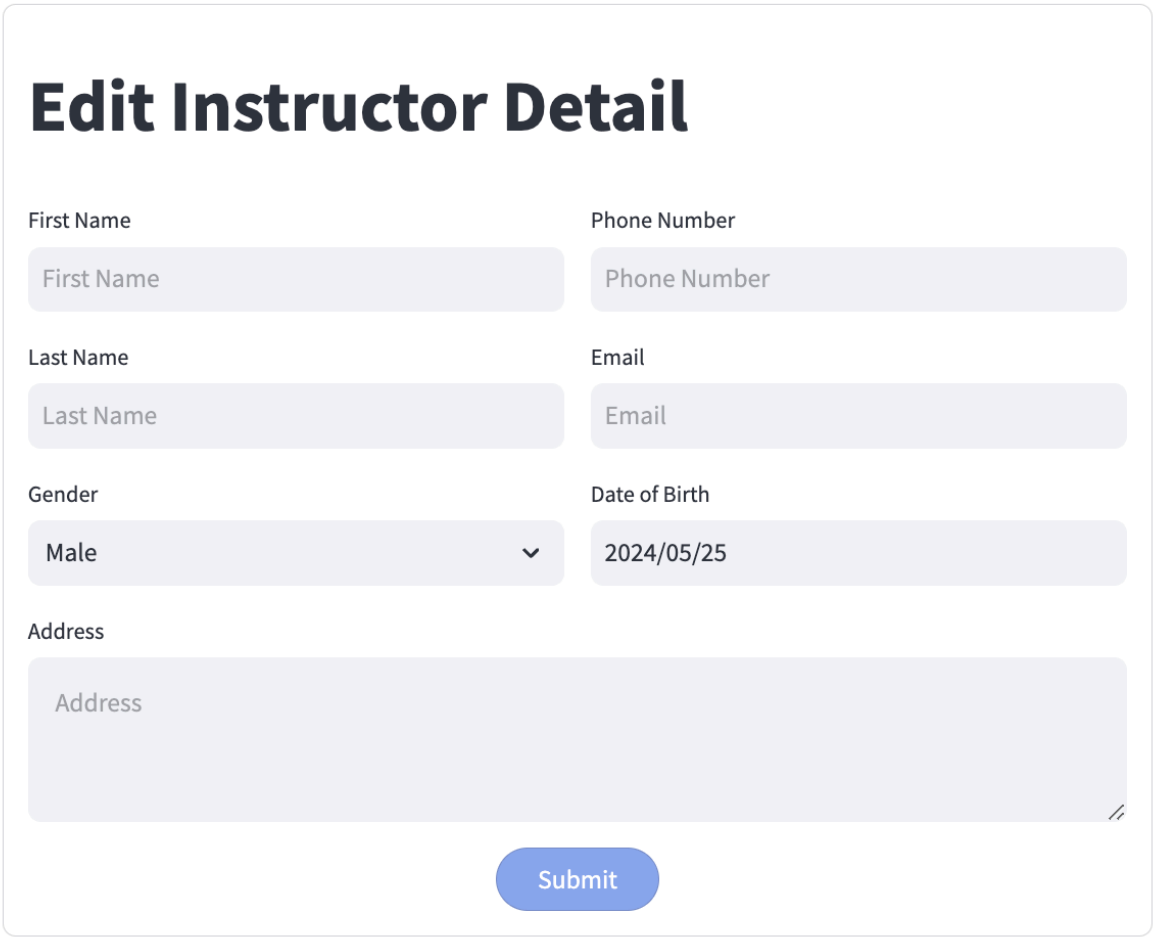
3) Edit Student Detail



In this form, only the student role would be able to access, it is used to edit their own profile. In which, when the student clicks the "Submit" button it will modify 4 tables:

- Student Table (Updated the student ID, student Year)
- Enrollment Table (Updated the student ID)
- Authenticator (Updated the E-mail)
- Transcript Table (Updated the student ID, student Year)

