



National University of Computer and Emerging Sciences



Digitizing MS Thesis Portal

Izna Zubair.....18L-0901
Sumren Fatima.....18L-0971
Ayesha Azhar.....18L-0983
Rimsha Tariq.....18L-1025

Supervisor: Mr. Farooq Ahmed

B.S. Computer Science
Final Year Project
June 2022

Anti-Plagiarism Declaration

This is to declare that the above publication produced under the:

Title: Digitizing MS Thesis Portal

is the sole contribution of the author(s) and no part hereof has been reproduced on **as it is** basis (cut and paste) which can be considered as Plagiarism. All referenced parts have been used to argue the idea and have been cited properly. I/We will be responsible and liable for any consequence if violation of this declaration is determined.

Date: 01-06-2022

Student 1

Name: Izna Zubair

Signature: 

Student 2

Name: Sumren Fatima

Signature: 

Student 3

Name: Ayesha Azhar

Signature: 

Student 4

Name: Rimsha Tariq

Signature: 

Table of Contents

Table of Contents	i
List of Tables	v
List of Figures	vi
Abstract	1
Chapter 1: Introduction	2
1.1 Goals and Objectives	3
1.2 Scope of the Project	3
Chapter 2: Related Work	4
Chapter 3: Requirements and Design	7
3.1 Functional Requirements	7
3.2 Non-Functional Requirements	10
3.3 Hardware and Software Requirements	10
3.3.1 Hardware Requirements.....	10
3.3.2 Software Requirements.....	10
3.4 System Architecture.....	11
3.4.1 Admin Component.....	12
3.4.2 Faculty Component.....	12
3.4.3 Thesis Portal Management Component.....	13
3.4.5 Subsystem Architecture	13
3.5 Architectural Strategies.....	16
3.5.1 Use of a particular type of product	16
3.5.2 Reuse of existing software components.....	16
3.5.3 Future plans for extending or enhancing the software.....	16
3.5.4 User interface paradigms	16
3.5.5 Concurrency and synchronization.....	16
3.6 Use Cases	17
3.6.1 Sign In.....	17
3.6.2 Filtered Search for Public	18
3.6.3 View Thesis	18
3.6.4 View Thesis for Public.....	19
3.6.5 Filtered Search	19
3.6.6 Edit Thesis for Faculty.....	20
3.6.7 Sign Out	21
3.6.8 View Supervised Thesis.....	21
3.6.9 Edit Thesis for Admin.....	22
3.6.10 Register Faculty Members	23
3.6.11 Register Students	24
3.6.12 View Registered Faculty.....	25
3.6.13 View Evaluated Thesis	25
3.6.14 Delete Thesis.....	26
3.6.15 View Registered Students	26
3.6.16 Update Student.....	27
3.6.17 Update Faculty	28
3.6.18 Delete Faculty	29
3.6.19 View Comments.....	29
3.6.20 Delete Student.....	30
3.6.21 Make a Comment	30
3.6.22 Edit Comment	31
3.6.23 Delete Comment	32

3.6.24 Change Password	33
3.6.25 Forgot Password.....	34
3.6.26 Suggest Topics.....	35
3.6.27 View Suggested Topics.....	35
3.6.28 Delete Topic	36
3.6.29 View Complete Thesis	36
3.6.30 Upload Thesis	37
3.6.31 View Trends.....	38
3.6.32 View Upcoming Seminars	38
3.7 GUI	39
3.7.1 Public Interfaces.....	39
3.7.2 Admin Interfaces.....	44
3.7.3 Faculty Interfaces.....	61
3.7.4 Student Interfaces.....	73
3.8 Database Design.....	76
3.8.1 ER Diagram	76
3.8.2 Data Dictionary	76
3.9 System Requirements.....	81
3.10 Design Considerations	81
3.10.1 Assumptions and Dependencies	81
3.10.2 General Constraints.....	81
3.11 Development Methods	82
3.12 Class diagram.....	83
3.13 Sequence diagram	84
3.14 Policies and Tactics.....	97
3.14.1 Code guidelines and conventions.....	97
3.14.2 Testing.....	97
3.14.3 User Interface	97
3.14.4 Hierarchical organization of source code	97
Chapter 4: Implementation and Test Cases	97
4.1 Implementation	97
4.1.1 Filtered Search	98
4.1.2 Authentication and Session Handling.....	98
4.1.3 Accounts Handling.....	98
4.1.4 Thesis View	98
4.1.5 Thesis Edit	98
4.1.6 Comments handling	99
4.1.7 Research Trends.....	99
4.1.8 Research Suggestions.....	99
4.1.9 Web Crawler	99
4.2 Test case Design and description	100
4.2.1 Sign In.....	100
4.2.2 Sign In with Invalid Email Test Case	100
4.2.3 Sign In with Invalid Password Test Case	101
4.2.4 Filtered Search Test Case.....	101
4.2.5 Filtered Search with Incorrect Input Test Case.....	102
4.2.6 View Thesis for Faculty and Admin Test Case	103
4.2.7 View Thesis for Public Test Case	103
4.2.8 Filtered Search with Sign In Test Case	104
4.2.9 Filtered Search with Sign and Invalid Input In Test Case	105

4.2.10 Edit Thesis for Faculty Test Case	105
4.2.11 Edit Thesis for Faculty with Cancel Button Test Case	106
4.2.12 Sign Out Test Case.....	107
4.2.13 View Supervised Thesis Test Case	108
4.2.14 Edit Thesis for Admin Test Case	108
4.2.15 Edit Thesis for Admin with Invalid Input Test Case	109
4.2.16 Edit Thesis for Admin with Cancel Button Test Case.....	110
4.2.17 Register Faculty Member Test Case	111
4.2.18 Register Faculty Member with Invalid Email Test Case	112
4.2.19 Register Faculty Member with Registered Email Test Case	113
4.2.20 Register Faculty Member Cancel Button Test Case	113
4.2.21 Register Student Test Case	114
4.2.22 Register Student with Invalid Email Test Case	115
4.2.23 Register Student with Invalid Roll Number Test Case	116
4.2.24 Register Student with Registered Email Test Case.....	116
4.2.25 Register Student with Cancel Button Test Case	117
4.2.26 View Registered Faculty Test Case	118
4.2.27 View Evaluated Thesis Test.....	118
4.2.28 Delete Thesis Test Case	119
4.2.29 Delete Thesis with Cancel Button Test Case.....	119
4.2.30 View Registered Students Test Case	120
4.2.31 Update Student Test Case	120
4.2.32 Update Student with Cancel Button Test Case	121
4.2.33 Update Faculty Test Case	122
4.2.34 Update Faculty with Cancel Button Test Case	123
4.2.35 Delete Faculty Test Case	124
4.2.36 Delete Faculty with Cancel Button Test Case	124
4.2.37 View Comments Test Case	125
4.2.38 Delete Student Test Case	125
4.2.39 Delete Student with Cancel Button Test Case	126
4.2.40 Make a Comment Test Case	127
4.2.41 Edit Comment Test Case	127
4.2.42 Edit Comment with Empty Field Test Case	128
4.2.43 Delete Comment Test Case.....	129
4.2.44 Delete Comment with Cancel Button Test Case.....	129
4.2.45 Change Password Test Case	130
4.2.46 Change Password with Incorrect Old Password Test Case	130
4.2.47 Change Password with Weak Password Test Case.....	131
4.2.48 Change Password with Cancel Button Test Case	132
4.2.49 Suggest Topics Test Case	132
4.2.50 Suggest Topics with Empty Field Test Case	133
4.2.51 View Suggested Topics Test Case.....	133
4.2.52 Delete Topic Test Case	134
4.2.53 Delete Topic with Cancel Button Test Case	134
4.2.54 View Complete Thesis Test Case	135
4.2.55 Upload Thesis Test Case.....	135
4.2.56 Upload Thesis with Cancel Button Test Case.....	136
4.2.57 View Most Researched Areas Test Case	137
4.2.58 View Upcoming Seminars Test Case	138
4.2.59 Performance Test Case	138

4.2.60 Usability Test Case	139
4.2.61 Availability Test Case.....	139
4.2.62 Extensibility Test Case	140
4.3 Test Metrics	140
Chapter 5: Conclusion.....	141
References.....	142

List of Tables

Table 1: Faculty Data Dictionary.....	76
Table 2: Admin Data Dictionary.....	77
Table 3: Student Data Dictionary	77
Table 4: Thesis Data Dictionary	78
Table 5: Domain Data Dictionary	79
Table 6: Domain_info Data Dictionary	79
Table 7: Comment Data Dictionary	79
Table 8: Committee_member Data Dictionary.....	80
Table 9: Suggested_topics Data Dictionary.....	80

List of Figures

Figure 1: MVT System Architecture Diagram	11
Figure 2: Component Diagram	11
Figure 3: Admin Component	12
Figure 4: Faculty Component	12
Figure 5: Thesis Portal Management Component	13
Figure 6: Account Management sub-component.....	13
Figure 7: Thesis Management sub-component.....	14
Figure 8: Advisor sub-component	14
Figure 9: Committee Member sub-component.....	15
Figure 10: Accounts Operations sub-component.....	15
Figure 11: Upload Thesis sub-component	16
Figure 12: Main Public Interface	39
Figure 13: View Thesis	40
Figure 14: Research Trends	41
Figure 15: Suggested Topics.....	42
Figure 16: Forgot Password.....	43
Figure 17:Admin Login Page.....	44
Figure 18: Admin Home Page	45
Figure 19: Thesis Edit.....	46
Figure 20: Thesis Edit Successful pop-up	47
Figure 21: Thesis Edit Unsuccessful pop-up	48
Figure 22: Thesis Delete Confirmation.....	49
Figure 23: Thesis Comments	50
Figure 24: Register Students	51
Figure 25: Admin View Registered Students	52
Figure 26: Edit Student	53
Figure 27: Delete Student	54
Figure 28: Register Faculty.....	55
Figure 29: View Faculty	56
Figure 30: Edit Faculty	57
Figure 31: Delete Faculty.....	58
Figure 32: Upload Thesis.....	59
Figure 33: Change Password	60
Figure 34: Faculty Login	61
Figure 35: Faculty Home	62
Figure 36: Supervised Thesis.....	63
Figure 37: Edit Thesis	64
Figure 38: View Comments	65
Figure 39: Add Comment	66
Figure 40: Delete Thesis	67
Figure 41: Evaluated Thesis.....	68
Figure 42: View Thesis	69
Figure 43: View Comments	70
Figure 44: Suggested Research Topics	71
Figure 45: Add Topic	72
Figure 46: Student Login	73
Figure 47: Student Home	74
Figure 48: Student Thesis Upload.....	75
Figure 49: ER Diagram.....	76

Figure 50: Class Diagram	83
Figure 51: Sign In sequence diagram.....	84
Figure 52: Filtered Search for Public Sequence Diagram	84
Figure 53: View Thesis Sequence Diagram.....	85
Figure 54: View Thesis for Public Sequence Diagram.....	85
Figure 55: Edit Thesis for Faculty Sequence Diagram.....	85
Figure 56: Sign Out Sequence Diagram	86
Figure 57: View Supervised Thesis Sequence Diagram.....	86
Figure 58: Edit Thesis for Admin Sequence Diagram.....	86
Figure 59: Register Faculty Members Sequence Diagram	87
Figure 60: Register Students Sequence Diagram.....	87
Figure 61: View Registered Faculty Sequence Diagram.....	88
Figure 62: View Evaluated Thesis Sequence Diagram.....	88
Figure 63: Delete Thesis Sequence Diagram.....	88
Figure 64: View Registered Students Sequence Diagram	89
Figure 65: Update Student Sequence Diagram.....	89
Figure 66: Update Faculty Sequence Diagram	90
Figure 67: Delete Faculty Sequence Diagram	90
Figure 68: Delete Student Sequence Diagram	91
Figure 69: View Comments Sequence Diagram.....	91
Figure 70: Make a Comment Sequence Diagram	92
Figure 71: Edit Comment Sequence Diagram	92
Figure 72: Delete Comment Sequence Diagram	93
Figure 73: Change Password Sequence Diagram	93
Figure 74: Reset Password Sequence Diagram	94
Figure 75: Suggest Topics Sequence Diagram	94
Figure 76: View Suggested Topics Sequence Diagram.....	95
Figure 77: Delete Topic Sequence Diagram	95
Figure 78: View Complete Thesis Sequence Diagram	95
Figure 79: Upload Thesis Sequence Diagram	96
Figure 80: View Most Researched Areas Sequence Diagram	96
Figure 81: View Upcoming Seminars/Conferences	96

Abstract

With ever-increasing global digital base, research has become more important. Extensive researches are done before developing a new technology. In order to promote research as well as demonstrate knowledge of the research areas focused in the university, our proposed project aims to provide a MS Thesis Portal for FAST-NU Computer Science Department. This portal helps people to know more about different areas in which research is done in the university. This also highlights the influence and quality of research in the university. Trend analysis visualization helps to get an intuition of the research domains. In addition, faculty members can provide research suggestions to the students. Moreover, this project also implements a crawler to extract a list of different upcoming research conferences and seminars, in the form of a news feed. Further, non-electronic maintenance of data is not an efficient way as sifting through thousands of files and folders to find a required document is not only time-consuming but also requires a lot of effort. To ease the hassle of searching through hard copies of research papers, it is best to opt for digitization. Therefore, this project intends to digitize this process which would help the university to maintain the data and provide various other services to the users. Moreover, user account maintenance provides functionalities to fulfil the aim of digitization.

Chapter 1: Introduction

As technological advancements are gaining strength, existing researches in computer science are improving and new researches are emerging in order to solve problems and fill technological gaps. Moreover, gaining information about the fascinating researches happening globally can help to strengthen local researches. Similarly, a platform to exhibit local researches can help to promote research done in Pakistan. Hence, promotion and enhancement of research are key factors that provide a ground for new solutions to come into play.

Furthermore, electronic maintenance of data is not just necessary to ease out the tasks but to sync with the digitized world. Digitization helps an organization to maintain the data and provide services to the users efficiently. It increases process effectiveness and improves data transparency [1]. It also helps to optimize processes and automate manual tasks [2]. In case of thesis information, maintaining and updating thesis information of thousands of old as well as current students is a tedious task. Maintaining this huge data manually can lead to inconsistency and redundancy in data. Moreover, searching for the record of a particular student or searching for the thesis related to a particular domain or supervised by a particular advisor or the thesis done in a particular year can be tedious as well. All these problems can be solved if all the information is stored in a single database instead of storing it in multiple files.

Therefore, the core aim of this project is to promote research in the field of computer science and highlight the research work conducted in FAST-NU through a web portal. Through this portal, users would be able to get information about theses work along with various other features such as most researched area, most popular research, etc. This platform would portray research to the outside world through which more research ideas can emerge. In addition, web crawler would extract information about different seminars and conferences related to computer science. Moreover, the faculty members can add their research suggestions to the website, which would help to guide the viewers.

Other major feature of this system is the search engine. This search engine would be available to everyone for searching the thesis related to a particular domain, year, advisor or student. This filter searching feature would save a lot of time by providing a user-friendly interface to sift through thousands of records without any hassle. This project would digitize the maintenance of thesis related information and provide easy access to users based on their roles and responsibilities. An admin will be able to enter student and thesis information. This information can later be viewed by faculty members and students. Faculty members can be either committee members or advisors. An advisor will be able to enter the grade of the thesis, provide feedback about the thesis and edit the abstract of the thesis. The admin can assign committee members to a thesis and update any information related to a particular thesis. Moreover, the students can view the grades and comments about their thesis through their accounts that will be created by the admin at the time of registration.

To briefly sum up the document, chapter 1 (Introduction) covers the objectives and motivation of doing the project. Moreover, chapter 2 (Related Work) covers the details about the technologies available and the technologies that we are using for the web development. The benefits and motivation for React, Django REST framework and Postgres are explained. Chapter 3 (Requirements and Design) covers the functional and nonfunctional requirements of the portal. System requirements covers the hardware and software requirements. Different diagrams provide an overview of the working of the portal. Chapter 4 covers implementation details of the system. Lastly, chapter 5 (Conclusion) is the crux of the whole document.

1.1 Goals and Objectives

The goal of this project is to provide a research repository to get intuition of the research work and trends of the university. Web-crawler would provide access to global and local conferences to strengthen the information base. A search engine will be available publicly where users can perform filter search based on keywords like title, domain, roll number, advisor name and student name. Moreover, different users of the application can utilize their privileged functionalities to perform relevant tasks. In order to provide smooth execution of the aforementioned functionalities, the system shall meet the performance requirements which include good processing speed and ability to cater at least 100 users at a time. Moreover, the application shall be available to its users 24/7 except during the maintenance phase, so that the users do not face any hindrance in their work.

1.2 Scope of the Project

The scope of this project includes maintaining and retrieving theses along with their information in an effortless and effective manner. This would exhibit the research done in the university. Moreover, trend analysis would visualize the research of the university and crawler would help to gain information from other conferences. Faculty members would be able to add the topics for research and the students can research on those topics.

Chapter 2: Related Work

The development of a web application requires the use of different tools for both: its front end and back end. There are a number of tools and technologies available today that help in the building and deploying web applications. A literature survey about some existing technologies is presented here.

2.1 Web Development Frameworks

Most commonly used frameworks for back-end development are Express.js, Django REST and Ruby on Rails, in addition to this, some typically used frameworks for the development of front end are React.js, Vue.js and Angular.

Express.js is a framework used for the development of back end of a web application. It helps to generate restful APIs. These APIs accept request coming from the client, process them and send the appropriate response. As Express.js is supported by Node.js, the web applications developed by using this framework can be scaled easily. This feature also improves the availability and failure tolerance. Another advantage of Express.js is that it is supported by Google v8 engine which enhances the performance of the application and also decreases the lag in processing. There are several well-known products where the back ends have been developed by using Express.js. In addition to this, Express.js also supports multiprocessing as it can handle hundreds of requests at the same time. Therefore, this framework is used to develop web applications where the number of clients would be many. Some of them are IBM, PayPal, Walmart and Flickr [3].

Another well-known back-end development framework is Django REST. Django provides a number of built-in functionalities that makes the handling of several web related tasks easier. These functionalities include user authentication, database migrations, admin panel and form handling. This framework helps to define a proper structure of the project. This structure makes it easier for the developer to figure out where to develop a new feature. Thus, this framework is very suitable for large-scale applications that have many features. In addition to this, the applications generated by using Django REST are safe from SQL injection attacks and cross-site request forgery [4]. A major con of Django REST is that it cannot handle multiple requests at the same time as it does not provide the support for multiprocessing which is a major requirement for the modern-day web applications. In addition to this, if the architecture of your web application is poorly designed, it can lead to experiencing issues with the speed of your application. Therefore, in order to develop a web application with good speed using Django REST, the architecture should be scalable and well-optimized [5].

Ruby on Rails is a server-side web development framework. It is a relatively new framework and is one of the most popular tools for back-end development of web applications. This framework is based on a language called “Ruby”. Ruby was used as a technology for rapid development of software. Therefore, Ruby on Rails is called “startup technology” as it guarantees quick deployments and quick launches. This framework ensures adherence to web standards in every part of the web application including data transfer and user interface and thus the web applications developed by using Ruby on Rails follow the accepted design paradigms [6]. It also enables a better readability of code and reduces the code required to develop a feature. The companies using Ruby on Rails are GitHub, Airbnb and Shopify. The disadvantage of Ruby on Rails is its slow speed which leads to bad scalability of applications developed by this framework. Another disadvantage is the lack of flexibility. To start a project

using this framework, routing needs to be configured and migrations for database need to be done. The default modules are helpful if some traditional functionalities have to be implemented but it may be difficult to implement unique features. A bad architecture for your project will be more damaging in Ruby on Rails than in any other framework. The structure issues are very tedious to resolve as the applications developed by this framework have components that are tightly coupled.

React.js is an open-source framework used to develop the front end of web applications. This framework was developed by Facebook. According to a survey conducted by Stack Overflow in 2021, this framework was ranked as the best front-end framework. This framework is suitable for those web applications that expect a high traffic. React.js works by creating and reusing components. A component outputs a piece of HTML code that can be reused. This feature of creating a component once and reusing it multiple times makes it easier for the developer to develop and maintain the user interface. React.js provides the developer a set of tools that makes the process of front-end development easier. These tools are designed as dev extension to Firefox and Chrome and they enable the developer to inspect the hierarchy of React components in the virtual DOM. React technologies are getting updated very rapidly. React developers need to constantly update their knowledge and skills and learn the new ways to handle tasks constantly. A disadvantage of this rapid change in technology is that there is no proper documentation present for React tools [7].

Vue.js is a framework used to develop the user interface for web applications, desktop software and mobile applications. Vue.js uses the MVC architecture but can also be used with other architectural frameworks for example the Component Based Architecture. Vue enables a quick download and is effective for search engine optimization. It has a very intuitive structure and the components can be easily deployed as they are an aggregation of JavaScript and HTML features. In addition to having a simple syntax, Vue also has an extensive documentation that helps the developer to easily understand its core concepts. The components developed in Vue are the elements of your web interface that can be written in HTML, CSS and JavaScript. This approach increases the readability of code and simplifies unit-testing [8]. In contrast to other frameworks, Vue.js has a small community as it is a new framework. It is not very scalable and thus it is not appropriate for large-scale applications. Another issue with Vue applications is that older versions of Safari browsers do not support it.

Angular is a JavaScript framework used to develop the front end of web applications. Angular was developed to ease the process of designing a user interface. This framework is suitable if you are designing a progressive web application or a large-scale web application with complex features. Angular has many third-party integrations that can be integrated easily and this provides the developers several tools to enhance the design and function of their user interface. It uses “ahead-of-time” compiler that compiles all the HTML and Typescript code into JavaScript code before your web application is loaded by the browser. A drawback of Angular is its limited support for search engine optimization operations [9].

2.2 Technologies used in the Project

In this project, Django REST is used to developed the back end and React.js is used to develop the front end. As this is a large-scale application with multiple classes of users and each of these user classes have different privileges, Django is a suitable framework for such an application. A major advantage of Django Rest over other frameworks is that it enables the developer to define the structure of URL while not forcing the developer to use auto-generated URLs. It also provides support for testing the APIs by providing a built-in API browser. It also provides support for a wide range of permission policies, media types and authentications. As authentication includes reading the credentials from the request and identifying the user privileges according to those credentials, Django Rest provides many modules to perform such operations effectively. These modules include OAuth and OAuth2. In short, all these available modules for authentication, testing and effective deployment of web APIs make Django Rest the best possible framework for this project.

React.js provides many robust features for the development of user interface. A feature of React.js called “virtual DOM” enables fast development. This feature has memory reconciliation algorithms. These algorithms create web pages in React’s virtual memory. If the user modifies the web pages, the complete user interface is re-rendered by the virtual DOM. During this re-rendering process, only those features are changed that have been modified by the developer. The data flow in React is unidirectional. Any component cannot be edited directly by the developer. Changes in a component can only be made by using the callback function. In addition to this, the user interface developed by using React is quite engaging and interactive. All these features make React a suitable framework for the development of user interface for this project.

To conclude, this chapter explains other commonly used technologies in web development and compares them with the technology that we have used in our development. It also sheds light on the various reasons that led us to preferring the software we used over the other available software.

Chapter 3: Requirements and Design

This section contains a detailed explanation of the functional and non-functional requirements of our web application, along with the development methodology that we have followed throughout the development process. Moreover, it also illustrates the design and interface of our web application.

3.1 Functional Requirements

Listed below are all the functional requirements along with their descriptions and the authorized users:

3.1.1 Sign In

The system shall let the users (Admin, Faculty and Student) to sign in to their registered accounts through email and password.

3.1.2 Sign Out

The system shall let the users (Admin, Faculty and Student) sign out of their accounts and terminate their session.

3.1.3 Filtered Search

The system shall allow its users (Admin, Faculty, Public and Student) to search through the thesis list by applying different filters on thesis' attributes in order to obtain precise results.

3.1.4 View Thesis

The system shall allow the users (Admin, Faculty, Public and Student) to view details of a particular thesis. However, some of the details e.g., thesis' grade, comments and committee members' names will be hidden from the public, but visible to both Admin and Faculty.

3.1.5 Edit Thesis

The system shall let the users (Admin and Faculty) modify the selected thesis. This functionality shall give editing access for all thesis attributes to the admin but restricts faculty from editing thesis apart from the ones that they have supervised and, in those thesis, student's name and roll number cannot be modified.

3.1.6 Delete Thesis

The system shall allow the user (Admin) to delete the selected thesis from the list of the entire saved thesis.

3.1.7 Register Faculty Members

The system shall allow the user (Admin) to create an account for a faculty member by entering the faculty member's name and email. The system shall automatically generate a password for the account created.

3.1.8 View Faculty

The system shall let the user (Admin) look at the list of all the registered faculty members.

3.1.9 Update Faculty

The system shall let the user (Admin) to update a faculty member's information e.g., name or password.

3.1.10 Delete Faculty

The system shall let the user (Admin) to delete a faculty member from the list of all the registered faculty members hence, deletes that member's account.

3.1.11 Register Students

The system shall allow the user (Admin) to create an account for a student by entering the student's name, email, roll number and status. The system shall automatically generate a password for the account created.

3.1.12 View Students

The system shall let the user (Admin) look at the list of all the registered students.

3.1.13 Update Student

The system shall let the user (Admin) to update a student's information e.g., name, password and status.

3.1.14 Delete Student

The system shall let the user (Admin) to delete a student from the list of all the registered students hence, deletes that student's account.

3.1.15 View Supervised Thesis

The system shall allow the users (Faculty) to view a complete list of the thesis that they have supervised or they have been a part of committee evaluation.

3.1.16 View Evaluated Thesis

The system shall allow the users (Faculty) to view a complete list of the thesis for which they were a part of the evaluation committee.

3.1.17 Make a Comment

The system shall let the users (Faculty) to post a comment beneath the thesis that they have supervised or evaluated. The comment shall be posted in the comments stream along with the user's name and timestamp.

3.1.18 Edit Comment

The system shall let the users (Faculty) edit a comment that they have previously posted beneath the thesis that they have supervised or evaluated.

3.1.19 Delete Comment

The system shall let the users (Faculty) to delete their previously posted comment beneath the thesis that they have supervised or evaluated.

3.1.20 View Comment

The system shall let the users (Faculty, Admin, Public and Student) to view comments beneath a particular thesis.

3.1.21 Change Password

The system shall let the users (Faculty, Admin and Student) to change their password when they are logged in.

3.1.22 Forgot Password

The system shall let the users (Faculty, Admin and Student) to change their password if they have forgotten it.

3.1.23 Upload Thesis

The system shall let the users (Admin and Student) upload thesis details and/or thesis pdf.

3.1.24 Suggest Topics

The system shall let the users (Faculty) to give/suggest new topics or areas of research.

3.1.25 View Suggested Topics

The system shall let the users (Faculty, Admin, Public and Student) to view a list of suggested topics.

3.1.26 Delete Topic

The system shall let the users (Faculty) to delete their previously posted topic.

3.1.27 View Complete Thesis

The system shall allow the users (Admin, Faculty, Public and Student) to view pdf of a particular thesis.

3.1.28 View Trends

The system shall allow the users (Admin, Faculty, Public and Student) to view different graphs/trends.

3.1.28 View Upcoming Seminars

The system shall allow the users (Admin, Faculty, Public and Student) to view a list of upcoming seminars (obtained from web crawling).

3.2 Non-Functional Requirements

Listed below are the non-functional requirements of the system.

3.2.1 Performance

- System shall not take more than 2 seconds to load.
- System shall be capable of accommodating at least 100 users at a time without crashing.

3.2.2 Usability

- System shall have a consistent interface across all pages.
- System shall provide effective navigation.
- System shall display appropriate error messages for the user's ease.

3.2.3 Availability

- System shall be available 24/7 except when there is an impromptu system failure or an ongoing maintenance period.

3.2.4 Extensibility

- System shall be able to incorporate more features as modular coding scheme shall be used.

3.3 Hardware and Software Requirements

Following are the hardware and software requirements for the development of the system:

3.3.1 Hardware Requirements

- PC with 4GB or greater RAM
- 64-bit operating system

3.3.2 Software Requirements

- Python: 3.8.8
- Django: 3.2.7
- Django Rest framework: 3.12.4
- PostgreSQL database
- pgAdmin4: web-based GUI tool to interact with the database
- React: 17.0.2
- Node: JavaScript runtime environment (v 16.1.0)
- Visual Studio Code: to write/edit code
- Postman: to test backend

3.4 System Architecture

As illustrated below, our system follows MVT architecture where react acts as a template by showing data on the components.

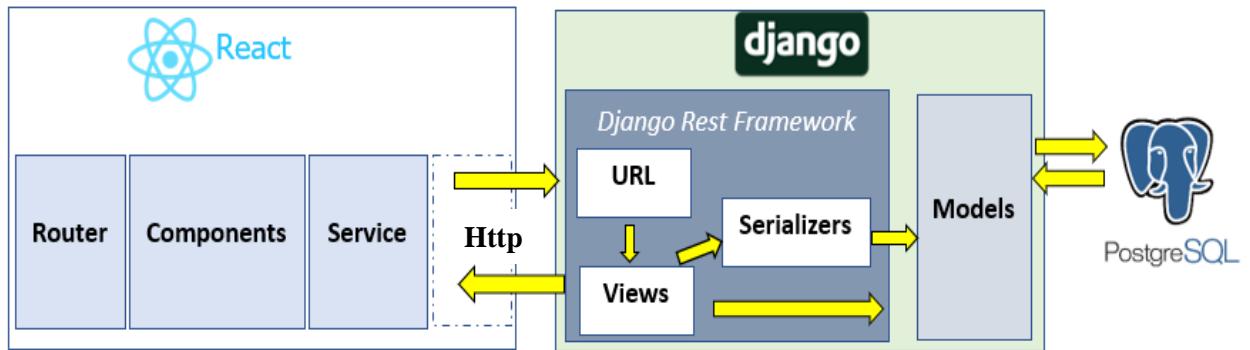


Figure 1: MVT System Architecture Diagram
This figure shows the MVT architecture of our system

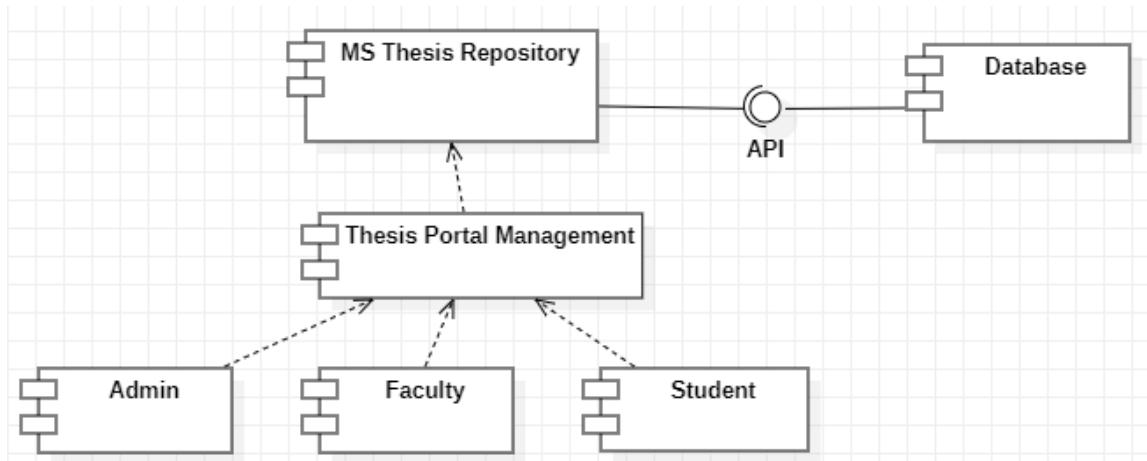


Figure 2: Component Diagram
This figure shows the component diagram of our MS Thesis Portal

3.4.1 Admin Component

Admin component handles all the operations related to management of faculty and student accounts as well as thesis management.

