VIETNAM NATIONAL UNIVERSITY OF HOCHIMINH CITY
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A WEB APPLICATION FOR STUDENT MANAGEMENT SYSTEM (SMS)

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ABBREVIATIONS

IT: Information Technology
SMS: Student Management System
DS: Database System
WAD: Web Application Development
ISM: Information System Management
SQL: Structured Query Language
VNUHCM: Viet Name National University, Ho Chi Minh City
SQ: Sequence Diagram
API: Application Programming Interface

ABSTRACT

Education system nowadays has been developed by many methods, but very few of them have efficient usage and well-built due to the lack of details and the inability to improve further as there are some too many aspects of the education system are continuously developed. This issue requires a better solution. However, traditional methods have failed this task, results in the failure and the inefficient of this system in the modern days. Many groups and organizations have been doing research that can fix this problem by applying various technology methods to the system, however, not every solution can be used wisely or acceptable due to the incompleteness or the unproductive. As the solution to improve the education system, the research will describe the methodology of collecting data from students and generate useful information for further analysis, along with creating a system to manage students that have been improved based on the previous and present model of student management.

CHAPTER 1

INTRODUCTION

1.1. Background

Nowadays, the development of the information technology (IT), especially the industrial revolution 4.0 has made changing our live. Peoples can use the familiar tools or automatic programs to improve their life quality. In the field of university management, how we can manage thousands of students in a big University? That is the problem which can be solved easily by using a computer software.

To carry out these problems, applying the knowledge that I have been studying in the School of Computer Science and Engineering, International University of VNUHCM, I propose a system to manage all students in the university, namely "Students Management System" (SMS). The SMS is developed based on the techniques of Web Application Development (WAD), Database System (DS) and Information System Management (ISM).

The SMS includes functions for management all student activities such as register for the courses, classify students based on faculty, major class, etc., to serve for studying process management. Students can access the system to search all information they need. The parents can be also accessed to the system to know full information of their children. Besides, the lecturers, administrators of the university can interact with the system to work on their tasks. Therefore, the SMS can keep and manage all information of the university, students and their information. It is easily to use, reuse for every kind of users. Moreover, it can also help parents and students keep tracking their own information such as score, tuition fee, attendance, etc.

1.2. Problem Statement

There are many problems that lectures are faced when evaluating a course through the traditional method. In general, the problem that they are facing is that they have the difficult to search the data and update the information. Teachers also have the problem of saving the student's record, performance, discipline, attendance. And parents have difficult to know their children information at school. The solution for these issues is handled by storing all the data in the database for future enhancement.

First, the weakness is in the data arrangement which mean that the recorded by applying the manual storage and requiring a large amount of paper to save student record, their result and performance. To be short of data arrangement which is stored in the manual ways, and stills using a large amount of paper form to save the information of students.

Second, data storage using paper form is too large and take too much time to arrange. The more pending time, the more error of feedback because of wasting in responding to student concerns and changing suitable approach.

Last, if the data in the form of paper the security is not ensured, the data might be lost due to flooding, fire,…

1.3. Scope and Objectives

This project will include all function for SMS that support for student, parents and lecturers, especial lecturers.

- Student: searching all information of they need such as: profile, performance, results, register courses,...
- Parent: accessed to the system to know full information of their children.
- Lecturer: manage student information quickly, and easy to update the record. Search and update student performance,...

The main point of this project is:

- Record all information of school to the database for the future improvement
- Analyze student record base on their performances and from that to have the way to improve their skill and abilities.

1.4. Structure of thesis

The structure of this thesis project will divide into 6 main parts:

- Chapter 1 Introduction: find out the background problem of the current student management system.
- Chapter 2 Literature Review: is the summarize of what technique, framework, tools, algorithm will be applied to the project.
- Chapter 3 Methodology: identify the system architecture, design the use case diagram, sequence diagram, database diagram for this management system
- Chapter 4 Implementation and Results: the picture will be shown to analyst the results are fulfilled and reach the goal of the research.

- Chapter 5 Discussion and Evaluation: The summarization and discussion the whole project.
- Chapter 6 Conclusion and future work: The conclusion which summarize the whole project and find out the future work need to be done to improve the project in the future.

CHAPTER 2

LITERATURE REVIEW

This chapter discusses about the applications and techniques that are widely used today Student Management System. Their actual strength and drawback need to be applied and improved more in SMS.

2.1. Overview of Student management system

SMS is the web application system. SMS will bring a lot of benefit for lecture, student and also for their parents. The system will help to access data, searching information and analyst data to improve quality of SMS. Moreover, the lecturer will be supported by tracking student's performance system, rating it, give statistics and analyst what technique will be fitted with students. About the students, with using the application, all information they need can be search easily. Besides, the lecturers, administrators of the university can interact with the system to work on their tasks. Therefore, the SMS can keep and manage all information of the university, students and their information. It is easily to use, reuse for every kind of users. Moreover, it can also help parents and students keep tracking their own information such as score, tuition fee, attendance, etc. The objective of this thesis is to build a web application for SMS. The thesis work provides a tool that can help the university to manage information of students. It can help handling, processing, maintaining and finding students information easily. Also, it provides an ability for users to export document in a printable format for using.

2.2. Review exist SMS

Nowadays, in 4.0 era, there are many SMS has been created and popular used in school life. In spite of the fact that these systems are considered to create a successful commitment to quality educating and learning, they still have a few impediments that obstructive to quality in education.

2.2.1. PowerTeacher Pro [1]

PowerTeacher Pro is one of the frameworks was created by PowerSchool. With the mission of progressing education involvement, they conducted the device and innovation required for supporting the heart of education – instructors. Their development points to help instructors to spare their time on organization, more time on instruction, and adjust with their

everyday lives. It moreover enables instructors with real-time experiences into student advance such that instructors can target growth ranges, observe the light bulb turn on, and really celebrate with students when they show effective development.

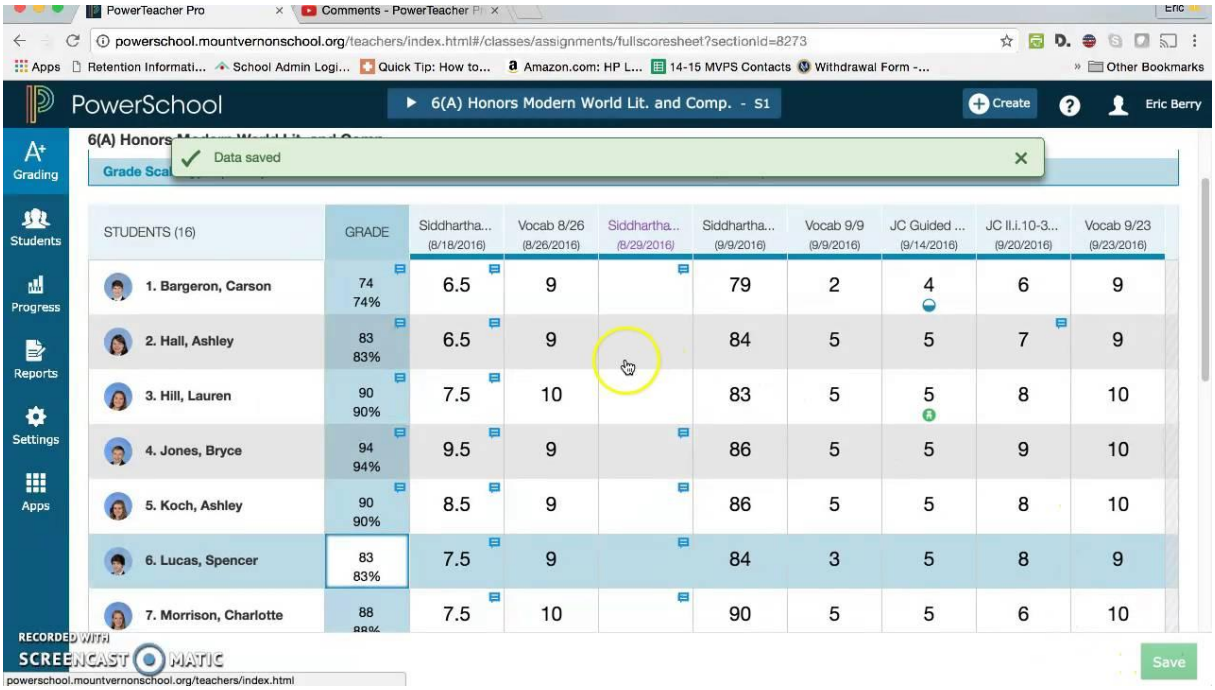

Figure 1: PowerTeacher Pro [1]

The preferences of this system:

- Helping addresses spare their time in evaluating by utilizing "quick-fill" technology
- Analyzing student abilities and extraordinary their qualities based on the disentangled advance reports.
- Simplifying advance report

The inadequacy of this system:

- Lack of increasing in value the level of course's victory for moving forward the educating method.
- Assess student based on the test, lost the exercises evaluation inside and exterior class.

2.2.2. Web School ERP [2]

Web School ERP is an education administration application created in MVC model. And they give school organization application and outlined by Gescis Technologies Pvt Ltd. Their essential objective is to construct a web arrangement for schools, with coordinates

particular modules to manage all perspectives of organization. Additionally, bringing the students, instructor, staff and parent come to the computerized stage.

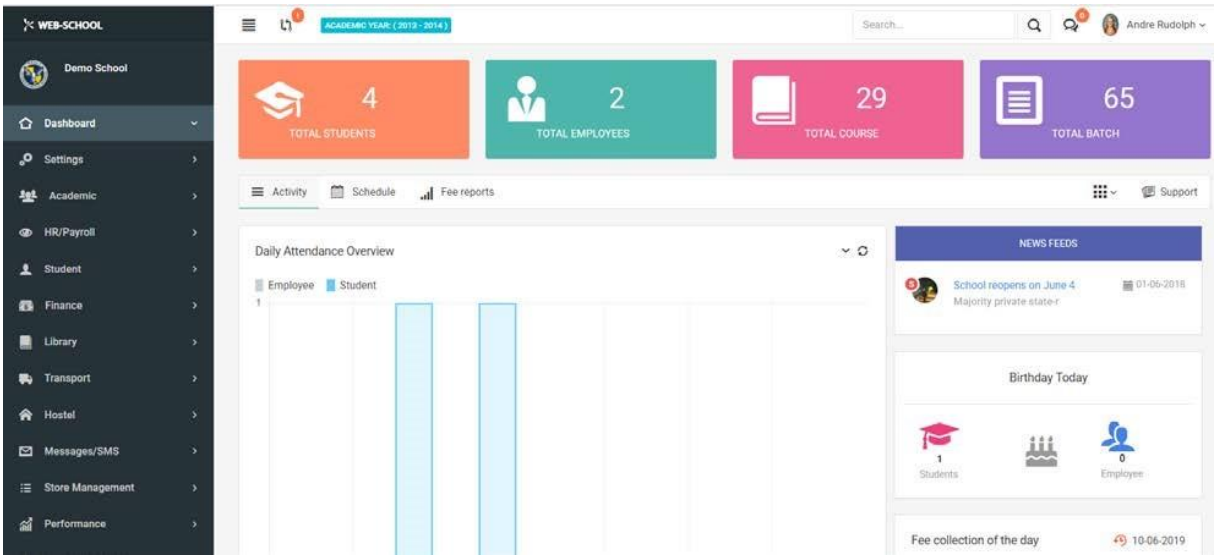

Figure 2: Web School ERP [2]

Advantages of these software:

- Software is user-friendly
- Access information everywhere and any time.
- Can be utilized on all stage, frameworks and gadgets like tablets, desktops, Window, MacOS.
- Allow client transfer unlimited records to its system centralized records.
- Allow parent can track student advance in school.
- The coordinates Payment door for online installment for student.
- Having capable engine planning for student course based on their subjects and instructor accessibility.

Moreover, these computer program have some drawbacks:

- Can't be connected to all school because each school have the preparation.
- Lack of Measurement in Student Records.
- Don't apply machine learning within the system.

2.2.3. Edusoftweb – IU [3]

Edusoftweb is a website system associated with Edusoft training management software, which are widely used in many university systems and having some following main functions:

- View the whole school schedule.
- View lecturer timetable.
- See the individual schedule of each student.
- Look up exam schedule, re-examination schedule of students.
- Register online courses for the training of the credit system.
- Re-enroll the subject for the year student.
- Grading score by lecturer

Figure 3: Edusoftweb webpage [3]

The advantages of Edusoftweb: The first is Edusoftweb which is used in IU based on webbase, it can easy use in all stages, framework or devices. Secondly is that it can be used anywhere with anytime of the days. The third advantage is that its support all base function for student and lectures. Lastly, Payment function is already being added and it easy to use for payment the tuition fee.

Some drawbacks of this web application is parents account cannot be created and which using it tracking their children with this system easily. The second thing is that the lacking of Student report for Lectures.

With the current function, Student cannot track and updating their information. Personalized is not be showed in this section. Another important option: parent tracking their children is not provided, this difficult is an obstacle for support all actor. Nowadays, the improving of AI and Machine Learning, there are many functions can use and the report for

student information is one of it, with updating technology, it will help the application more efficiently.

2.2.4. Blackboard system [4]

The Blackboard Learning Management System (LMS) as known as one of the incredible academic solutions that give genuine learning exercises the board, profound assistance with the course material.

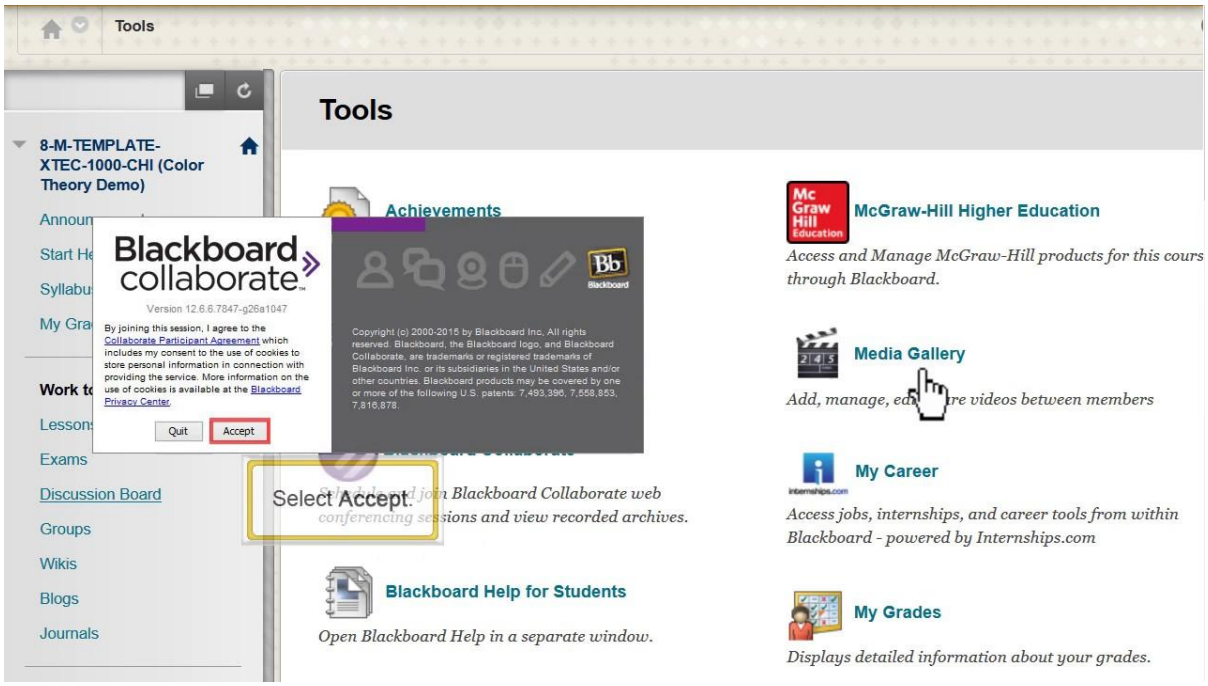

Figure 4: Blackboard system

The strengths of Backboard system:

- Simple to use
- Available in all platform (Desktop, Tablets, Mobile, etc.)
- Allow students can update and download all class' material that was uploaded.
- Connect student – teacher
- Doing quizzes, submitting the assignment on the internet
- Easily to follow the plans/ deadline which was set in your schedule.
- Having several tools that are useful (Speed Grader, Turn-it-in, Chat box, etc.)

However, Backboard system also has some limitations that should be improved:

- Not including course registration
- Not having student's feedback for reference
- Lack of features to asissit lecturers

2.3. Review about technology

2.3.1. Programming language

JavaScript (programming language) [4]

Figure 5: Javascript icon [4]

JavaScript is the programming language of HTML and the Web. JavaScript is utilized basically for improving the interaction of a client with the webpage. In other words, you'll be able make your webpage more enthusiastic and intelligently, with the assistance of JavaScript. JavaScript is additionally being utilized broadly in diversion advancement and Portable application advancement. The programs in this language are called scripts. They can be composed right in a web page's HTML and run consequently as the page load

2.3.2. Techniques

MongoDB (database management system) [5]

Figure 6: MongoDB icon

MongoDB is an open source and versatile NoSQL database. MongoDB is written by C++, so it is able of high-speed computing, not at all like current database management systems. Each table within the SQL utilized in the MongoDB is called collection. Each record in MongoDB is called a record. A MongoDB record is put away as a record, which is written down with the field and value structure. In MongoDB, the structure of database could be a gathering of related collections. Each database has a distinct set of information and can contain gigantic records. MongoDB gives unstructured information storage, high accessibility, high execution, and storage development. In addition, it offers extraordinary site back-end capacity for high-traffic websites since it is speedy, adaptable, and simple to execute.