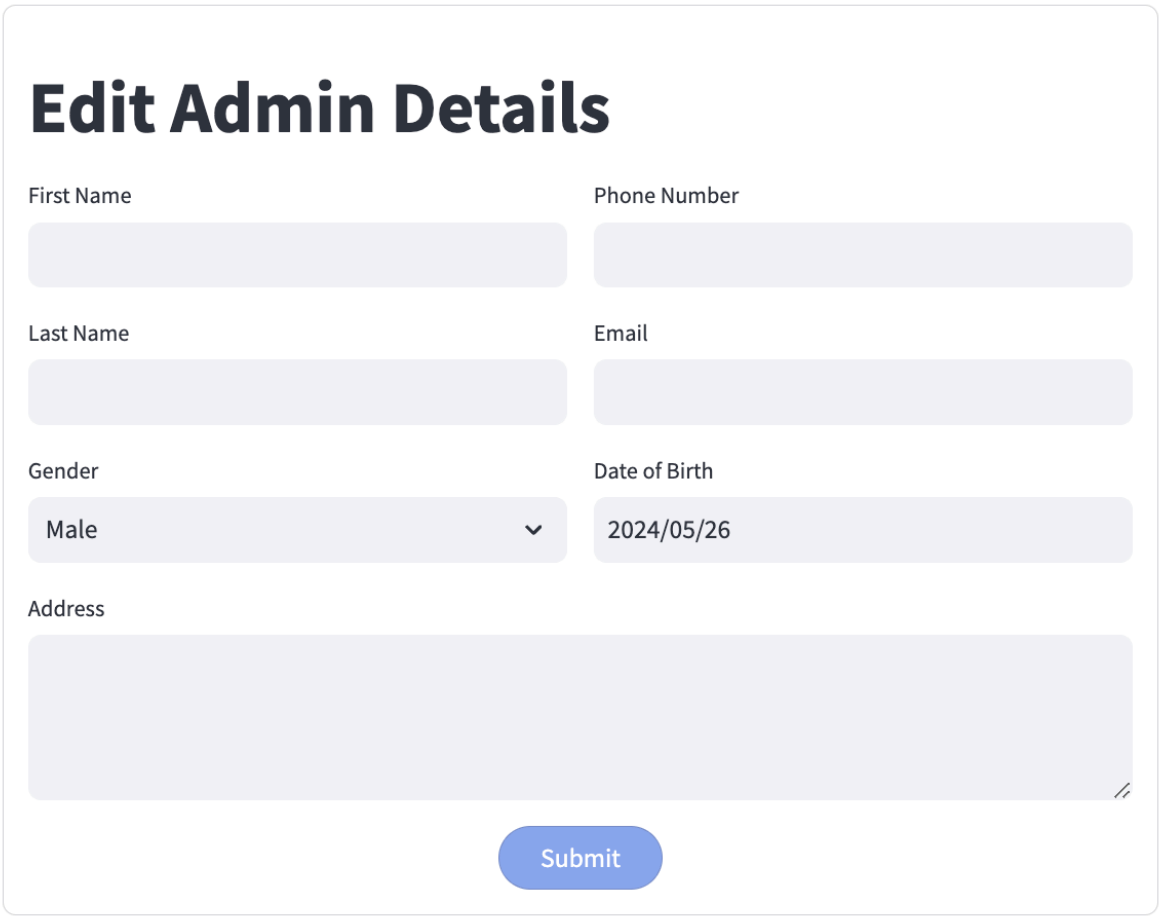
4) Edit Instructor Detail



However, for this form, the instructor's role is the one who can update the data. This form is capable of updating 4 tables:

- Department Table (Updated the Department Name)
- Instructor Table (Updated the Instructor ID)
- Course Table ((Updated the Name of Instructor in that course)
- Authenticator (Updated the E-mail)