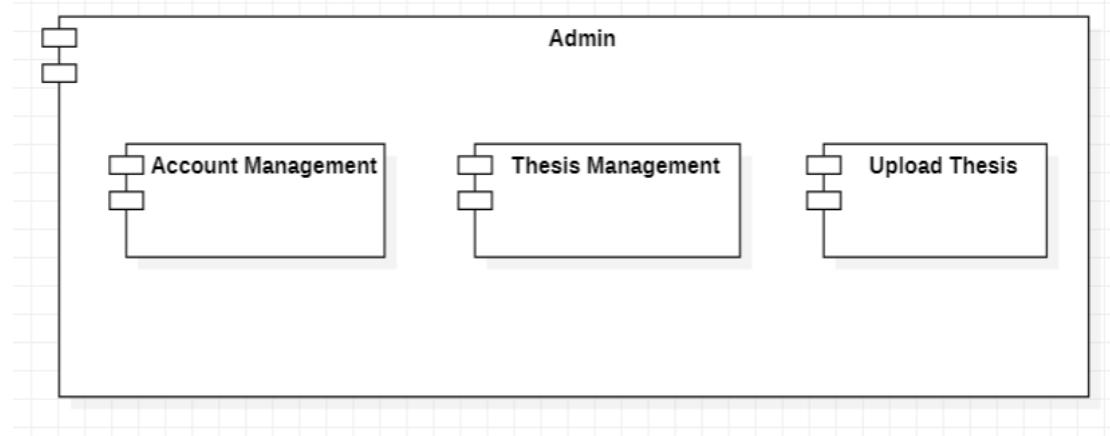


Figure 3: Admin Component

This figure shows the admin component of our system

3.4.2 Faculty Component

Faculty component handles all the functionalities that are available to a faculty member as an advisor and/or as a committee member.

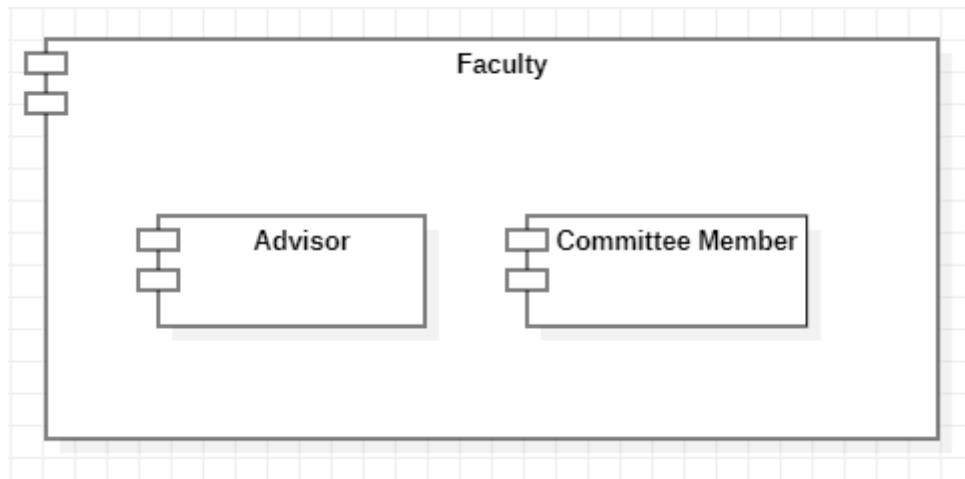


Figure 4: Faculty Component

This figure shows the faculty component of our system

3.4.3 Thesis Portal Management Component

Thesis Portal Management Component handles account operations e.g., Sign in, sign out etc. for users. Also, it will manage major functionalities of our system (searching and viewing thesis details).

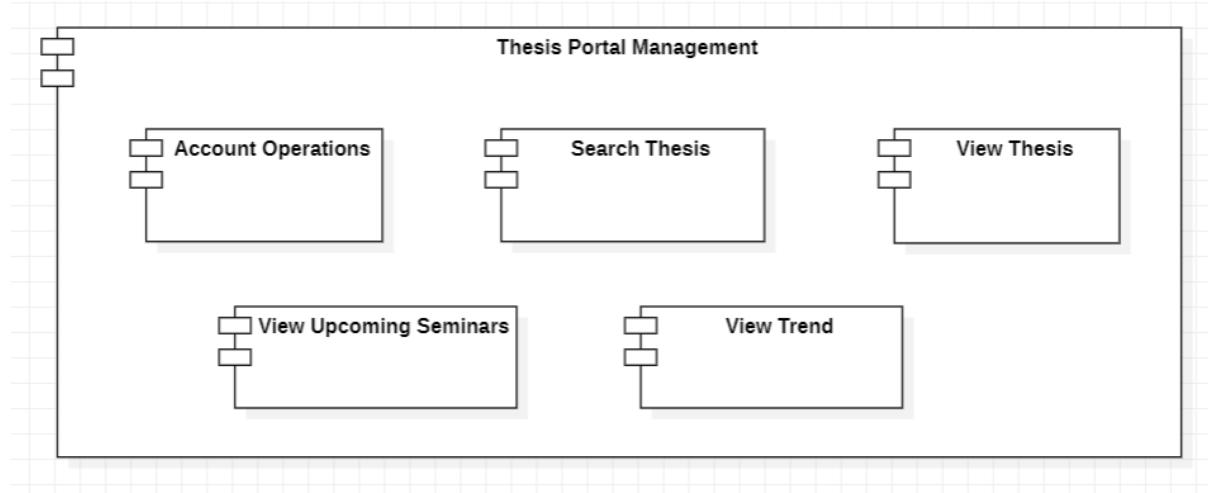


Figure 5: Thesis Portal Management Component
This figure shows the thesis management component of our system

3.4.5 Subsystem Architecture

Some of the previously components shown can be broken down further into their sub components.

3.4.5.1 Accounts Management sub-component

Account management sub-component manages create, delete, update and view account operations for all the users.

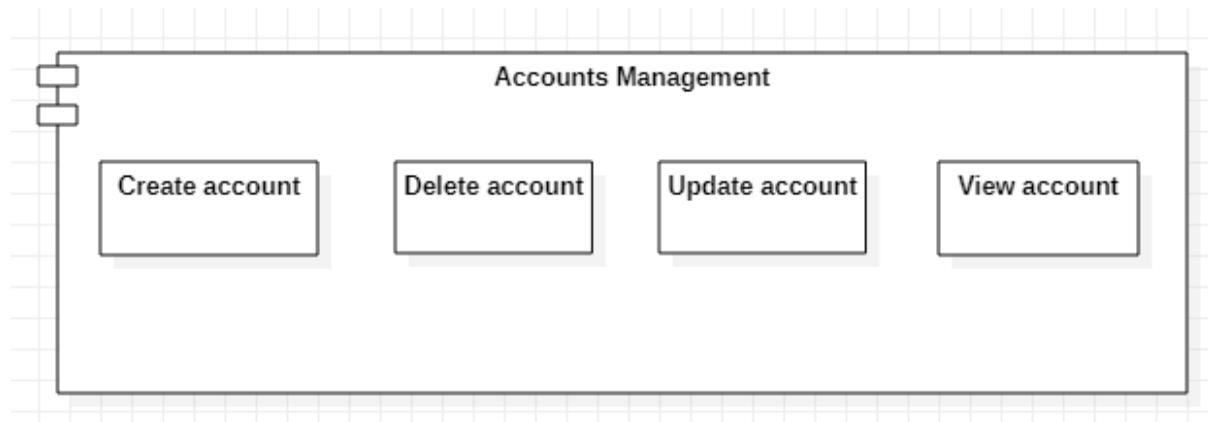


Figure 6: Account Management sub-component
This figure shows the sub-component of Admin component

3.4.5.2 Thesis Management sub-component

This sub-component handles editing features for theses.

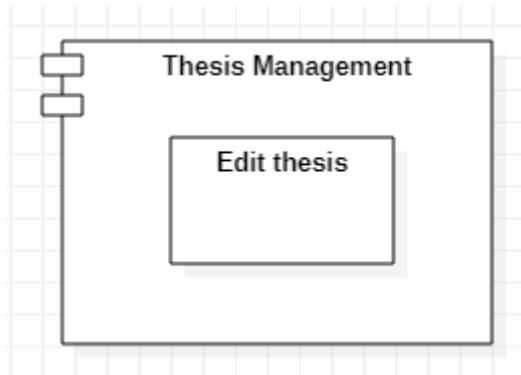


Figure 7: Thesis Management sub-component

This figure shows the sub-component of Admin component

3.4.5.3 Advisor sub-component

Advisor sub-component handles operations related to comments as well as edit thesis operation.

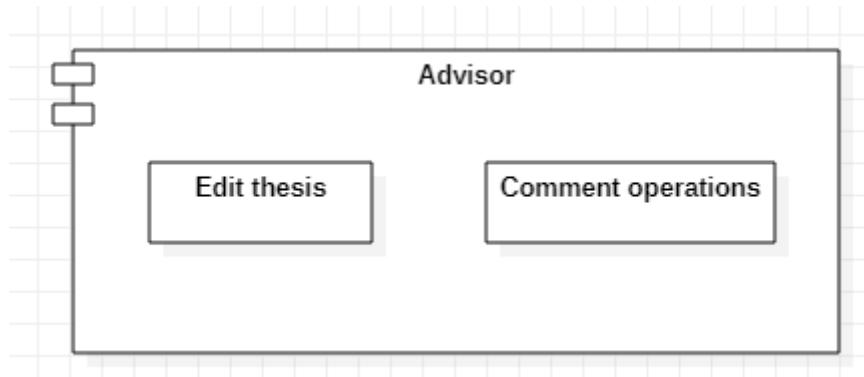


Figure 8: Advisor sub-component

This figure shows the sub-component of Faculty component

3.4.5.4 Committee Member sub-component

Committee member sub-component handles operations related to comments.

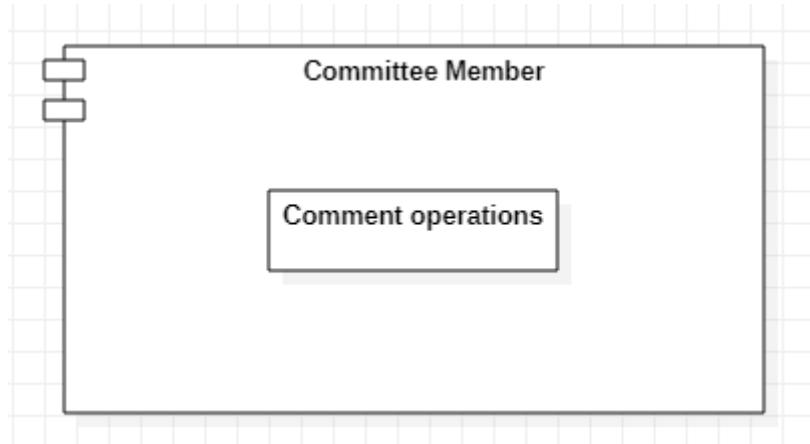


Figure 9: Committee Member sub-component
This figure shows the sub-component of Faculty component

3.4.5.5 Accounts Operations sub-component

Accounts operation sub-component manages basic operations related to users' accounts.

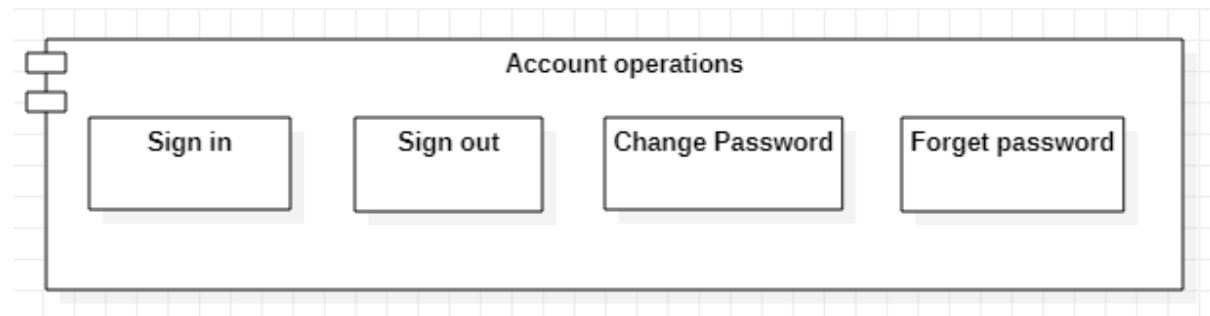


Figure 10: Accounts Operations sub-component
This figure shows the sub-component of Thesis Portal Management component

3.4.5.6 Upload Thesis sub-component

Upload Thesis sub-component handles operations related to upload full thesis document as well as specific details of thesis only.

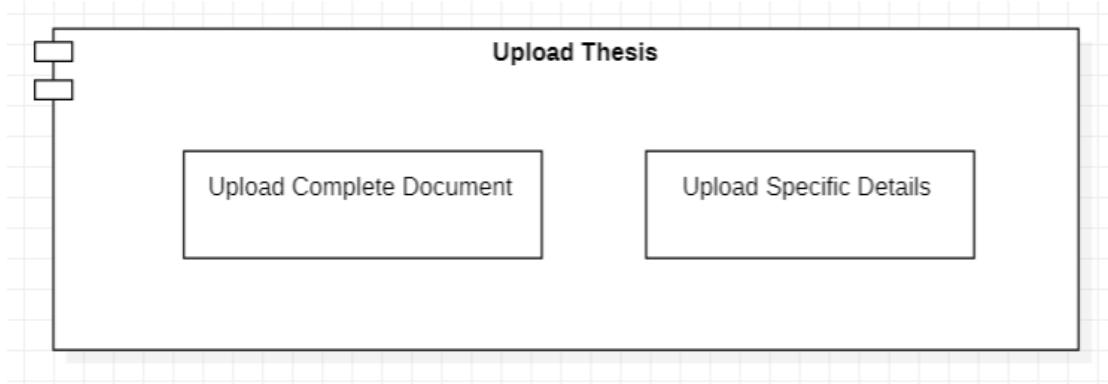


Figure 11: Upload Thesis sub-component
This figure shows the sub-component of Student component

3.5 Architectural Strategies

Listed below are the design strategies that were taken into consideration for our web application.

3.5.1 Use of a particular type of product

We are using Django Rest Framework since the website of FAST-NUCES has already been implemented using the mentioned framework and we need to integrate the portal we are designing to the website; therefore, we are using the same framework to implement the MS thesis portal.

3.5.2 Reuse of existing software components

For client-side application, built-in classes and functions of CSS and web3 will be used.

3.5.3 Future plans for extending or enhancing the software

We have following future plans regarding the enhancement of the website portal:

- We will be connecting this portal to other research websites to promote research.
- We will be improving the user interface of the website in the future to make it more appealing to the users.

3.5.4 User interface paradigms

As mentioned earlier, we will be integrating the portal to the website of the university. So, we are designing the user interface of the portal same as that of the university's website for the purpose of consistency.

3.5.5 Concurrency and synchronization

The website can be accessed by multiple users on their multiple devices at the same time.

3.6 Use Cases

This section includes a use case for each functionality, describing how a user will perform a particular task.

3.6.1 Sign In

Name	Sign In		
Actors	Admin, Faculty, Student		
Summary	The user shall provide their email and password on the sign in form and after successful verification, redirect the user to the home page.		
Pre-Conditions	The user must be in the database records. The user must not already be logged in.		
Post-Conditions	The user's session is successfully established and shall be redirected to the home page.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Login as Admin' or 'Login as Faculty' or 'Login as Student' button.	2	The sign in page is displayed asking for email and password.
3	The user enters a valid email and password.	4	The system verifies the email and password, establishes a session for the user and redirects the user to the home page.
Alternative Flow			
3	The user enters invalid email or password.	4-A	The system responds with an error message: <i>Incorrect email or password entered.</i>
3	The user clicks on the 'Sign in with google' button.	4-B	The system signs into the user's account using login credentials from already signed in google account.

3.6.2 Filtered Search for Public

Name	Filtered Search for Public		
Actors	Public		
Summary	This allows the user to search through the students' thesis and come to a set of precise results based on the different filters provided.		
Pre-Conditions	None.		
Post-Conditions	A list of theses is displayed based on the input values of filters.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user enters the student's name and/or roll number and/or title and/or selects value for one or more fields from the drop-down menus of advisor name, year, thesis type and/or selects domain(s).		
2	The user then clicks on the 'search' button.	3	The system displays a list of theses based on the values given in filters.
Alternative Flow			
2	The user enters incorrect value(s) for any of the input fields.	3-A	The system responds with a message: <i>No results found.</i>

3.6.3 View Thesis

Name	View Thesis		
Actors	Admin, Faculty		
Summary	This allows the user to view the selected thesis in detail.		
Pre-Conditions	The user must be logged in. The user must be on their Homepage.		
Post-Conditions	The thesis selected by the user is displayed.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the title of the thesis that they want to view.	2	The system displays thesis title, abstract, associated domains, year, type, grade, student's name, roll number, advisor's name, committee and comments.
No Alternative Flow			

3.6.4 View Thesis for Public

Name	View Thesis for Public		
Actors	Public, Student		
Summary	This allows the user to view the selected thesis in detail.		
Pre-Conditions	None.		
Post-Conditions	The thesis selected by the user is displayed.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the title of the thesis that they want to view.	2	The system displays the thesis title, abstract, associated domains, year, thesis type, student's name, roll number and advisor's name.
No Alternative Flow			

3.6.5 Filtered Search

Name	Filtered Search		
Actors	Admin, Faculty, Student		
Summary	This allows the user to search through the students' thesis and come to a set of precise results based on the different filters provided.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	A list of theses is displayed based on the input values of filters.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user enters the student's name and/or roll number and/or title and/or selects value for one or more fields from the drop-down menus of advisor name, year, thesis type and/or selects domain(s).		
2	The user then clicks on the 'search' button.	3	The system displays a list of theses based on the values given in filters.
Alternative Flow			
2	The user enters incorrect value(s) for any of the input fields.	3-A	The system responds with a message: <i>No results found.</i>

3.6.6 Edit Thesis for Faculty

Name	Edit Thesis for Faculty		
Actors	Faculty		
Summary	This allows the user to make changes to the thesis.		
Pre-Conditions	The user must be logged in. The system must be on the list of theses supervised by that user's page.		
Post-Conditions	The changes made are updated in the database and the user is redirected to the thesis list page.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Edit' button next to the thesis that they want to update.	2	The system displays thesis title and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type, domain, advisor name and committee members' names are editable through drop-down menus.
3	The user edits thesis title and/or selects value for one or more fields from the drop-down menus of advisor name, year, thesis type, domain(s), grade and/or committee members' names.		
4	The user then clicks on the 'Save changes' button.	5	The system updates the changes in the database and redirects the user to the thesis list page.
Alternative Flow			
4	The user presses the 'Cancel' button.	5-A	The system does not save the changes in the database, redirects the user to the thesis list page.

3.6.7 Sign Out

Name	Sign Out		
Actors	Admin, Faculty, Student		
Summary	The user clicks on the ‘Sign Out’ button and their session is ended.		
Pre-Conditions	The user must already be logged in.		
Post-Conditions	The user’s session is successfully terminated and shall be redirected to the main page.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the ‘Sign Out’ button.	2	The system signs the user out and redirects to the default main page.
No Alternative Flow			

3.6.8 View Supervised Thesis

Name	View Thesis		
Actors	Faculty		
Summary	This allows the user to view a list of all the thesis supervised by the user.		
Pre-Conditions	The user must be logged in. The user must be on their Homepage.		
Post-Conditions	A list of all the supervised thesis is displayed.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on ‘View Supervised Thesis’ button.	2	The system displays a list of all the thesis supervised by the particular user/faculty member.
No Alternative Flow			

3.6.9 Edit Thesis for Admin

Name	Edit Thesis for Admin		
Actors	Admin		
Summary	This allows the user to make changes to the thesis.		
Pre-Conditions	The user must be logged in. The system must be on the list of thesis' page.		
Post-Conditions	The changes made are updated in the database and the user is redirected to the thesis list page.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Edit' button next to the thesis that they want to update.	2	The system displays thesis title, student's name, roll number and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type, domain, advisor name and committee members' names are editable through drop-down menus.
3	The user edits thesis title and/or student's name and/or roll number and/or selects value for one or more fields from the drop-down menus of advisor name, year, thesis type, domain(s), grade and/or committee members' names.		
4	The user then clicks on the 'Save changes' button.	5	The system updates the changes in the database and redirects the user to the thesis list page.
Alternative Flow			
4	The user enters the incorrect format for the student's roll number and clicks the 'Save changes' button.	5-A	The system responds with a message: ' <i>Incorrect roll number format</i> '.
4	The user presses the 'Cancel' button.	5-B	The system doesn't save the changes in the database, redirects the user to the thesis list page.

3.6.10 Register Faculty Members

Name	Register Faculty Members
Actors	Admin
Summary	This allows the user to create accounts of the faculty members.
Pre-Conditions	The user must be logged in.
Post-Conditions	The faculty member's information is stored in the database and the user is redirected to the 'Register Faculty Member' page.
Special Requirements	None

Basic Flow

Actor Action		System Response	
1	The user clicks on the 'Register Faculty Member' button.	2	The registration page is displayed asking for the faculty member's name and email.
3	The user enters a name and valid email and clicks on the 'Register' button.	4	The system verifies if the email is in correct format and doesn't already exist in the database of registered members.
		5	The system then generates a password and saves the information in the database.
		6	It responds with an ' <i>Account successfully created</i> ' message and redirects to the registration page.

Alternative Flow

3	The user enters invalid email.	4-A	The system responds with an error message: <i>Incorrect email</i> . Redirects the user to the registration page.
3	The user enters an already registered email.	4-B	The system responds with an error message: <i>User already registered</i> . Redirects the user to the registration page.
3	The user clicks on the 'Cancel' button.	4-C	The system redirects the user to the list of all members.

3.6.11 Register Students

Name	Register Students		
Actors	Admin		
Summary	This allows the user to create accounts of the students who want to register for the thesis.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The student's information is stored in the database and the user is redirected to the 'Register Student' page.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Register Student' button.	2	The registration page is displayed asking for the student's name, roll number and email.
3	The user enters name, roll number, email, selects the student's status from drop-down and clicks on the 'Register' button.	4	The system verifies if the roll number and email are in correct format the email doesn't already exist in the database of registered students.
		5	The system then generates a password and saves the information in the database.
		6	It responds with an ' <i>Account successfully created</i> ' message and redirects to the registration page.
Alternative Flow			
3	The user enters invalid email.	4-A	The system responds with an error message: <i>Incorrect email</i> . Redirects the user to the registration page.
3	The user enters an incorrect roll number.	4-B	The system responds with an error message: <i>Incorrect roll number format</i> . Redirects the user to the registration page.
3	The user enters an already registered email.	4-C	The system responds with an error message: <i>User already registered</i> . Redirects the user to the registration page.
3	The user clicks on the 'Cancel' button.	4-D	The system redirects the user to the list of all students.

3.6.12 View Registered Faculty

Name	View Registered Faculty		
Actors	Admin		
Summary	This allows the user to view the complete list of registered faculty members whose details are saved in the database.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The complete list of registered faculty members is displayed.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Registered Faculty' button.	2	The system displays the list of all registered faculty members.
No Alternative Flow			

3.6.13 View Evaluated Thesis

Name	View Evaluated Thesis		
Actors	Faculty		
Summary	This allows the user to view a list of all the thesis evaluated by the user.		
Pre-Conditions	The user must be logged in. The user must be on their Homepage.		
Post-Conditions	A list of all the evaluated thesis is displayed.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Evaluated Thesis' button.	2	The system displays a list of all the thesis evaluated by the particular user.
No Alternative Flow			

3.6.14 Delete Thesis

Name	Delete Thesis		
Actors	Admin		
Summary	This allows the user to remove a thesis from the thesis database.		
Pre-Conditions	The user must be logged in. The system must be on the list of thesis' page.		
Post-Conditions	The thesis is deleted from the database and the user is redirected to the page containing the list of all thesis.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Delete' button beside the specific thesis.	2	The system displays an alert message: <i>Do you want to delete?</i>
3	The user clicks on the 'Yes' button.	4	The system deletes the thesis from the database, displays the ' <i>Thesis successfully deleted!</i> ' message and redirects to the list of all thesis.
Alternative Flow			
3	The user clicks on 'Cancel' button.	4-A	The system redirects the user to the list of all thesis.

3.6.15 View Registered Students

Name	View Registered Students		
Actors	Admin		
Summary	This allows the user to view the complete list of registered faculty members whose details are saved in the database.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The complete list of registered students is displayed.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Registered Students' button.	2	The system displays the list of all registered students.
No Alternative Flow			

3.6.16 Update Student

Name	Update Student		
Actors	Admin		
Summary	This allows the user to update a student's name, status and/or password.		
Pre-Conditions	The user must be logged in. The system must be on the list of students' page.		
Post-Conditions	The student's information is updated in the database and the user is redirected to the page containing the list of all students.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Update' button beside the specific student's details.	2	The system displays all the name, status and password related to that student.
3	The user selects the attributes that they want to update.	4	The system prompts for new inputs for the selected fields.
5	The user enters an updated name and/or new password and/or selects an option from the status drop-down and clicks on the 'Update' button.	6	The system updates the attributes in the database, displays the ' <i>Updated successfully!</i> ' message and redirects to the list of all students.
Alternative Flow			
3	The user enters a password that contains either only numbers or only alphabets.	4-A	The system responds with an error message: <i>weak password</i> .
3	The user enters a password with length less than 6.	4-B	The system responds with an error message: <i>password length should be at least 6</i> .
3	The user clicks on the 'Cancel' button.	4-C	The system redirects the user to the list of all students.

3.6.17 Update Faculty

Name	Update Faculty		
Actors	Admin		
Summary	This allows the user to update a faculty member's name and/or password.		
Pre-Conditions	The user must be logged in. The system must be on the list of faculty members' page.		
Post-Conditions	The faculty member's information is updated in the database and the user is redirected to the page containing the list of all members.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Update' button beside the specific member's details.	2	The system displays the name and password related to that member.
3	The user selects the attributes that they want to update.	4	The system prompts for new inputs for the selected fields.
5	The user enters an updated name and/or new password and clicks on the 'Update' button.	6	The system updates the attributes in the database, displays the ' <i>Updated successfully!</i> ' message and redirects to the list of all members.
Alternative Flow			
3	The user enters a password that contains either only numbers or only alphabets.	4-A	The system responds with an error message: <i>weak password</i> .
3	The user enters a password with length less than 6.	4-B	The system responds with an error message: <i>password length should be at least 6</i> .
3	The user clicks on the 'Cancel' button.	4-C	The system redirects the user to the list of all members.

3.6.18 Delete Faculty

Name	Delete Student		
Actors	Admin		
Summary	This allows the user to remove a faculty member from the faculty member's database.		
Pre-Conditions	The user must be logged in. The system must be on the list of faculty members' page.		
Post-Conditions	The member information is deleted from the database and the user is redirected to the page containing the list of all members.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Delete' button beside the specific member's details.	2	The system displays an alert message: <i>Do you want to delete?</i>
3	The user clicks on the 'Yes' button.	4	The system deletes the student from the database, displays the ' <i>Faculty member successfully deleted!</i> ' message and redirects to the list of all members.
Alternative Flow			
3	The user clicks on the 'Cancel' button.	4-A	The system redirects the user to the list of all members.

3.6.19 View Comments

Name	View Comments		
Actors	Admin, Faculty, Student, Public		
Summary	This allows the user to view all the comments on a thesis.		
Pre-Conditions	The system must be displaying a particular thesis.		
Post-Conditions	All the comments are displayed in a window.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Comments' button.	2	The system displays a window containing all the comments on a thesis along with the commenter's name and timestamp.
No Alternative Flow			

3.6.20 Delete Student

Name	Delete Student		
Actors	Admin		
Summary	This allows the user to remove a student from the student's database.		
Pre-Conditions	The user must be logged in. The system must be on the list of students' page.		
Post-Conditions	The student's information is deleted from the database and the user is redirected to the page containing the list of all students.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Delete' button beside the specific student's details.	2	The system displays an alert message: <i>Do you want to delete?</i>
3	The user clicks on the 'Yes' button.	4	The system deletes the student from the database, displays the ' <i>Student successfully deleted!</i> ' message and redirects to the list of all students.
Alternative Flow			
3	The user clicks on the 'Cancel' button.	4-A	System redirects to the list of students.

3.6.21 Make a Comment

Name	Make a Comment		
Actors	Faculty		
Summary	This allows the user to make a comment on the thesis supervised/evaluated by the user.		
Pre-Conditions	The user must be logged in. The system must be displaying a particular thesis.		
Post-Conditions	The comment is posted beneath the thesis and saved in the database.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the text box beneath the stream of comments, types their comment and clicks on the 'Post' button.	2	The system posts/displays the comment at the end of the comment stream along with the user's name and timestamp. It saves the comment in the database and redirects the user to the current page, which also includes the newly posted comment.
Alternative Flow			

1	The user presses ‘Post’ button without typing anything in the comment box.	2-A	The system redirects the user to the current page, which includes the previous comments only.
---	--	-----	---

3.6.22 Edit Comment

Name	Edit Comment
Actors	Faculty
Summary	This allows the user to edit a comment that they posted.
Pre-Conditions	The user must be logged in. The system must be displaying a particular thesis.
Post-Conditions	The edited comment is replaced by the old one and saved in the database.
Special Requirements	None

Basic Flow

Actor Action		System Response	
1	The user clicks on the ‘Edit’ button underneath the comment they made previously.	2	The system posts/displays the comment in a text box so that the user can edit.
3	The user types in a new comment and clicks on the ‘Post’ button.	4	The system saves the comment along with its new timestamp in the database and redirects the user to the current page, which also includes the newly posted comment in its previous place.

Alternative Flow

3	The user presses the ‘Post’ button without typing anything in the comment box.	4-A	The system redirects the user to the current page, which includes the previous comments only.
---	--	-----	---

3.6.23 Delete Comment

Name	Delete Comment		
Actors	Faculty		
Summary	This allows the user to delete a comment that they posted.		
Pre-Conditions	The user must be logged in. The system must be displaying a particular thesis.		
Post-Conditions	The comment is deleted from the comments stream and from the database.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'x' button on the top-right corner of the comment that they posted earlier.	2	The system responds with an alert message: 'Do you want to delete this comment?'
3	The user selects the 'Yes' option.	4	The system deletes the comment from the database and redirects the user to the current page, which does not include the deleted comment.
Alternative Flow			
3	The user presses the 'Cancel' button.	4-A	The system redirects the user to the current page with an old comment stream.

3.6.24 Change Password

Name	Change Password		
Actors	Admin, Faculty, Student		
Summary	This allows the user to change the password of their account.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The password is updated and saved in the database.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the ‘Change Password’ button.	2	The system displays the old password, new password and new password confirmation fields.
3	The user enters the old password, new password and new password confirmation and presses ‘Save’ button.	4	The system verifies the old password, replaces it with the new password and redirects the user to their homepage.
Alternative Flow			
3	The user enters an incorrect old password.	4-A	The system displays the ‘ <i>Incorrect old password</i> ’ message.
3	The user enters a password that contains either only numbers or only alphabets.	4-B	The system responds with an error message: ‘ <i>weak password</i> ’.
3	The user clicks on the ‘Cancel’ button.	4-C	The system redirects to the user’s homepage.