NetJS (backend framework) [6]

Figure 7:NestJS icon

Nest (NestJS) is a framework for building server-side applications with Node.js effectively. Its employments high-level JavaScript language expressions (but still permits engineers to utilize JavaScript) and combines the properties of OOP (Object-Oriented Programming), FP (Functional Programming) and FRP (Functional response programming) Essentially Nest uses effective framework HTTP server as Express Nest moreover supports their API specifically for developers. Developers are free to utilize the large number of third-party modules accessible for the platform. It can be understood that all the packages that we install when using Express / Fastify can be effortlessly coordinates into Nestjs.

ReactJS (frontend library) [7]

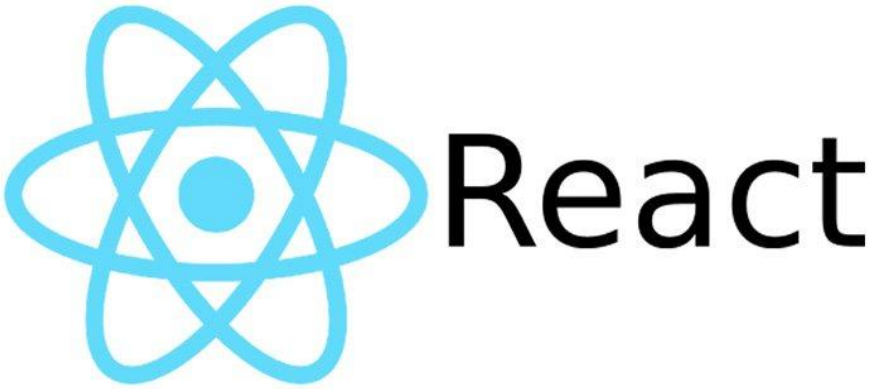

Figure 8: ReactJS icon

Respond is the JavaScript library for building user interfaces. It is created by Facebook and kept up by Facebook, Instagram and a community of person engineers and organizations. A React application is a collection of particular components that show a view. Changes to a single viewpoint or a component, not a whole framework that can be effectively iterated into item improvement are the probability of each view component.

Node.JS (backend environment) [8]

Figure 9: NodeJS icon

Node.js is an application runtime environment that's utilized to type in server-side by JavaScript code. Node.js strengths are building applications that run in real time on a web platform. This is one of the popular technical in recent times of the back-end developer community. Thanks to Node.js, developers were able to write server-side applications using Javascript. Node.js employments Google V8 JavaScript engine to execute code. The asynchronous event- driven engine in NodeJS executes all requests whereas holding up for a response. The preferences of NodeJS are real time, asynchronous, quicker, adaptable much appreciated to I/O demonstrate.

GraphQL (Query Language for API) [9]

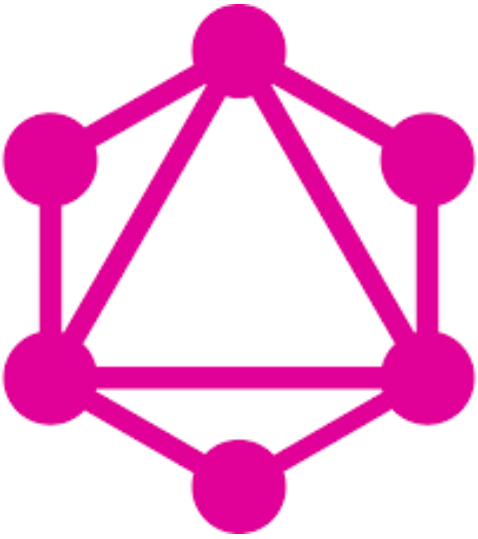

Figure 10: GraphQL icon

GraphQL is a query language that describes how to request data, and is often used to load data from a server to the client. GraphQL includes three features that include allowing the client to determine exactly what data they need, making it easier to synthesize data from multiple sources and using a type system to describe the data.

2.3.3. MVC Models

MVC models nowadays is the most common designed patterns which used by the web application, there would be the short reviews MVC models (not specifying) in this paper. “Model”, “View”, ”Controller” are three components which are related and subordinate with each other in this model.

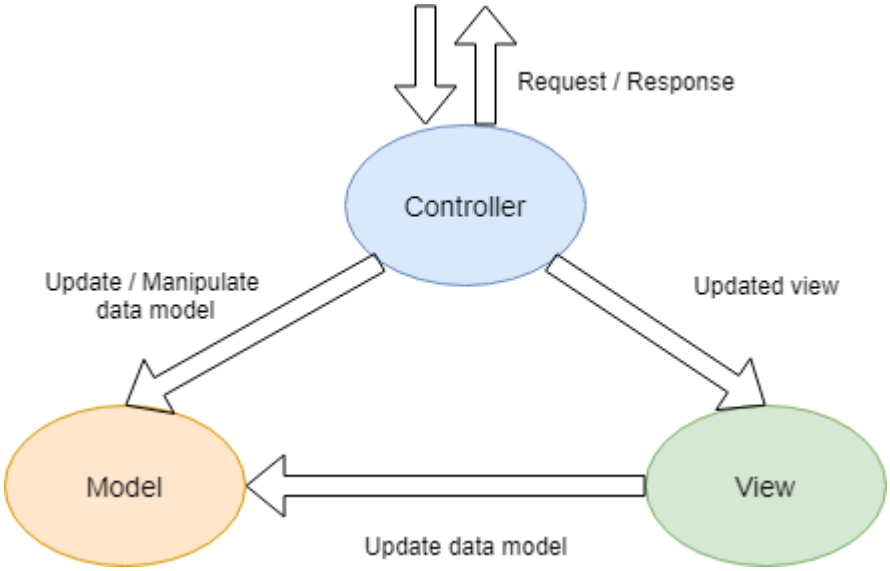

Figure 11: MVC model diagram

In this model, Model class are related to the user input logic. View are used to the user interface of the application. Controller – respond user request by linked the Model with appropriate View. Each layer of the application independent of each other and three classes can work on the single application at the same time.

CHAPTER 3

METHODOLOGY

As applied the theory in the previous chapter 2, this chapter working with the functions of technologies, design and technical are used in the thesis implementation.

3.1. User requirement analysis

In this section, use cases is used to identify and organize the requirements. Three main factors of the application are Student, Lecture, Admin... And we will also show the database structure to improve the project.

3.1.1. Use case diagram

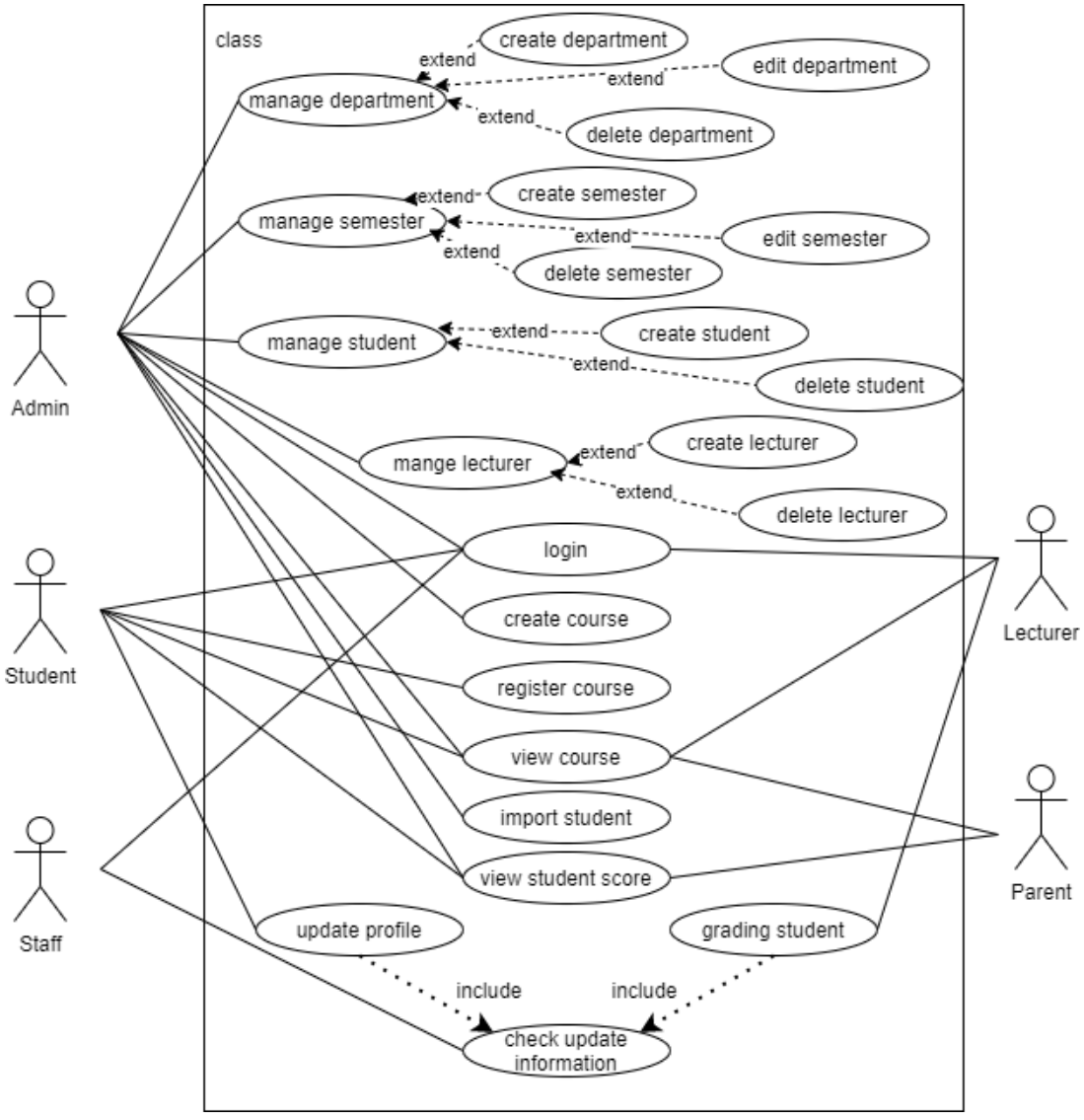

Figure 12: Use case diagram

Use case 1 – Login

Identifier: UC1

Precondition:

1. User must have an account before login.
2. The System display login page.

Step	Action	Expected Response
1	Input invalid username, password	
2	Click submit button	Show messge to notice “Username or password is incorrect”
3	Input valid username, password	
4	Click submit button	The system displays the Home page with different role access.(admin/lecturer/student/staff/parent)
5	Check post-conditions 1	

Table 1: Log in

Post condition:

1. **The application is online and displayed user login’s function.**

User story 1: As an admin, I want to login to using my functions.

User story 2: As a lecturer, I want to login to using my functions.

User story 3: As a student, I want to login to using my functions.

Use case 2 – Manage Lecturer

Identifier: UC2

Precondition:

1.User must have an admin account

Step	Action	Expected System Response
1	Application Menu is showed to choose User data information	
2	Login with Lecturer account	The system does not permit to edit
3	Login with Student account	The system does not permit to edit
4	Login with Admin account	The system permits to edit
5	Create/Update users detail invalid	The system shows notification information

6	Create/Update users detail valid	The system created/updated information

Table 2: Manage Lecturer

Post condition:

1. **The application information is created or updated.**

Use case 3 – Manage courses

Identifier: UC3

Precondition:

1.User must have an admin account

Step	Action	Expected System Response
1	Application Menu is showed to choose Courses data information	
2	Login with Lecturer account	The system does not permit to edit
3	Login with Student account	The system does not permit to edit
4	Login with Admin account	The system permits to edit
5	Create/Update Courses detail invalid	The system shows notification information
6	Create/Update Courses detail valid	The system created/updated information

Table 3: Manage courses

Post condition:

1. **The application information is created or updated.**

Use case 4 – Manage Student

Identifier: UC4

Precondition:

1.User must have an admin and Lecturer account

Step	Action	Expected System Response
1	Application Menu is showed to choose User data information	
2	Login with Lecturer account	The system permits to edit
3	Login with Student account	The system does not permit to edit

4	Login with Admin account	The system permits to edit
5	Create/Update user information is invalid	The system shows notification information
6	Create/Update user information is valid	The system created/updated information

Table 4: Manage Student

Post condition:

1. **The application information is created or updated.**

Use case 5 – Search function

Identifier: UC5

Precondition:

1.User must have an account and login to the system

Step	Action	Expected System Response
1	Select Search Bar	
2	User enter keyword need to find	The system searches a case that matches the search criteria
3	System find the match	System display request information
4	Else	System show no matching data

Table 5: Search function

Post condition: none

Use case 6 – Register Course

Identifier: UC6

Precondition:

1.User must login as a student.

Step	Action	Expected System Response
1	Login with Student account	The system shows Home page
2	Click on “Course” menu	The system will display Course tab
3	Choose current Semester in semester dropdown list	The system will display Course list

4	Click on Course	The system will display Course information page
5	Click on “Regist course” button	The system change the button to “Registed”
6	Check post-condition 1	

Table 6: Register Course

Post condition:

1. **The course will be in the course list of students.**

Use case 7 – Create Course

Identifier: UC7

Precondition:

1.User must login as an admin or a lecturer.

Step	Action	Expected System Response
1	Login with admin or lecturer account	The system shows Homepage
2	Click on “Course” menu	The system will display all Course tab
3	Click on ‘New course" button in Course tab	The system will display the form to create new course
4	Input Course Name, Course Title, Description, Status, Credit	
5	Click Create Course button	The system shows notification information
6	Check post-condition 1	

Table 7: Create Course

Post condition:

1. **The new Course is saved to the database.**

Use case 8 – Import Student list

Identifier: UC8

Precondition:

1.User must login as Lecturer account.

Step	Action	Expected System Response
1	Login with lecturer account	
3	Click on "Student" menu	The system will display all Student tab
4	Click on "Import" button in Student tab	The system returns all course list
5	Click “Choose File” Button	The system will open the link for user to select file on the computer.
6	Choose File and click "Open" Button	The system will upload user’s file
7	Click “Import Student” button	Show message to notice successful
8	Check post-condition 1	

Table 8: Import student list

Post condition:

1. **All of student in file will be saved in database.**

Use case 9 – Grading student

Identifier: UC9

Precondition:

1.User must login as Lecturer account.

Step	Action	Expected System Response
1	Login with lecturer account	
2	Choose semester in semester dropdown list	The system shows all course list of this semester
2	Click on Course	The system navigates to course information
3	Click on Update button to update	The system will display a popup to input.
4	Input the percentage of present scores, midterm scores, final scores, quiz scores	
5	Click on "Student" menu	The system will display all Student tab
6	Input student score into the Course	

	section	
7	Click "Grading" button	
8	Check post-condition 1	

Table 9: Grading student

Post condition:

1. **New student outcome will be saved in database.**

Use case 10 – Manage Department

Identifier: UC10

Precondition:

1.User must have an admin account

Step	Action	Expected System Response
1	Application Menu is showed to choose User data information	
2	Login with Lecturer account	The system does not permit to edit
3	Login with Student account	The system does not permit to edit
4	Login with Admin account	The system permits to edit
5	Click “Department” tab in menu bar	The system shows list of departments
6	Create/Update Department detail invalid	The system shows notification information
7	Create/Update Department detail valid	The system created/updated information

Table 10: Manage Department

Post condition:

1. **The application information is created or updated.**

Use case 11 – Manage Semester

Identifier: UC11

Precondition:

1.User must have an admin account

Step	Action	Expected System Response
1	Application Menu is showed to choose User data information	
2	Login with Lecturer account	The system does not permits to edit
3	Login with Student account	The system does not permit to edit
4	Login with Admin account	The system permits to edit
5	Click “Semester” tab in menu bar	The system shows list of semester
6	Create/Update Semester detail invalid	The system shows notification information
7	Create/Update Semester detail valid	The system created/updated information

Table 11: Manage Semester

Post condition:

1. **The application information is created or updated.**

3.2. System Design

3.2.1. Database design

In database design part, we will focus on design database for this application. By using SQL, we will use ER model to verify the entities and each relationship of all part in this system. From that, we can build database schema easily.

ERD:

By designing the ERD graph, we can know the connection of the application and entities. The diagram below will point out that the application has seven table: Role, User, Enroll, Courses, Semester_Course, Department, Semester. Each entity has its relationship and their attributes.