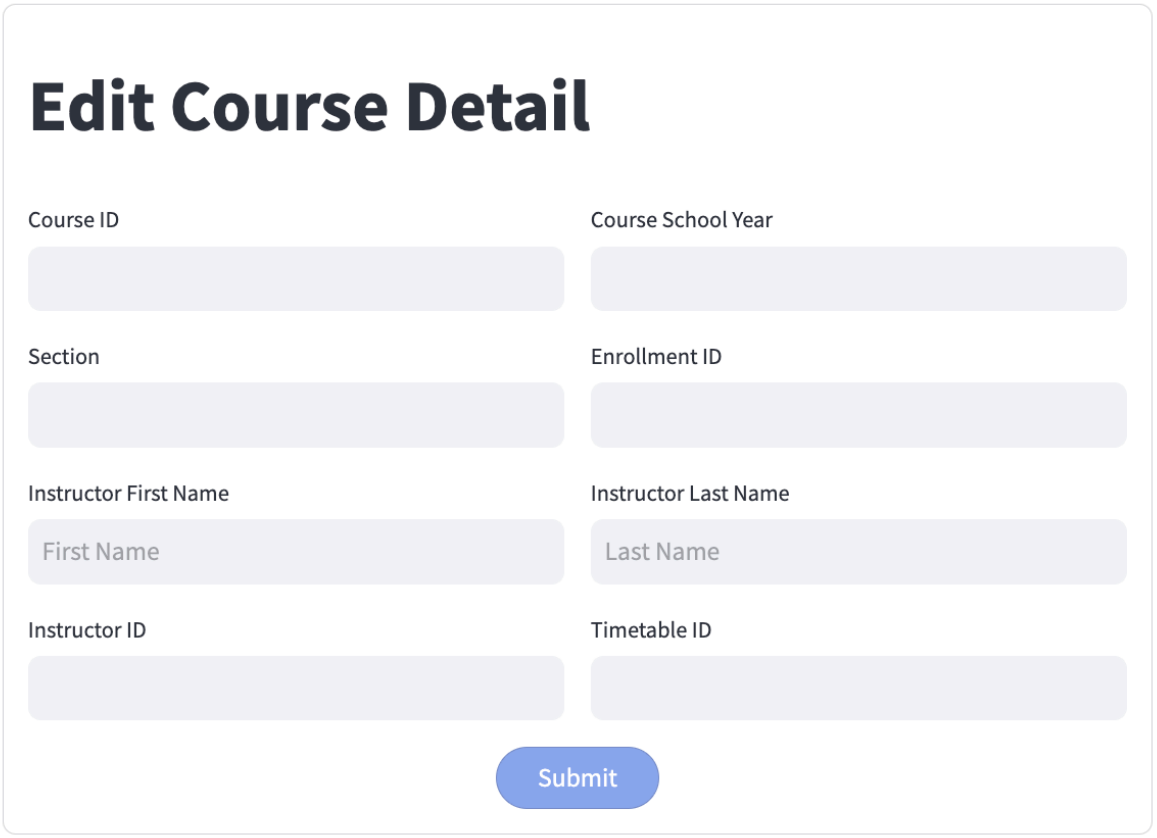
5) Edit Administrator Detail



In this form, the administrator is the one who can update the data. This form is capable of updating only 2 tables:

- Admin Table (Updated the Admin ID)
- Authenticator (Updated the E-mail)

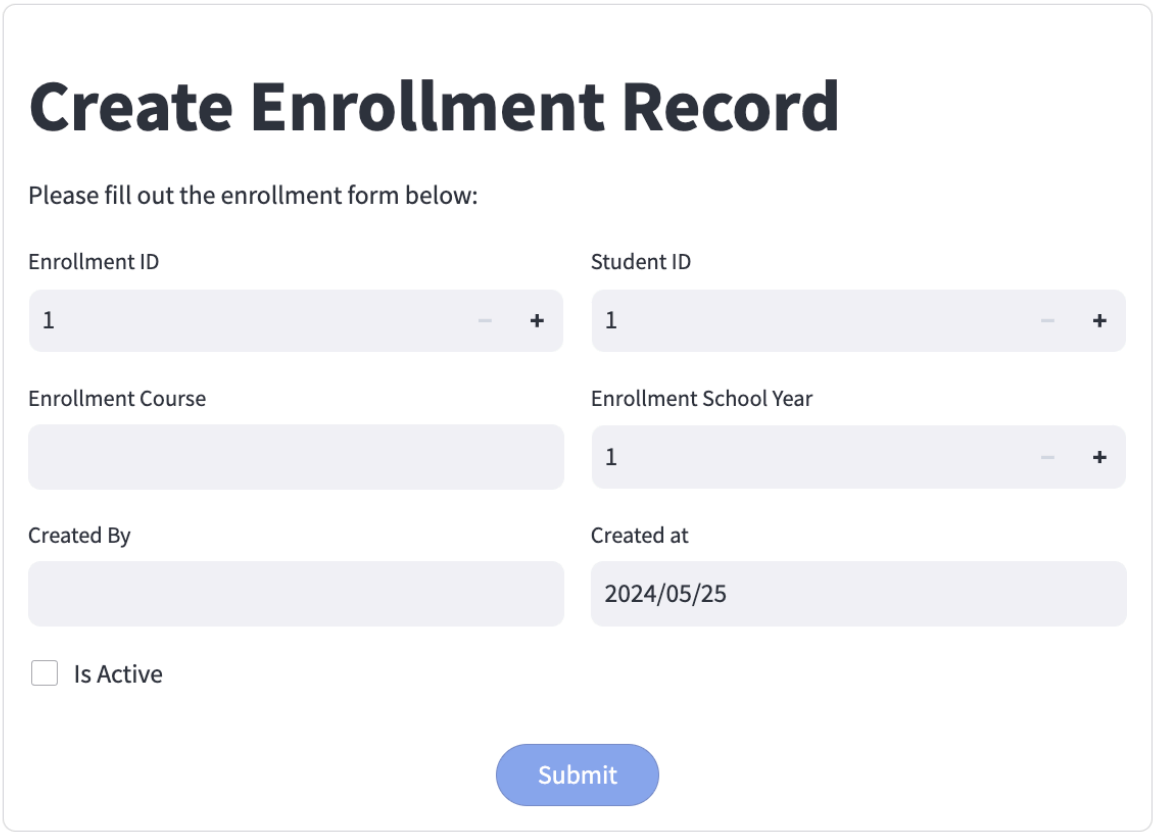
6) Edit Course Detail



For this form, only the instructors and administrators roles are the ones who can access this form. 4 tables will be modified with this form.