3.6.25 Forgot Password

Name	Forgot Password		
Actors	Admin, Faculty, Student		
Summary	This allows the user to reset the password of their account.		
Pre-Conditions	The user must have an account.		
Post-Conditions	The newly generated password is saved in the database.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Reset Password' link.	2	The system displays the email address field.
3	The user enters the valid email address and clicks on the 'Get' button.	4	The system verifies the email address, sends an OTP on the email address, saves the OTP in the database and redirect to the login page.
Alternative Flow			
3	The user enters an invalid email.	4-A	The system displays the ' <i>Incorrect email address</i> ' message.
3	The user presses the 'Cancel' button.	4-B	The system redirects to the login page.

3.6.26 Suggest Topics

Name	Suggest Topics		
Actors	Faculty		
Summary	This allows the user to suggest new topics that students can work on.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The newly suggested topic is entered in the database.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the text box beneath the stream of suggested topics, types a topic and clicks on the 'Post' button.	2	The system posts/displays the newly added topic at the end of the topics stream along with the user's name. It saves the topic in the database and redirects the user to the current page, which also includes the newly posted topic.
Alternative Flow			
1	The user presses 'Post' button without typing anything in the text box.	2-A	The system redirects the user to the current page, which includes the previous topics only.

3.6.27 View Suggested Topics

Name	View Suggested Topics		
Actors	Admin, Faculty, Public, Student		
Summary	This allows the user to view all the topics suggested by faculty.		
Pre-Conditions	None.		
Post-Conditions	All the topics are displayed in a window.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Suggested Topics' button.	2	The system displays a window containing all the topics along with the commenter's name.
No Alternative Flow			

3.6.28 Delete Topic

Name	Delete topic		
Actors	Faculty		
Summary	This allows the user to delete a topic that they posted.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The topic is deleted from the topics stream and from the database.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'x' button on the top-right corner of the topic that they posted earlier.	2	The system responds with an alert message: 'Do you want to delete this topic?'
3	The user selects the 'Yes' option.	4	The system deletes the topic from the database and redirects the user to the current page, which does not include the deleted topic.
Alternative Flow			
3	The user presses the 'Cancel' button.	4-A	The system redirects the user to the current page with an old topics' stream.

3.6.29 View Complete Thesis

Name	View Complete Thesis		
Actors	Public, Faculty, Admin, Student		
Summary	This allows the user to view the pdf of thesis		
Pre-Conditions	The system must be displaying basic details of a thesis.		
Post-Conditions	The pdf of the thesis is displayed.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Complete Thesis' button.	2	The system displays the pdf of the thesis.
No Alternative Flow			

3.6.30 Upload Thesis

Name	Upload Thesis		
Actors	Admin, Student		
Summary	This allows the user to upload thesis and/or thesis details.		
Pre-Conditions	The user must be logged in.		
Post-Conditions	The thesis is saved in the database and the user is redirected to the Upload Thesis page.		
Special Requirements	None.		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Upload Thesis' button.	2	The system displays thesis title, abstract and future work in the form of text boxes. Grade, thesis year, type, domain, advisor name and committee members' names are displayed through drop-down menus. Upload pdf button is also displayed.
3	The user enters thesis title, abstract and future work and selects value(s) from drop-down menus of advisor name, year, thesis type, domain(s), grade and committee members' names and/or uploads a pdf of thesis.	5	The system saves the thesis details in the database and redirects the user to the Upload Thesis page.
Alternative Flow			
4	The user presses the 'Cancel' button.	5-A	The system redirects the user to the homepage .

3.6.31 View Trends

Name	View Trends		
Actors	Admin, Faculty, Public, Student		
Summary	This gives a visual representation of different trends.		
Pre-Conditions	None.		
Post-Conditions	Displayed different graphs of trends.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'View Trends' button.	2	The system displays different graphs depicting the trends in the data.
No Alternative Flow			

3.6.32 View Upcoming Seminars

Name	View Upcoming Seminars		
Actors	Admin, Faculty, Public, Student		
Summary	Names and dates of upcoming research seminars are shown as hyperlinks.		
Pre-Conditions	None.		
Post-Conditions	List of upcoming research seminars is shown as hyperlinks.		
Special Requirements	None		
Basic Flow			
Actor Action		System Response	
1	The user clicks on the 'Show All' button.	2	The system displays a list of upcoming research seminars as hyperlinks.
Alternative Flow			
1	The user clicks on a hyperlink.	2-A	The system directs the user to the website corresponding to the hyperlink.

3.7 GUI

3.7.1 Public Interfaces

3.7.1.1 Public Interface

The screenshot shows the main public interface of the MS Thesis Repository. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, social media (Facebook, Instagram, LinkedIn), Homepage, and location (Block-B, Faisal Town, Lahore). Below the navigation bar is the FAST School of Computing logo and links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS.

The main content area features a dark header "MS Thesis Repository" with a breadcrumb "FSC > Graduate Thesis > MS Thesis Repository". On the right is a "log in" button. Below the header is a search bar with fields for Roll Number, Student Name, Advisor, Year, Thesis Type, Title, and a search icon.

Below the search bar are several filter buttons: ML, Security, Network, Deep Learning, and AI. There are also arrows for navigating through the results.

Two tabs are visible: "Research Trends" (selected) and "Suggested Topics".

The main content area displays a list of thesis results. Each result card includes the title, year, author, advisor, and domain(s). The results are categorized by date:

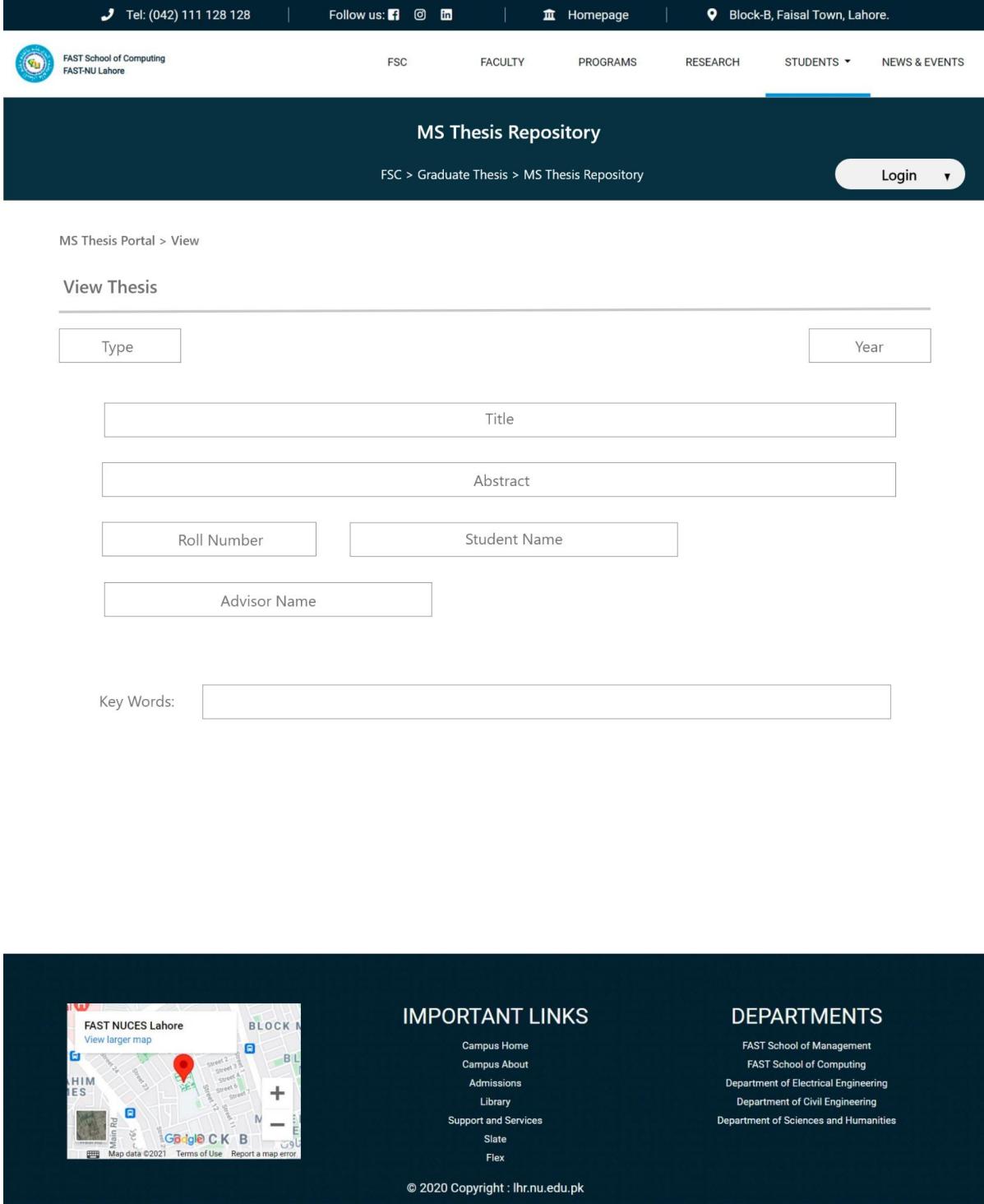
- Conferences**
 - 9 – 12 May 2022**
38th IEEE International Conference on Data Engineering (ICDE 2022)
 - 21 – 29 May 2022**
44th International Conference on Software Engineering (ICSE 2022)
 - 22 – 26 May 2022**
43rd IEEE Symposium on Security and Privacy (SP 2022)
 - 30 May – 3 June 2022**
International Parallel and Distributed Processing
- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing** (2019)
Roll Number: 17L-1234 Author: Hassan Ali
Advisor: Dr. Farzana Ali
Thesis Type: 1 Domain(s): Image Processing
- The Qualification Problem In AI Systems** (2019)
Roll Number: 18L-1234 Author: Minal Amir
Advisor: Dr. Azhar Tariq
Thesis Type: 1 Domain(s): Artificial Intelligence
- Deep Residual Learning For Image Recognition** (2018)
Roll Number: 18L-2222 Author: Iman Hafeez
Advisor: Dr. Asim Ali
Thesis Type: 1 Domain(s): Deep Learning, Image Processing

At the bottom left is a map of FAST NUces Lahore. The bottom right contains sections for "IMPORTANT LINKS" (Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex) and "DEPARTMENTS" (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities).

Copyright information at the bottom: © 2020 Copyright : lhr.nu.edu.pk

Figure 12: Main Public Interface
This figure shows the main interface of the portal visible to the public (UC-3.6.2)

3.7.1.2 View Thesis



The screenshot shows the 'MS Thesis Repository' section of a website. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, social media icons (Facebook, Instagram, LinkedIn), Homepage, Block-B, Faisal Town, Lahore, and menu items for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. Below the navigation bar, the title 'MS Thesis Repository' is displayed, along with a breadcrumb trail: FSC > Graduate Thesis > MS Thesis Repository. A 'Login' button is also present.

The main content area is titled 'View Thesis'. It contains several input fields for searching: 'Type' (with a dropdown arrow), 'Year' (with a dropdown arrow), 'Title' (input field), 'Abstract' (input field), 'Roll Number' (input field), 'Student Name' (input field), 'Advisor Name' (input field), and 'Key Words:' (input field). On the left side, there is a map of the FAST NUCES Lahore campus with a red marker indicating a location. On the right side, there are sections for 'IMPORTANT LINKS' (Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex) and 'DEPARTMENTS' (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities). The footer includes a copyright notice: © 2020 Copyright : Ihr.nu.edu.pk

Figure 13: View Thesis
This figure shows the main interface showing thesis in detail to public (UC-3.6.4)

3.7.1.3 Research Trends

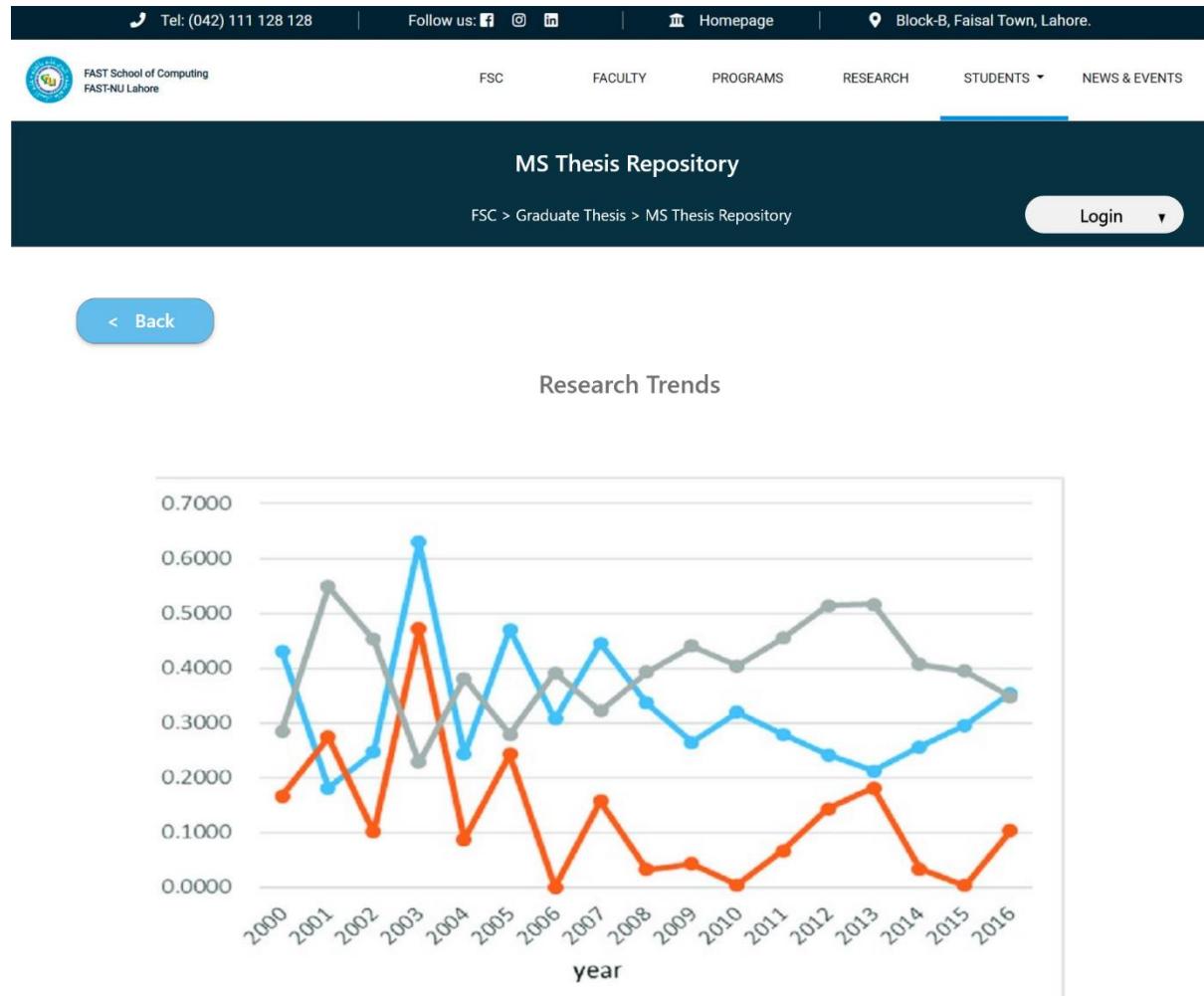


Figure 14: Research Trends
*This functionality shows the research trends of the university
(UC-3.6.31)*

3.7.1.4 Suggested Topics

The screenshot shows the 'MS Thesis Repository' section of the FAST School of Computing website. At the top, there are links for Tel: (042) 111 128 128, social media (Facebook, Instagram, LinkedIn), Homepage, and location (Block-B, Faisal Town, Lahore). Below this is a navigation bar with links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS (with a dropdown arrow), and NEWS & EVENTS. A 'Login' button is also present.

The main content area is titled 'MS Thesis Repository' and shows a breadcrumb path: FSC > Graduate Thesis > MS Thesis Repository. There are five suggested topics listed in boxes:

- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing** (Advisor of the topic)
- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing** (Advisor of the topic)
- The Qualification Problem In AI Systems** (Advisor of the topic)
- The Qualification Problem In AI Systems** (Advisor of the topic)
- The Qualification Problem In AI Systems** (Advisor of the topic)

Each topic box contains a link to 'Description of the topic'. At the bottom of the page, there is a map of the FAST NUCES Lahore campus, a sidebar with 'IMPORTANT LINKS' (Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex), and a sidebar with 'DEPARTMENTS' (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities). The copyright notice at the bottom is © 2020 Copyright : lhr.nu.edu.pk

Figure 15: Suggested Topics
Public can view topics suggested by the faculty members (UC-3.6.27)

3.7.1.5 Forgot Password

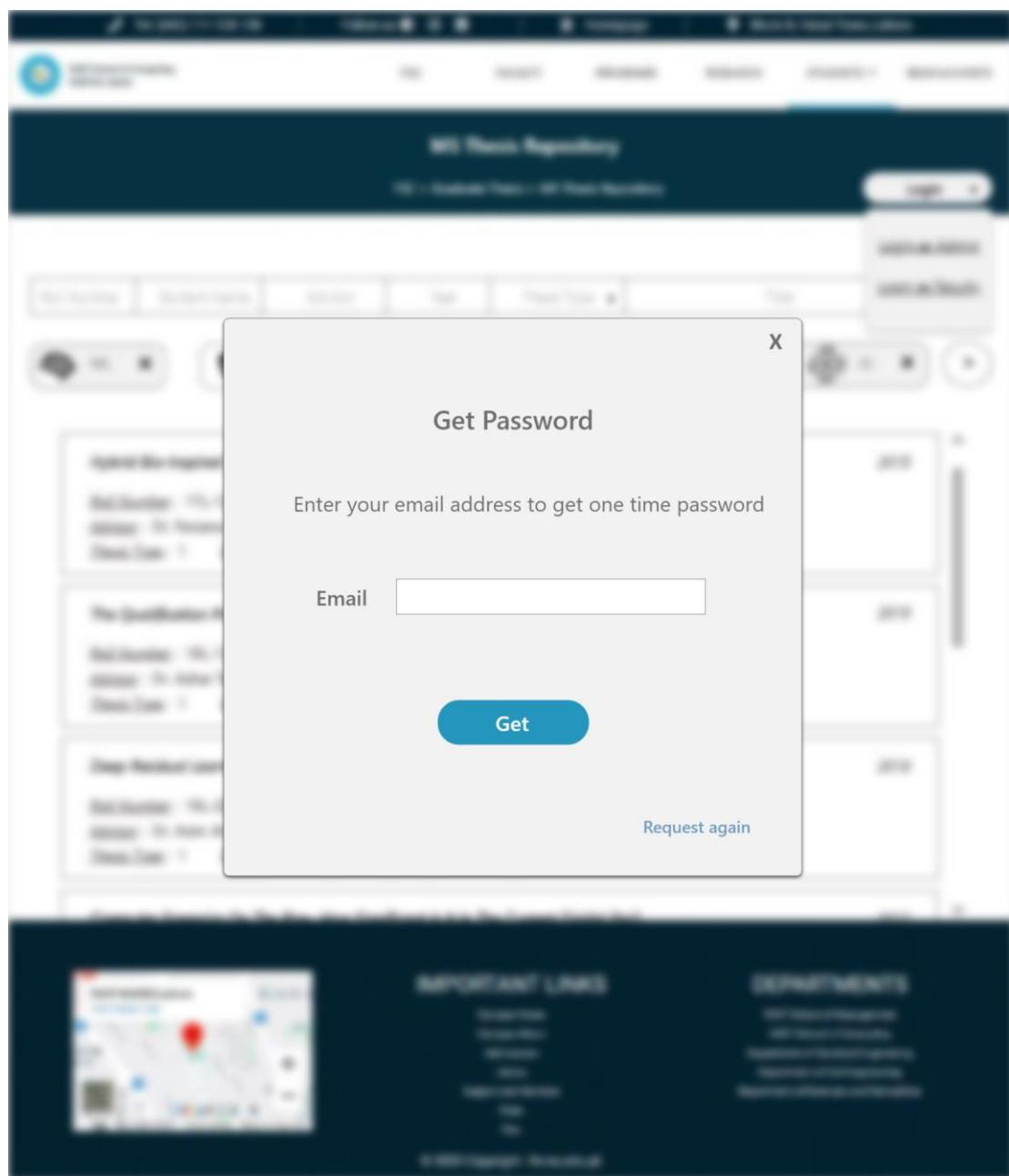


Figure 16: Forgot Password

This figure shows the forget password interface (UC-3.6.25)

3.7.2 Admin Interfaces

3.7.2.1 Admin Login Interface

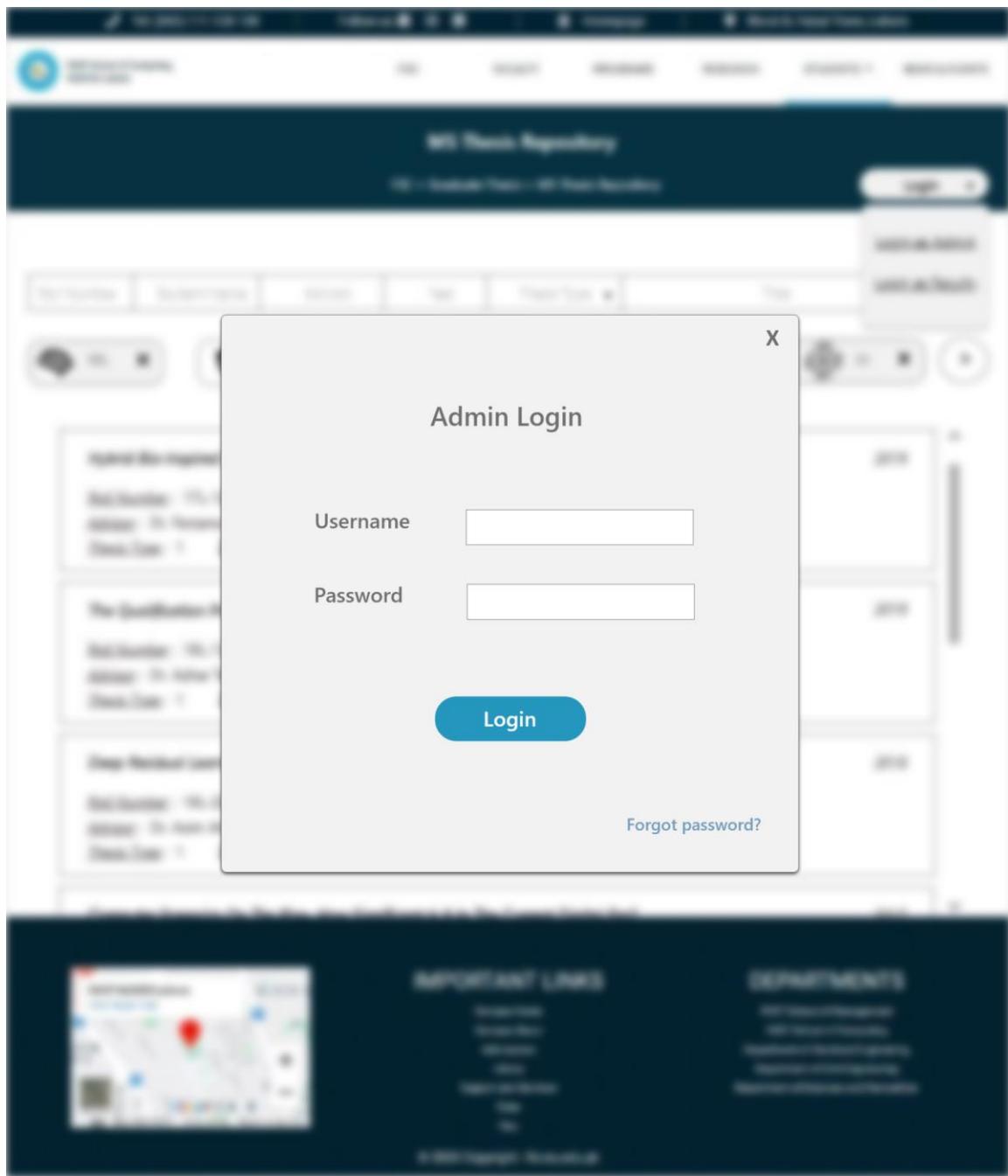


Figure 17:Admin Login Page
*This figure shows login interface for the admin of the portal
(UC-3.6.1)*

3.7.2.2 Admin Home

MS Thesis Repository

FSC > Graduate Thesis > MS Thesis Repository

Hi, Amna

[Change Password](#)

[Log Out](#)

Home Register Faculty Register Students View Faculty View Students

Roll Number Student Name Advisor Year Thesis Type Title

ML Security Network Deep Learning AI

Research Trends Suggested Topics

Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing 2019

Roll Number: 17L-1234 Author: Hassan Ali
Advisor: Dr. Farzana Ali
Thesis Type: 1 Domain(s): Image Processing

[Edit](#) [Delete](#)

The Qualification Problem In AI Systems 2019

Roll Number: 18L-1234 Author: Minal Amir
Advisor: Dr. Azhar Tariq
Thesis Type: 1 Domain(s): Artificial Intelligence

[Edit](#) [Delete](#)

Deep Residual Learning For Image Recognition 2018

Roll Number: 18L-2222 Author: Iman Hafeez
Advisor: Dr. Asim Ali
Thesis Type: 1 Domain(s): Deep Learning, Image Processing

[Edit](#) [Delete](#)

IMPORTANT LINKS

- Campus Home
- Campus About
- Admissions
- Library
- Support and Services
- Slate
- Flex

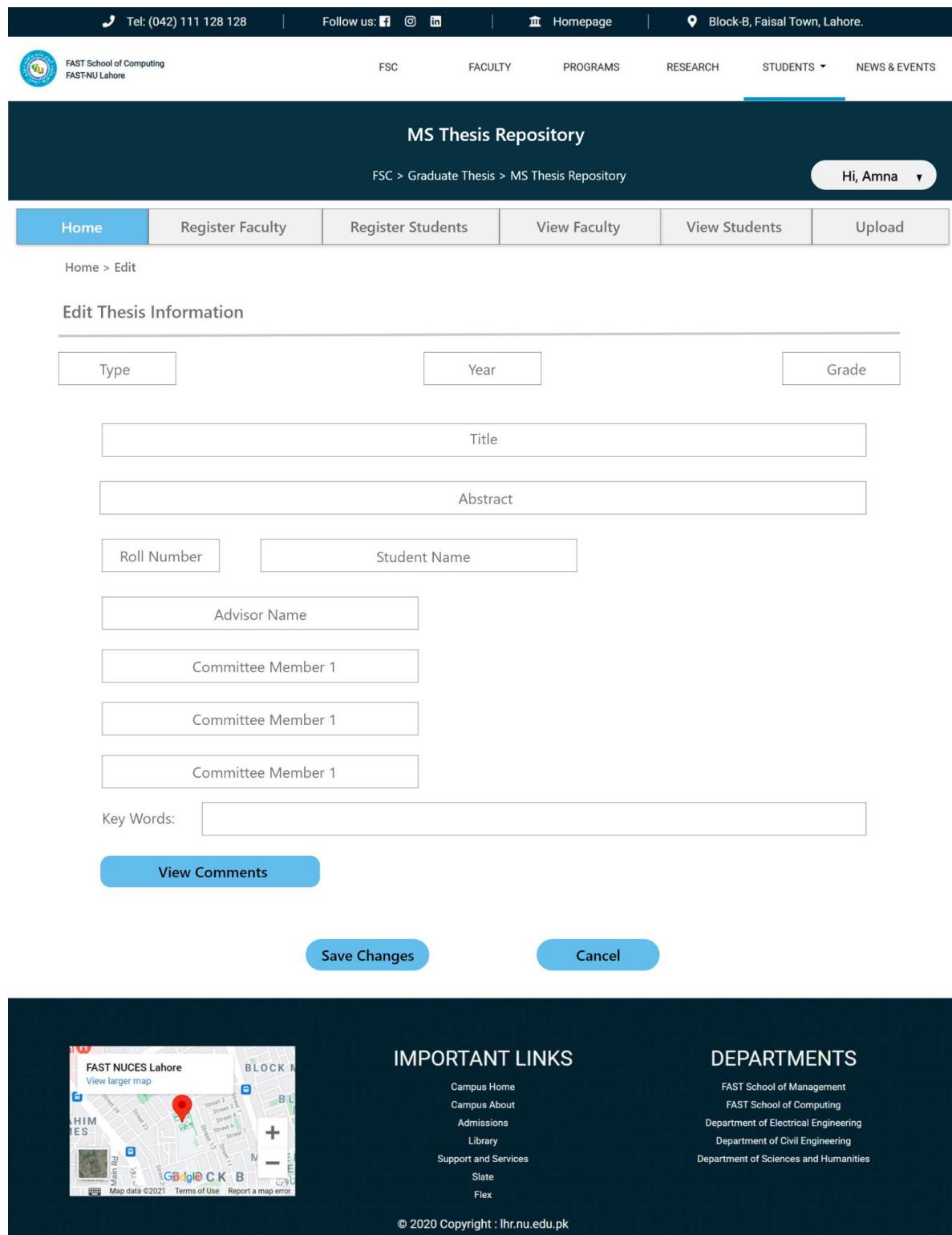
DEPARTMENTS

- FAST School of Management
- FAST School of Computing
- Department of Electrical Engineering
- Department of Civil Engineering
- Department of Sciences and Humanities

© 2020 Copyright : Ihr.nu.edu.pk

Figure 18: Admin Home Page
This is the home page of admin, which is visible after successful login (UC-3.6.1)

3.7.2.3 Thesis Edit



The screenshot shows the 'MS Thesis Repository' interface. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, Follow us: (Facebook, Instagram, LinkedIn), Homepage, and Block-B, Faisal Town, Lahore. Below the navigation bar, the FAST School of Computing logo and name are displayed, along with links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS (dropdown), and NEWS & EVENTS. A user profile 'Hi, Amna' is shown on the right.

The main title 'MS Thesis Repository' is centered above the breadcrumb 'FSC > Graduate Thesis > MS Thesis Repository'. Below the breadcrumb, there is a navigation menu with links for Home, Register Faculty, Register Students, View Faculty, View Students, and Upload. The 'Home' link is highlighted with a blue background.

The page content starts with 'Edit Thesis Information'. There are several input fields: 'Type' (dropdown), 'Year' (dropdown), 'Grade' (dropdown), 'Title' (text area), 'Abstract' (text area), 'Roll Number' (text area), 'Student Name' (text area), 'Advisor Name' (text area), 'Committee Member 1' (text area), 'Committee Member 1' (text area), 'Committee Member 1' (text area), and 'Key Words:' (text area). Below these fields are two buttons: 'View Comments' (blue button) and 'Save Changes' (blue button). To the right of the 'Save Changes' button is a 'Cancel' button.

At the bottom of the page, there is a map of the FAST NUCES Lahore campus with a red dot indicating the location. To the right of the map are sections for 'IMPORTANT LINKS' and 'DEPARTMENTS'. The 'IMPORTANT LINKS' section includes Campus Home, Campus About, Admissions, Library, Support and Services, Slat, and Flex. The 'DEPARTMENTS' section lists the FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, and Department of Sciences and Humanities. Copyright information at the bottom states '© 2020 Copyright : lhr.nu.edu.pk'.