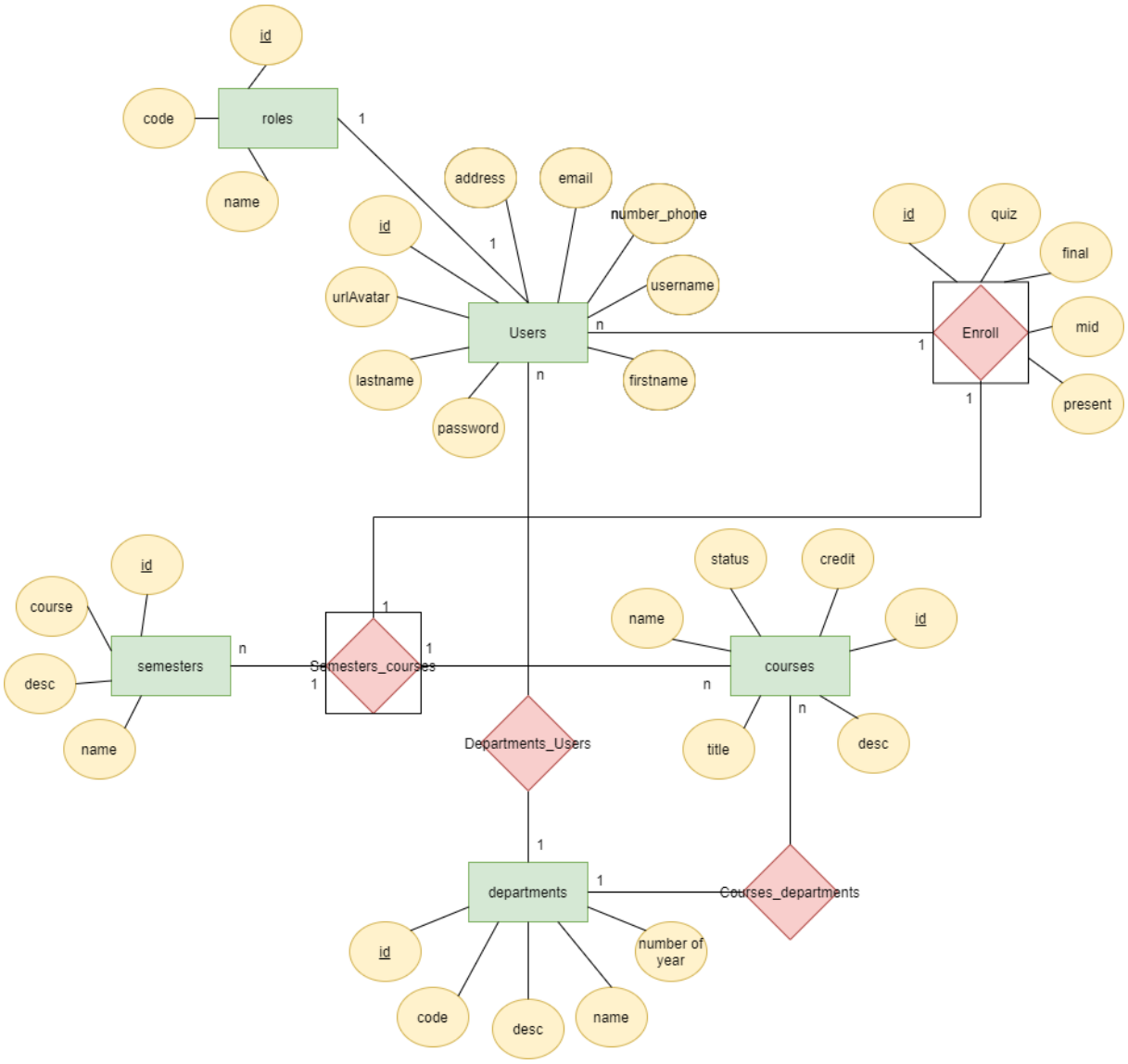

Figure 13: ERD diagram

3.2.2. Database diagram

By having a database schema, we can analyze the structure of the application and the relationship between each table, so the we can emphasize and control its workflow to improve the process. The relationship diagram below having nine entities in the system: user, roles, enroll, courses, semester, semesters_course, departments, courses_departments, departments_users. The table of user includes: id (primary key), firstname, lastname, role id (foreign key), email, password, phone number, address, urlAvatar and username. This table show about user acting in the system. It has 2 relationships with 5 table: enroll, departments_users. Enroll is the most important table and it also the most complex table because it has so many complicated relationships. The relationship between course and

semester is many – to – many because one course can be enrolled in many semesters and in one semester many courses can be stored in it. The departments table is equally important. It has relationship one – to - many with courses table and has relationship table is course_department. One enroll information has one semester_course.

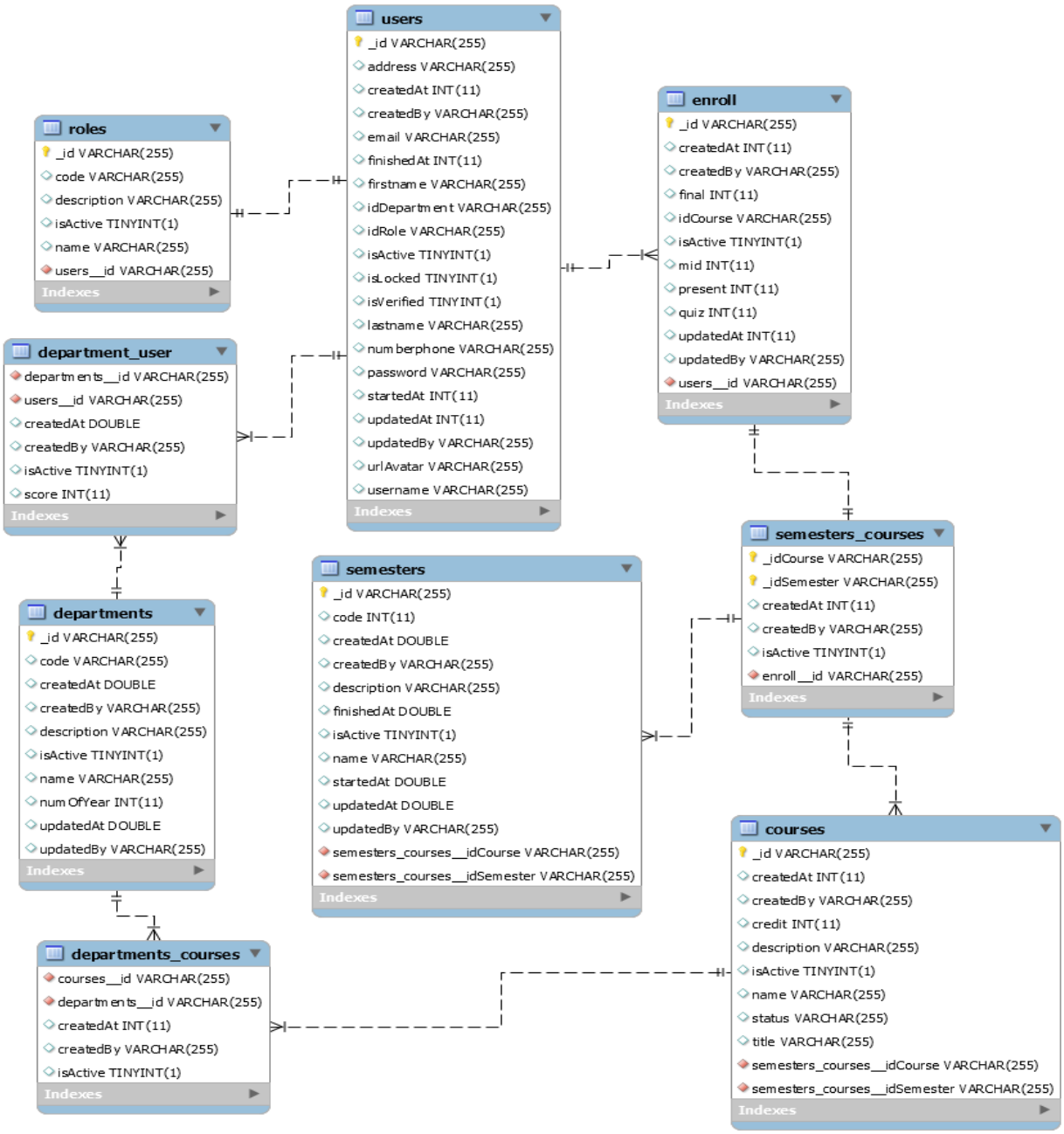

Figure 14: Database diagram

3.2.3. Sequence Diagram

The below sequence diagram outlines how the system will work for each use case. It describes objects and classes included within the script and the arrangement of messages exchanged between the object required to perform the functions of the script. Here is some highlight function of the system.

Sequence Diagram 1: Create course

When lecturer click on button CreateCourse from View. A createCourse function will active to Controller class. The Controller class insert to model and the model return the response. In Alternative form, Model will insert to database class and it will send the response through all class.

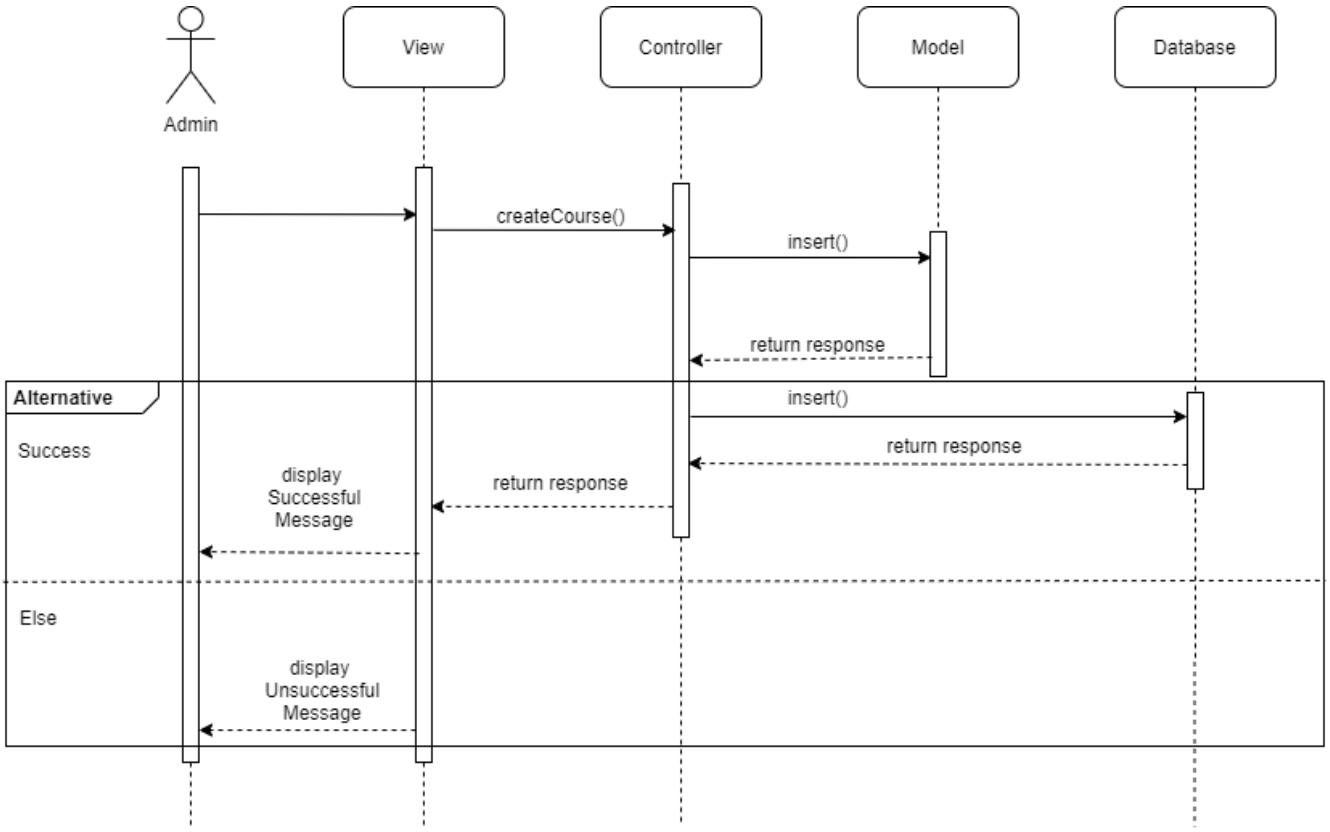

Figure 15: Create course SQ diagram

Sequence Diagram 2: Import Student

When Lecturer import student, there are a connection of view class and controller class to choose file from computer. The controller will check the correct format of file with checkCorrectForm function. This Controller import student to Model class and Model will send the response back. Also the Controller importStudent to check the data exist or not at

Database class and its class send the response if data not exist. The Controller display corressponding message with successful or unsucessful.

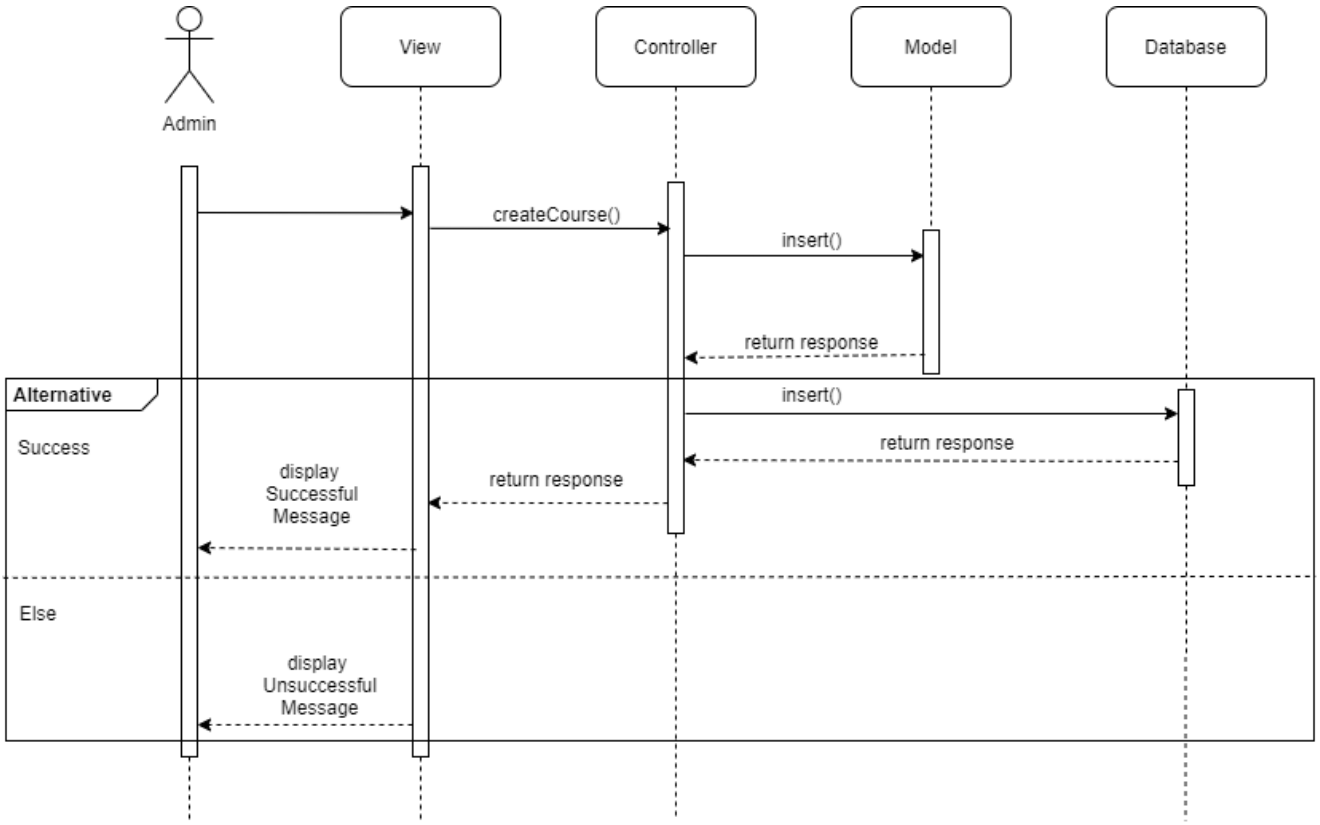

Figure 16: Import student by excel SQ diagram

Sequence Diagram 3: Log in

Login sequence diagram show how the processes run with many actors when an actor login functions. If user request to sign in, the Users input username and password to View class. This class need to check validation of Controller class to check login information. The Controller will check user information and return responses to view class. The massage can be login successful message or login failure message belongs to the information that user input fits with data.