- Instructor Table (Updated the Instructor ID)
- Course Table (Updated the Course ID)
- Timetable Table (Updated the Timetable ID)
- CourseName Table(Updated the CourseName Course_id)

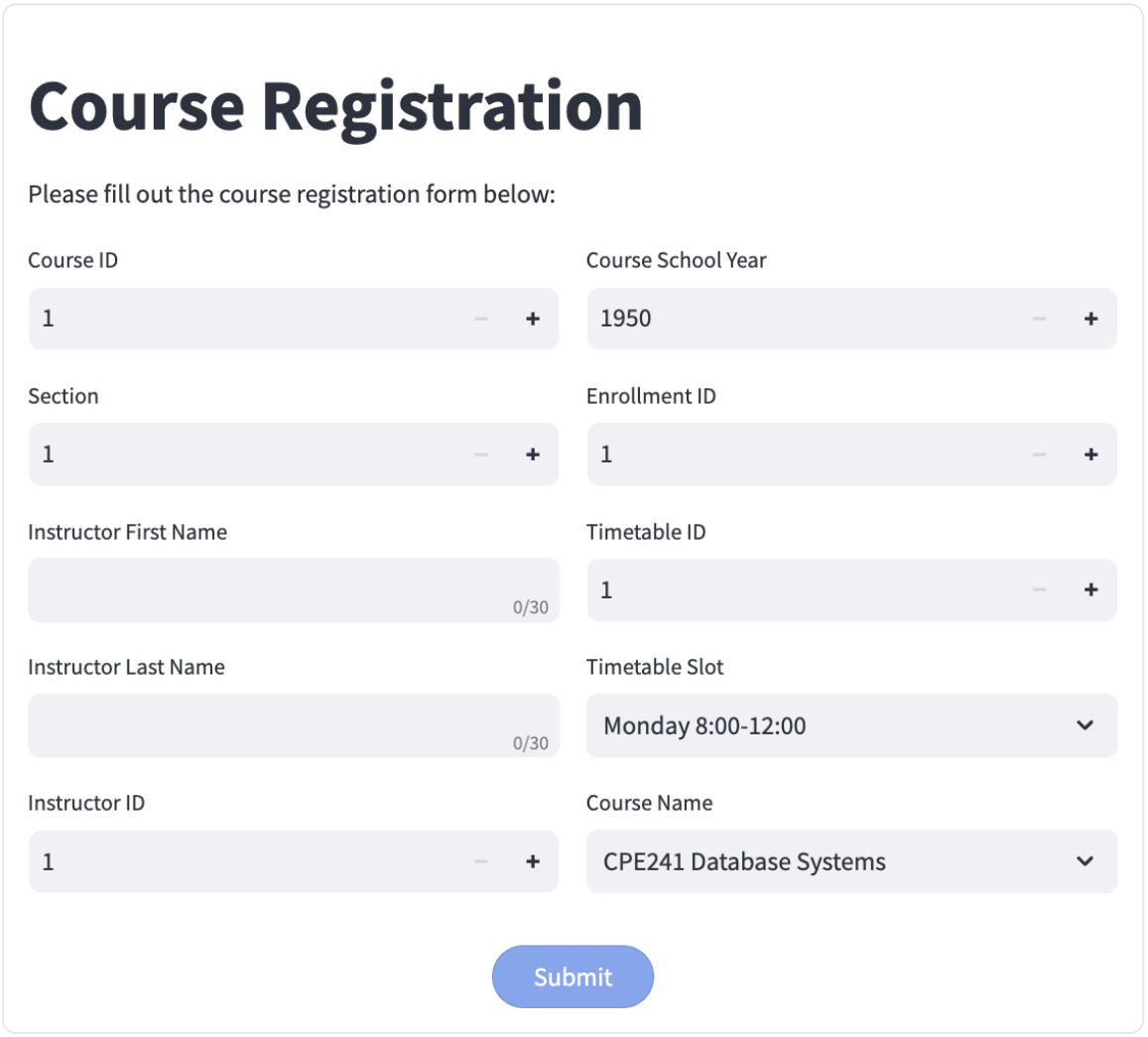
7) Enrollment Registration Form



The only positions with access to this form are those of instructors and administrators. With this form, it can be used to edit 2 tables:

- Enrollment Table (Created Enrollment record)
- Course Table (Created Course record)