Figure 19: Thesis Edit
*This figure shows interface for thesis modification by admin
(UC-3.6.9)*

3.7.2.4 Thesis Edit Successful

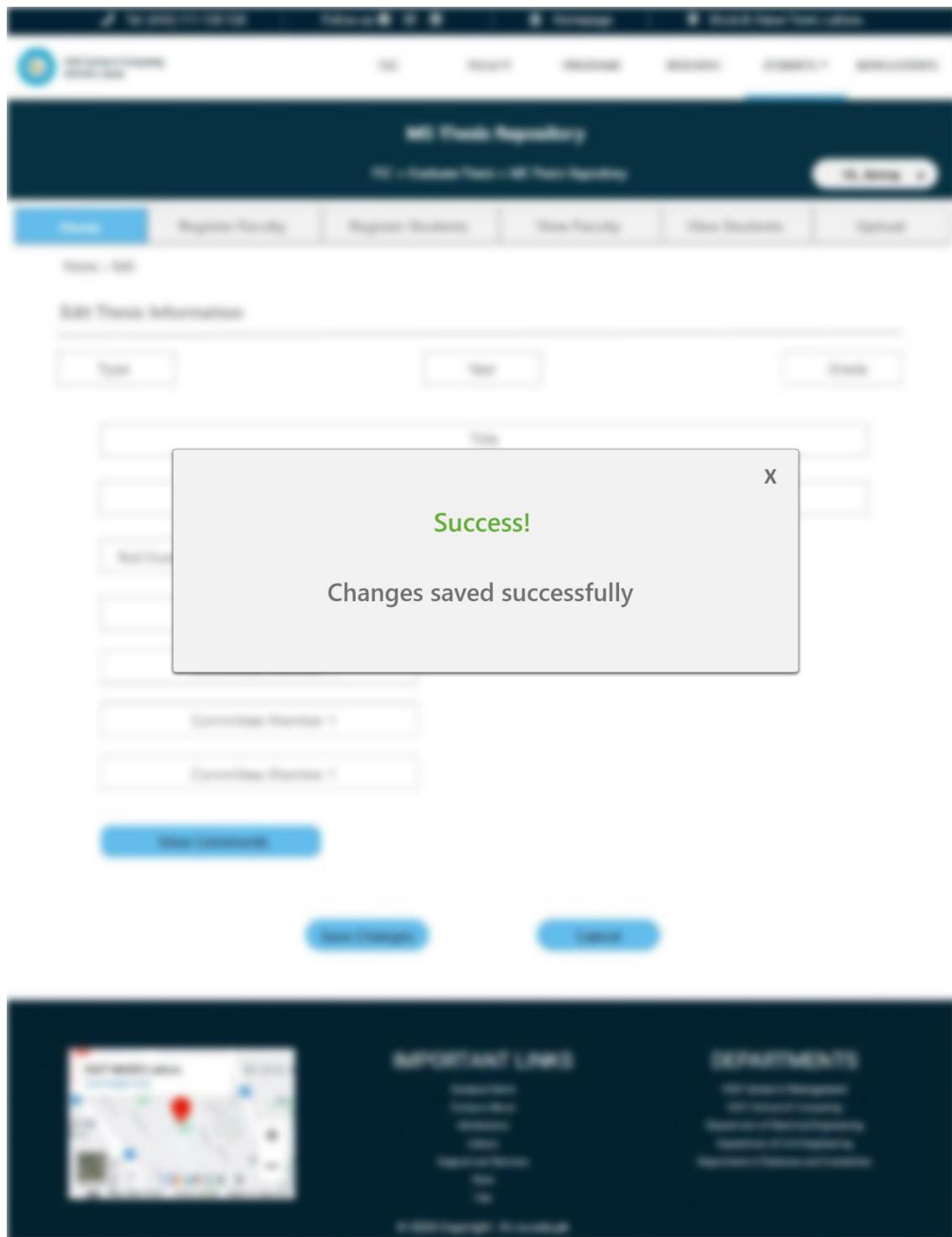


Figure 20: Thesis Edit Successful pop-up
This figure shows confirmation of successful edit to the admin

3.7.2.5 Thesis Edit Unsuccessful

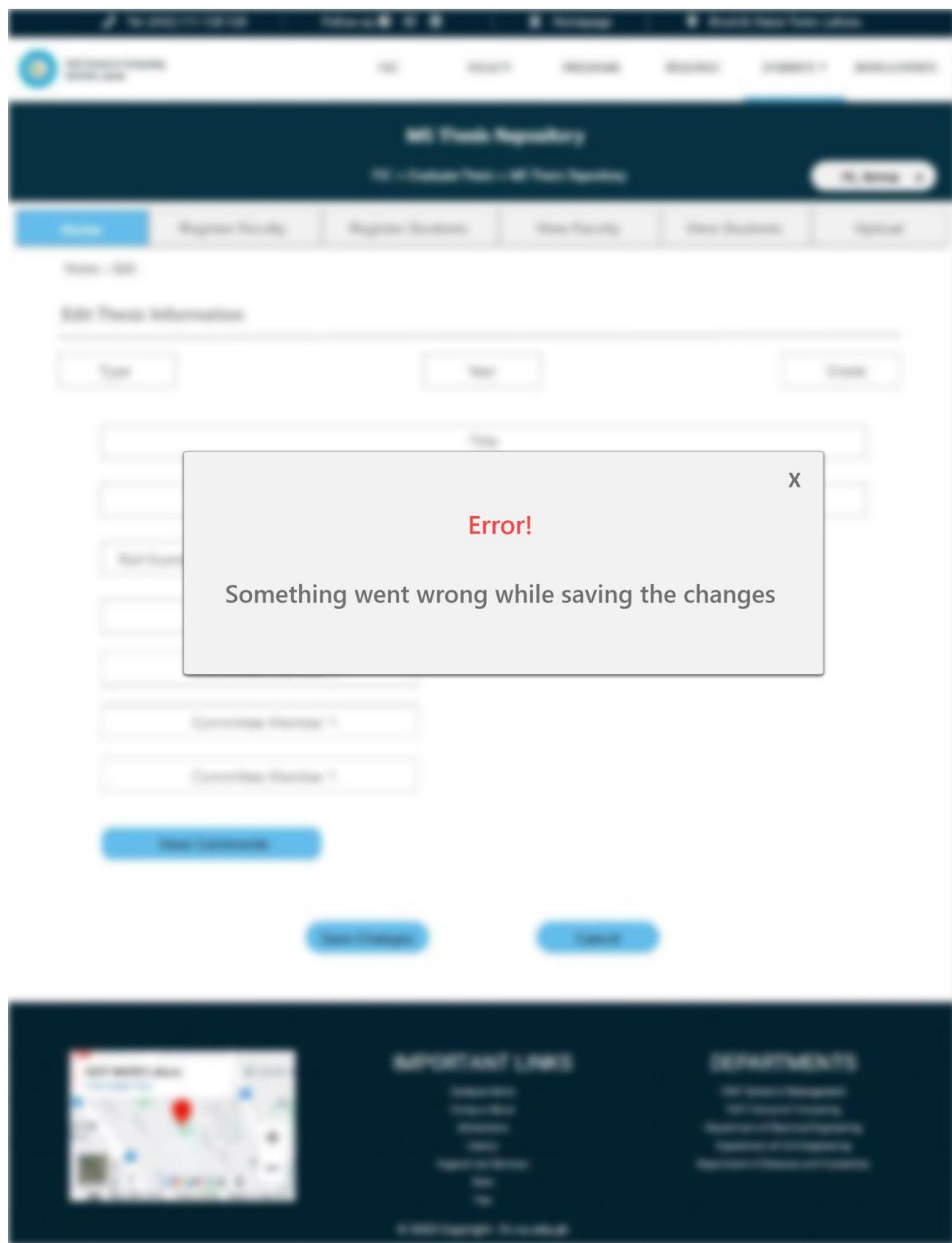


Figure 21: Thesis Edit Unsuccessful pop-up
This figure shows confirmation of unsuccessful edit to the admin

3.7.2.6 Thesis Delete Confirmation

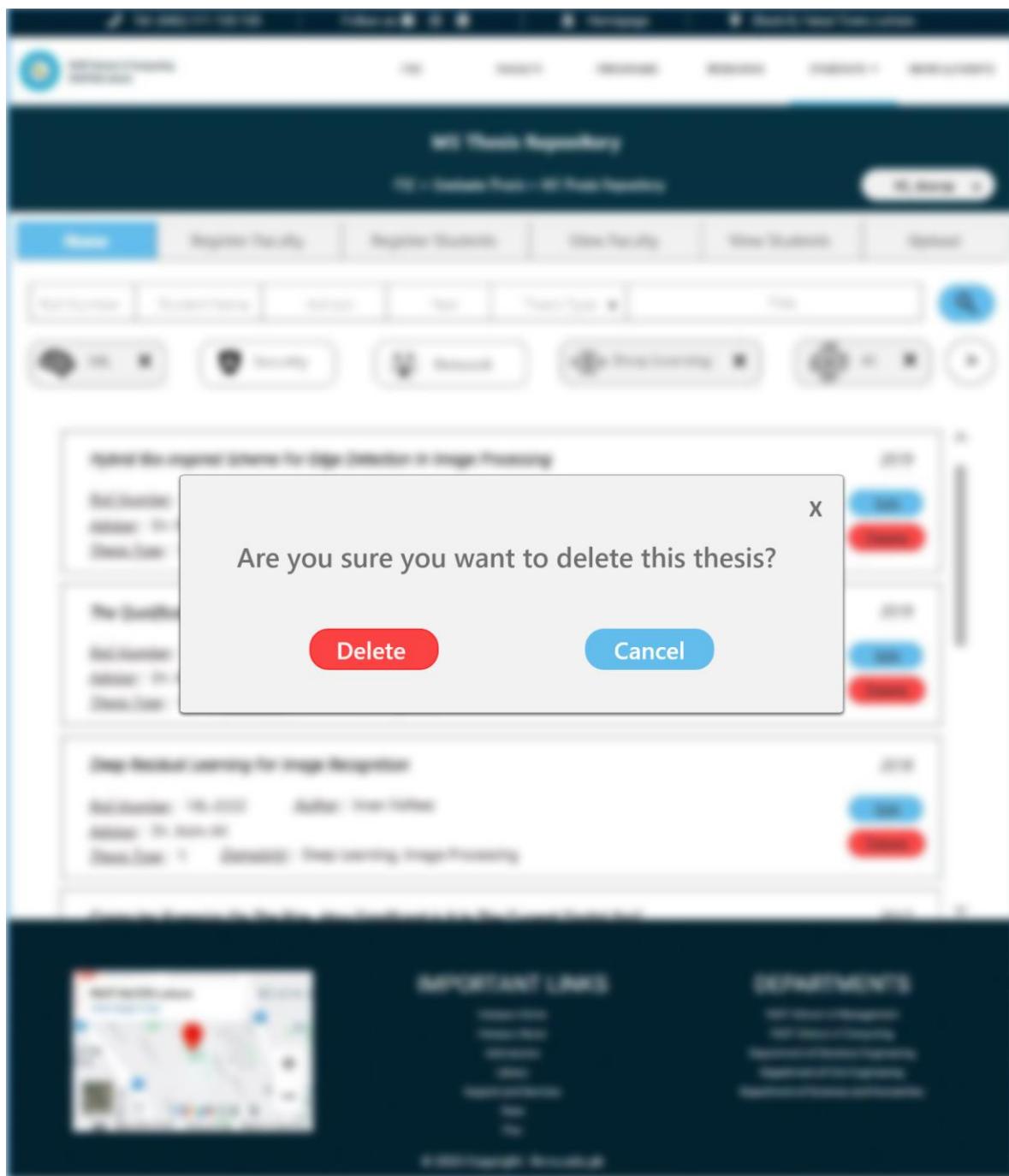


Figure 22: Thesis Delete Confirmation

This figure shows a confirmation message when an admin attempts to delete a thesis

3.7.2.7 Thesis Comments

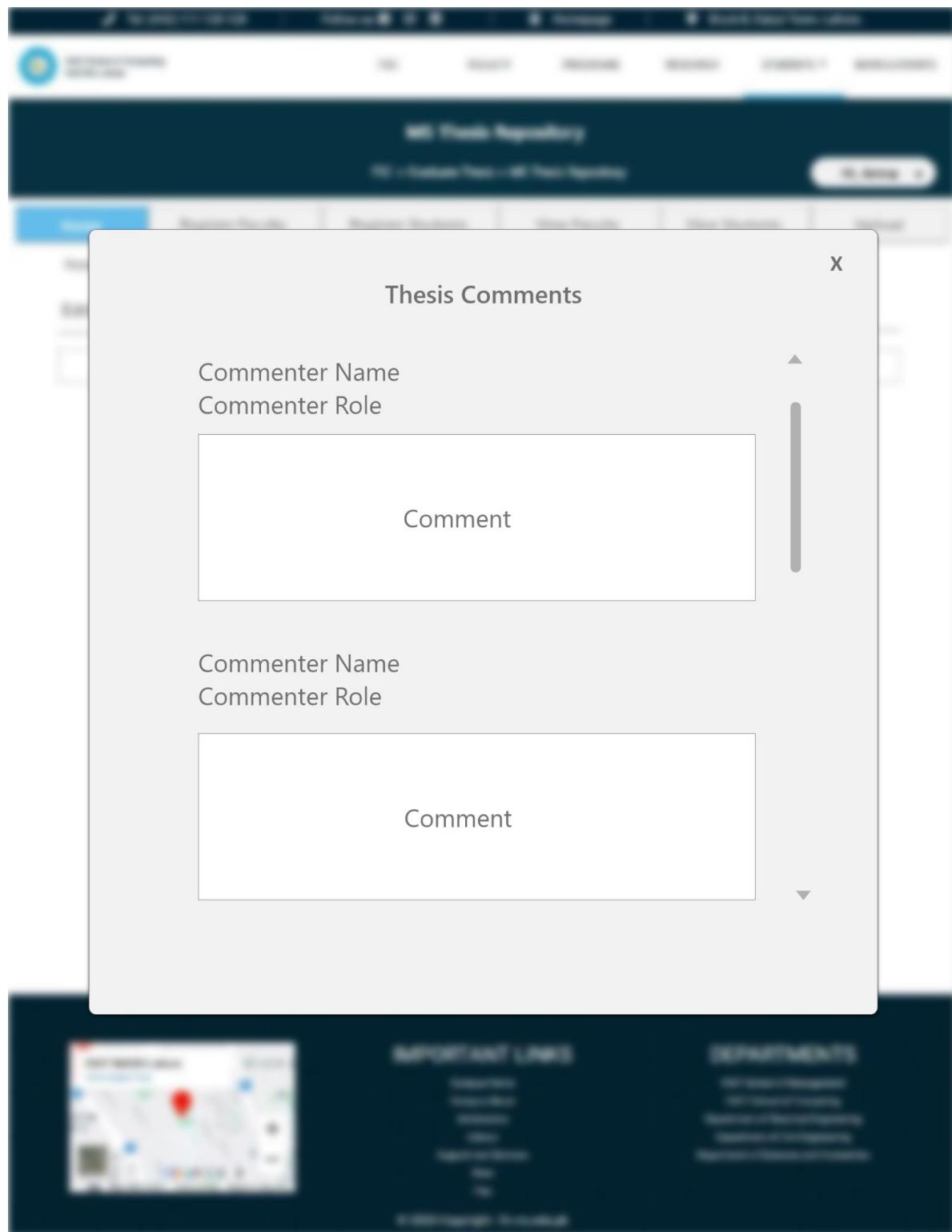
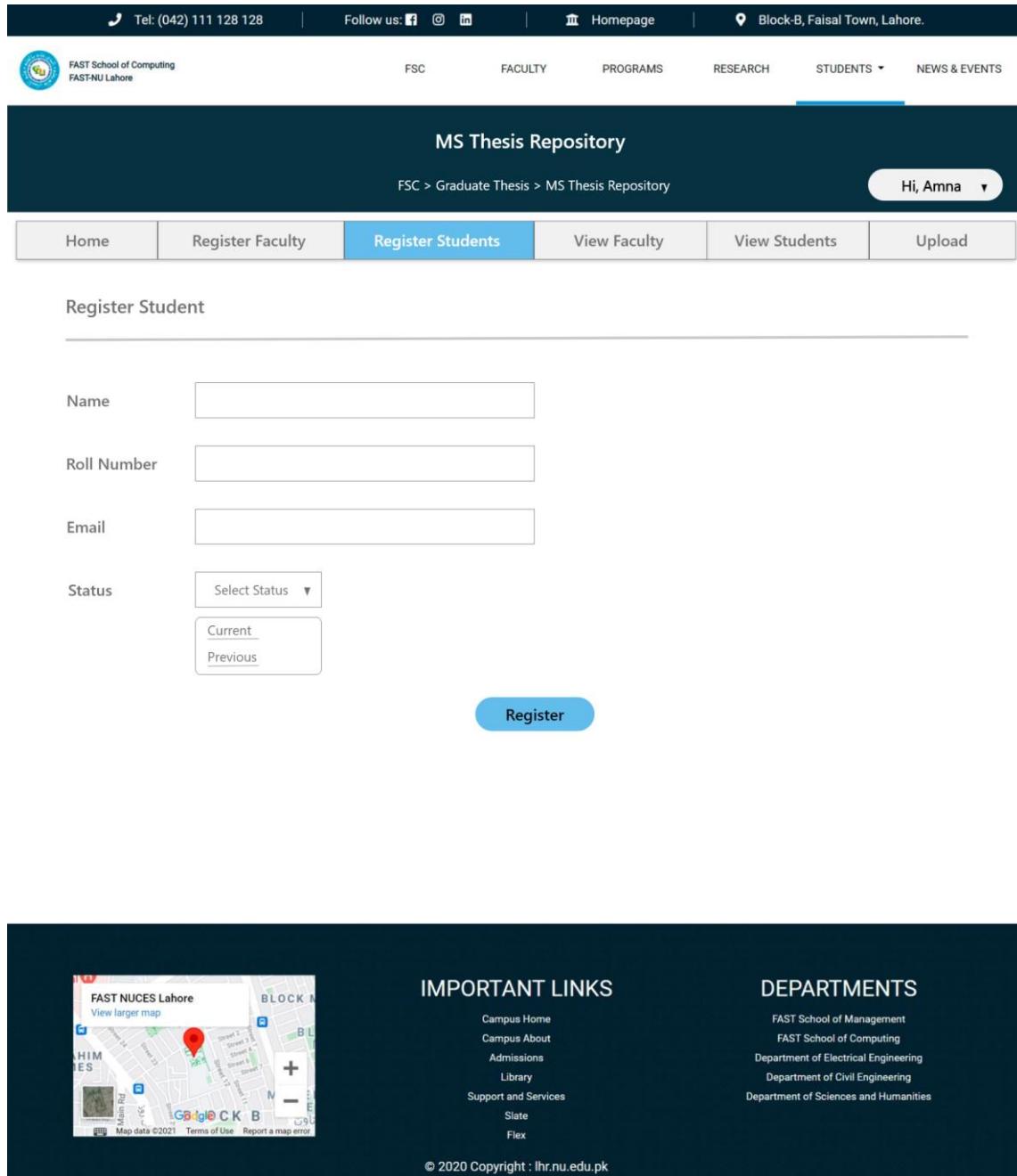


Figure 23: Thesis Comments

This figure shows interface to view comments of the thesis made by advisor and committee members (UC-3.6.19)

3.7.2.8 Register Student



The screenshot shows the 'MS Thesis Repository' section of the website. At the top, there is a navigation bar with links for 'FSC', 'FACULTY', 'PROGRAMS', 'RESEARCH', 'STUDENTS', and 'NEWS & EVENTS'. Below this is a secondary navigation bar with 'Home', 'Register Faculty', 'Register Students' (which is highlighted in blue), 'View Faculty', 'View Students', and 'Upload'. A user profile 'Hi, Amna' is visible on the right. The main content area is titled 'Register Student' and contains fields for 'Name', 'Roll Number', 'Email', and 'Status' (with options 'Current' and 'Previous'). A 'Register' button is at the bottom. The footer includes a map of the campus, links to 'IMPORTANT LINKS' like Campus Home, Campus About, Admissions, Library, Support and Services, Slat, and Flex, and a list of 'DEPARTMENTS' including FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, and Department of Sciences and Humanities.

Figure 24: Register Students
This figure shows interface for students' registration (UC-3.6.11)

3.7.2.9 View Students

The screenshot shows the 'MS Thesis Repository' interface. At the top, there is a header bar with links for 'Tel: (042) 111 128 128', 'Follow us: Facebook, Instagram, LinkedIn', 'Homepage', and 'Block-B, Faisal Town, Lahore'. Below the header, the FAST School of Computing logo and name are displayed, along with navigation links for 'FSC', 'FACULTY', 'PROGRAMS', 'RESEARCH', 'STUDENTS', 'NEWS & EVENTS', and a user profile 'Hi, Amna'. A search bar labeled 'Search students' is located above a list of registered students. The student list includes four entries: 'Amna Ali' (Roll Number: 17L-1234), 'Minal Amir' (Roll Number: 18L-1234), 'Iman Hafeez' (Roll Number: 18L-2222), and 'Hamza Ali'. Each student entry has 'Edit' and 'Delete' buttons to the right. At the bottom of the page, there is a map of the FAST NUCES Lahore campus, a section for 'IMPORTANT LINKS' (Campus Home, Campus About, Admissions, Library, Support and Services, Slat, Flex), and a section for 'DEPARTMENTS' (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities). The copyright notice '© 2020 Copyright : lhr.nu.edu.pk' is also present.

Figure 25: Admin View Registered Students
This figure shows interface to view registered students (UC-3.6.15)

3.7.2.10 Edit Student

The screenshot shows the 'Edit Student Information' form. The fields filled are:

- Name: Asma Ali
- Roll Number: 18L-2233
- Email: l182233@lhr.nu.edu.pk
- Password: 45376#%\$%
- Status: Current

At the bottom, there are 'Save Changes' and 'Cancel' buttons.



Figure 26: Edit Student
This figure shows interface through which admin can edit registered student (UC-3.6.16)

3.7.2.11 Delete Student

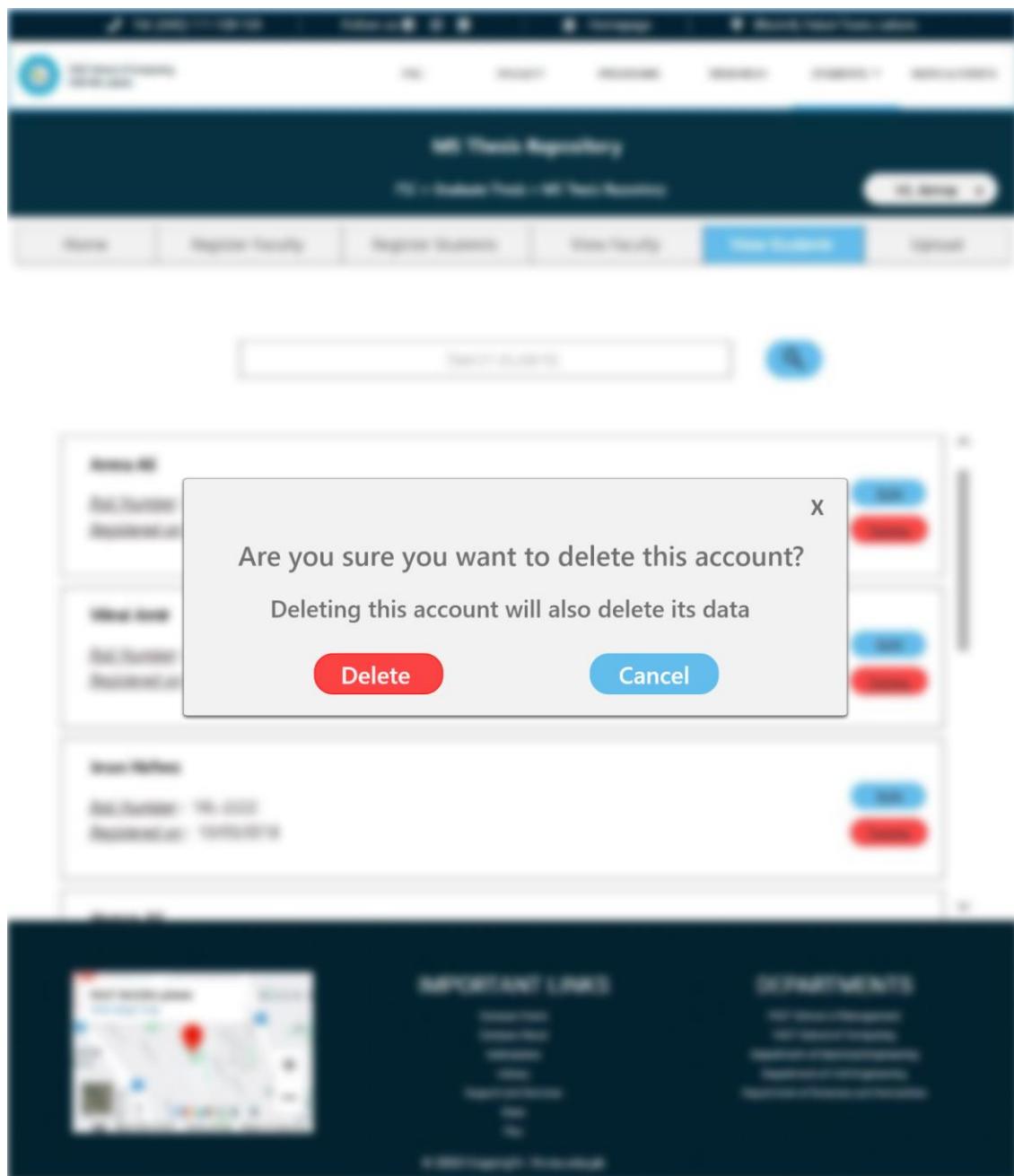


Figure 27: Delete Student

This figure shows admin can delete registered student through this page (UC-5.19)

3.7.2.12 Register Faculty

The screenshot shows the 'MS Thesis Repository' interface. At the top, there's a navigation bar with links for Tel: (042) 111 128 128, social media icons, Homepage, Block-B, Faisal Town, Lahore, and menu items like FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. Below the navigation is a dark header bar with 'MS Thesis Repository' and a breadcrumb trail: FSC > Graduate Thesis > MS Thesis Repository. A 'Hi, Amna' dropdown is also present. The main content area has tabs for Home, Register Faculty (which is highlighted in blue), Register Students, View Faculty, View Students, and Upload. The 'Register Faculty Member' form contains fields for Name and Email, both with placeholder text ('Enter Name' and 'Enter Email'). A large 'Register' button is centered below the fields. At the bottom, there's a map of the FAST NUCES Lahore campus, a section for 'IMPORTANT LINKS' with links to Campus Home, Campus About, Admissions, Library, Support and Services, Slat, and Flex, and a 'DEPARTMENTS' section listing various academic units.

MS Thesis Repository

FSC > Graduate Thesis > MS Thesis Repository

Hi, Amna

Home Register Faculty Register Students View Faculty View Students Upload

Register Faculty Member

Name

Email

Register

IMPORTANT LINKS

- Campus Home
- Campus About
- Admissions
- Library
- Support and Services
- Slate
- Flex

DEPARTMENTS

- FAST School of Management
- FAST School of Computing
- Department of Electrical Engineering
- Department of Civil Engineering
- Department of Sciences and Humanities

© 2020 Copyright : Ihr.nu.edu.pk

Figure 28: Register Faculty
*This figure shows admin can register faculty through this page
(UC-5.10)*

3.7.2.13 View Faculty

The screenshot shows the 'MS Thesis Repository' interface. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, Follow us: (Facebook, Instagram, LinkedIn), Homepage, and Block-B, Faisal Town, Lahore. Below the navigation bar, there is a header with the FAST School of Computing logo, FAST-NU Lahore, and links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, NEWS & EVENTS. The main title 'MS Thesis Repository' is displayed above the breadcrumb 'FSC > Graduate Thesis > MS Thesis Repository'. A user profile 'Hi, Amna' is shown on the right. Below the header, a navigation menu includes Home, Register Faculty, Register Students, View Faculty (which is highlighted in blue), View Students, and Upload. A search bar labeled 'Search Faculty' with a magnifying glass icon is present. The main content area displays four faculty entries: Amna Ali, Minal Amir, Iman Hafeez, and Hamza Ali, each with an email link and edit/delete buttons. At the bottom, there is a map of the FAST NUCES Lahore campus, a sidebar with 'IMPORTANT LINKS' (Campus Home, Campus About, Admissions, Library, Support and Services, Slat, Flex), and a 'DEPARTMENTS' section listing various academic units.

MS Thesis Repository

FSC > Graduate Thesis > MS Thesis Repository

Hi, Amna

Home Register Faculty Register Students **View Faculty** View Students Upload

Search Faculty

Amna Ali
Email: amna.ali@nu.edu.pk

Minal Amir
Email: minal.amir@nu.edu.pk

Iman Hafeez
Email: iman.hafeez@nu.edu.pk

Hamza Ali

IMPORTANT LINKS

- Campus Home
- Campus About
- Admissions
- Library
- Support and Services
- Slate
- Flex

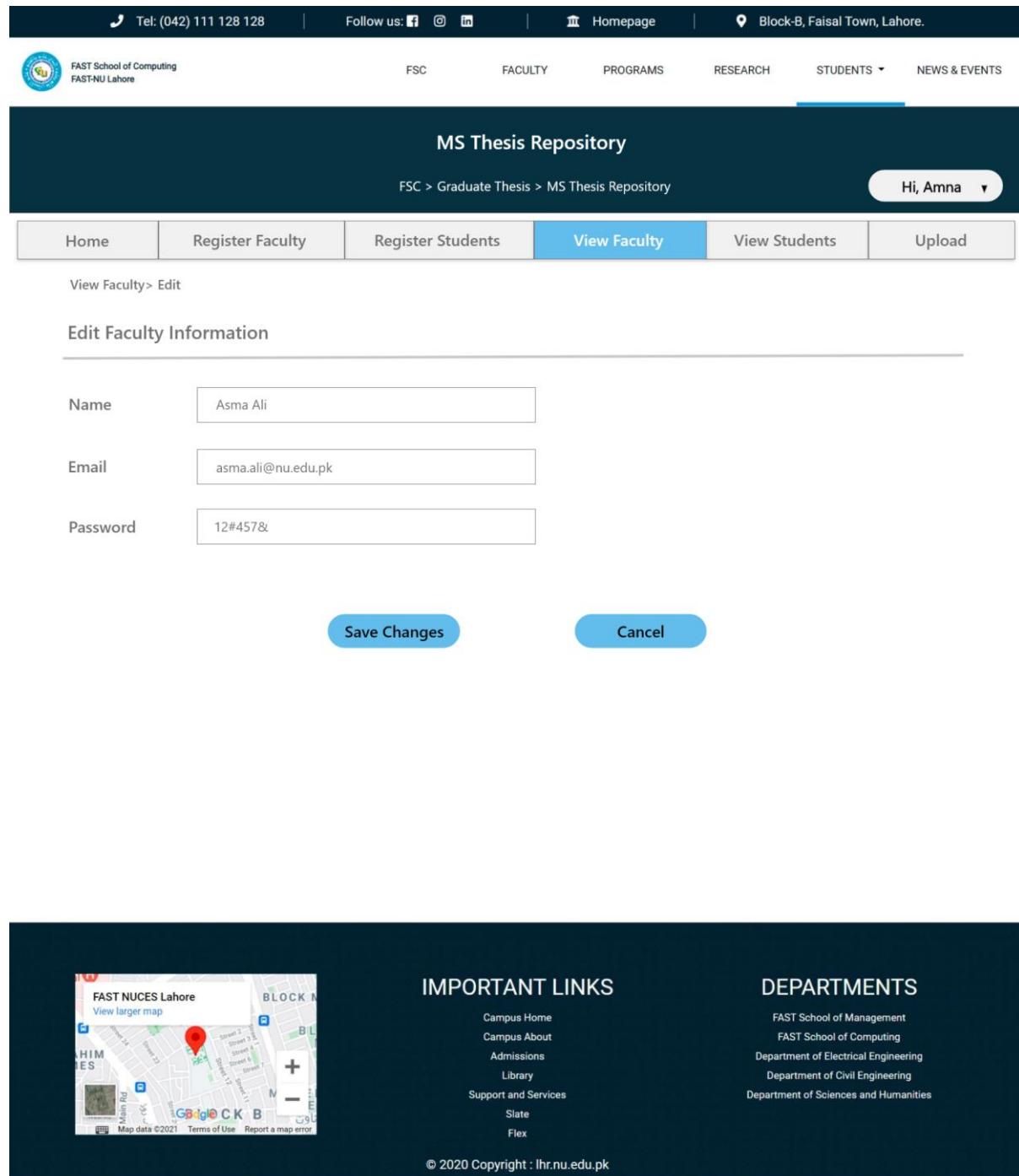
DEPARTMENTS

- FAST School of Management
- FAST School of Computing
- Department of Electrical Engineering
- Department of Civil Engineering
- Department of Sciences and Humanities

© 2020 Copyright : lhr.nu.edu.pk

Figure 29: View Faculty
This figure shows that admin can view faculty through this page (UC-5.12)

3.7.2.14 Edit Faculty



The screenshot shows the 'MS Thesis Repository' interface. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, social media icons (Facebook, Instagram, LinkedIn), Homepage, and location information (Block-B, Faisal Town, Lahore). Below the navigation bar, there is a secondary navigation menu with links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. The 'View Faculty' link is highlighted in blue. The main content area has a dark header 'MS Thesis Repository' and a breadcrumb navigation 'FSC > Graduate Thesis > MS Thesis Repository'. A user profile 'Hi, Amna' is shown on the right. Below the header, there is a horizontal navigation bar with links for Home, Register Faculty, Register Students, View Faculty (highlighted in blue), View Students, and Upload. The main form is titled 'Edit Faculty Information' and contains fields for Name (Asma Ali), Email (asma.ali@nu.edu.pk), and Password (12#457&). At the bottom of the form are 'Save Changes' and 'Cancel' buttons. The footer of the page includes a map of the FAST NUCES Lahore campus, a section for 'IMPORTANT LINKS' with links to Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex, and other departments like FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, and Department of Sciences and Humanities. The footer also includes copyright information: © 2020 Copyright : lhr.nu.edu.pk.