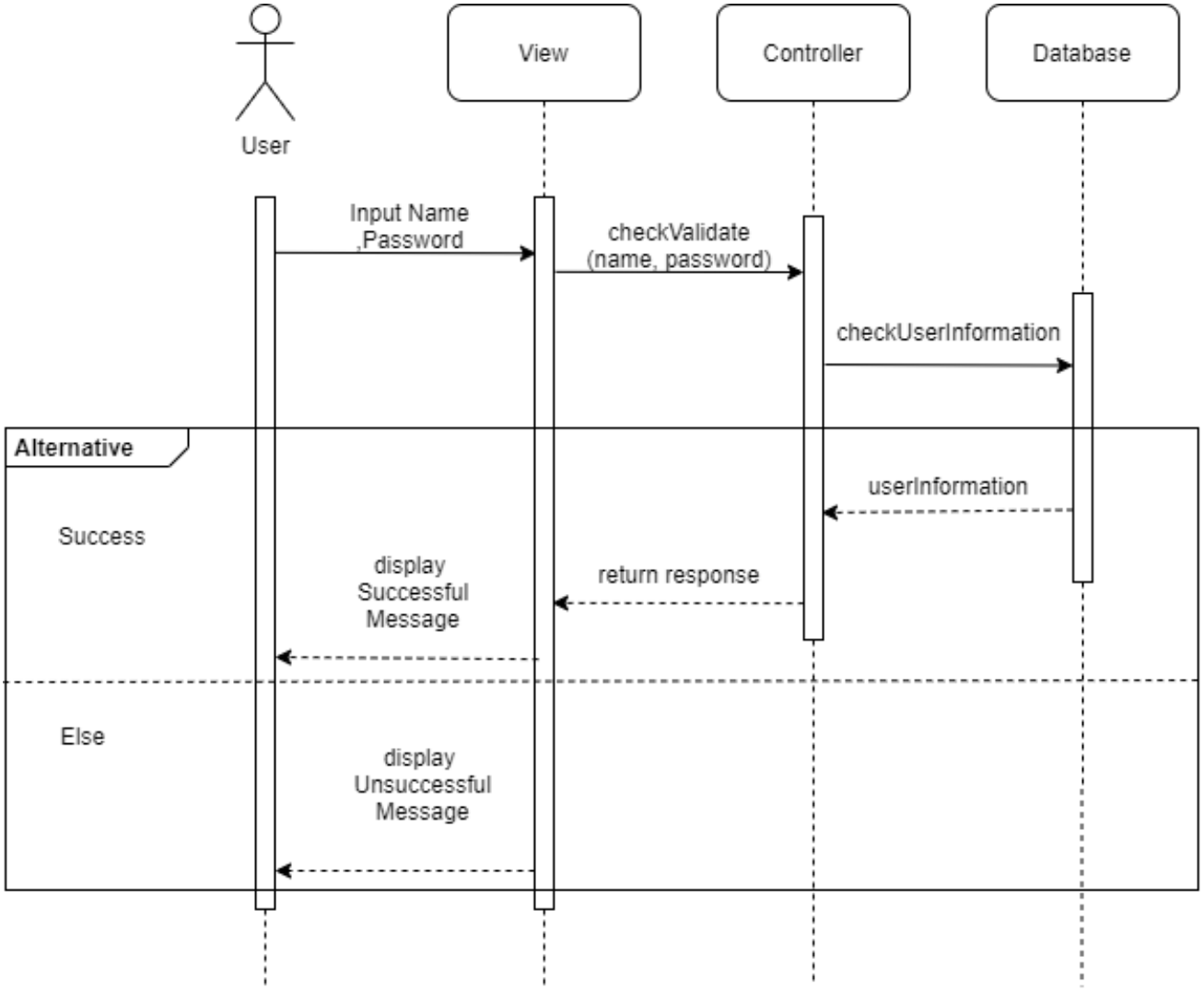

Figure 10: Log in SQ diagram

3.2.4. Class Diagram

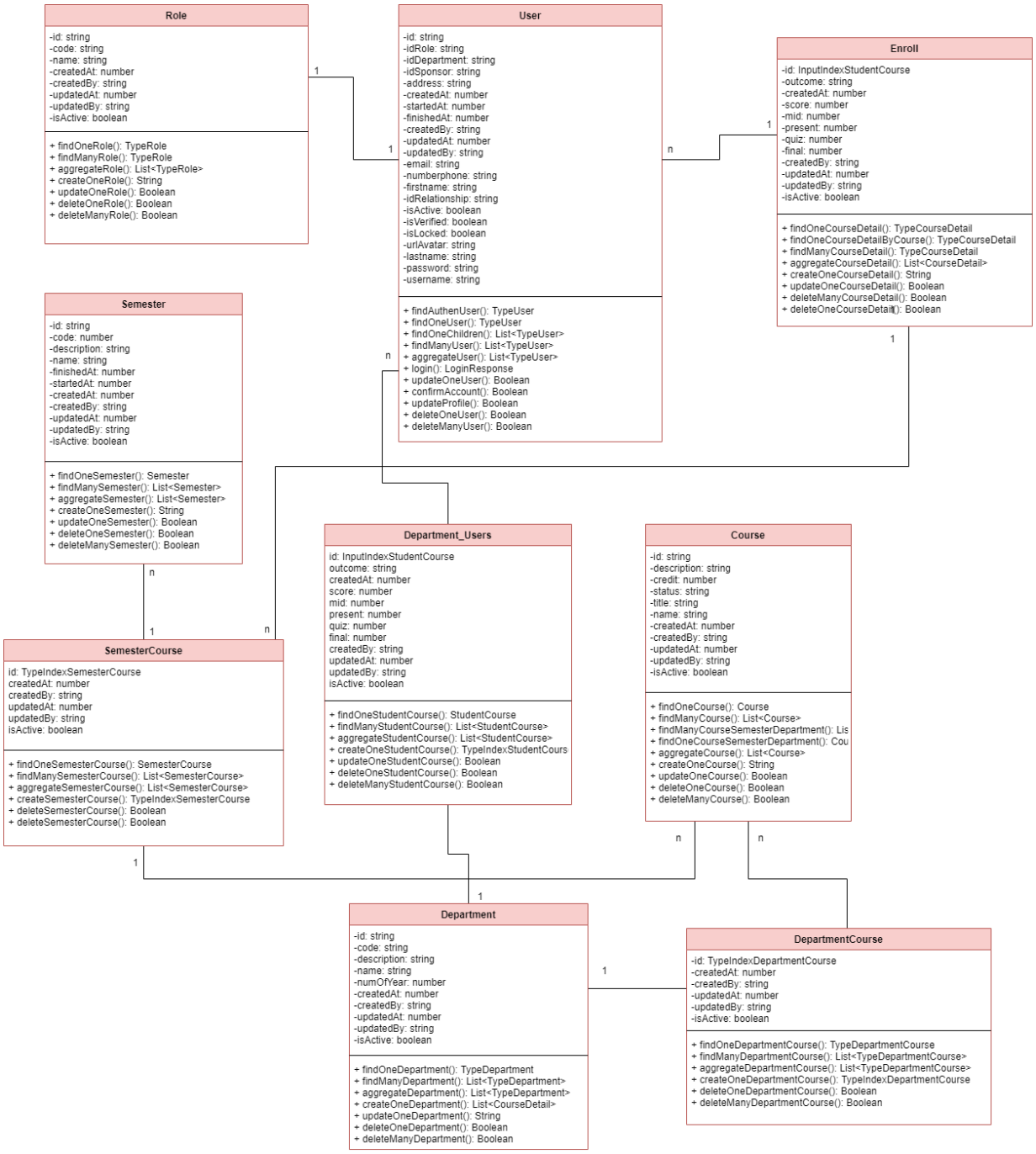

Figure 17: Class Diagram

First of all, User and Role are defined as the two elements of the system. There are 1 to 1 relationship because the user when login to the system only have 1 role which corresponding function. Enroll, Semester_Course, User are three more elements. Its form a complex relationship. One more element is Enroll. The Department and Course have the relationship is 1 to n because which one course, the system can have many course. With its relationship its can define which course must be in the right Department. Semester,

Semester_Course, Course is also a complex relationship with can define which course in the semester. Department and User have the relationship 1 to n, which its relationship to define where department of 1 user because one student can only be in one department but the department have many users. Each class define class to do each function.

CHAPTER 4

IMPLEMENTATION AND RESULTS

After all research about the technique and find out the methodology which required for building a Student Management System. This chapter will provide the process of implementation in this report.

4.1. Implementation

There are 5 roles active in this application: Admin, Student, Lecturer, Parent and Staff. Each role has their authorizations and functions.

Administration

The Student Management System is created for education in university. So that, the Administration have the right to manage all accounts in the system. The accounts are divided into 4 levels (except admin): student, lecturer, parent, staff. Admin have almost all functions in the system except manage the student outcome and cannot register course for the students. Only admin can create class and assigned class to any lecturer that in this system. No other role else can assign class for teacher expected admin.

Student

User login to the website with student account will see all course of program. User can register course from the website and can also have the right to change their profile or keep track their outcome in the system.

Lecturer

With a teacher account, when user login to the website, they can see their responsibility courses. So that they can edit or delete their courses if it is necessary. The thing is that they only see the courses that they are assigned and cannot see with other teachers. Lecture can import students into the student list with the number of students is not matter. User can grade outcome score for student. And the system will calculate average score for each student outcome score.

Parent

Parent account can be used by parent that can help to tracking the study information of the student like student outcome.

Staff

Staff is the one who can check all the update profile of the student and accepts for the change. If the change is not accepted the profile of the student cannot be change.

4.2. Results

The result is the graphic user interface of the website including with its functions which are described and screen captures.

4.2.1. Login page

This page allows user log into the website by using their username and password which create by administration. All that information stored in the database. And each account has different roles and different functions.

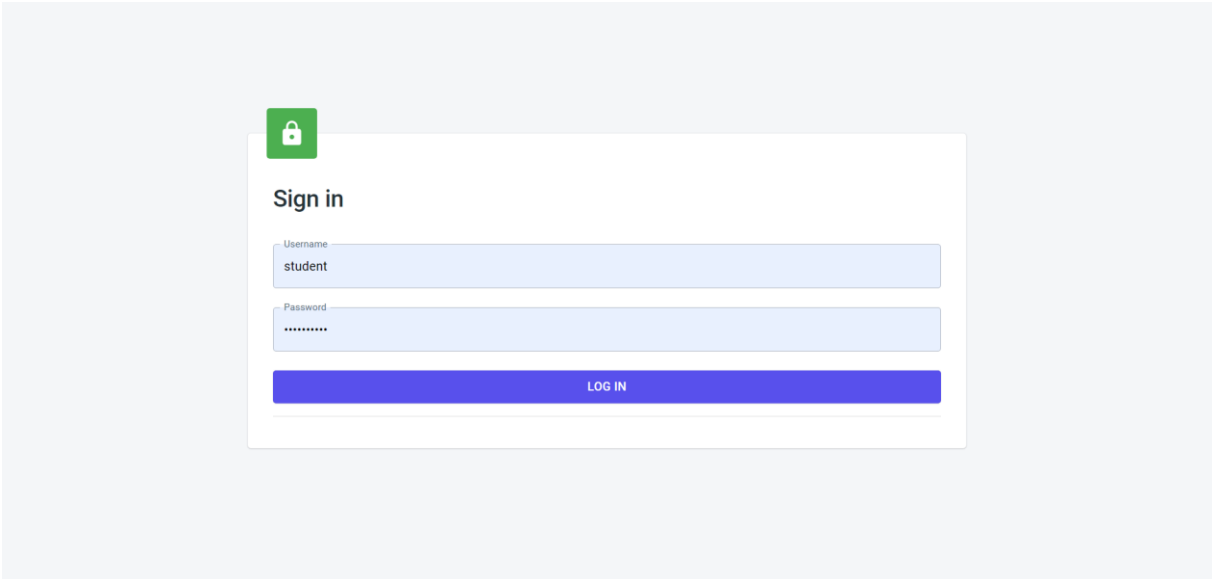

Figure 18: Login page

4.2.2. Edit Profile

In this page, user can update their information. And sent it update request to staff for approval.

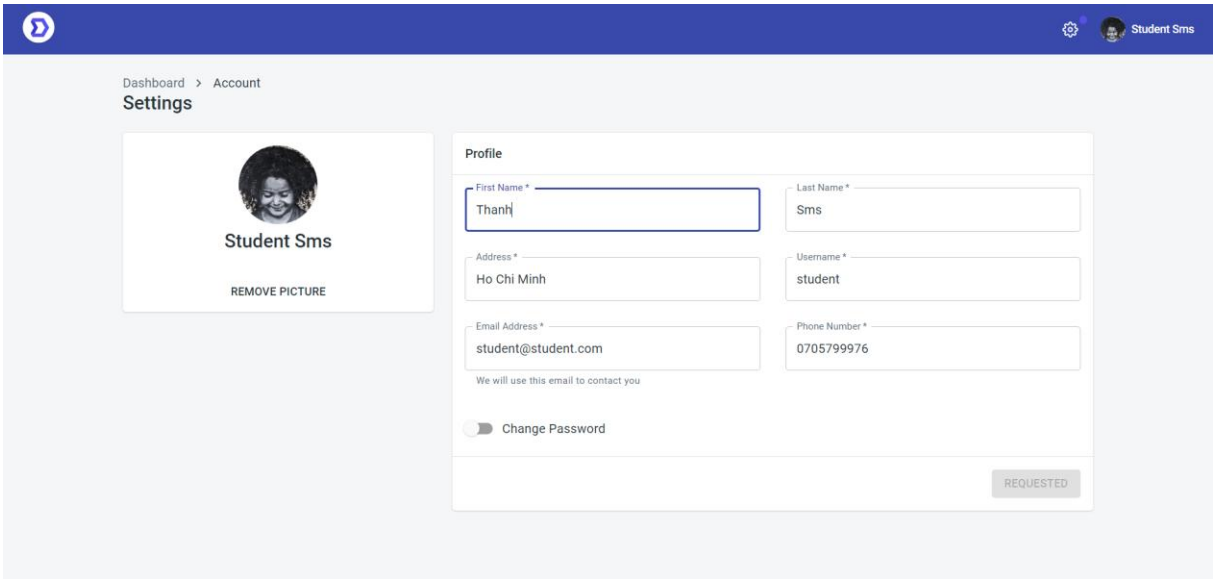

Figure 19: Edit profile

4.2.3. Create/Delete lecture and Student account

In this page, only administration can access and have this tab “Lecturer” for create/update/delete lecturer account.

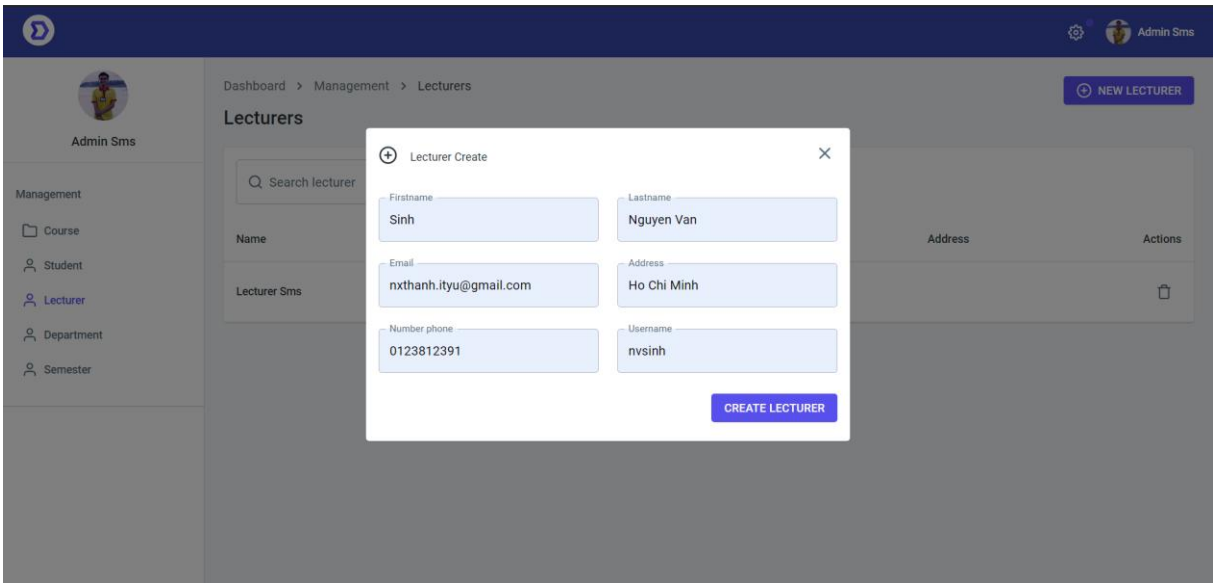

Figure 20: Create lecturer account

The lecturer information cannot be updated by user. The profile of lecturer can only be updated by themselves.

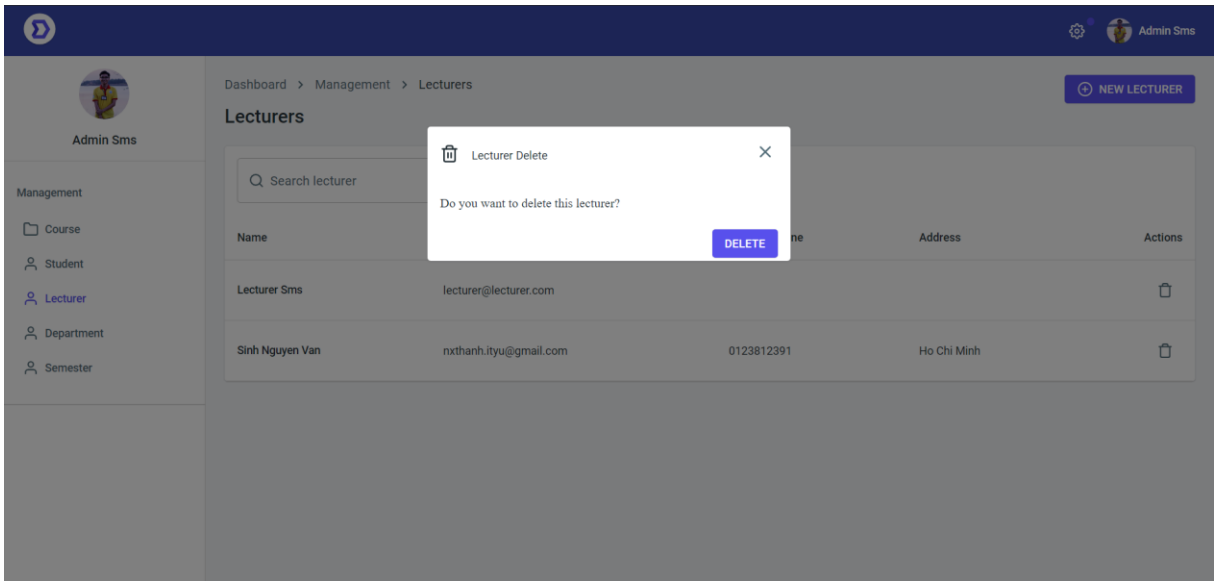

Figure 21: Delete Lecture

Moreover, the Student tab only can be shown to manage Student when user login as Admin. Create and Delete function also have the same page of mange Lecturer.