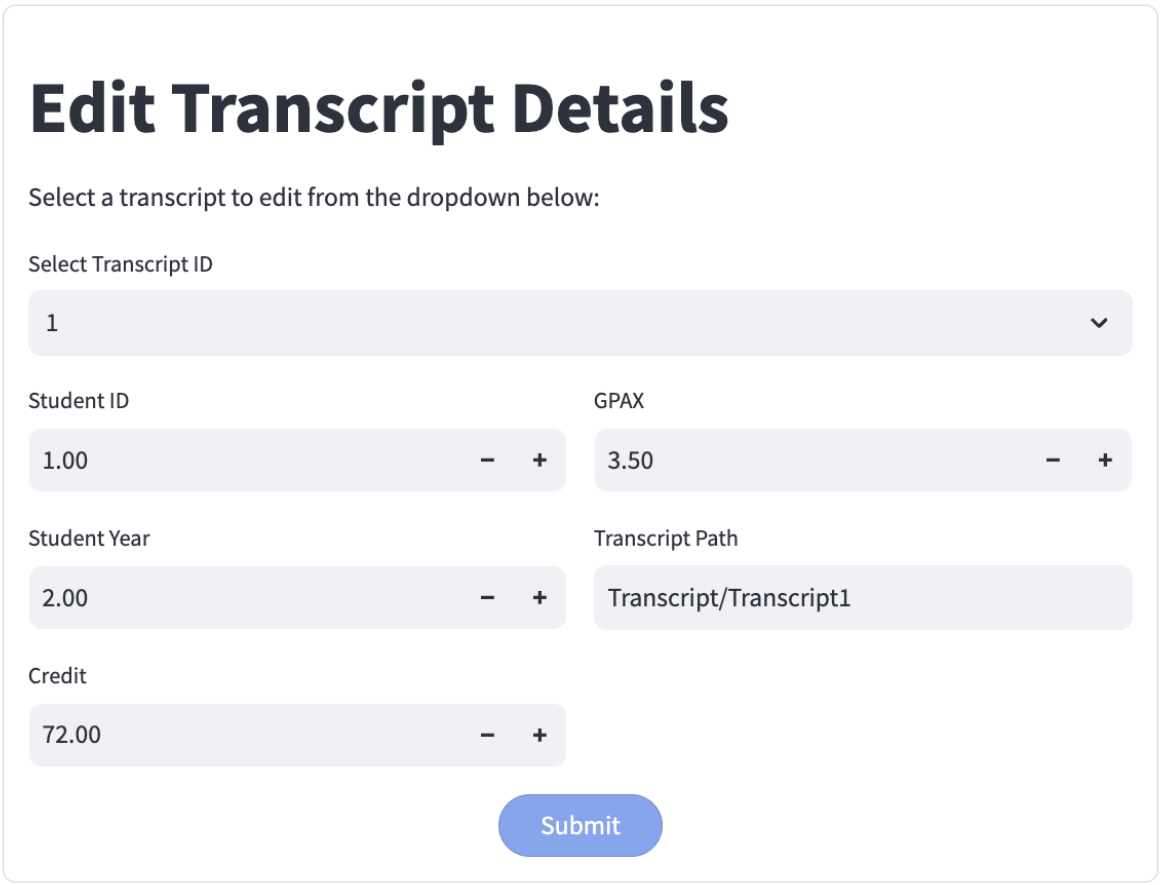
8) Course Registration Form



Course registration is a transaction in which only the admin can edit the information. Other roles can only be viewed. In this form, the information in these tables consists of 2 tables:

- CourseName table (Created the course)
- Timetable table (Set time and time slot in the table)

9) Create Transcript Form



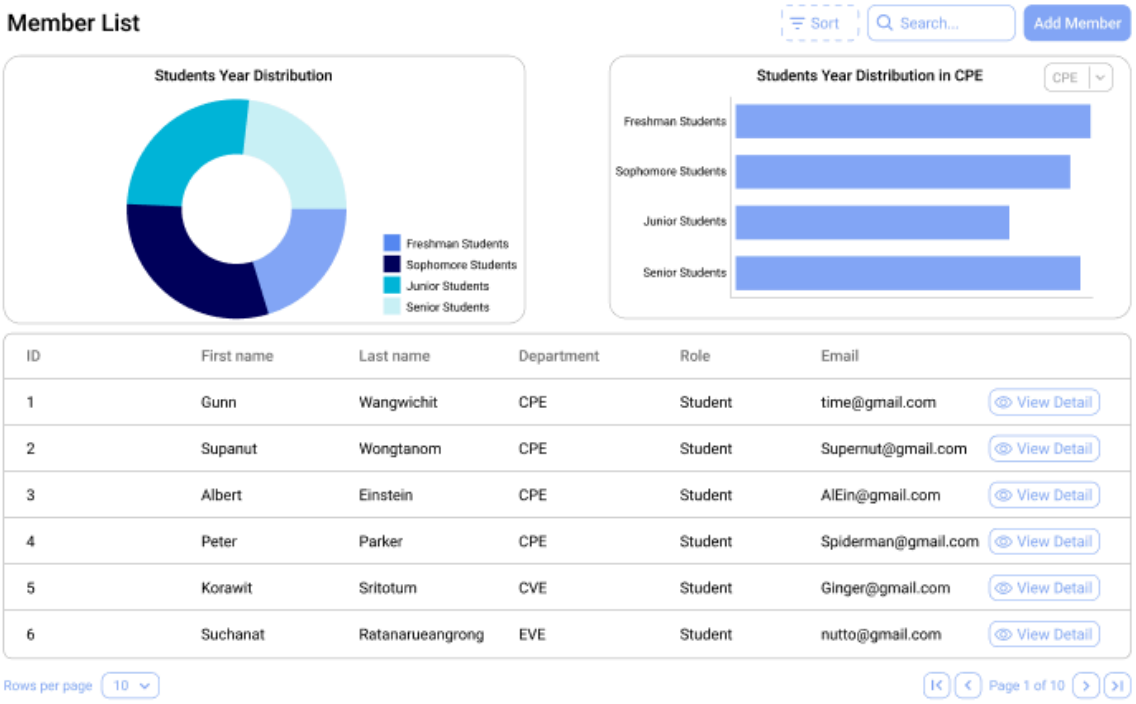
Transcript detail is a transaction in which only the admin can edit the information. Other roles can only be viewed. In this form, the information in these tables consists of 2 tables:

- Transcript table (Updated the Transcript table)
- Student table (Updated the Transcript_id)

Advance Analysis Report

The advance analysis report will include aggregated information from 3 or more tables Our system currently has 5 reports as follows:

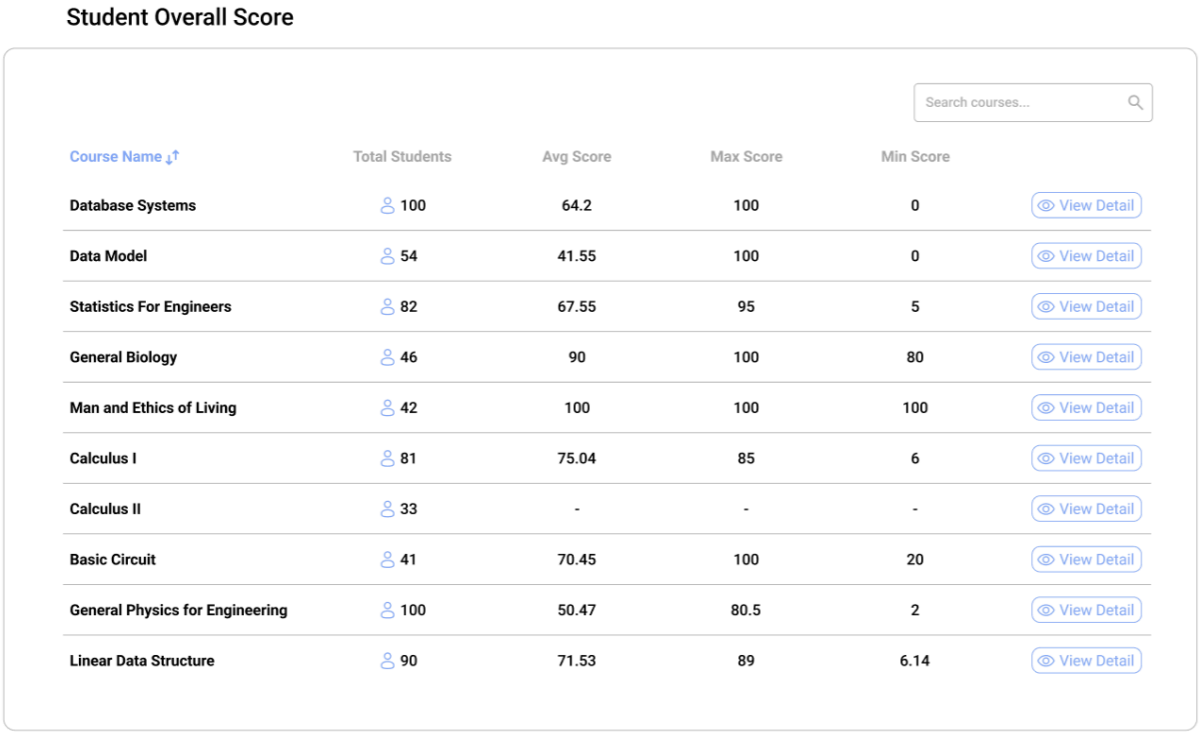
1) Member List Report



This page will provide the overall students' year distribution and also show each department.

- Students and instructors’ information
- The sum of each student's year in the university
- The sum of each student's year in each department