Figure 30: Edit Faculty
This figure shows admin can edit faculty through this interface (UC-5.17)

3.7.2.15 Delete Faculty

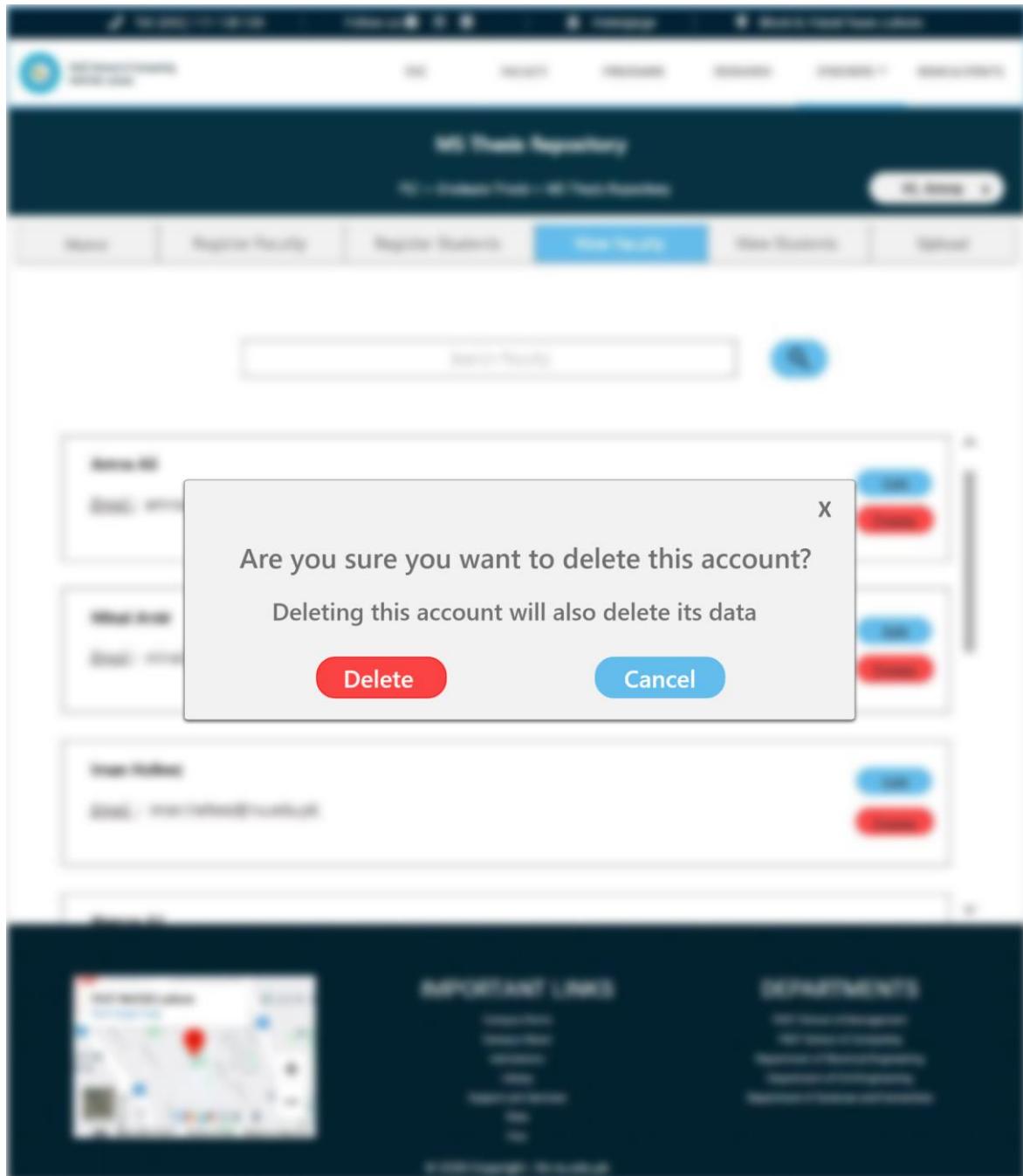


Figure 31: Delete Faculty

This figure shows that admin can delete a faculty member through this page (UC 3.6.18)

3.7.2.16 Upload Thesis

MS Thesis Repository

FSC > Graduate Thesis > MS Thesis Repository

Hi, Amna

Home Register Faculty Register Students View Faculty View Students Upload

Title

Abstarcet

Future Work

Name

Roll Number

Advisor Name

Year

Grade

Committee Member(s)

Domains(s)

Upload Thesis

Submit

© 2020 Copyright : lhr.nu.edu.pk

IMPORTANT LINKS

- Campus Home
- Campus About
- Admissions
- Library
- Support and Services
- Slate
- Flex

DEPARTMENTS

- FAST School of Management
- FAST School of Computing
- Department of Electrical Engineering
- Department of Civil Engineering
- Department of Sciences and Humanities

Figure 32: Upload Thesis
Admin can upload thesis through this page (UC-3.6.30)

3.7.2.17 Change Password

The screenshot shows a web interface for changing a password. At the top, there is a dark header bar with various links and social media icons. Below it, a blue navigation bar contains the title 'MS Thesis Repository' and a breadcrumb trail 'FSC > Graduate Thesis > MS Thesis Repository'. A user profile 'Hi, Amna' is visible on the right. The main content area has a light background and features two input fields: 'Old Password' and 'New Password', each with its own input box. Below these fields is a blue button labeled 'Save Changes'. At the bottom of the page, there is a map showing the location of FAST NUCES Lahore, followed by sections for 'IMPORTANT LINKS' and 'DEPARTMENTS'.

MS Thesis Repository

FSC > Graduate Thesis > MS Thesis Repository

Hi, Amna

Home Register Faculty Register Students View Faculty View Students Upload

Old Password

New Password

Save Changes

IMPORTANT LINKS

- Campus Home
- Campus About
- Admissions
- Library
- Support and Services
- Slate
- Flex

DEPARTMENTS

- FAST School of Management
- FAST School of Computing
- Department of Electrical Engineering
- Department of Civil Engineering
- Department of Sciences and Humanities

© 2020 Copyright : lhr.nu.edu.pk

Figure 33: Change Password
This figure shows that admin can change their password through this page (UC-3.6.24)

3.7.3 Faculty Interfaces

3.7.3.1 Faculty Login

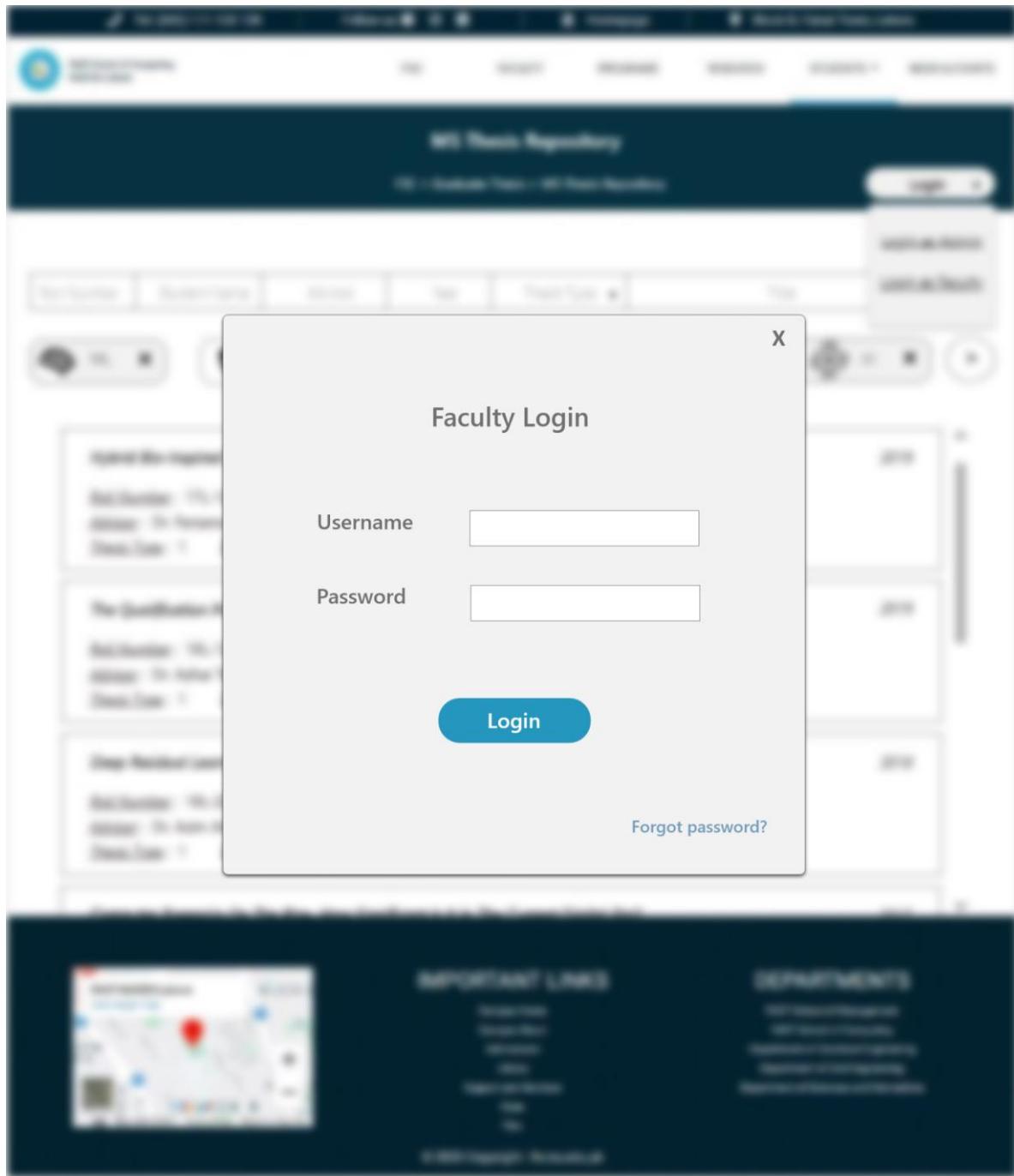


Figure 34: Faculty Login
This figure shows login page for the faculty (UC-3.6.1)

3.7.3.2 Faculty Home

The screenshot shows the FAST School of Computing MS Thesis Repository homepage. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, Follow us: (Facebook, Instagram, LinkedIn), Homepage, and Block-B, Faisal Town, Lahore. Below the navigation bar is the FAST School of Computing logo and a menu with links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. A blue header bar displays "MS Thesis Repository". Below it, a breadcrumb trail shows FSC > Graduate Thesis > MS Thesis Repository. On the right, a "Hi, Ali" dropdown menu is visible. The main content area has tabs for Home, Supervised Thesis, Evaluated Thesis, and Your Suggested Topics. There are search and filter fields for Roll Number, Student Name, Advisor, Year, Thesis Type (with a dropdown arrow), and Title, along with a search icon. Below these are several filters for research topics: ML, Security, Network, Deep Learning, and AI, each with a delete icon and a circular arrow icon. There are also buttons for Research Trends and Suggested Topics. The page lists three thesis entries from 2019:

- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing** (2019)

Roll Number: 17L-1234 Author: Ali Hamza
Advisor: Dr. Farzana Ali
Thesis Type: 1 Domain(s): Image Processing
- The Qualification Problem In AI Systems** (2019)

Roll Number: 18L-1234 Author: Iman Amir
Advisor: Dr. Azhar Tariq
Thesis Type: 1 Domain(s): Artificial Intelligence
- Deep Residual Learning For Image Recognition** (2018)

Roll Number: 18L-2222 Author: Iman Hafeez
Advisor: Dr. Asim Ali
Thesis Type: 1 Domain(s): Deep Learning, Image Processing

At the bottom, there is a map of the FAST NUACES Lahore campus, a section for Important Links (Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex), and a list of Departments (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities). The footer includes a copyright notice: © 2020 Copyright : lhr.nu.edu.pk.

Figure 35: Faculty Home
This figure shows home page of faculty who logged in (UC-3.6.5)

3.7.3.3 Supervised Thesis

The screenshot shows the 'MS Thesis Repository' page. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, Follow us (Facebook, Instagram, LinkedIn), Homepage, and Block-B, Faisal Town, Lahore. Below the navigation bar, the FAST School of Computing logo and name are displayed, along with links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. A search bar at the top right says 'Hi, Ali'. Below the header, a breadcrumb navigation shows FSC > Graduate Thesis > MS Thesis Repository. The main content area has tabs for Home, Supervised Thesis (which is selected), Evaluated Thesis, and Your Suggested Topics. A search bar labeled 'Search students' with a magnifying glass icon is present. The main content displays four supervised theses in cards:

- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing** (2019)
 - Roll Number: 17L-1234 Author: Hassan Ali
 - Advisor: Dr. Ali Amir
 - Thesis Type: 1 Domain(s): Image Processing
- The Qualification Problem In AI Systems** (2019)
 - Roll Number: 18L-1234 Author: Minal Amir
 - Advisor: Dr. Ali Amir
 - Thesis Type: 1 Domain(s): Artificial Intelligence
- Deep Residual Learning For Image Recognition** (2018)
 - Roll Number: 18L-2222 Author: Iman Hafeez
 - Advisor: Dr. Ali Amir
 - Thesis Type: 1 Domain(s): Deep Learning, Image Processing
- Computer Forensics On The Rise- How Significant Is It In The Current Digital Era?** (2017)
 - Roll Number: 19L-1234 Author: Naveed Ali
 - Advisor: Dr. Ali Amir
 - Thesis Type: 1 Domain(s): Computer Science

At the bottom of the page, there is a map of the FAST NUCES Lahore campus, a sidebar with 'IMPORTANT LINKS' (Campus Home, Campus About, Admissions, Library, Support and Services, State, Flex) and 'DEPARTMENTS' (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities), and a copyright notice: © 2020 Copyright : lhr.nu.edu.pk

Figure 36: Supervised Thesis
This figure shows theses which are under supervision (UC-3.6.8)

3.7.3.4 Edit Thesis

The screenshot shows the 'MS Thesis Repository' interface. At the top, there's a navigation bar with links for Tel: (042) 111 128 128, social media icons, Homepage, and Block-B, Faisal Town, Lahore. Below the navigation is the FAST School of Computing logo and a menu with FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. A user profile 'Hi, Ali' is shown on the right.

The main content area has a title 'MS Thesis Repository' and a breadcrumb path 'FSC > Graduate Thesis > MS Thesis Repository'. Below this is a navigation bar with tabs: Home (selected), Supervised Thesis, Evaluated Thesis, and Your Suggested Topics.

The 'Edit Thesis Information' section contains fields for Type, Year, Grade, Title, Abstract, Roll Number, Student Name, Advisor Name, Committee Member 1, Committee Member 2, Committee Member 3, Key Words, and a 'View Comments' button. Buttons for 'Save Changes' and 'Cancel' are located at the bottom of this section.

At the bottom of the page is a footer with a map of the FAST NUCES Lahore campus, links to important pages like Campus Home, Campus About, Admissions, Library, Support and Services, Slat, Flex, and a 'DEPARTMENTS' section listing various academic units.

Figure 37: Edit Thesis
This figure shows that faculty member can edit the accessible thesis information (UC-3.6.6)

3.7.3.5 View Comments

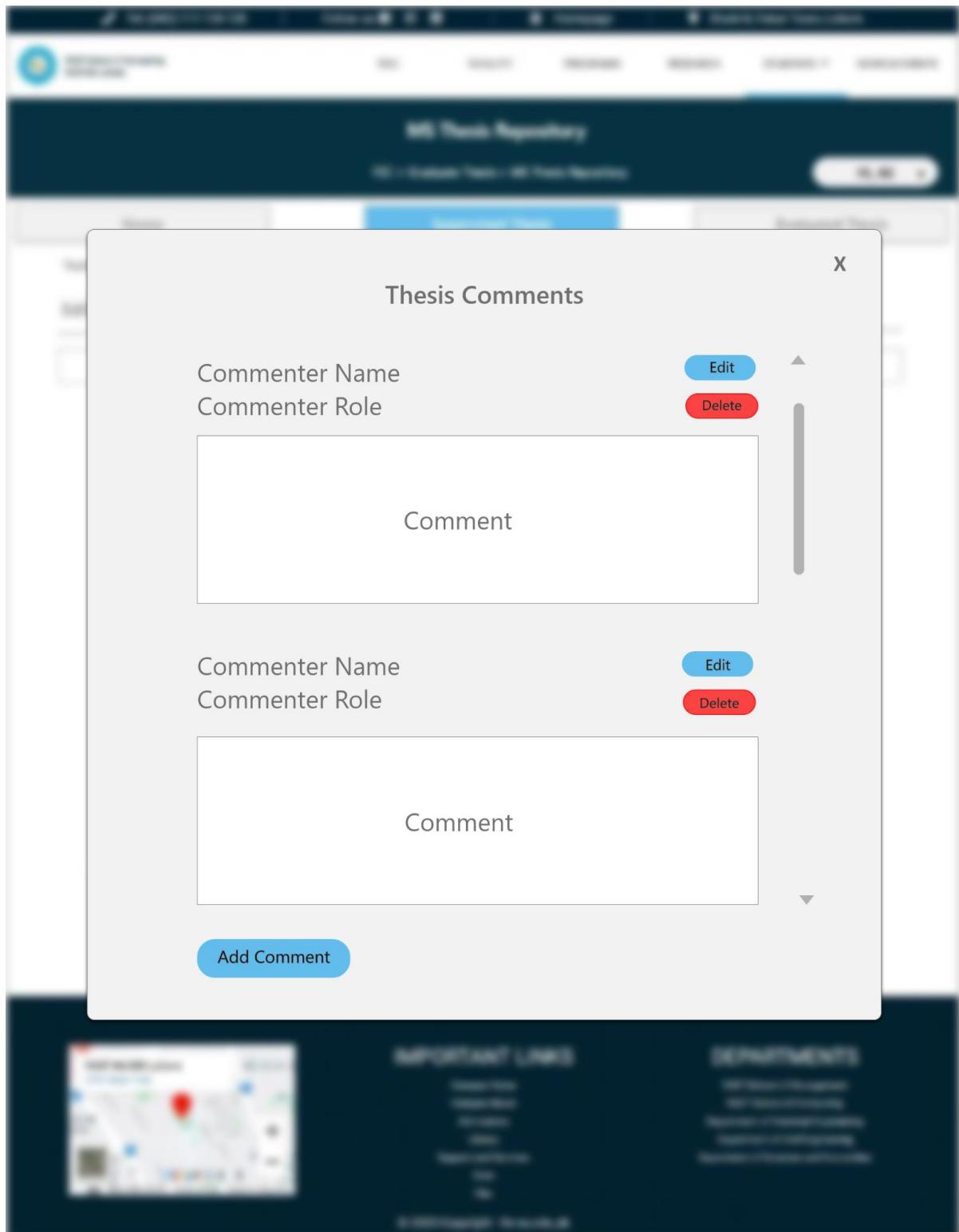


Figure 38: View Comments

This figure shows that faculty can view comments and can edit only theirs (UC-3.6.19)

3.7.3.6 Add Comment

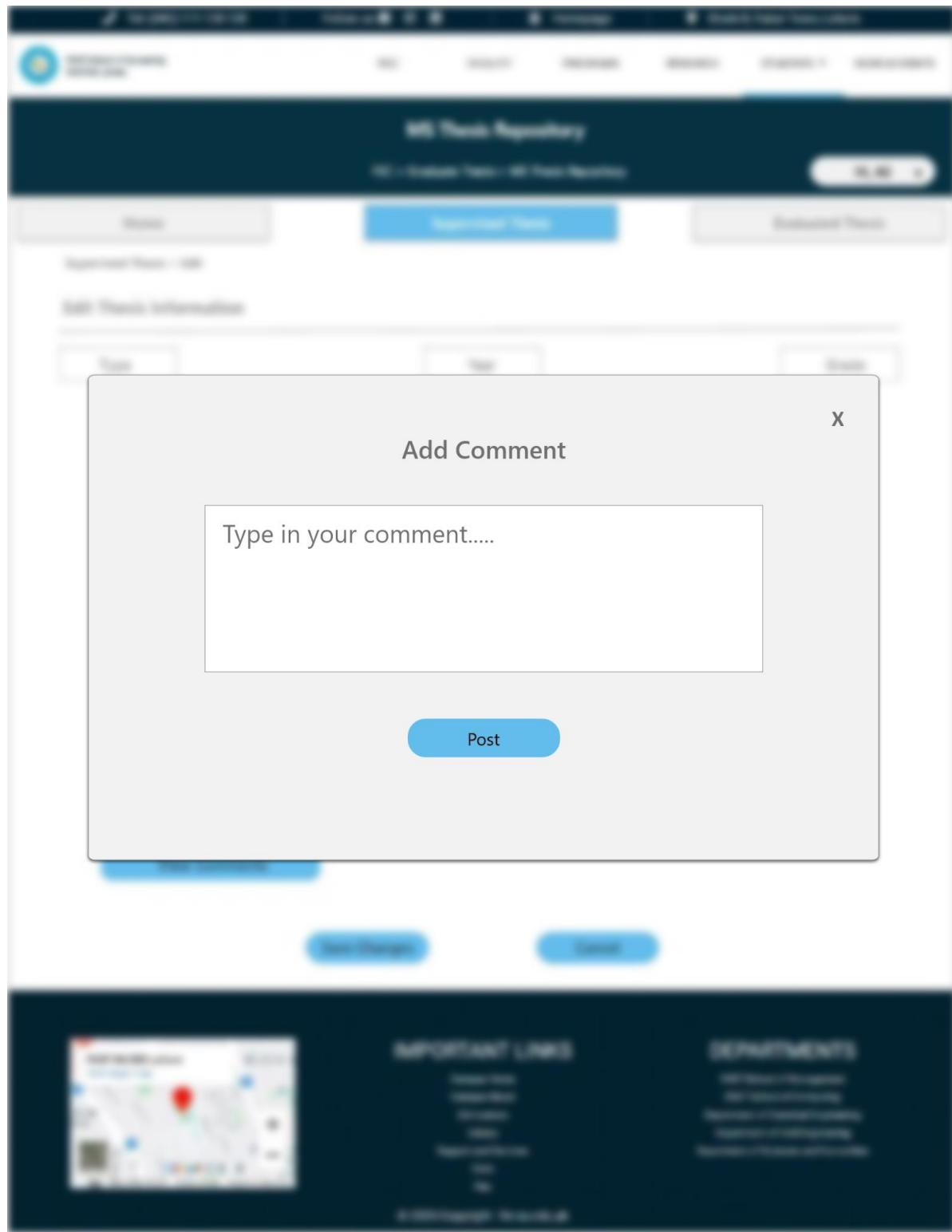


Figure 39: Add Comment
*This figure shows interface for faculty member to add comments
(UC-3.6.21)*

3.7.3.7 Delete Thesis

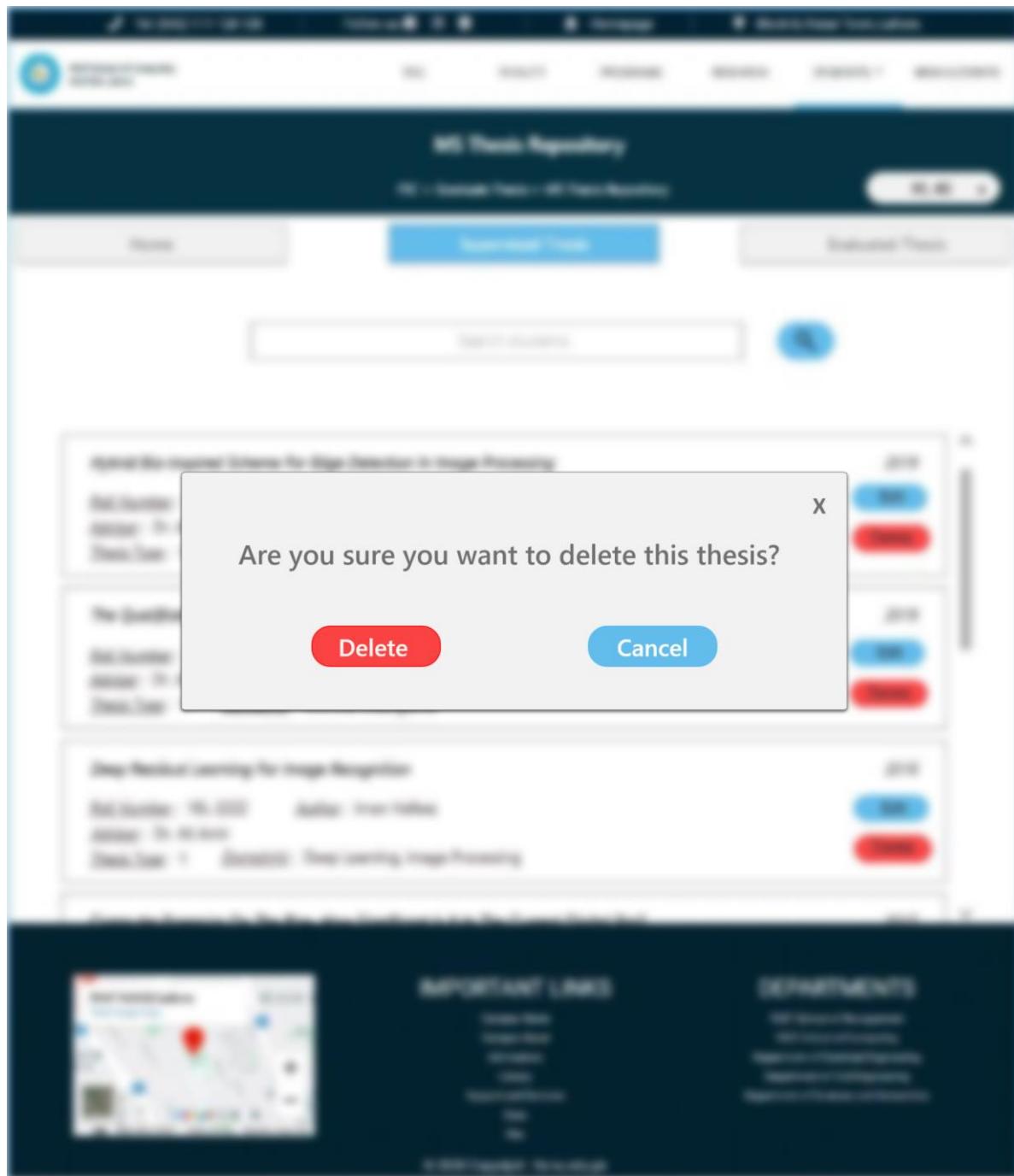


Figure 40: Delete Thesis
This figure shows faculty member can delete thesis under their supervision (UC-3.6.14)

3.7.3.8 Evaluated Thesis

The screenshot shows the FAST School of Computing MS Thesis Repository website. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, social media icons, Homepage, and location information (Block-B, Faisal Town, Lahore). Below the navigation bar, the FAST logo and name are displayed, along with links for FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS, and NEWS & EVENTS. The main title "MS Thesis Repository" is centered above a breadcrumb trail: FSC > Graduate Thesis > MS Thesis Repository. A "Hi, Ali" dropdown menu is visible on the right. Below the header, there are four tabs: Home, Supervised Thesis, Evaluated Thesis (which is highlighted in blue), and Your Suggested Topics. A search bar labeled "Search students" with a magnifying glass icon is positioned below the tabs. The main content area displays a list of evaluated theses, each in a card format. The first card is for "Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing" from 2019, authored by Hassan Ali, with a roll number of 17L-1234 and advisor Dr. Ali Amir. The second card is for "The Qualification Problem In AI Systems" from 2019, authored by Minal Amir, with a roll number of 18L-1234 and advisor Dr. Ali Amir. The third card is for "Deep Residual Learning For Image Recognition" from 2018, authored by Iman Hafeez, with a roll number of 18L-2222 and advisor Dr. Ali Amir. The fourth card is for "Computer Forensics On The Rise- How Significant Is It In The Current Digital Era?" from 2017. At the bottom of the page, there is a map of the FAST NUCES Lahore campus, a section for "IMPORTANT LINKS" (Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex), and a section for "DEPARTMENTS" (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities). Copyright information for 2020 is also present.

Figure 41: Evaluated Thesis
This figure shows interface for faculty to see theses for which they were committee members (UC-3.6.13)

3.7.3.9 View Thesis

The screenshot shows the 'MS Thesis Repository' interface. At the top, there are links for Tel: (042) 111 128 128, social media (Facebook, Instagram, LinkedIn), Homepage, and location (Block-B, Faisal Town, Lahore). The main navigation menu includes FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS (dropdown), and NEWS & EVENTS. Below the menu, the title 'MS Thesis Repository' is displayed, along with the breadcrumb 'FSC > Graduate Thesis > MS Thesis Repository'. A user profile 'Hi, Ali' is shown on the right.

The 'Evaluated Thesis' tab is selected. The page contains several input fields:

- Type, Year, Grade (each in its own box)
- Title (in a long input box)
- Abstract (in a long input box)
- Roll Number
- Student Name
- Advisor Name (in a box)
- Committee Member 1 (in four separate boxes)
- Key Words: (in a long input box)

A blue 'View Comments' button is located at the bottom left of the form area.