4.2.4. Create/Update/Delete course

Another main actor is Course. By using Admin right, Course information can be managed easily.

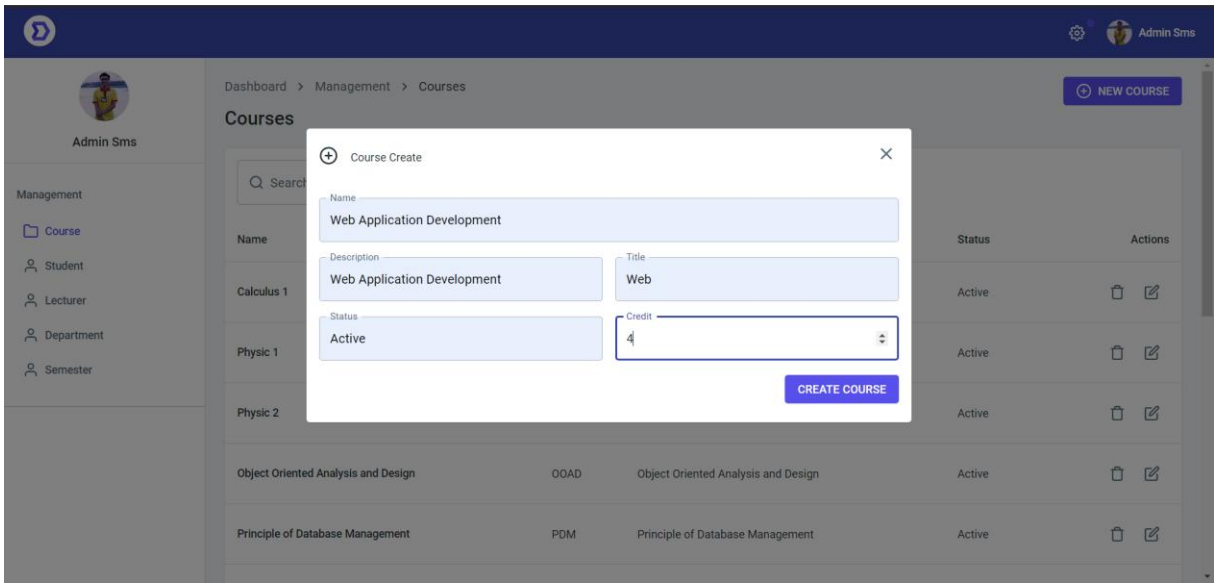

Figure 22: Create Course

Edit information of course is another function can be used by admin right.

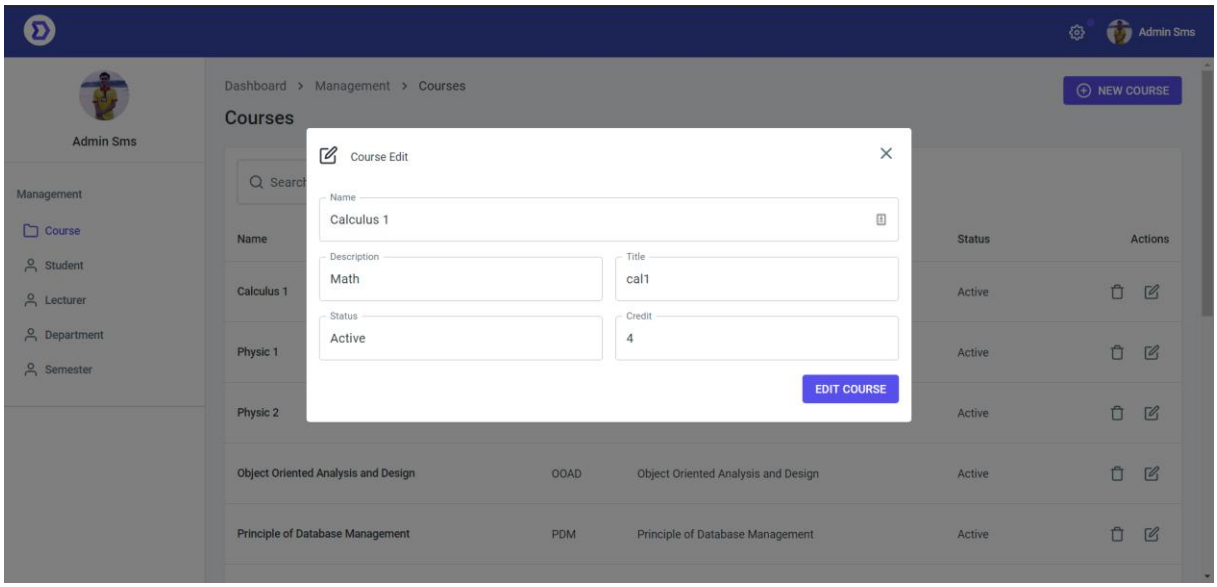

Figure 23: Edit Course

User can delete course when the course is removed form the sylabus of the department.

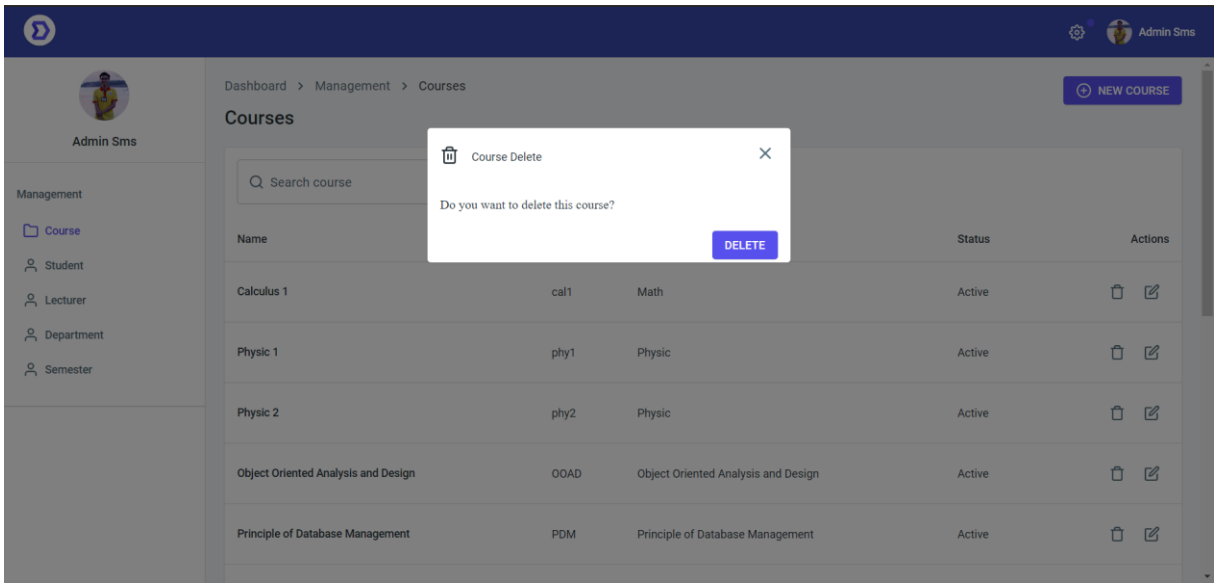

Figure 24: Delete Course

4.2.5. Manage Department

With Amin role, user can manage Department with create/edit/delete function.

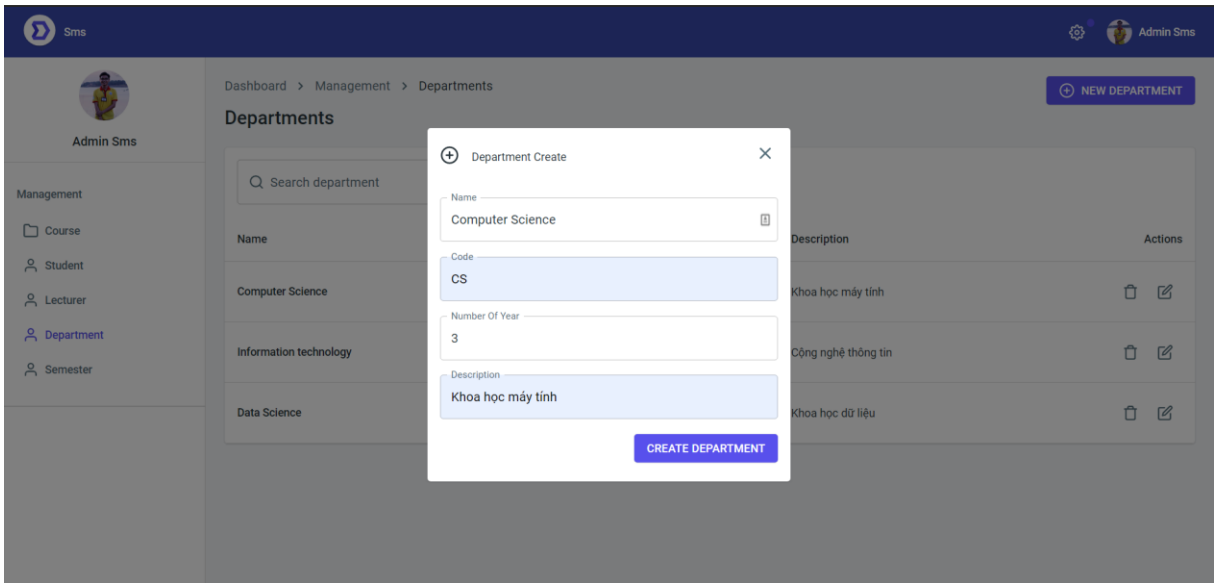

Figure 25: Create Department

With manage department function, department page is showed all information of department with 4 tabs: Details, Student, Lecturers and Course.

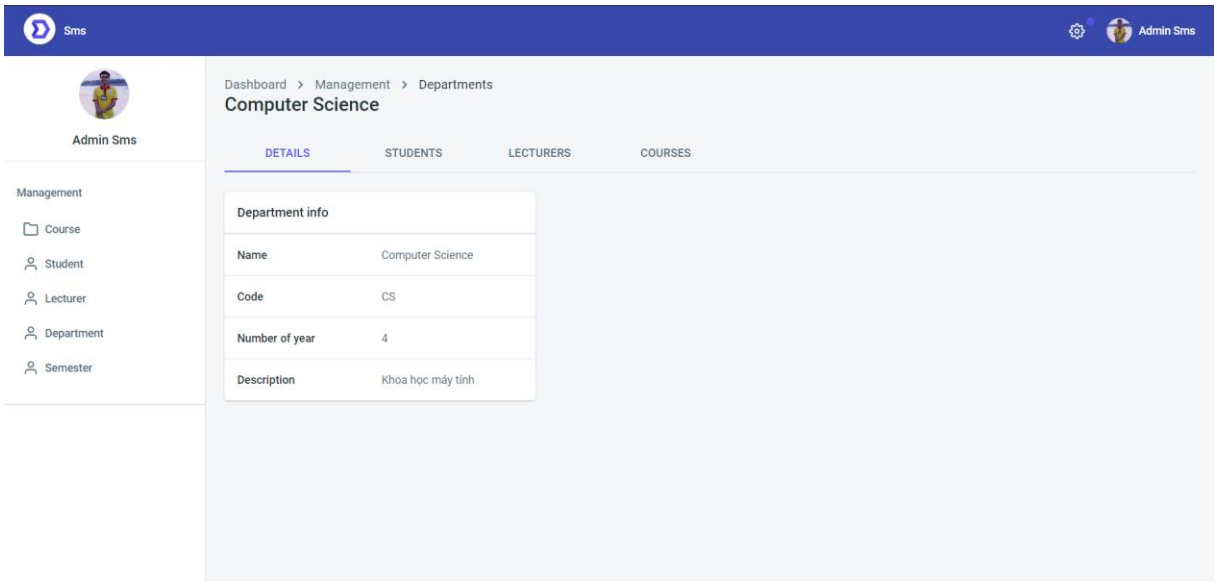

Figure 26: Department tab

In student tab, user can add student to department or remove student from department which help its to manage all student of department.

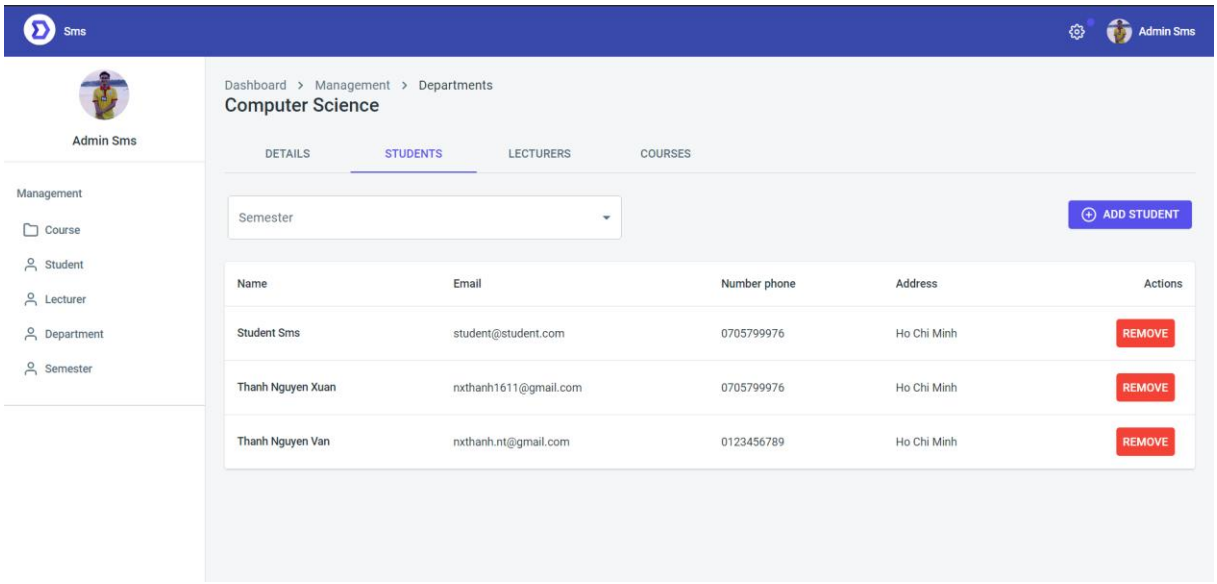

Figure 27: Student tab

Lecturer tab and Course tab have also the same functions of student tab in department. User can add or remove lecturer and course from department.

4.2.6. Manage Semester

Semester can also be managed by admin. Create/Edit/Delete is the default function. By starting of semester, admin must be added student to the semester when adding student to semester.

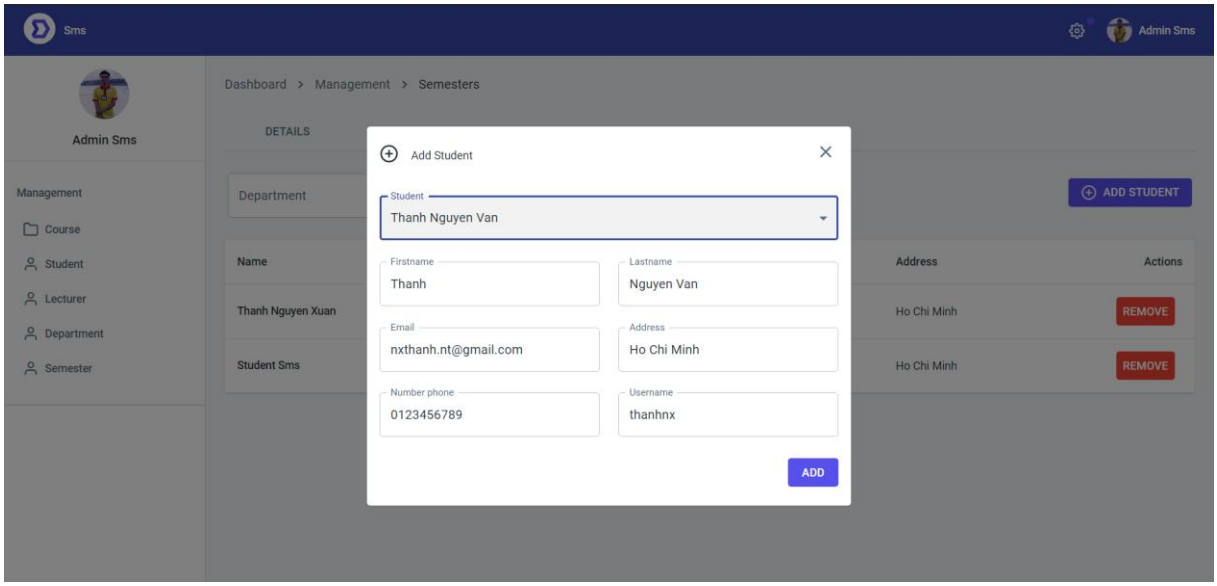

Figure 28: Adding student to semester

The second things must be added is course. After adding course to semester successfully, student can be search and register it.