2) Student Overall Score Report

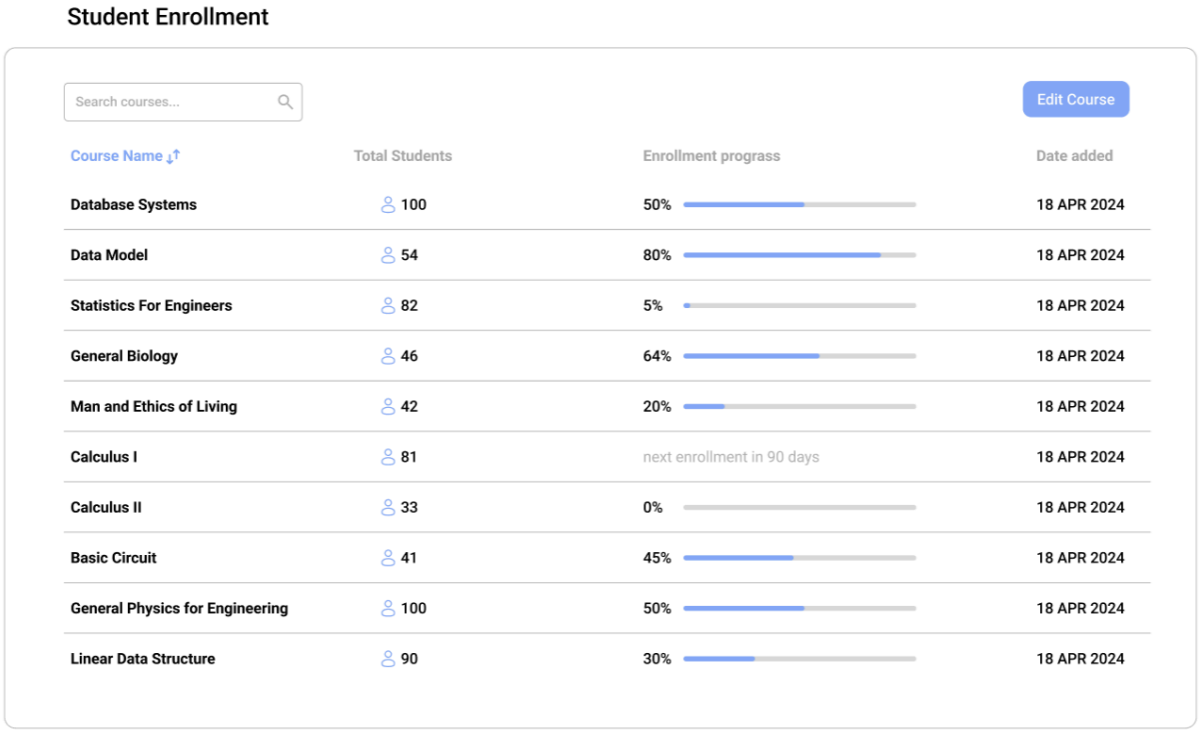


Course Name	Total Students	Avg Score	Max Score	Min Score	
Database Systems	100	64.2	100	0	View Detail
Data Model	54	41.55	100	0	View Detail
Statistics For Engineers	82	67.55	95	5	View Detail
General Biology	46	90	100	80	View Detail
Man and Ethics of Living	42	100	100	100	View Detail
Calculus I	81	75.04	85	6	View Detail
Calculus II	33	-	-	-	View Detail
Basic Circuit	41	70.45	100	20	View Detail
General Physics for Engineering	100	50.47	80.5	2	View Detail
Linear Data Structure	90	71.53	89	6.14	View Detail

In this report, it will display the scores of the students in each course. it will provide

- The total number of students in each course
- The maximum score that the student received in each course
- The average score that the student received in each course
- The minimum score that the student received in each course

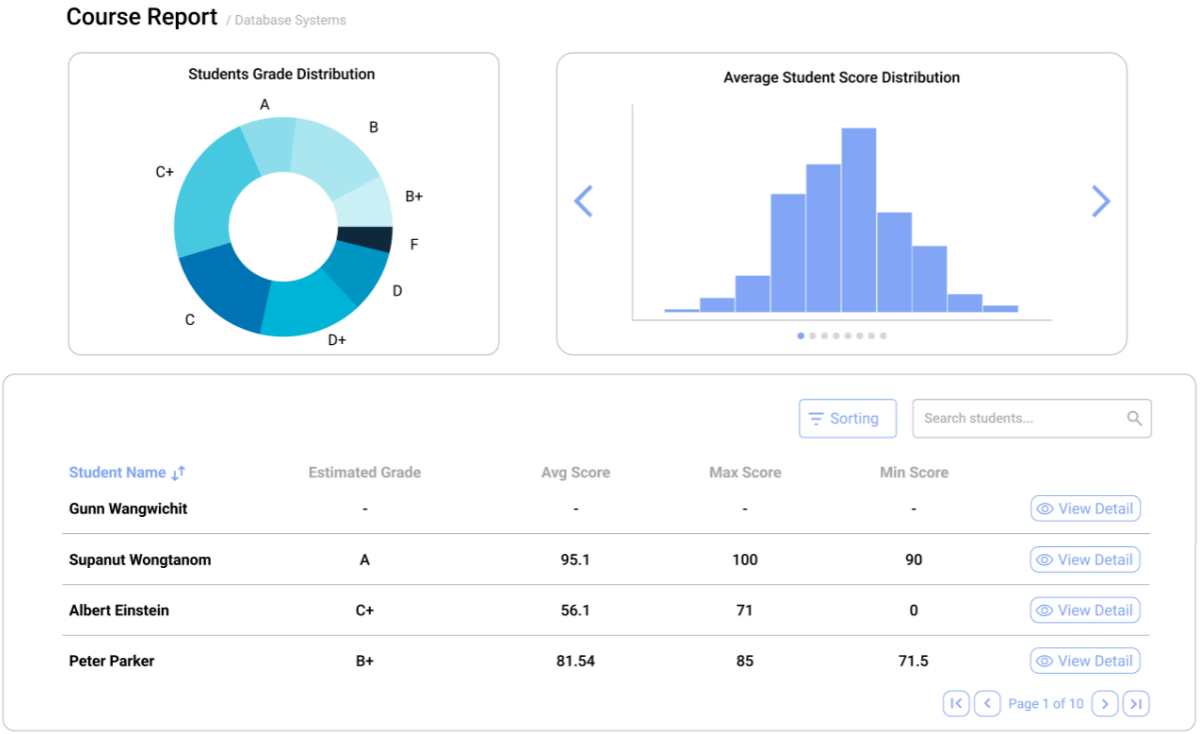
3) Student Enrollment Report



In this page, it provides the capacity of each course that the student can enroll in. It provides