The footer section includes:

- IMPORTANT LINKS:** Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex.
- DEPARTMENTS:** FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities.
- A map of FAST NUCES Lahore with a red marker indicating the location.
- Copyright information: © 2020 Copyright : lhr.nu.edu.pk

Figure 42: View Thesis
This figure shows that faculty can view thesis for which they were committee members (UC-3.6.3)

3.7.3.10 View Comments

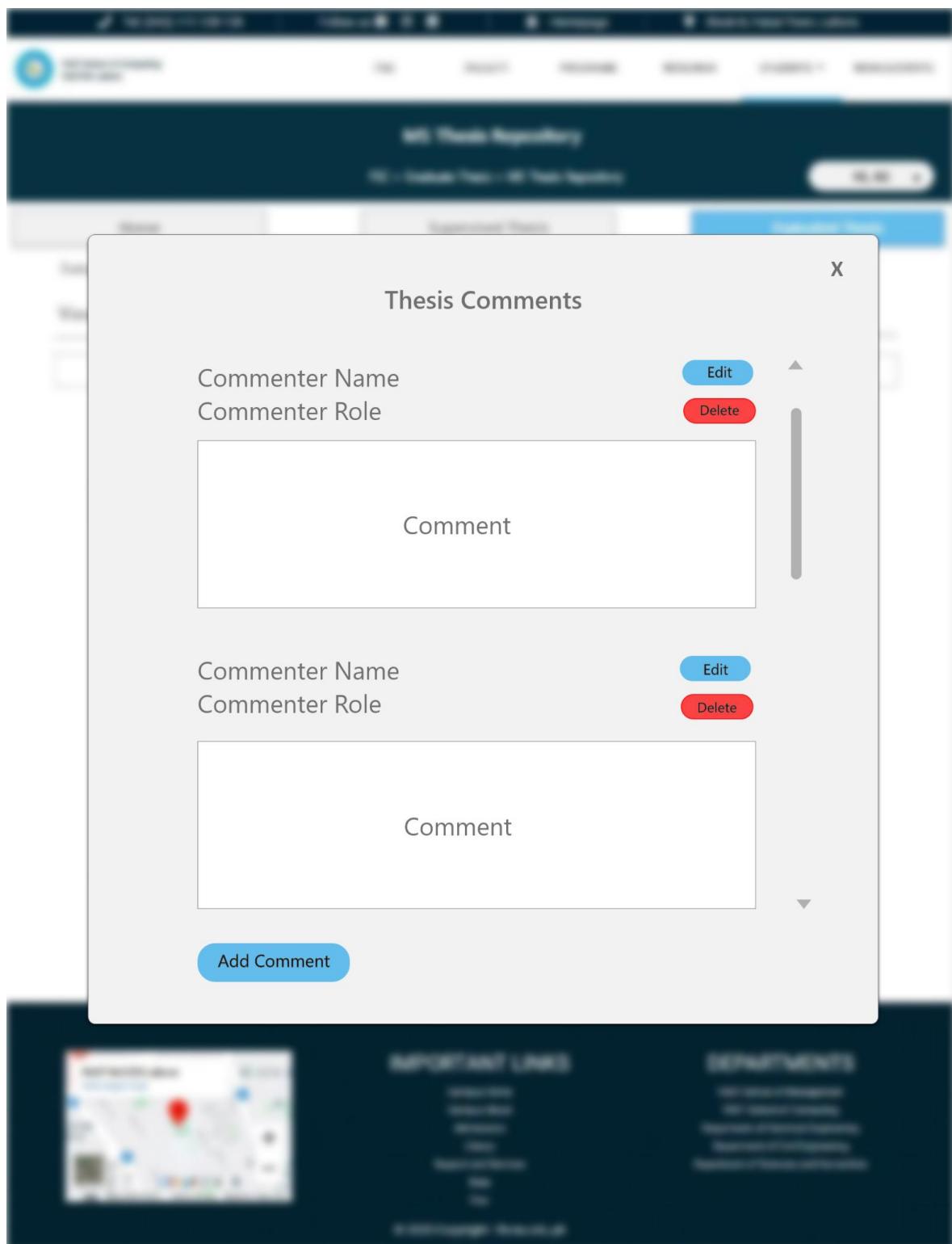


Figure 43: View Comments

*This figure shows that faculty can view comments and modify or delete only theirs
(UC-3.6.19)*

3.7.3.11 Research Topic Suggestions

The screenshot shows the 'MS Thesis Repository' section of the portal. At the top, there are navigation links for 'FSC', 'FACULTY', 'PROGRAMS', 'RESEARCH', 'STUDENTS', and 'NEWS & EVENTS'. A user profile 'Hi, Ali' is visible on the right. Below the header, a breadcrumb trail shows 'FSC > Graduate Thesis > MS Thesis Repository'. The main content area displays five suggested research topics in a grid:

- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing**
 - Description of the topic
 - [Edit](#)
 - [Delete](#)
- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing**
 - Description of the topic
 - [Edit](#)
 - [Delete](#)
- The Qualification Problem In AI Systems**
 - Description of the topic
 - [Edit](#)
 - [Delete](#)
- The Qualification Problem In AI Systems**
 - Description of the topic
 - [Edit](#)
 - [Delete](#)
- The Qualification Problem In AI Systems**
 - Description of the topic
 - [Edit](#)
 - [Delete](#)

At the bottom of the page, there is a map of the FAST NUCES Lahore campus, a list of 'IMPORTANT LINKS' including Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex, and a list of 'DEPARTMENTS' including FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, and Department of Sciences and Humanities. Copyright information at the bottom reads '© 2020 Copyright : lhr.nu.edu.pk'.

Figure 44: Suggested Research Topics
Faculty members can view and edit their suggested topics

3.7.3.12 Add Topic

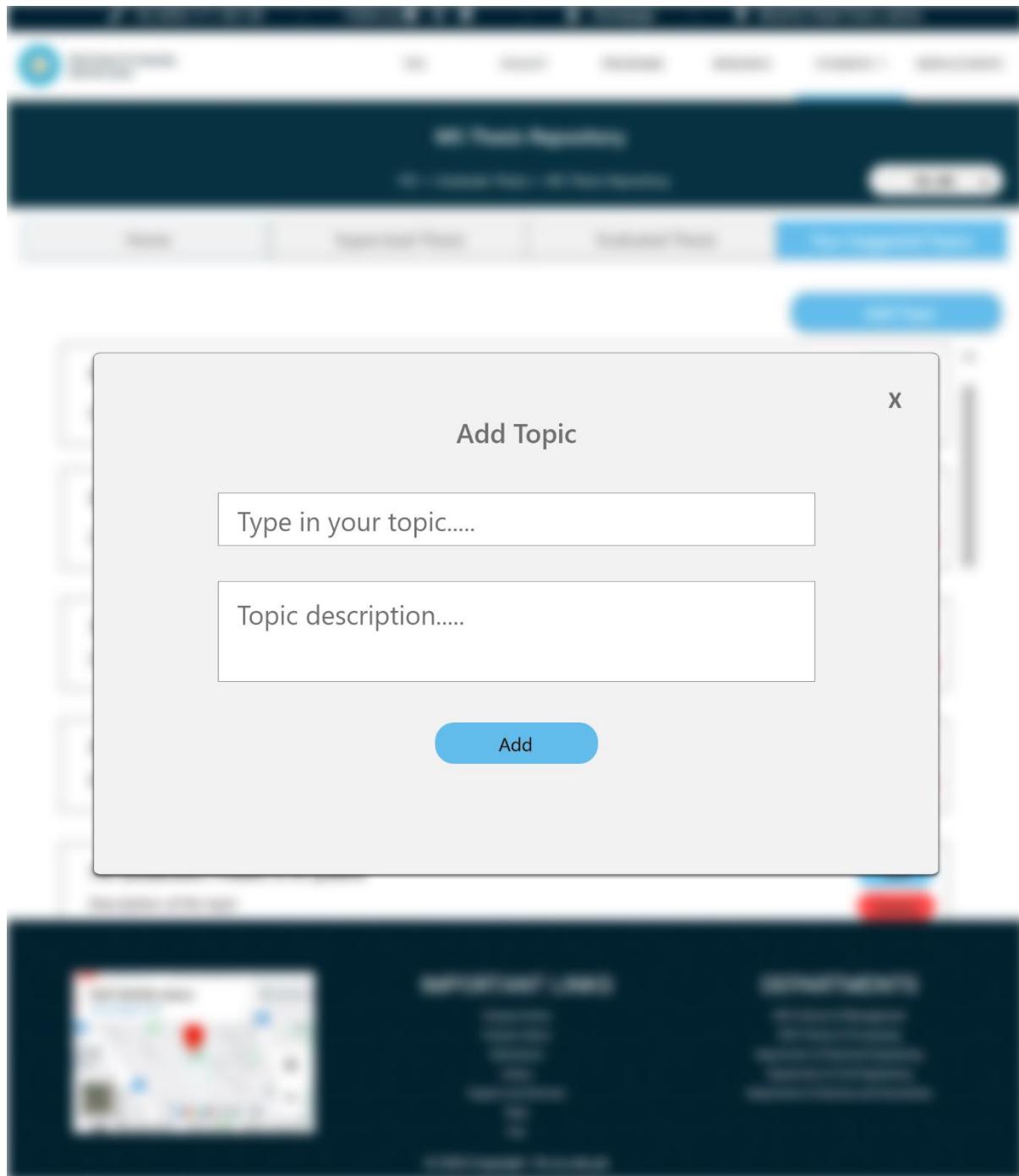


Figure 45: Add Topic
Faculty can add topic (UC-3.6.26)

3.7.4 Student Interfaces

3.7.4.1 Student Login

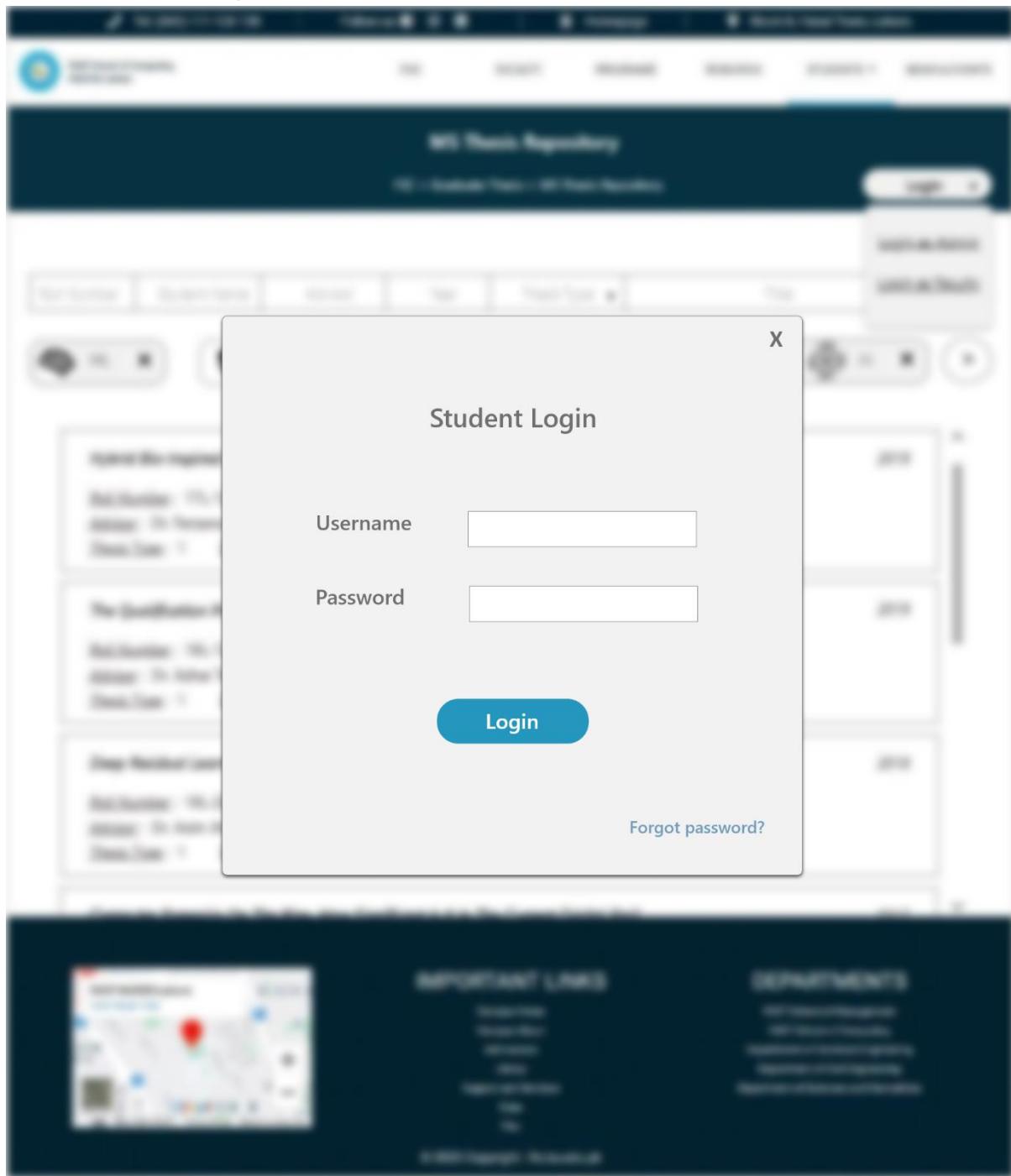


Figure 46: Student Login
Student login page

3.7.4.2 Student Home

The screenshot shows the FAST School of Computing MS Thesis Repository student home page. At the top, there is a navigation bar with links for Tel: (042) 111 128 128, Follow us: (Facebook, Instagram, LinkedIn), Homepage, Block-B, Faisal Town, Lahore, FSC, FACULTY, PROGRAMS, RESEARCH, STUDENTS ▾, and NEWS & EVENTS. A user profile 'Hi, Ali' is also present.

The main content area features a search bar with fields for Roll Number, Student Name, Advisor, Year, Thesis Type, Title, and a search icon. Below the search bar are several filters: ML (Machine Learning), Security, Network, Deep Learning, AI, and a general search icon. There are also buttons for Research Trends and Suggested Topics.

Three thesis entries are listed:

- Hybrid Bio-Inspired Scheme For Edge Detection In Image Processing** (2019)
 - Roll Number: 17L-1234 Author: Ali Hamza
 - Advisor: Dr. Farzana Ali
 - Thesis Type: 1 Domain(s): Image Processing
- The Qualification Problem In AI Systems** (2019)
 - Roll Number: 18L-1234 Author: Iman Amir
 - Advisor: Dr. Azhar Tariq
 - Thesis Type: 1 Domain(s): Artificial Intelligence
- Deep Residual Learning For Image Recognition** (2018)
 - Roll Number: 18L-2222 Author: Iman Hafeez
 - Advisor: Dr. Asim Ali
 - Thesis Type: 1 Domain(s): Deep Learning, Image Processing

At the bottom, there is a map of the FAST NUCES Lahore campus, a section for Important Links (Campus Home, Campus About, Admissions, Library, Support and Services, Slate, Flex), and a list of Departments (FAST School of Management, FAST School of Computing, Department of Electrical Engineering, Department of Civil Engineering, Department of Sciences and Humanities). The footer also includes a copyright notice: © 2020 Copyright : lhr.nu.edu.pk

Figure 47: Student Home
Home page of the student after login

3.7.4.3 Student Thesis Upload

MS Thesis Repository

FSC > Graduate Thesis > MS Thesis Repository

Hi, Amna

Student Home > Upload Thesis

Upload Thesis

Title

Abstract

Future Work

Name

Roll Number

Advisor Name

Year

Grade

Domain(s)

Upload Thesis

Submit

IMPORTANT LINKS

- Campus Home
- Campus About
- Admissions
- Library
- Support and Services
- Stake
- Flex

DEPARTMENTS

- FAST School of Management
- FAST School of Computing
- Department of Electrical Engineering
- Department of Civil Engineering
- Department of Sciences and Humanities

© 2020 Copyright : lhr.nu.edu.pk

Figure 48: Student Thesis Upload
Student can upload the thesis

3.8 Database Design

3.8.1 ER Diagram

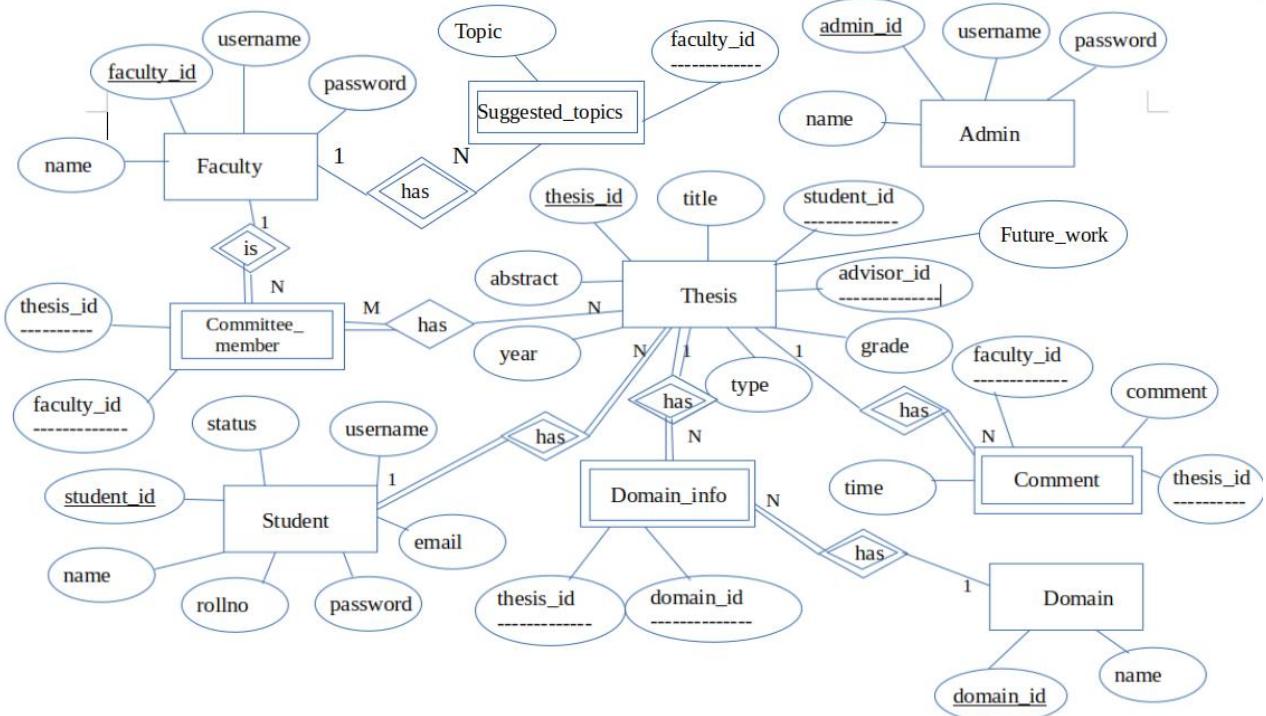


Figure 49: ER Diagram
This shows the ER diagram of the system

3.8.2 Data Dictionary

3.8.1.1 Faculty

Table 1: Faculty Data Dictionary
This is the data dictionary for faculty

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Faculty_id	Int	No	Yes	No	Unique id of faculty member in the database
Name	Varchar	No	No	No	The name of faculty member
Username	Varchar	No	No	No	The username of faculty member that he will use to login to his account
Password	Varchar	No	No	No	The password of the faculty member used for authentication

3.8.1.2 Admin

Table 2: Admin Data Dictionary
This is the data dictionary for admin

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Admin_id	Int	No	Yes	No	Unique id of the admin member in the database
Name	Varchar	No	No	No	The name of the admin
Username	Varchar	No	No	No	The username of admin that he will use to login to his account
Password	Varchar	No	No	No	The password of the admin that will be used for authentication during login

3.8.1.3 Student

Table 3: Student Data Dictionary
This is the data dictionary for student

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Student_id	Int	No	Yes	No	The unique id of student in the database
Name	Varchar	No	No	No	Full name of the student
RollNo	Varchar	No	No	No	Roll number of the student
Username	Varchar	No	No	No	Student's username used to login to account
Password	Varchar	No	No	No	The password of the student that will be used for authentication
Status	Boolean	No	No	No	Value will be 1 if the student is an active student else its value will be 0

3.8.1.4 Thesis

Table 4: Thesis Data Dictionary
This is the data dictionary for thesis

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Thesis_id	Int	No	Yes	No	The unique id of the thesis in the database
Title	Varchar	No	No	No	The title of the thesis
Abstract	Varchar	Yes	No	No	The abstract of the thesis
Year	Int	No	No	No	The year in which the thesis was submitted
Type	Int	No	No	No	Its value will be 1 if it is thesis-I otherwise 2.
Student_id	Int	No	No	Yes	The id of the student whom the thesis belongs to
Advisor_id	Int	No	No	Yes	The id of the advisor of the thesis
Grade	Varchar	Yes	No	No	The grade awarded to the thesis
Future_work	Varchar	Yes	No	No	The “future work” section of the thesis will be saved in this field

3.8.1.5 Domain

Table 5: Domain Data Dictionary
This is the data dictionary for domain

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Domain_id	Int	No	Yes	No	The unique id of the domain in the database
Name	Varchar	No	No	No	The name of the domain

3.8.1.6 Domain Info

Table 6: Domain_info Data Dictionary
This is the data dictionary for domain_info

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Domain_id	Int	No	No	Yes	The id of the domain the thesis belongs to
Thesis_id	Int	No	No	Yes	The id of the thesis

3.8.1.7 Comment

Table 7: Comment Data Dictionary
This is the data dictionary for comments

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Faculty_id	Int	No	No	Yes	The id of the committee member who made the comment
Comment	Varchar	No	No	No	The text of the comment
Thesis_id	Int	No	No	Yes	The id of the thesis about which the comment was made
Time	Time	No	No	No	The time when the comment was made

3.8.1.8 Committee Member

Table 8: Committee_member Data Dictionary

This is the data dictionary for committee member

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Thesis_id	Int	No	No	Yes	The id of the thesis
Faculty_id	Int	No	No	Yes	The id of the faculty member who is the committee member for this thesis

3.8.1.9 Suggested Topics

Table 9: Suggested_topics Data Dictionary

This is the data dictionary for suggested topics

Attributes	Data Type	Nullable	Primary Key	Foreign Key	Description
Faculty_id	Int	No	No	Yes	The id of the faculty member who suggested the topic
Topic	Varchar	No	No	No	The topic suggested by the faculty member

3.9 System Requirements

In order to develop and run the web application, certain tools and software are required which would allow rapid and efficient development. Hence, all the system requirements related to both hardware and software have been extensively described in the Hardware/Software requirements' section.

3.10 Design Considerations

This section describes many of the issues which need to be addressed or resolved before attempting to devise a complete design solution.

3.10.1 Assumptions and Dependencies

- A web browser should be installed on the users' devices to run this web application.
- The faculty accounts can only be accessed by those who are registered by the administrator by using their university email addresses.
- There should be a stable internet connection to access this application.
- This web application has to be integrated with the existing CS department website and has to be connected to the university server to be able to access and store data.

3.10.2 General Constraints

- The interface of the portal must be consistent with the interface of the original website since it is to be integrated with the main website of the university. Any change in the interface of the main website shall be applied to the interface of the portal too.
- Since the portal is for the official use of the university only, the administrator can only register students and faculty members using their official NU IDs.
- There can be denial of service in case too many students try to register themselves at the same time and our website could not handle too many requests at the same time. This would be effective when the students would be given access to register themselves using the portal in the future.

3.11 Development Methods

It is important to follow pre-defined software development methods in order to work efficiently and produce the output in a sophisticated and timely manner. In our project, we will use the following software development approaches:

3.11.1 Agile Method

Agile software development methodology promotes rapid development of the software therefore, we will follow this methodology to develop the software within the given timespan. As we will be in constant contact with the faculty members who have proposed this project, there is a possibility of ongoing changes in the requirements and this approach will give us the flexibility to make the changes in the software anytime during the development phase. Moreover, agile methodology does not solely rely on the initial documentation as requirements keep on changing therefore, we will keep on editing our deliverables according to the changes that will be made during the development phase; timely modifications in the deliverables will keep our documentation up to date. In order to produce the output within the given time frame and efficiently divide the tasks amongst the team members, our focus will be on collaborative work as stated in the agile approach.

5.2 V-Model

V-model or verification and validation model will be partly used in our development. In this model, development and testing is done simultaneously so that any errors/issues can be dealt with at an early stage. This will help us to verify if we are fulfilling the requirements accurately and validate those requirements at each development stage using various testing techniques. However, we will not be following this model completely as it does not support the idea of flexible requirements, but we will follow its basic idea of side-by-side testing.

3.12 Class diagram

Following figure shows the class diagram of our system.

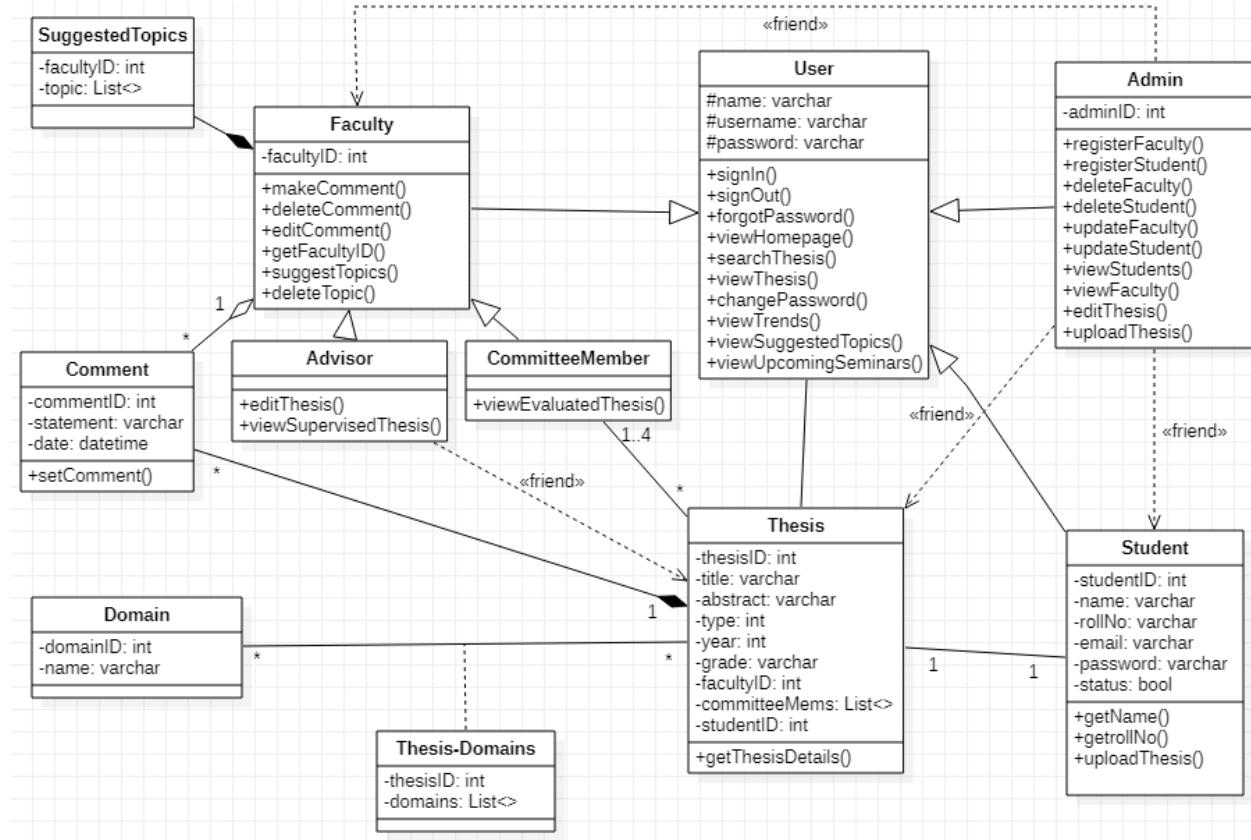


Figure 50: Class Diagram
This figure shows the class diagram of MS Thesis Portal

3.13 Sequence diagram

Following are the sequence diagrams of our system.

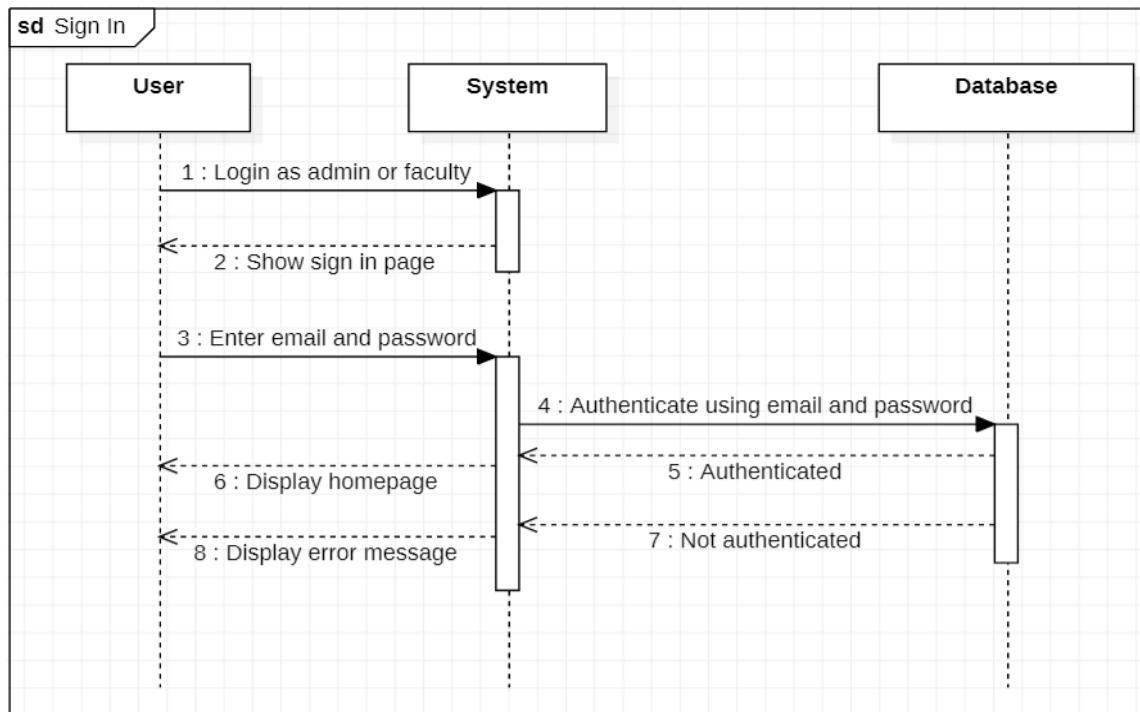


Figure 51: Sign In sequence diagram
This figure shows the sign in sequence diagram of our system.

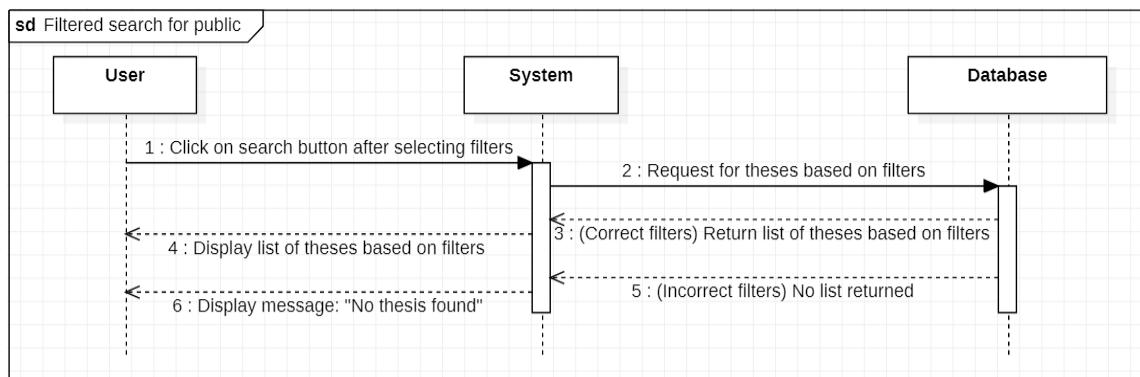


Figure 52: Filtered Search for Public Sequence Diagram
This figure shows the filtered search for public sequence diagram of our system.