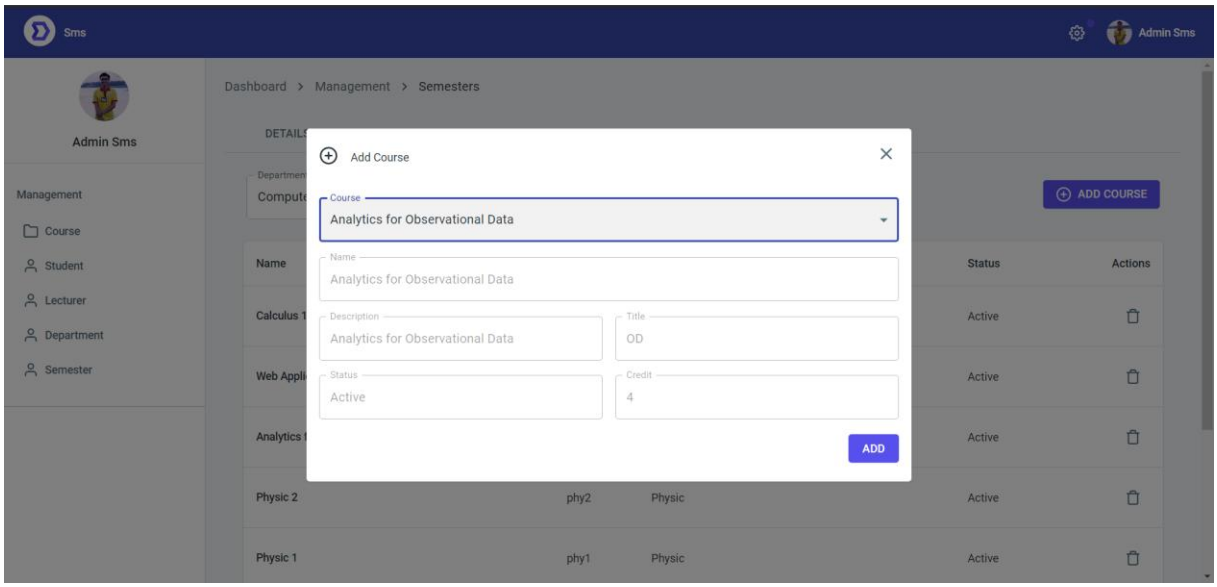

Figure 29: Adding course to semester

4.2.7. Import Students

There is one function to support the management of student. Import students can be used by import student from a file with a right format.

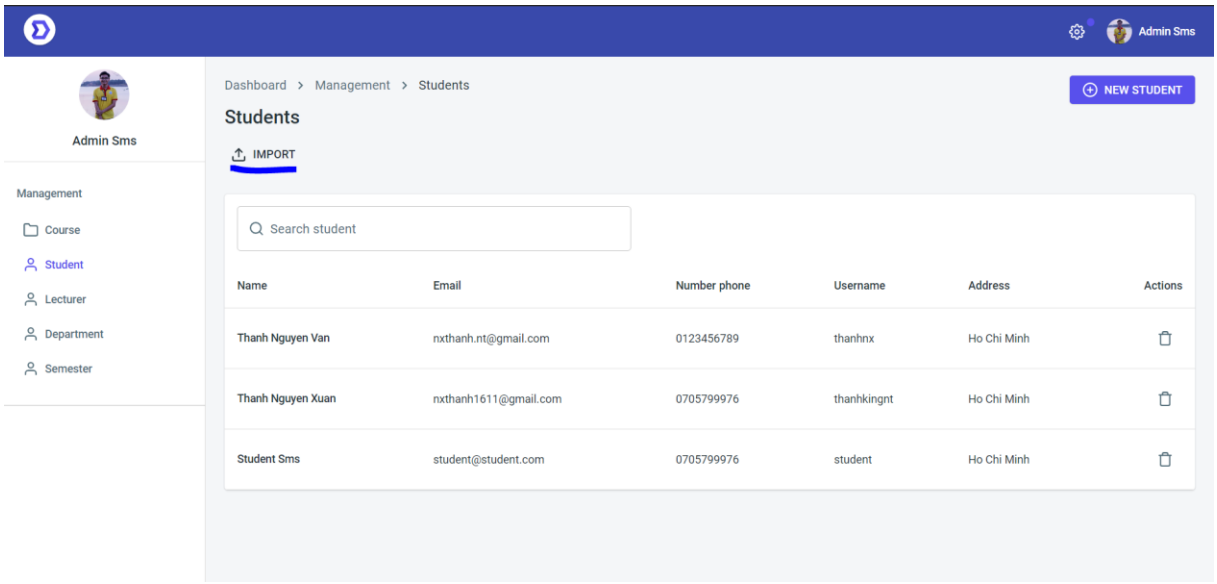

Figure 30: Import Student button

4.2.8. Register Course by Student

Register Course is the main function of SMS and only Student can be used.

The Student page information also show department information and Course Registed table.

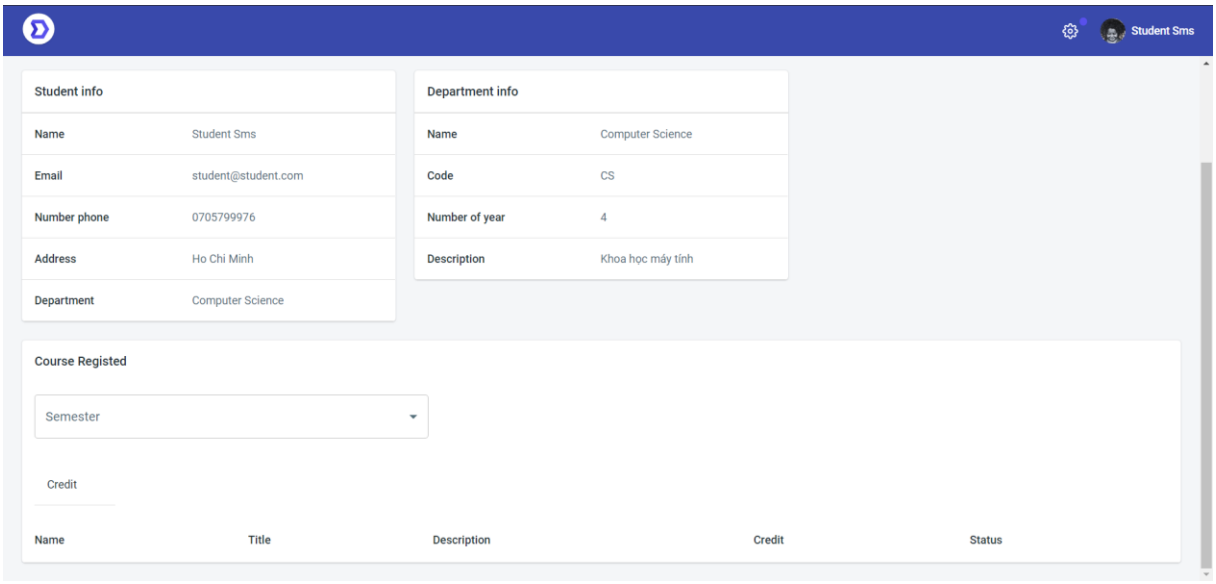

Figure 31: Student page

By open tab course and selecting the Semester the course list is shown.

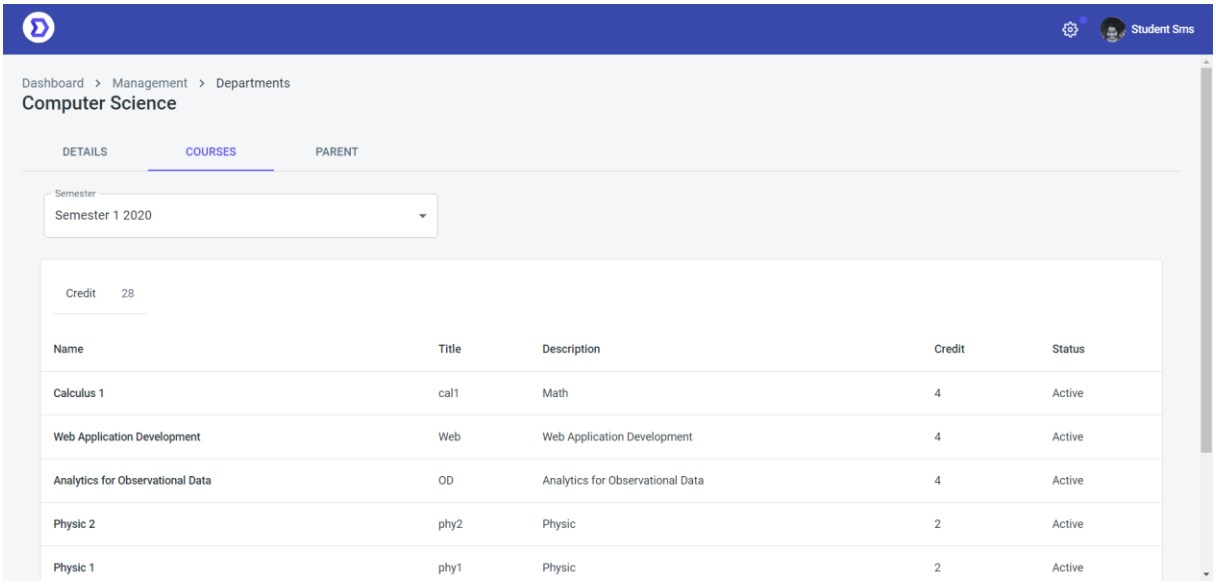

Figure 32: Course Tab

Choosing one courses that student need to be registed. The Course information page is shown.

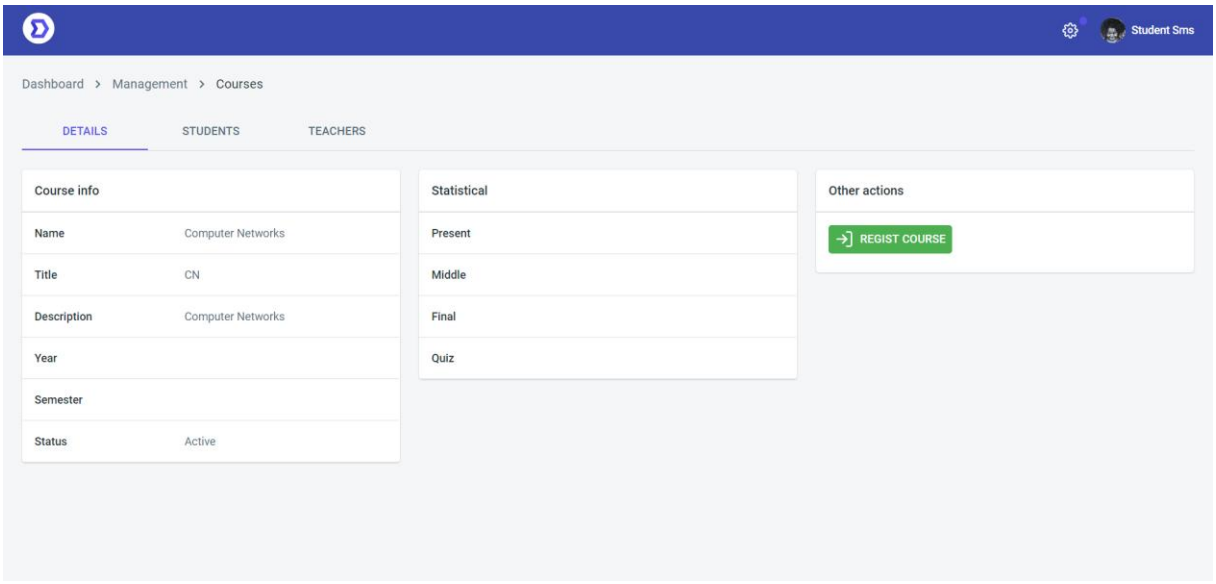

Figure 33: Regist Course

Click on Regist Course button for requesting course. A pop up will be shown when regist course successful. Registed course is shown in the Course Registed of Student.

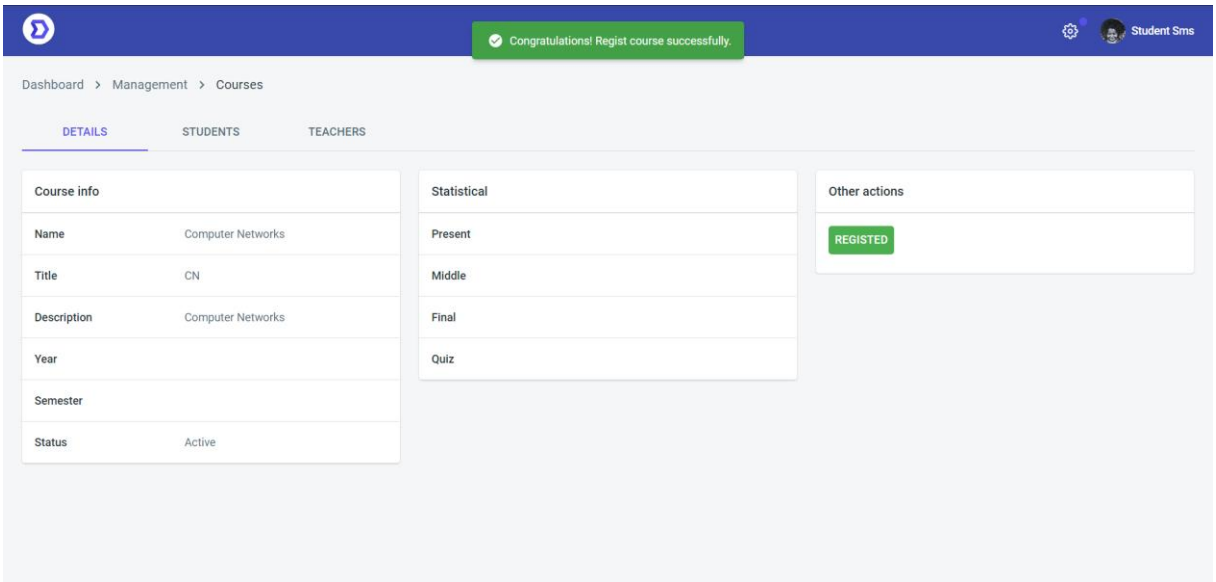

Figure 34: Registed successful

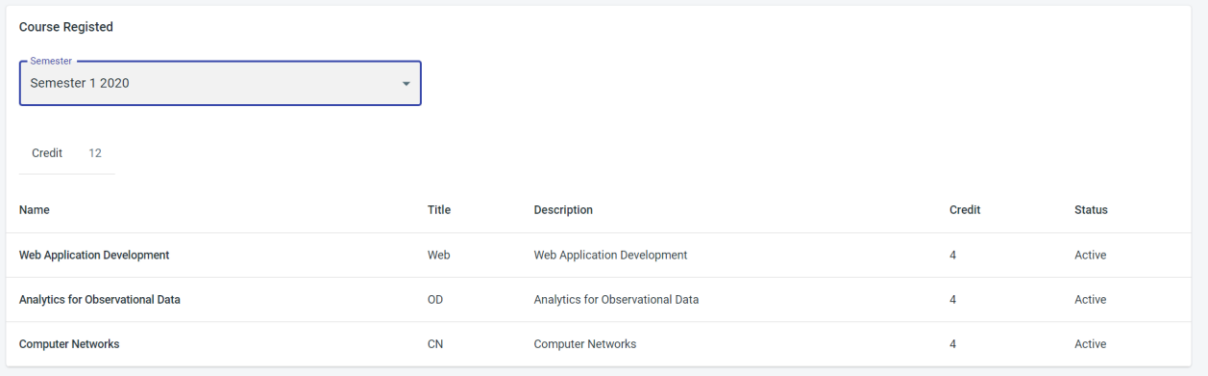

Figure 35: Course Registed show tab

4.2.9. Grading Student

By using Lecturer right, when user login to system, lecturer can only see their assign courses

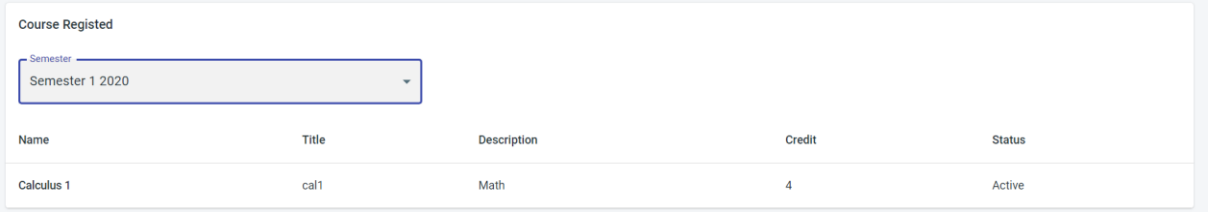

Figure 36: Course Registed tab of Lecturer

By clicking on this assign course, course information is shown.

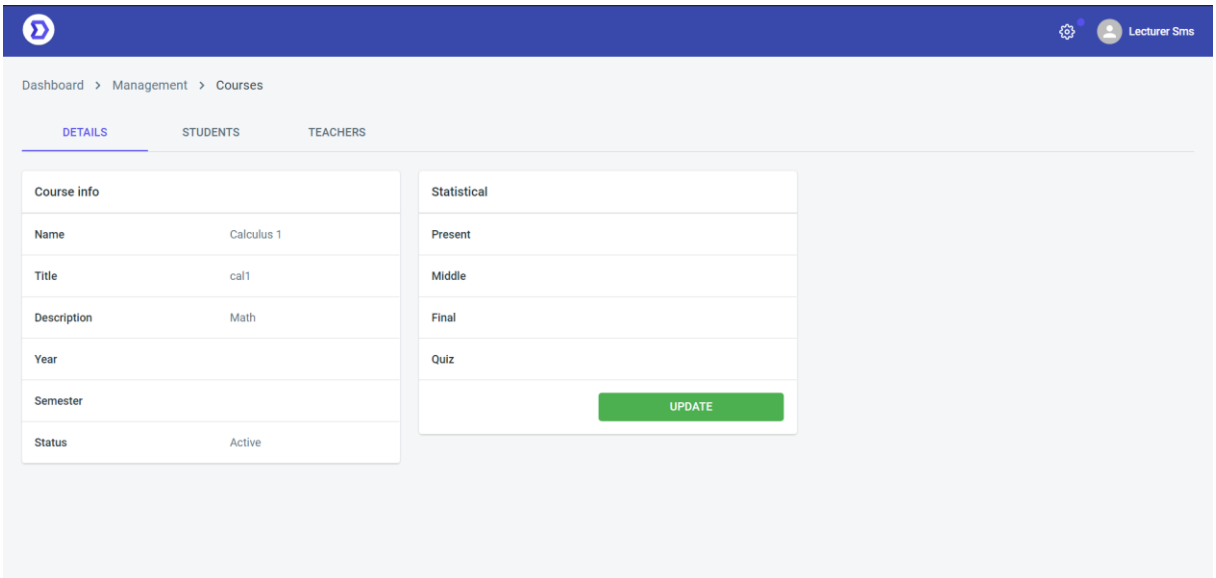

Figure 37: Course information for update statistics of score

Before grading student information, Lecturer must be update the percentage of all scores.