- The total number of students in each course
- The percentage of the enrollment progress in each course in the form of a loading bar

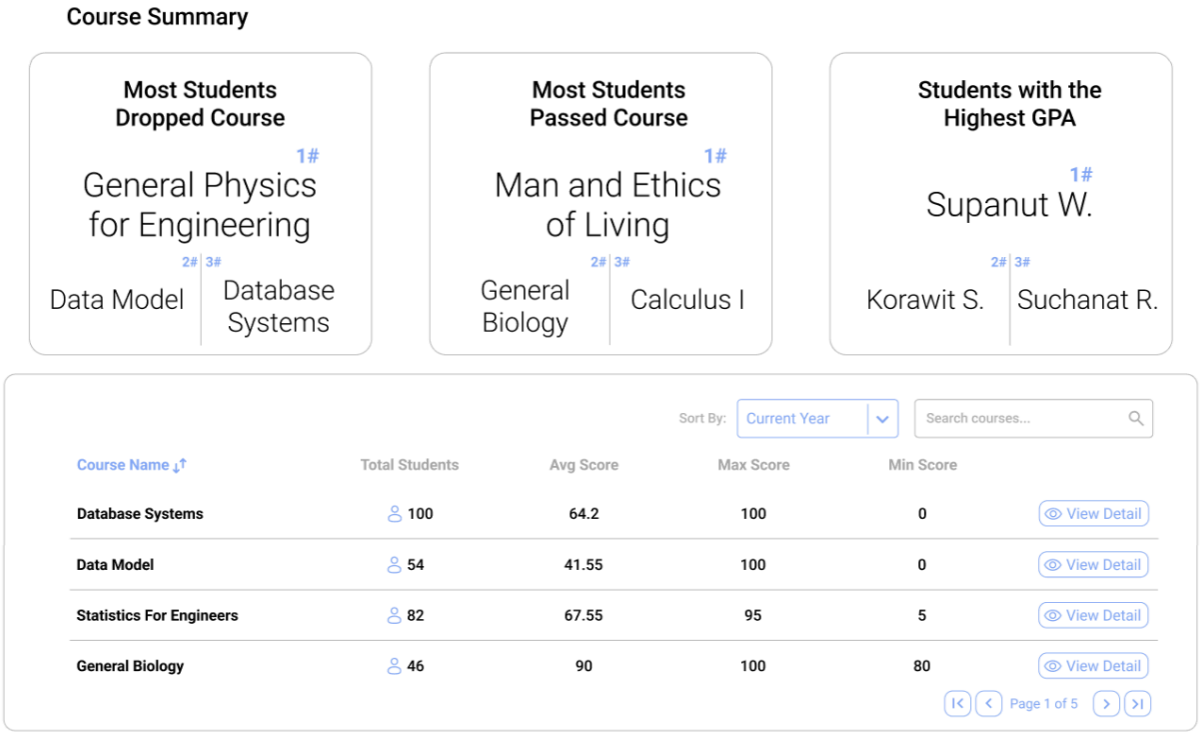
4) Course Report



This report will show the summarized students' grades of each student in the course. It will show

- The maximum score that each student received in the course
- The average score that each student received in each course
- The minimum score that each student received in each course

5) Course Summary Report



This report will provide a summary of which course has the most dropped students and the most passed courses. Not only that but, it also provides the students who have the highest GPA. It will display

- The total number of students in each course
- The maximum score that the student received in each course
- The average score that the student received in each course
- The minimum score that the student received in each course
- The course that has the most students dropped
- The course that has the most students passed

Responsibilities

1) Mr. Korawit Sritotum
    - UX/UI Designer
    - Report Writer
    - Video Editor
    - ER-Diagram Designer
2) Mr. Gunn Wangwichit
    - UX/UI Designer
    - Front-end Developer
    - Report Writer
    - ER-Diagram Designer
3) Mr. Supanut Wongtanom
    - ER-Diagram Designer
    - Video presentation
    - Front-end Developer
    - Report writer
4) Mr. Suchanat Ratanarueangrong
    - Back-end Developer
    - Front-end Developer
    - Report Writer
    - Database Designer and Developer
5) Mr. Phakhapol Maneesopa
    - Front-end Developer
    - Report Writer
    - Back-end Developer
    - ER-Diagram Designer