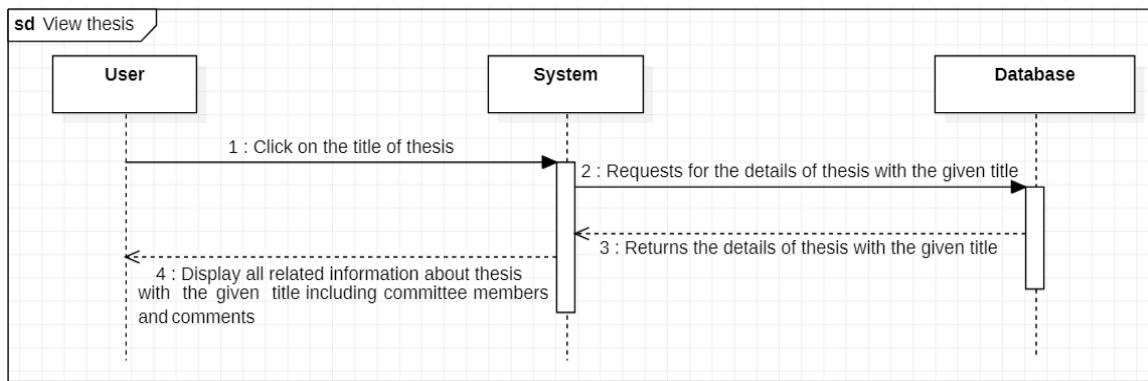


Figure 53: View Thesis Sequence Diagram
This figure shows the view thesis sequence diagram of our system.

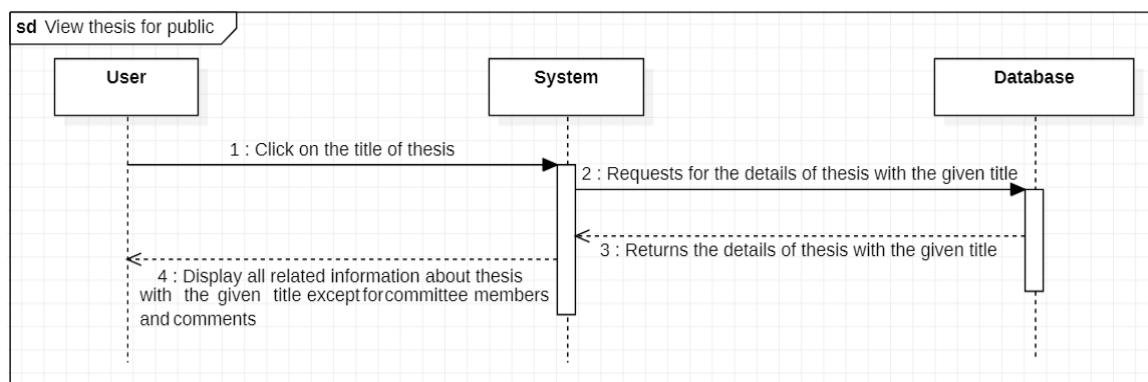


Figure 54: View Thesis for Public Sequence Diagram
This figure shows the view thesis for public sequence diagram of our system.

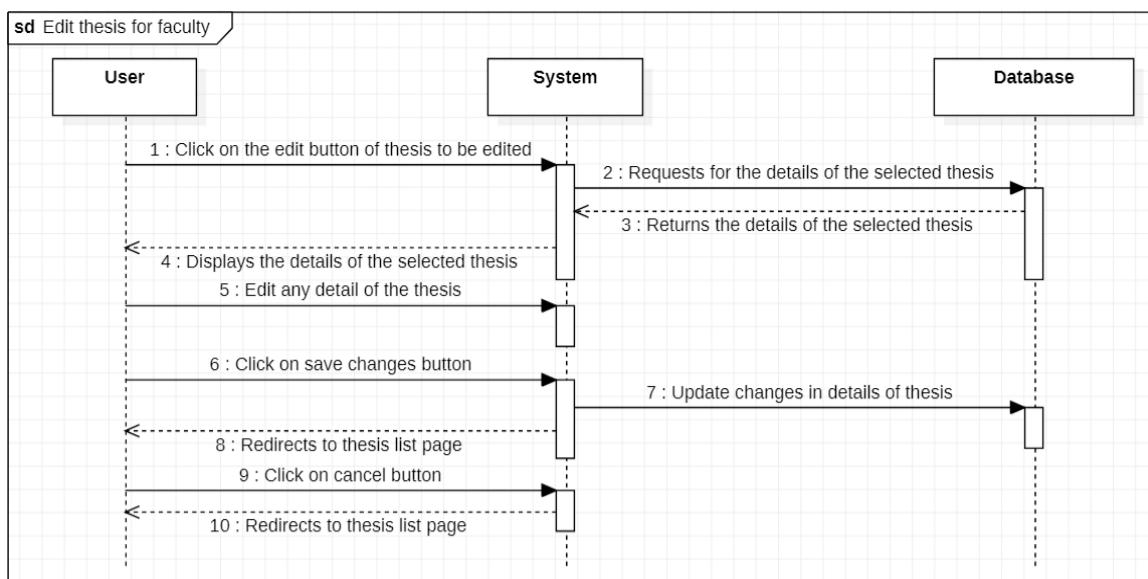


Figure 55: Edit Thesis for Faculty Sequence Diagram
This figure shows the edit thesis for the faculty sequence diagram of our system.

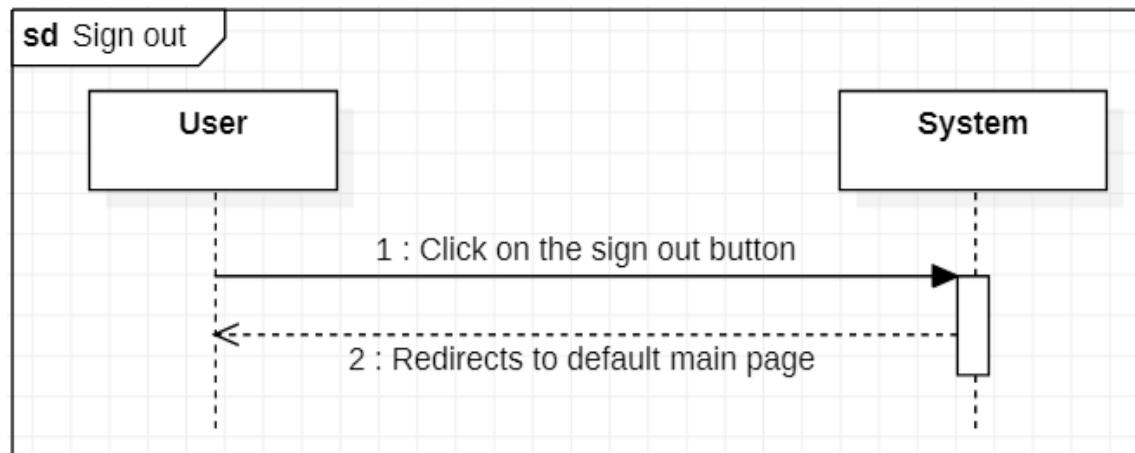


Figure 56: Sign Out Sequence Diagram
This figure shows the sign out sequence diagram of our system.

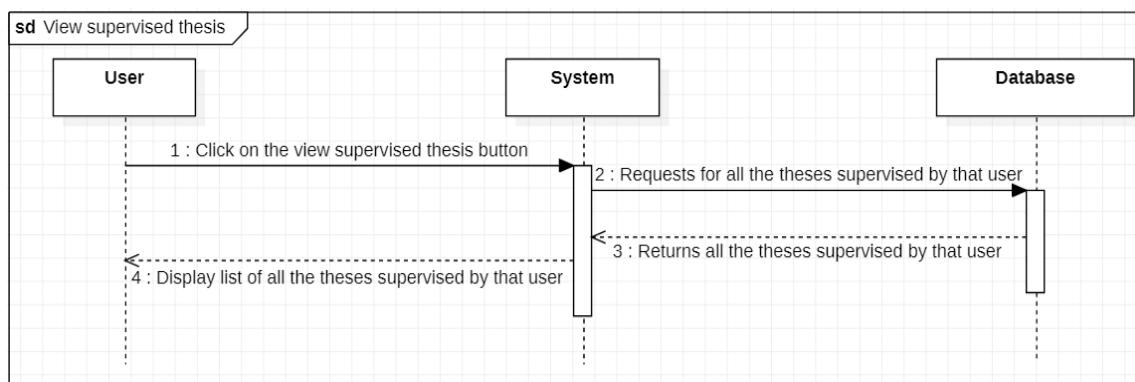


Figure 57: View Supervised Thesis Sequence Diagram
This figure shows the view supervised thesis sequence diagram.

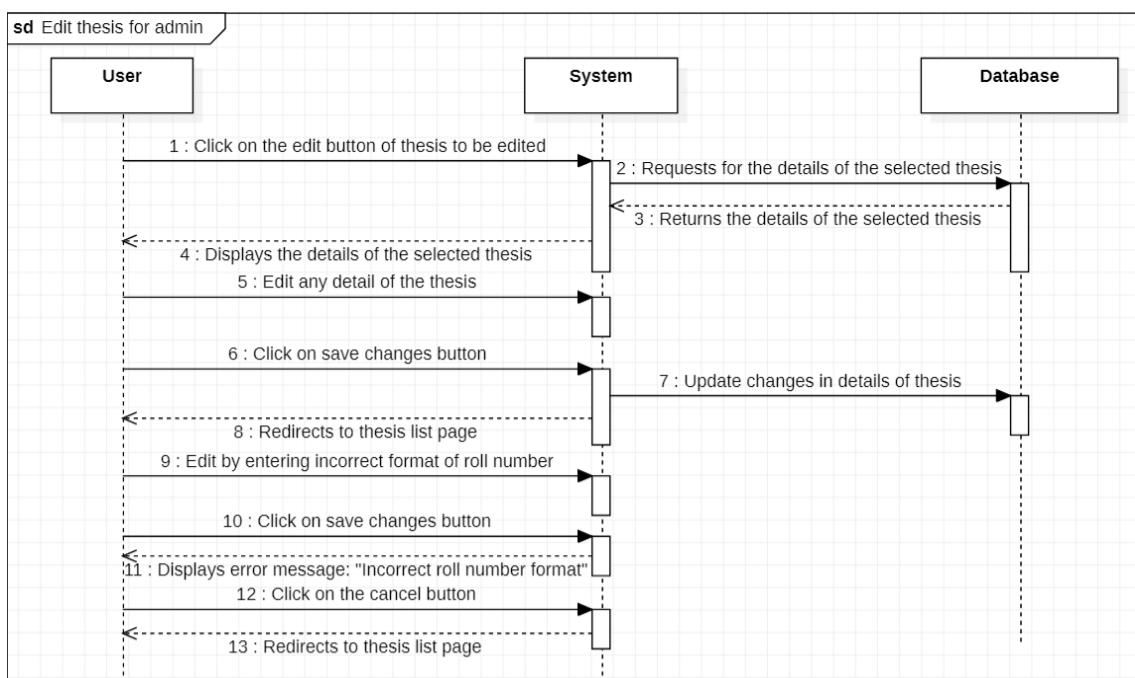


Figure 58: Edit Thesis for Admin Sequence Diagram
This figure shows the edit thesis for admin sequence diagram.

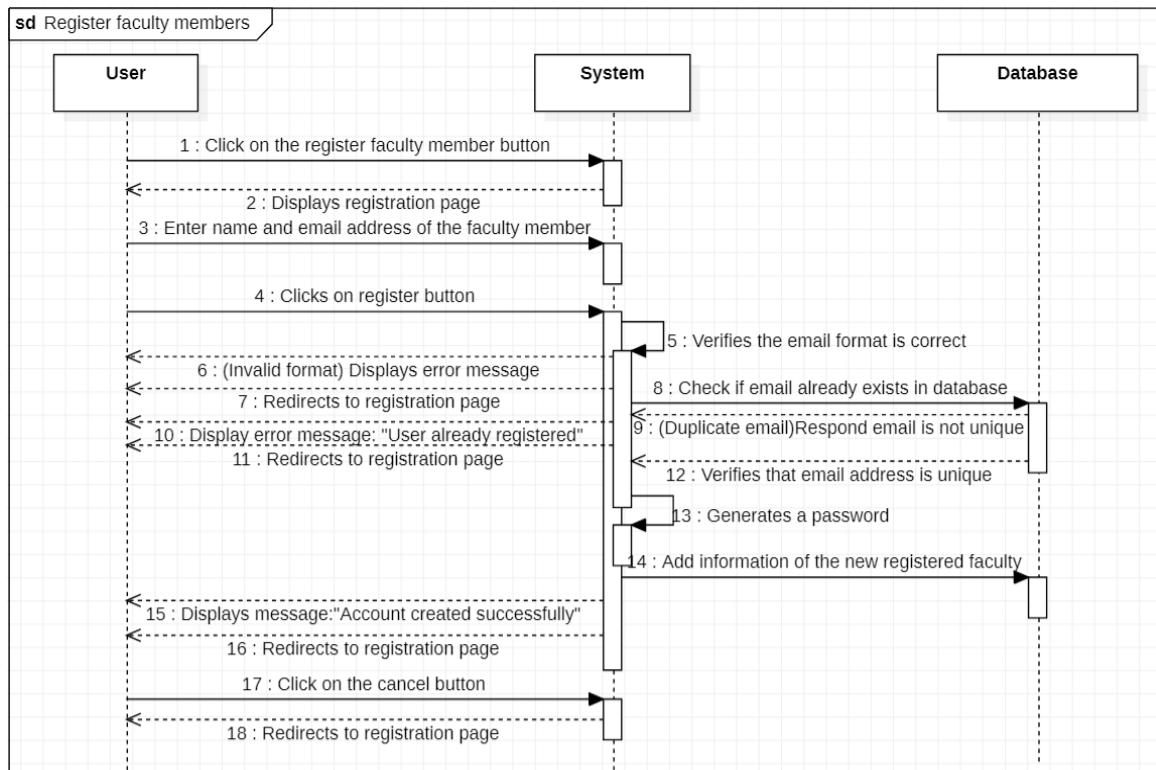


Figure 59: Register Faculty Members Sequence Diagram
This figure shows the register faculty members sequence diagram of our system.

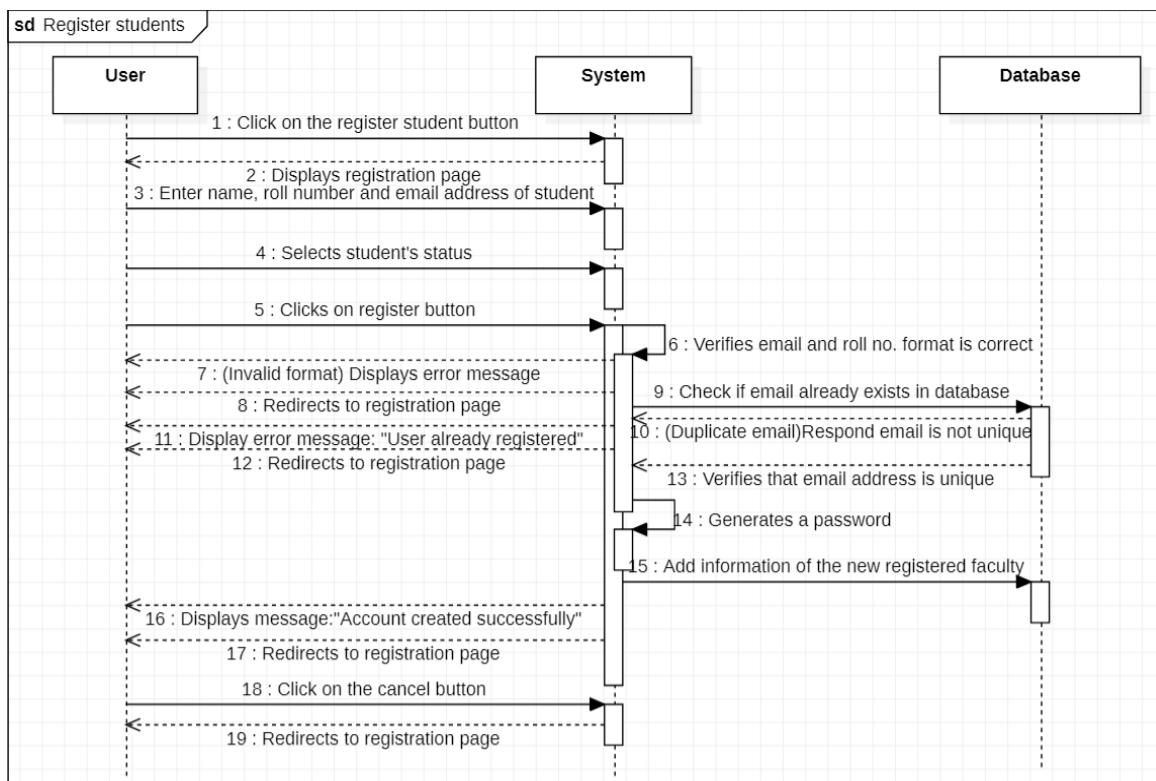


Figure 60: Register Students Sequence Diagram
This figure shows the register students sequence diagram of our system.

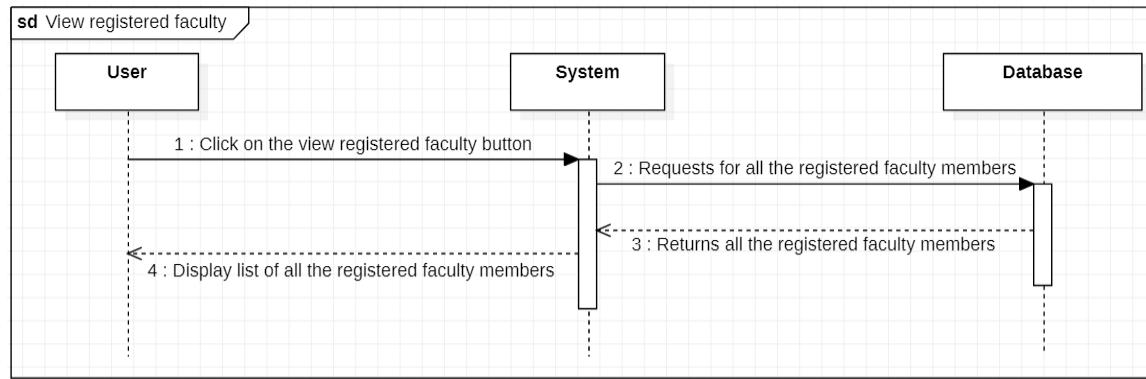


Figure 61: View Registered Faculty Sequence Diagram
This figure shows the view registered faculty sequence diagram of our system.

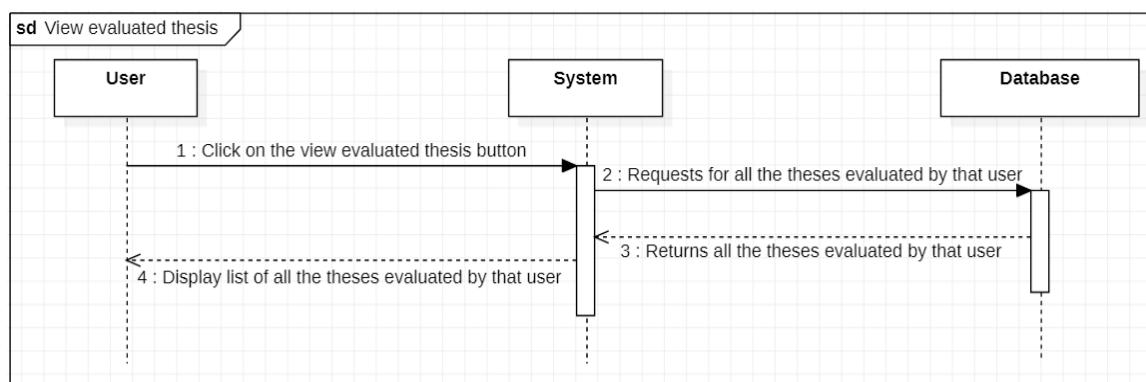


Figure 62: View Evaluated Thesis Sequence Diagram
This figure shows the view evaluated thesis sequence diagram of our system.

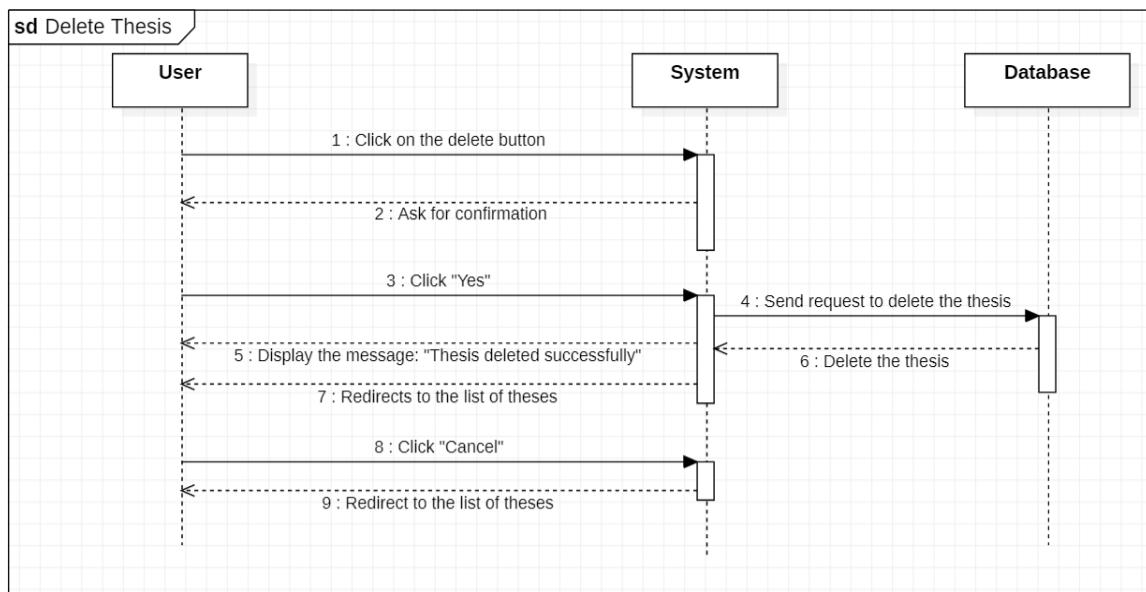


Figure 63: Delete Thesis Sequence Diagram
This figure shows the delete thesis sequence diagram of our system.

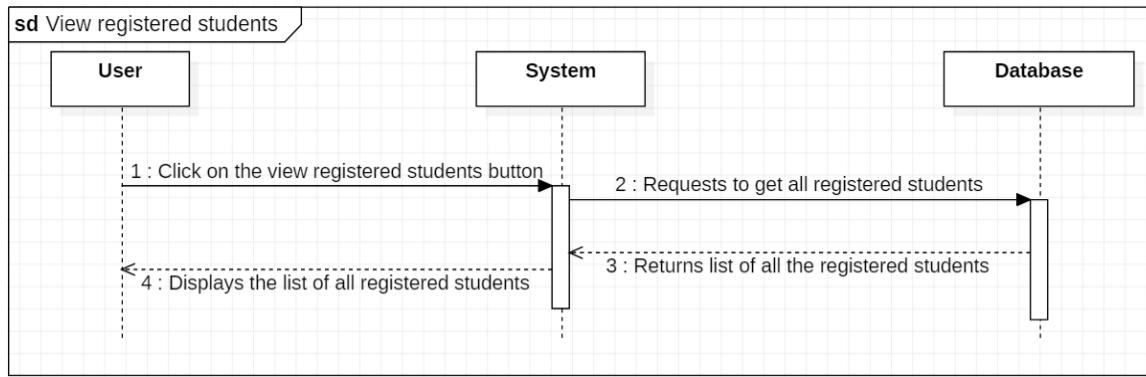


Figure 64: View Registered Students Sequence Diagram
This figure shows the view registered students sequence diagram of our system.

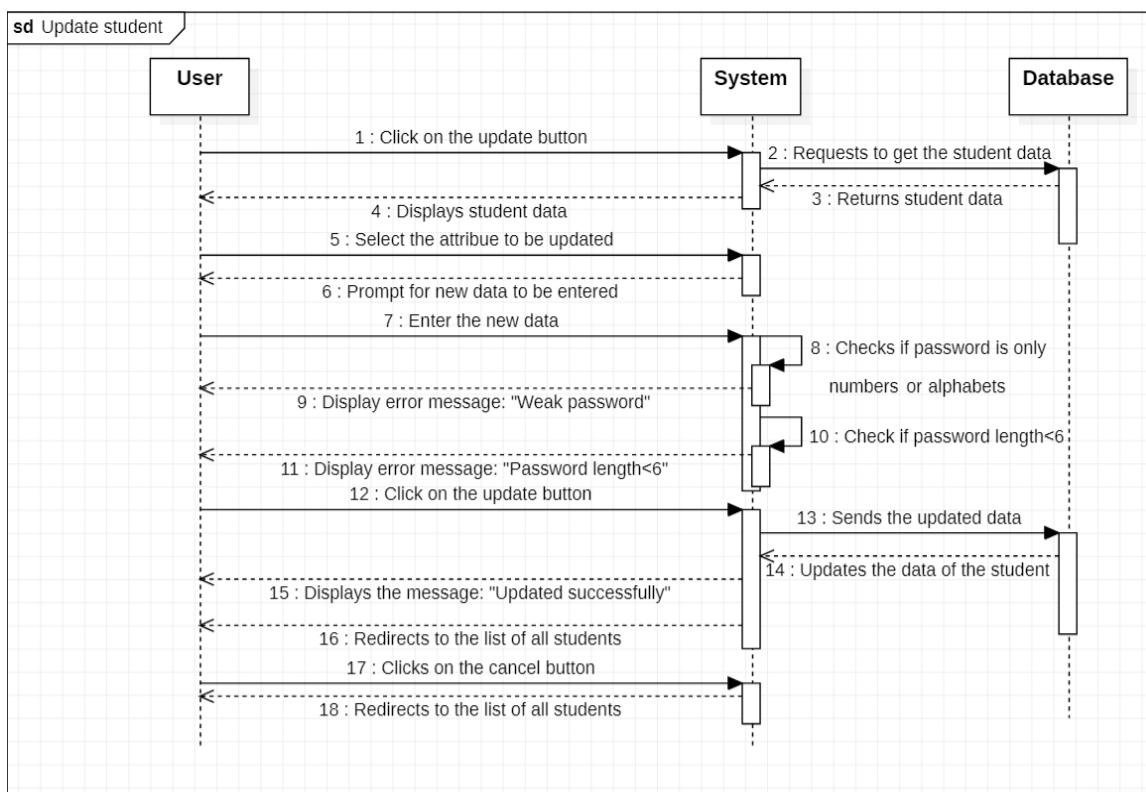


Figure 65: Update Student Sequence Diagram
This figure shows the update student sequence diagram of our system.

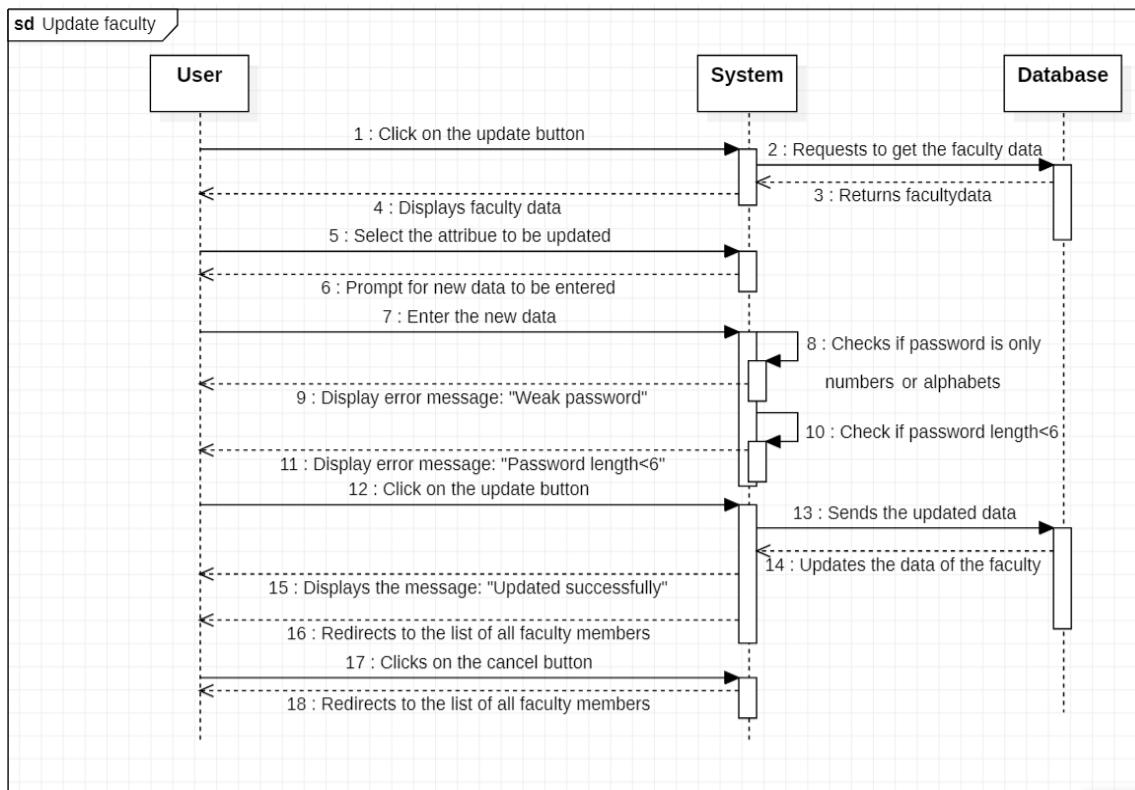


Figure 66: Update Faculty Sequence Diagram
This figure shows the update faculty sequence diagram of our system.