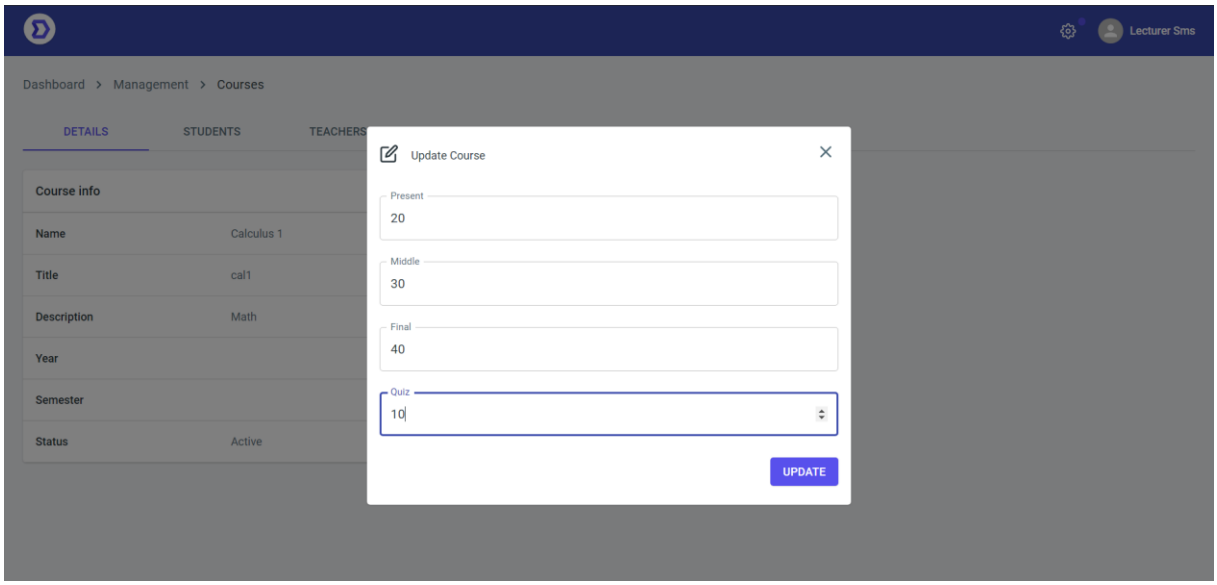

Figure 38: Update score percentage

A Student tab is shown a list of students for grading. Enter score and click on grading. The total score is shown.

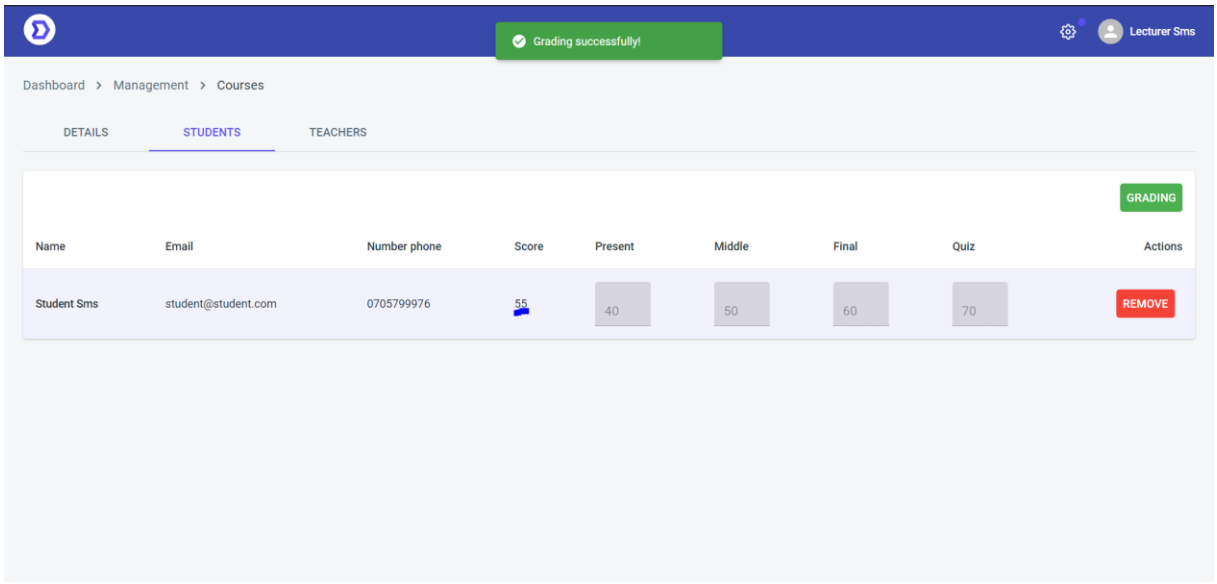

Figure 39: Grading student

4.2.10. View score

After Staff approve scores, Student can view their score for tracking.

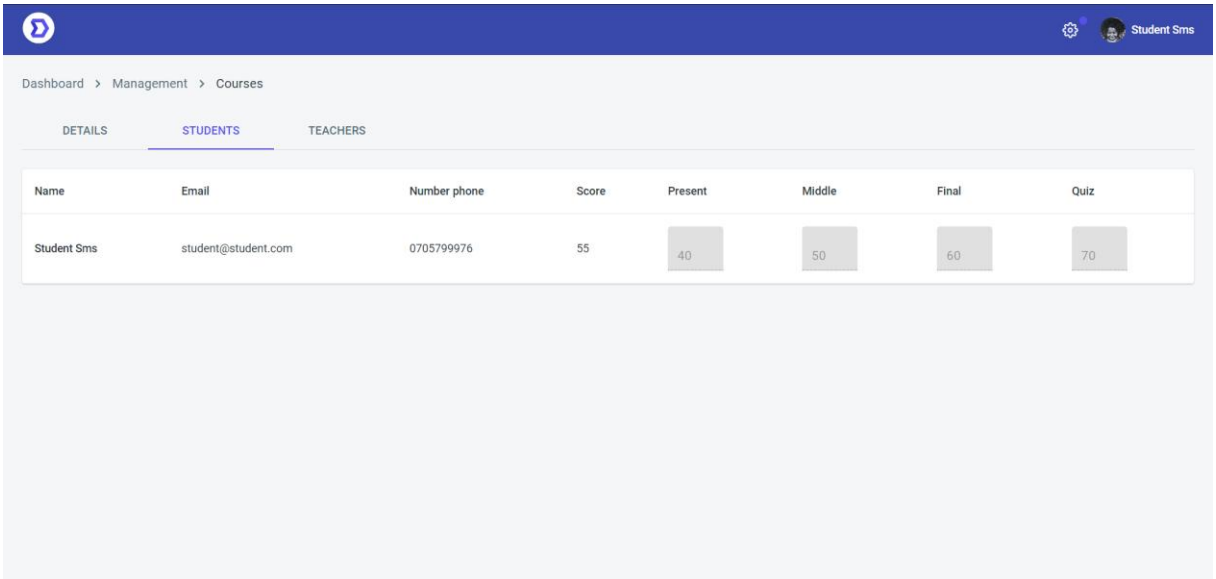

Figure 40: Student view score

4.2.11. Check update by staff

There are 2 updated must be approved by staff. It is update profile and update student score.

As a staff, when student update their profile, I can check that update and approve it.

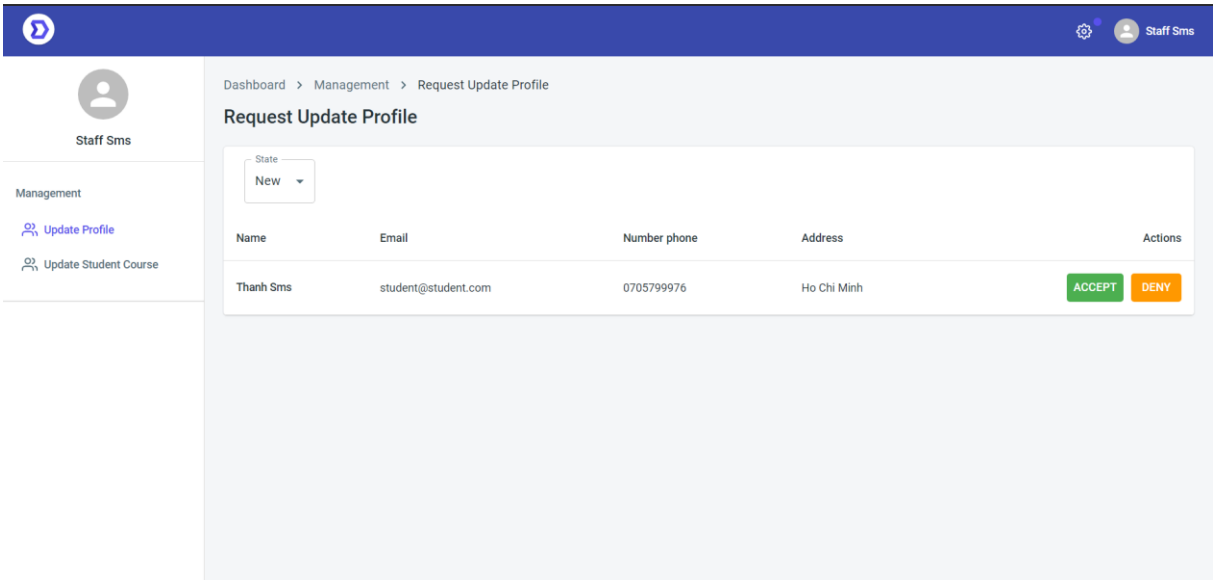

Figure 41: Update profile tab

There is update student score tab for approving.

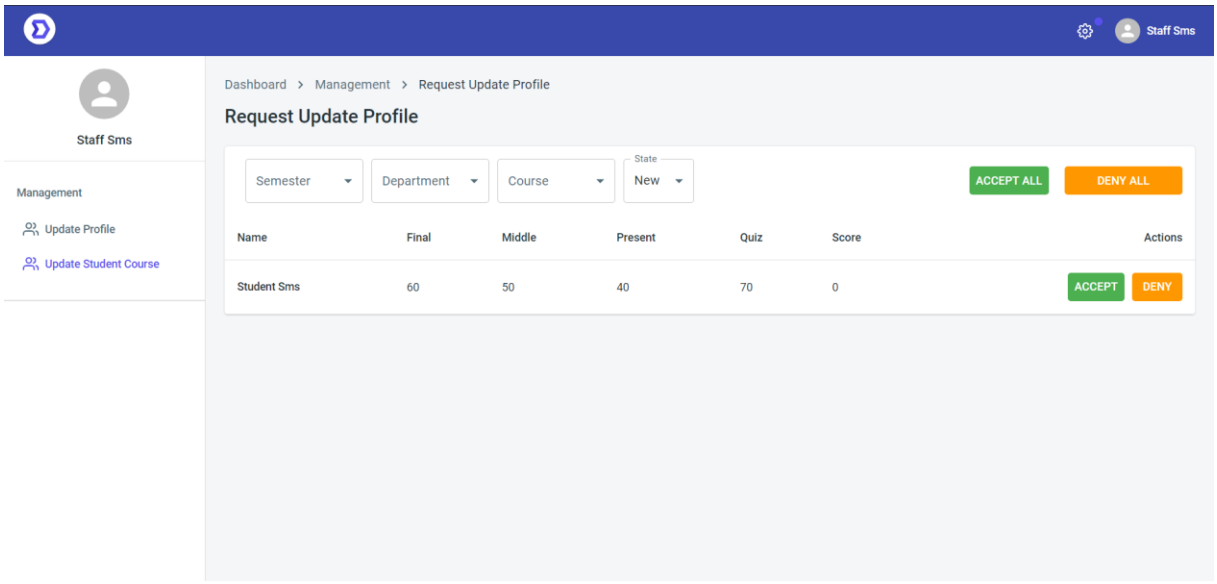

Figure 42: Update student score tab

4.2.12. Parent account

With student account, user can create their parent account in parent tab. Parent can see information of their children.

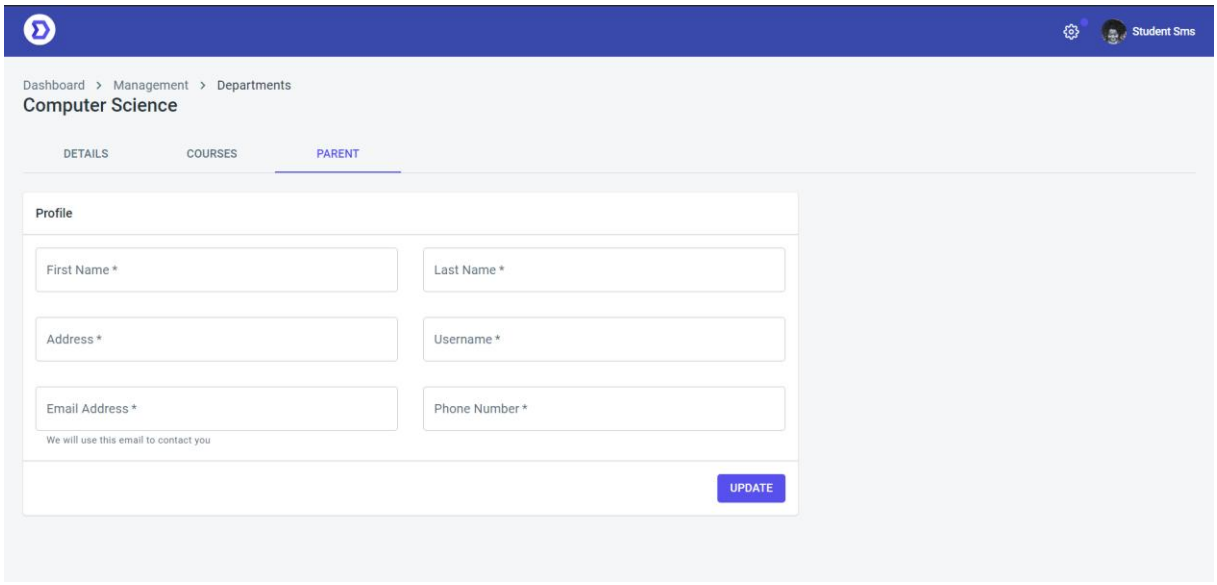

Figure 43: Create Parent account

After creating successfully, An email will be automatically sent to parent's email for providing a link to access the system. This link will navigate to SMS for entering new password of parent account.

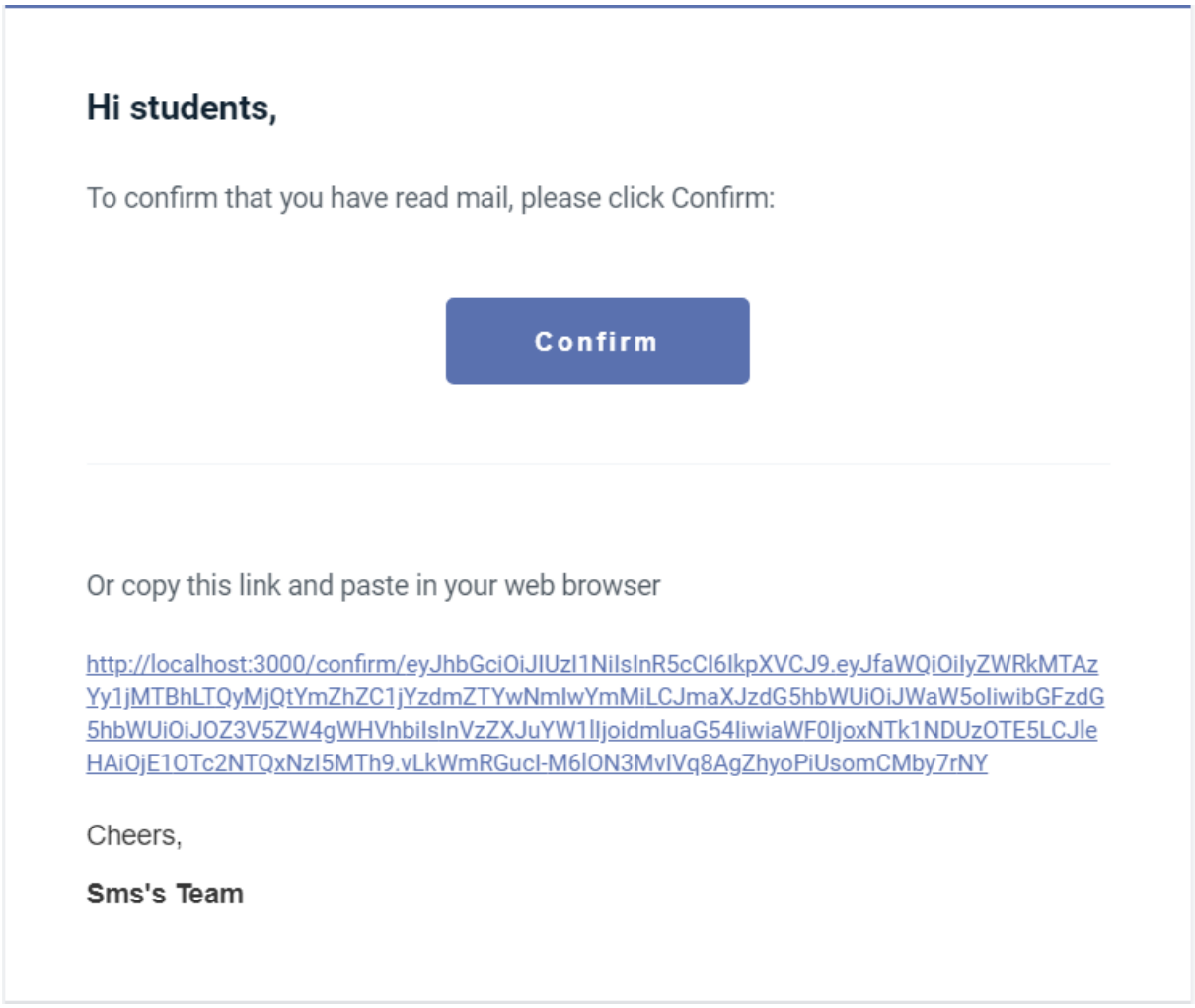

Figure 44: Confirm mail

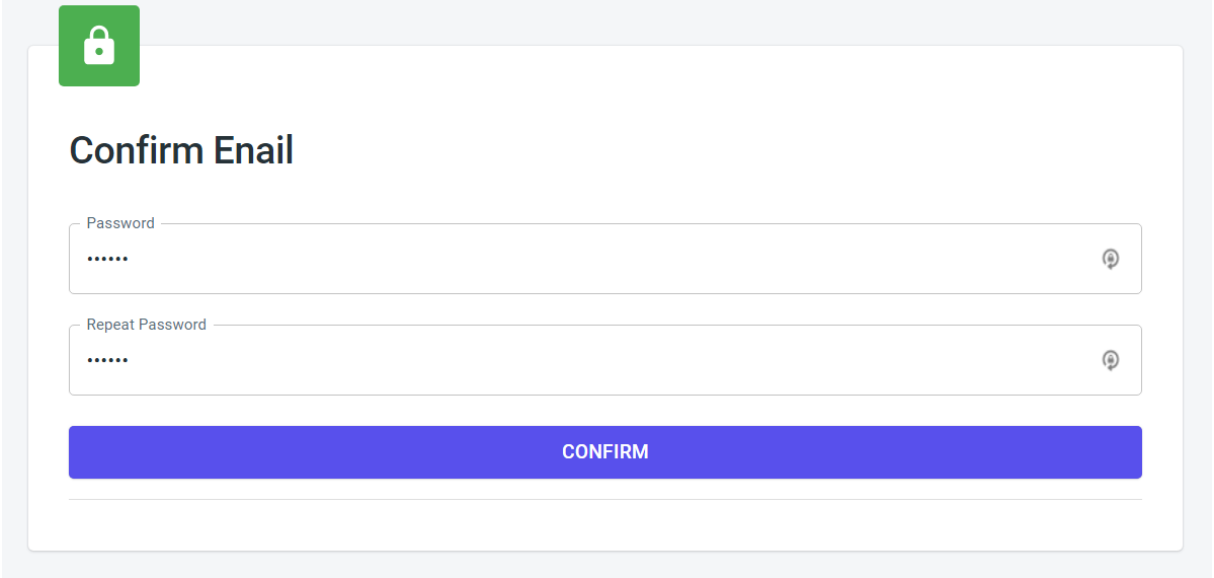

Figure 45: Enter password

After entering password and confirmation, login to the system with parent account. Parent page is shown which course their children enter and all credit was spent corresponding with chosen semester.

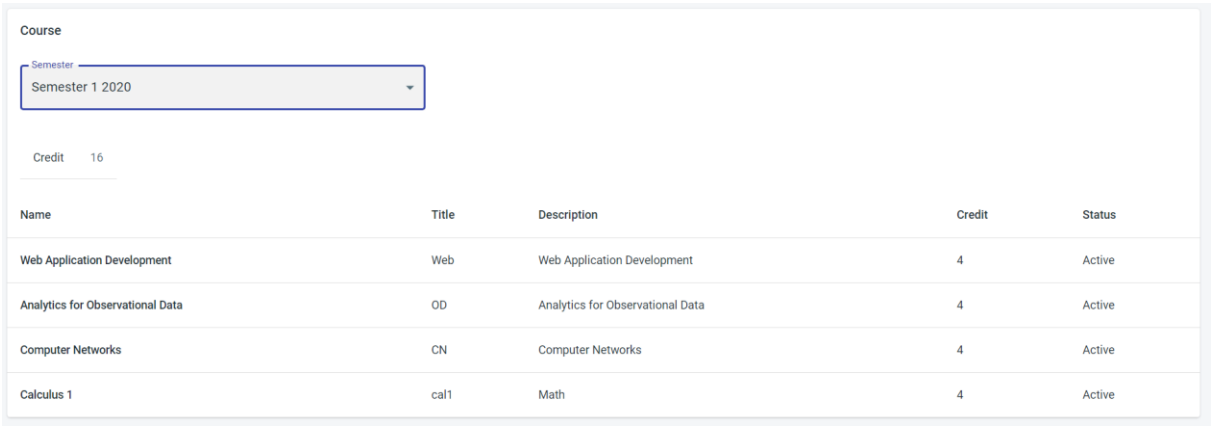

Figure 46: Course list of their children

Clicking on which course already been grading, the score of this course is shown.

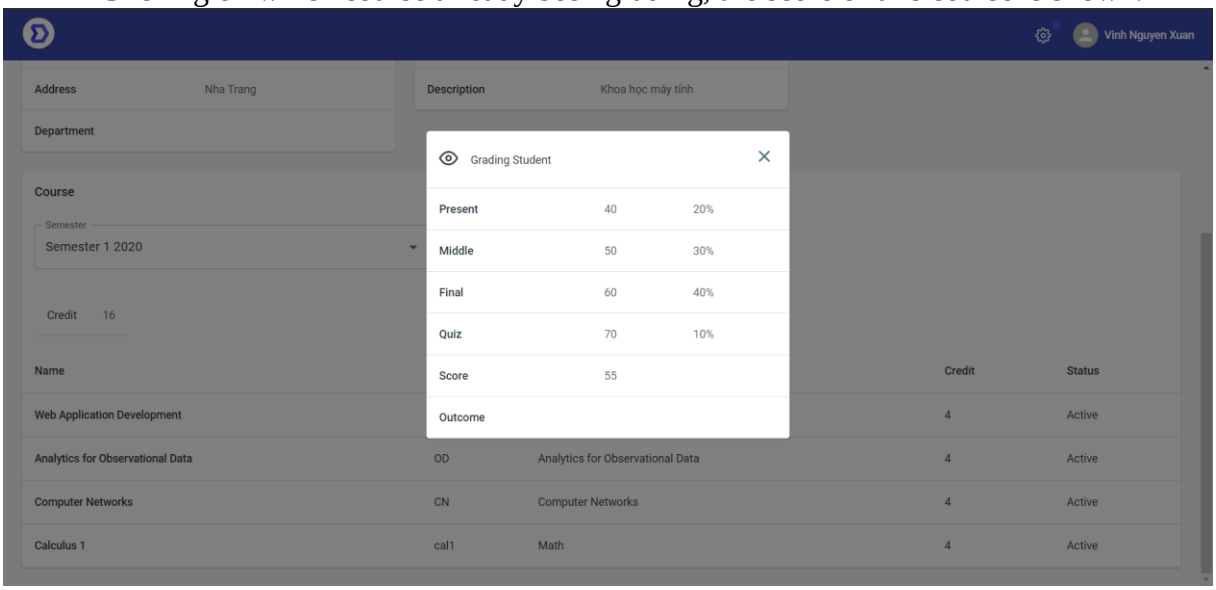

Figure 47: Children performance

4.2.13. Setting page option

There are 3 option of setting theme: Light, One Dark, Unicom

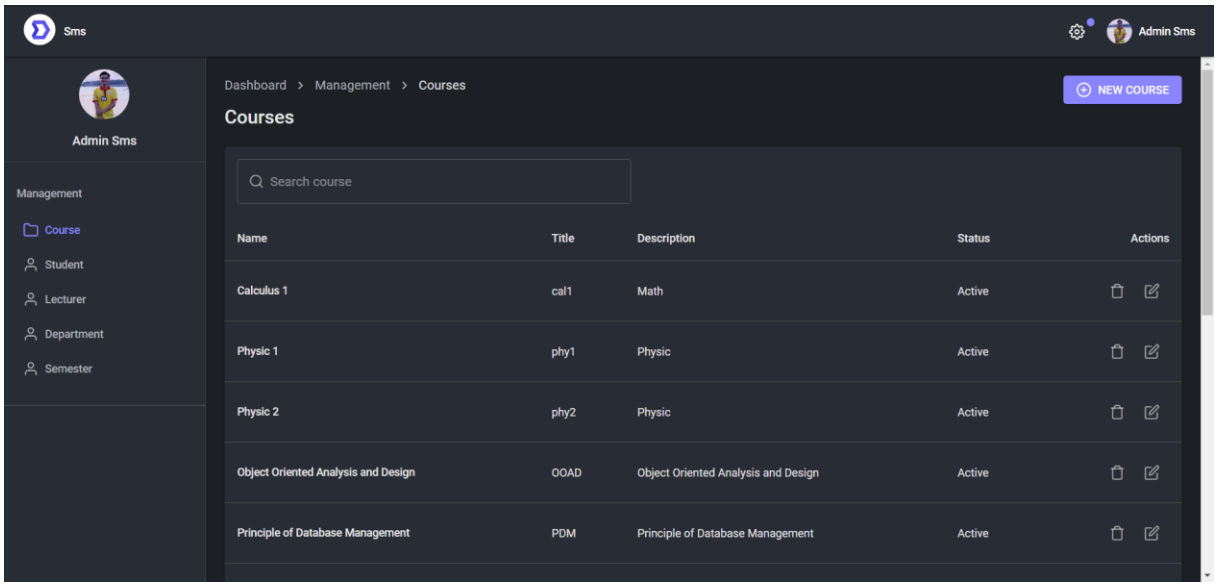

Figure 48: One Dark theme

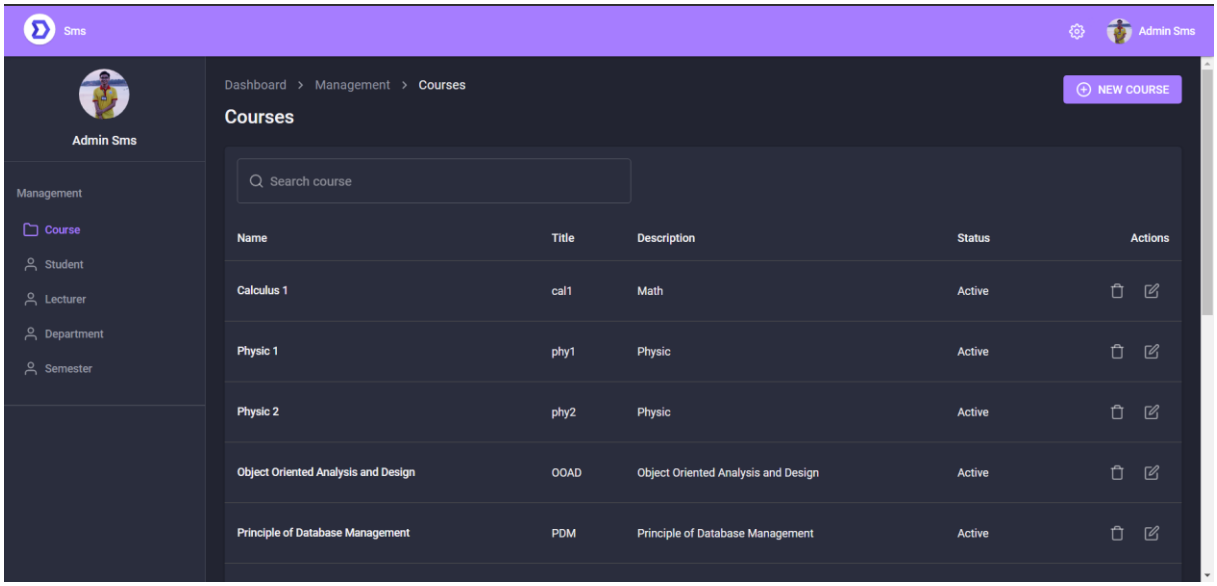

Figure 49: Unicorn theme

CHAPTER 5

DISCUSSION AND EVALUATION

5.1. Discussion

There is some fault when start to plan the idea to make the application. At first my beginning idea is student management system but my planning is not supported more option for student, many rolls with many actors and function, but it not focused on tracking student and support student function. It took time for another time of planning and improve more function for solving student problem of academic program and make it in the right way. Moreover, the real system operation process is big with many specific roles for all user to use easily, by separate the main point for student, researching and classify suitable function is more easily.

This project was developed using JavaScript programing language. User interface rendering with ReactJS. The database with using MongoDB and GraphQL to create connection and store. NestJS is the main framework using in backend of the system, because it can connect with others framework easily. However, the cleaning code, clearing for maintaining and scaling in the future is leaving.

Furthermore, the software needs to use mechanized testing like unit test or client-side testing, this project is testing manually, and may not all bugs and mistakes were defined.

5.2. Evaluation

To adjust an application, we should consider many usually factors:

The to begin with standard ought to be the design and the user's experience with them. The plan should friendly, and the interface must have a great vision for client. With that, it will have the connection of the client with the application.

Secondly, it must fulfill all client requirement. All work within the application must be as much natural for the client to utilize as conceivable. If the user has numerous troubles when running the application, that application may be a fail product.

Finally, the structure of the site is very important. In case that the designer plan with true database for the framework, the system can be upgraded simply within the future, and the security will be ensured.

However, due to the limits of time, the application only stops at this stage, the web application still feels lacking some more function to expand. In the future, more functions and characteristics will be created on the website.

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1. Conclusion

A successful academic program is the collection of many factors but the main point is planning a student management system for tracking and evaluating student performance and help manager to manage all the course and staff effectively. In the past, with old system, it is a nightmare and time-consuming for student and also for their parent to keep tracking with the academic program. By understanding the past restrictions of the traditional evaluation, the high-tech strategy which is the student management system through online has been created for supporting student as much as conceivable. And this application has effectively solved this issue, with high capacity size and transfer speed. Other than, it also brings numerous benefits for both progressing the quality of the subject and saving time. Moreover, the supporting system also help student to apply knowledge that gain from class into society.

6.2. Future work

In the future work the Student management system should be improved many things and overcome the limitation. The user interface, first, need to be improved more friendly and easy to use. The layout should be usable for many devices such as computer, tablet and mobile. Moreover, in the role of lecture, the system should be developed more functions to help this role like automatically grading will be added for saving time as much as possible. Applying machine learning for summarizing the results help the teacher can easily see the overall score, analyst the limitations that should be improved in the future. Beside that students can see the teacher’s assessment for improving their performance.

REFERENCES

[1] https://www.powerschool.com/ [Accessed April 12,2020]

[2] https://web-school.in/ [Accessed April 12,2020]

[3] https://edusoftweb.hcmiu.edu.vn/ [Accessed April 12,2020]

[4] https://blackboard.hcmiu.edu.vn/ [Accessed April 12,2020]

[5] https://www.javascript.com/ [Accessed May 8,2020]

[6] https://www.mongodb.com/ [Accessed May 8,2020]

[7] https://nestjs.com/ [Accessed May 8,2020]

[8] https://reactjs.org/ [Accessed May 8,2020]

[9] https://nodejs.org/en/ [Accessed May 8,2020]

[10] https://graphql.org/ [Accessed May 8,2020]

[11] N. Pandit. What is reactjs and why should we use it?,

https://www.c-sharpcorner.com/article/what-and-why-reactjs/

[Accessed May 8,2020]

[12] Object-Oriented Analysis and Design with Applications, 3rd Edition by Grady Booch, Robert A. Maksimchuk, Michael WEngle, Bobbi J. Young, Jim Conallen, Kelli A.Houston.

[13] Arun Kumar, *Database Management System*, 2009

[14] Jim Gray, *Database Modeling and Design*, MA: Microsoft Research

[15] Carles Matus, *Introduction to Web Applications Development*, 2010

[16] Matt Weisfeld, *The Object-Oriented Thought Process*, 4th Edition MA: Addison-Wesley Professional, March 2013

[17] Online Diagramming: https://app.diagrams.net/ [Accessed April 13,2020]

[18] MVC Design Pattern. [Accessed April 13,2020]

https://www.geeksforgeeks.org/mvc-design-pattern/.Christensson, P. (2006)

[19] JavaScript. (n.d.). [Accessed April 13,2020]

https://techterms.com/definition/javascript

[20] What is JavaScript (JS)? - Definition from Techopedia. (n.d.).

https://www.techopedia.com/definition/3929/javascript-js [Accessed April 8,2020]

APPENDICES