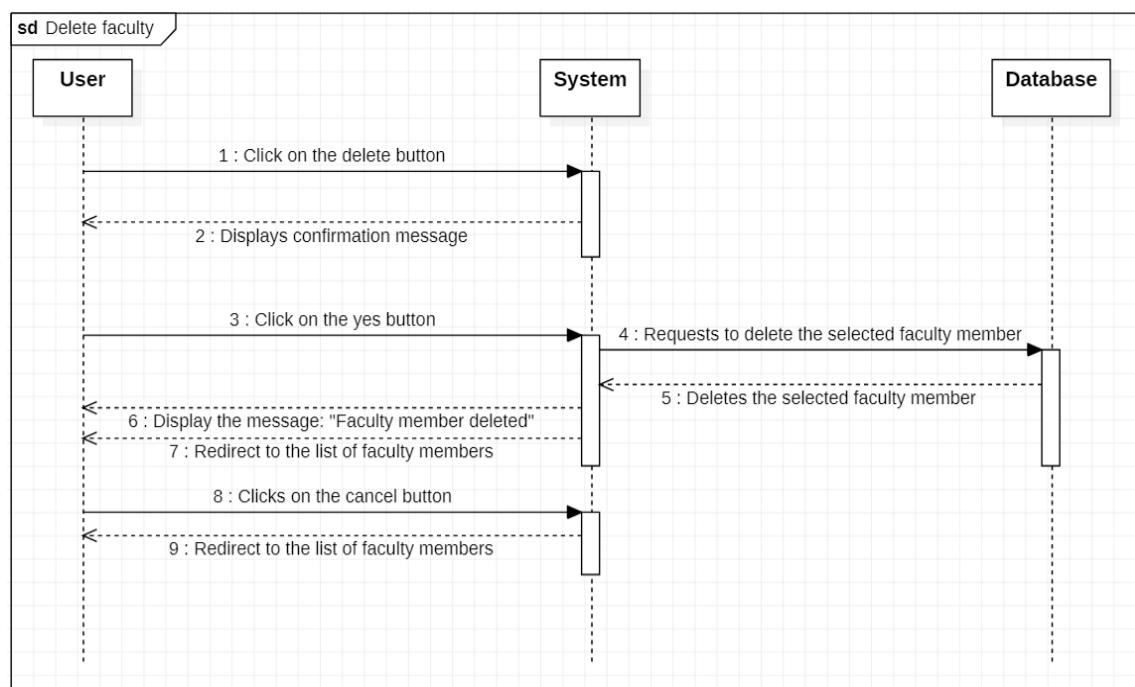
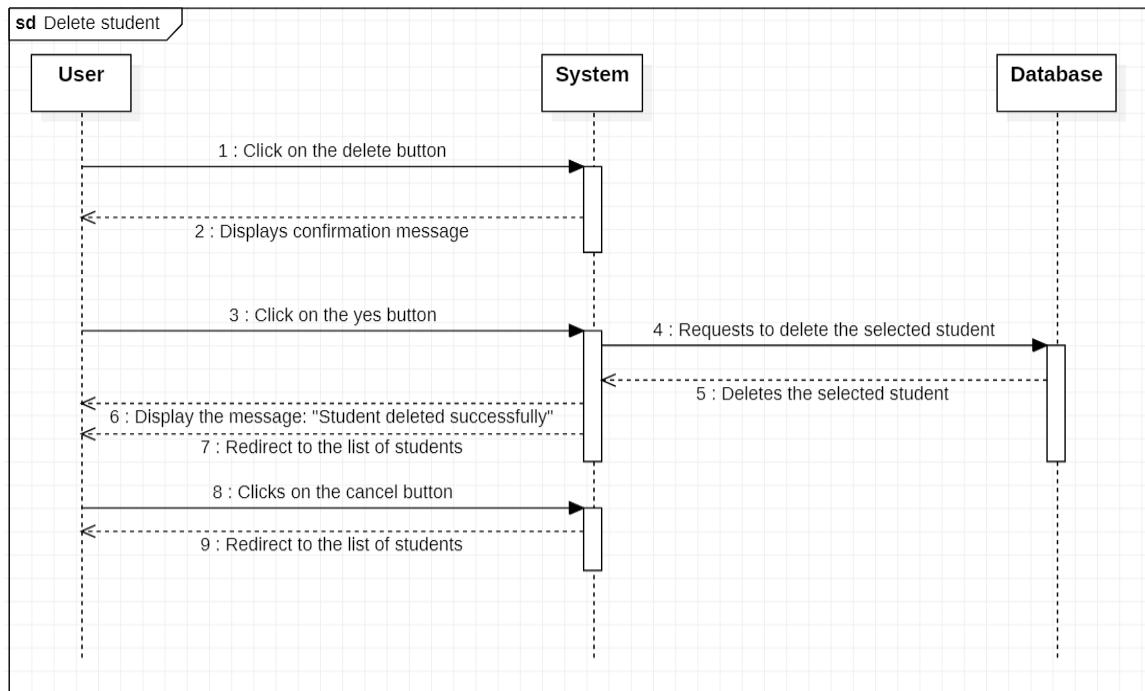
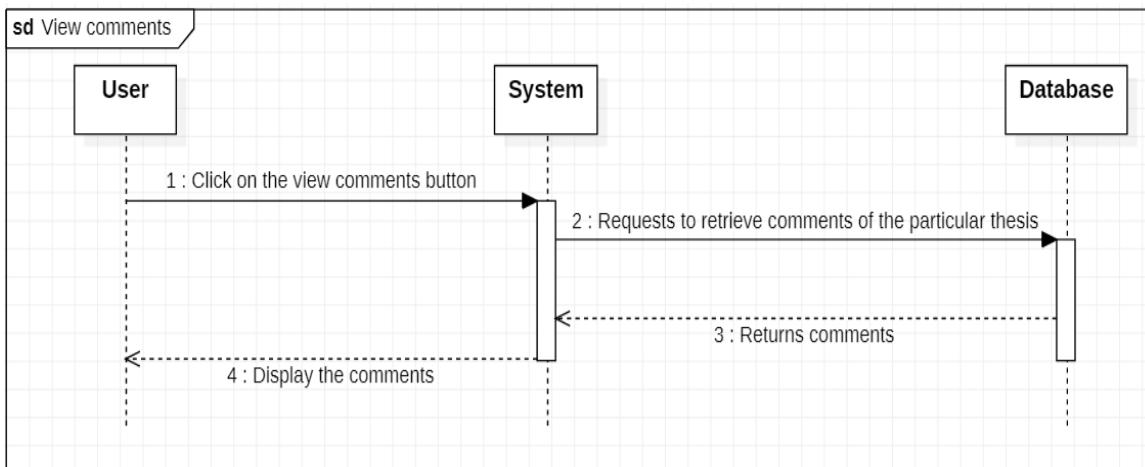


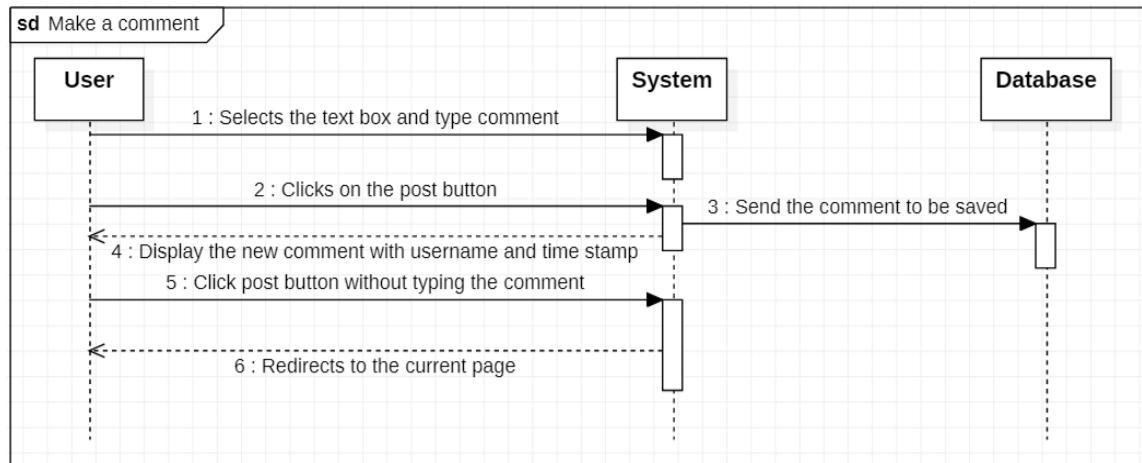
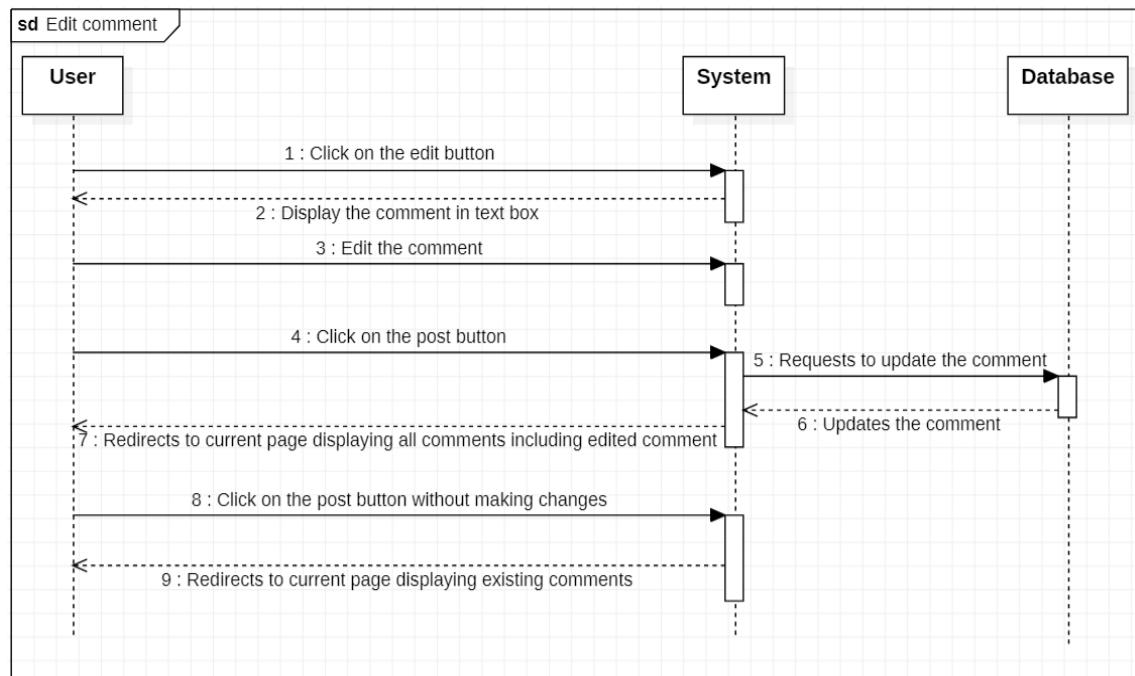
Figure 67: Delete Faculty Sequence Diagram
This figure shows the delete faculty sequence diagram of our system.

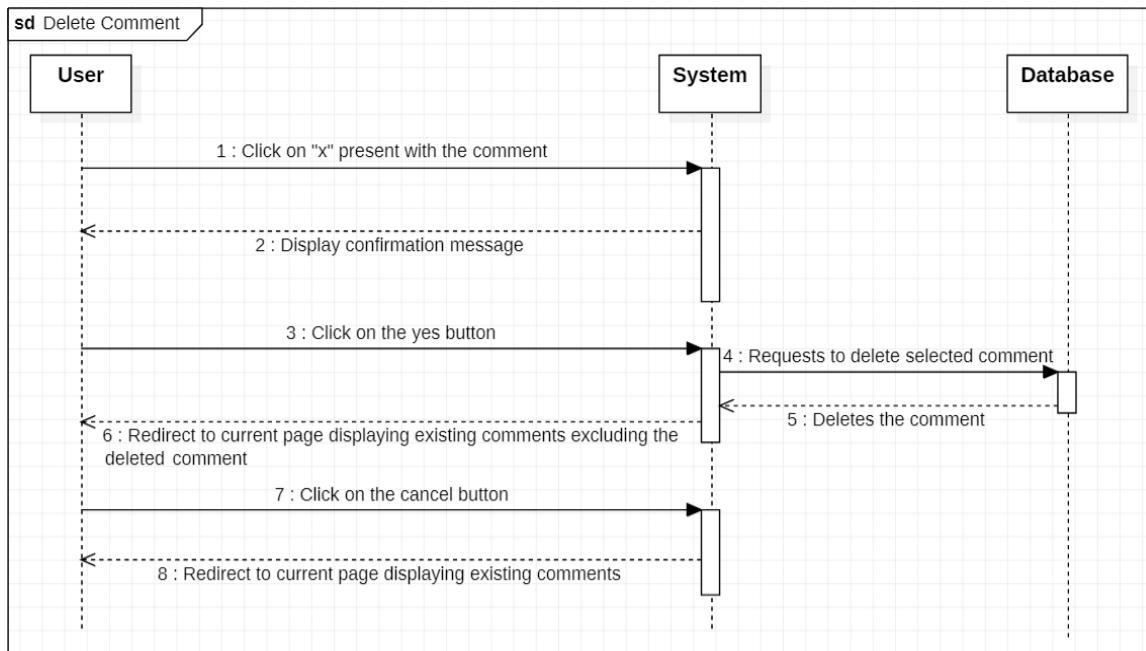
**Figure 68: Delete Student Sequence Diagram**

This figure shows the delete student sequence diagram of our system.

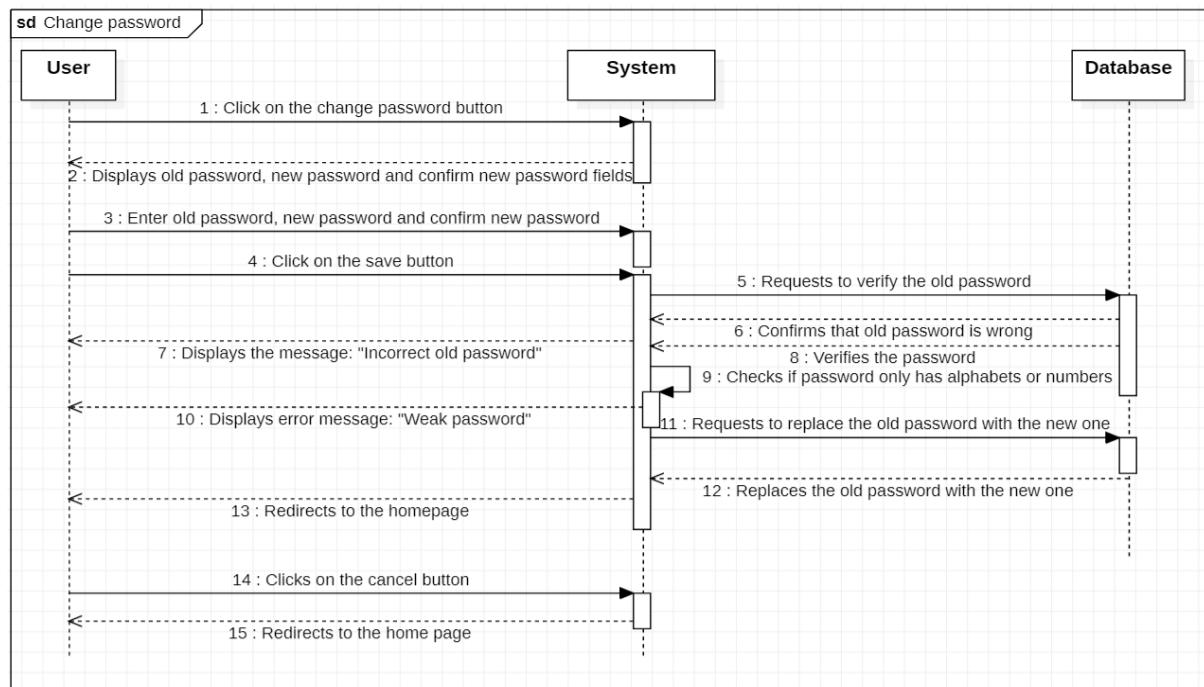
**Figure 69: View Comments Sequence Diagram**

This figure shows the view comments sequence diagram of our system.

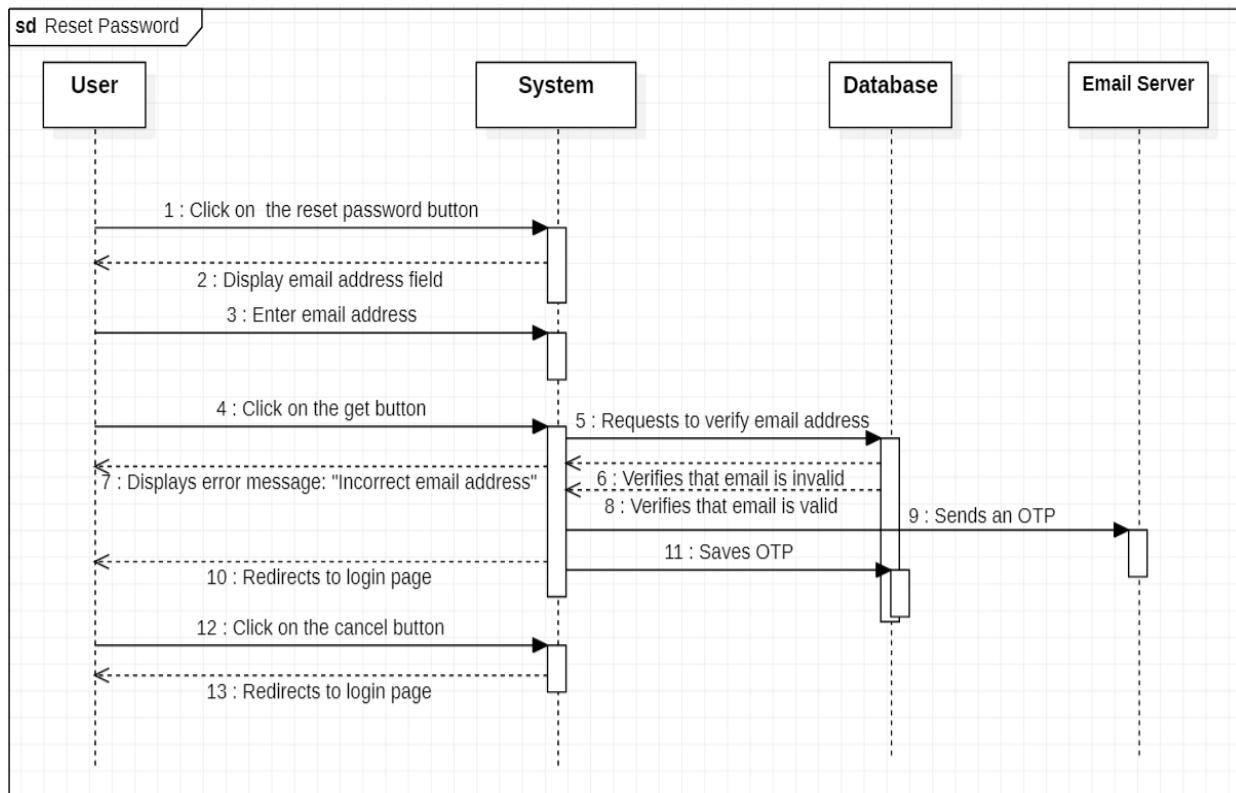
**Figure 70: Make a Comment Sequence Diagram***This figure shows the make a comment sequence diagram of our system.***Figure 71: Edit Comment Sequence Diagram***This figure shows the edit comment sequence diagram of our system.*

**Figure 72: Delete Comment Sequence Diagram**

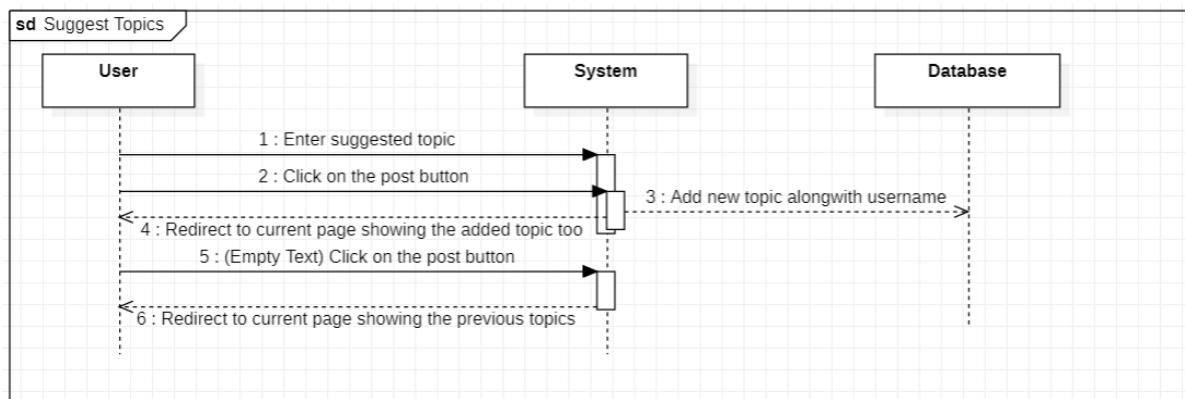
This figure shows the delete comment sequence diagram of our system.

**Figure 73: Change Password Sequence Diagram**

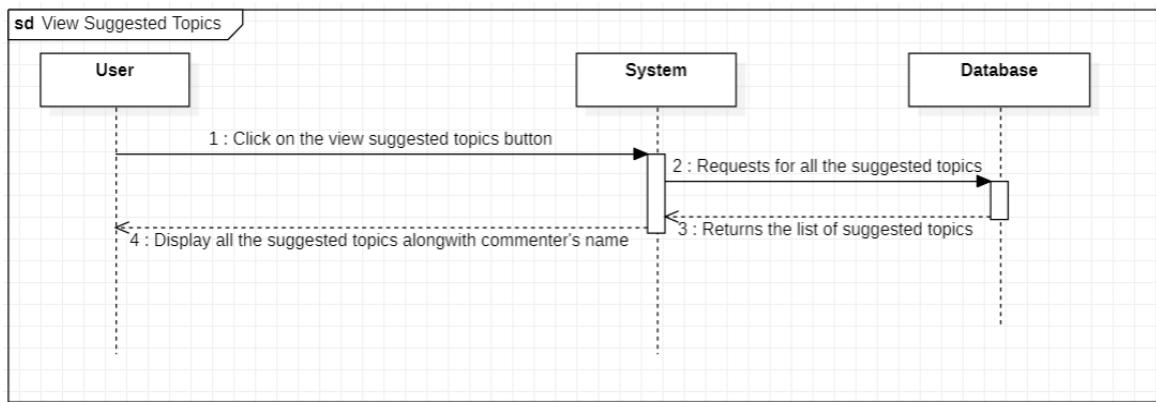
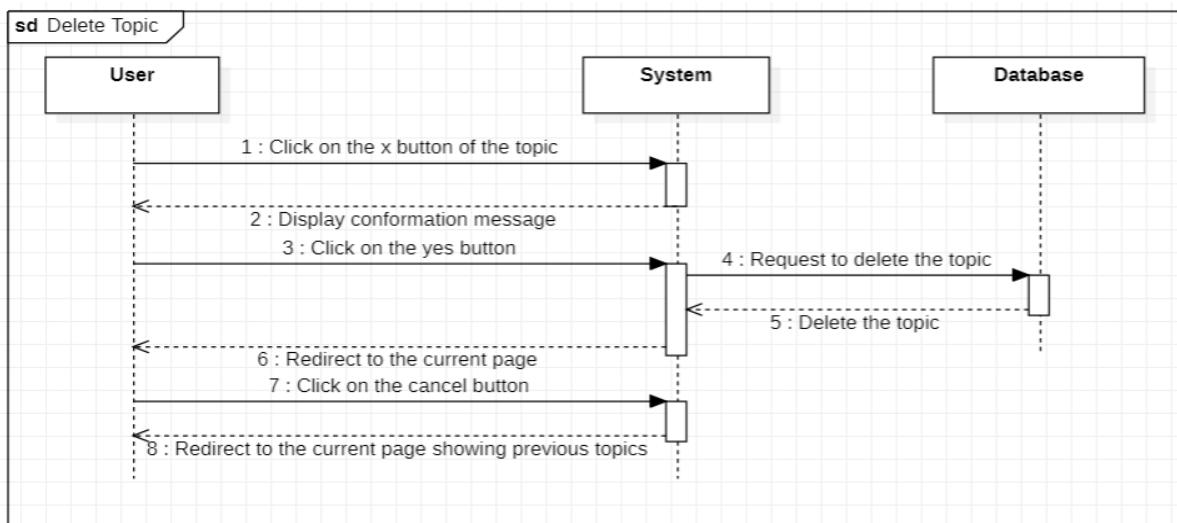
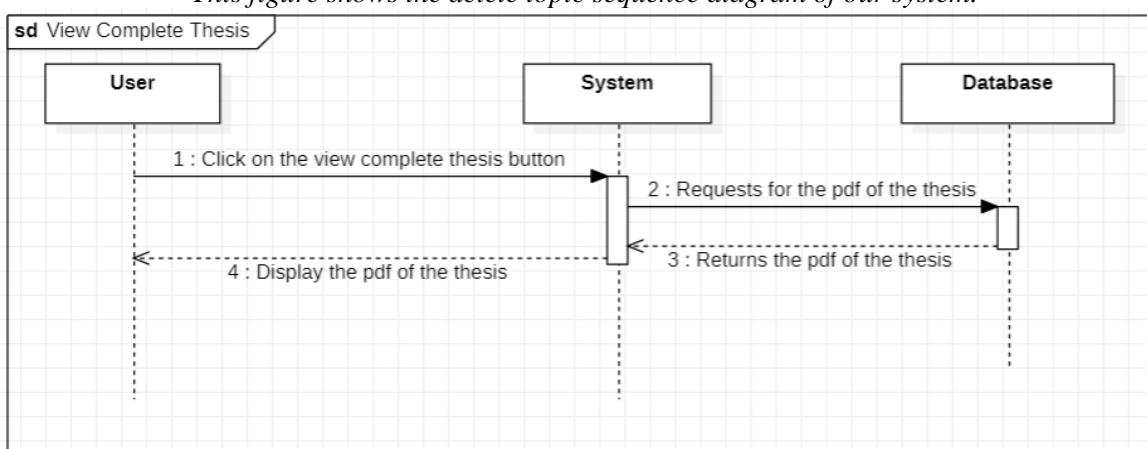
This figure shows the change password sequence diagram of our system.

**Figure 74: Reset Password Sequence Diagram**

This figure shows the reset password sequence diagram of our system.

**Figure 75: Suggest Topics Sequence Diagram**

This figure shows the suggest topics sequence diagram of our system.

**Figure 76: View Suggested Topics Sequence Diagram***This figure shows the view suggested topics sequence diagram of our system.***Figure 77: Delete Topic Sequence Diagram***This figure shows the delete topic sequence diagram of our system.***Figure 78: View Complete Thesis Sequence Diagram***This figure shows the view complete thesis sequence diagram of our system.*

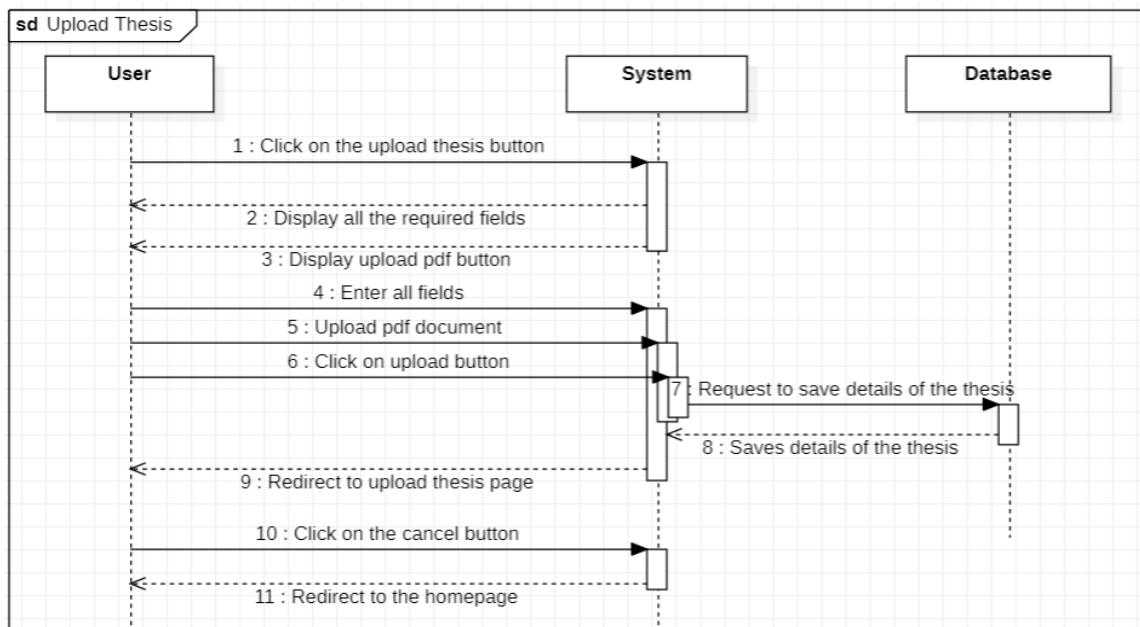


Figure 79: Upload Thesis Sequence Diagram
This figure shows the upload thesis sequence diagram of our system.

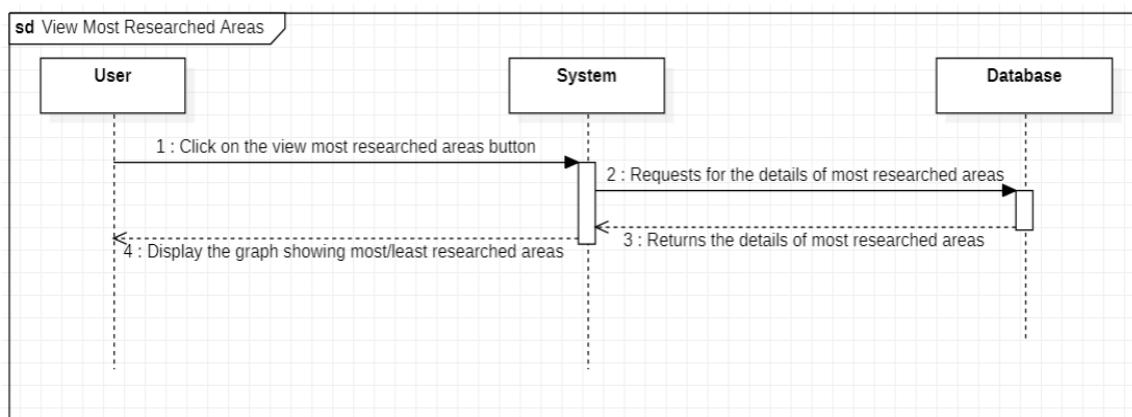


Figure 80: View Most Researched Areas Sequence Diagram
This figure shows the view most researched areas sequence diagram of our system.

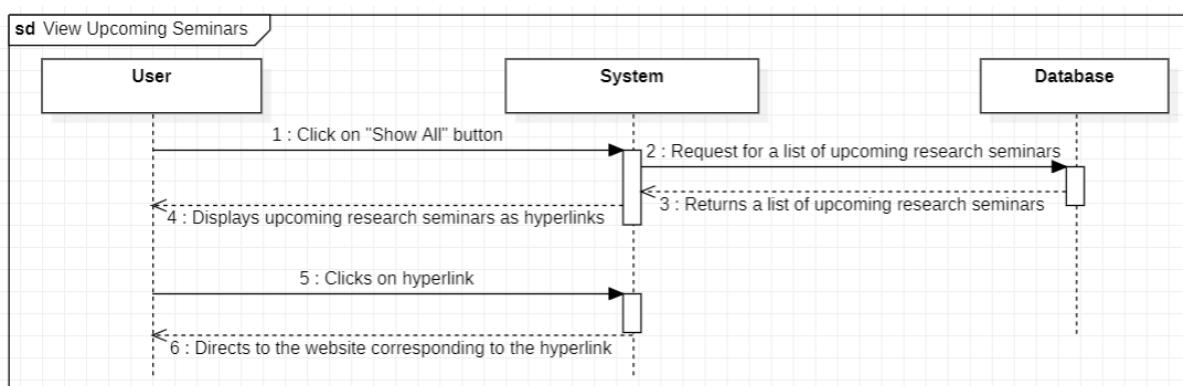


Figure 81: View Upcoming Seminars/Conferences
This figure shows the sequence diagram for View upcoming seminars.

3.14 Policies and Tactics

This section briefly states the policies that were taken into consideration while implementing our web application.

3.14.1 Code guidelines and conventions

Coding conventions of Python, HTML, CSS and JS will be followed. Moreover, design patterns and principles will be considered to develop an efficient program.

3.14.2 Testing

Blackbox and Whitebox testing techniques will be used to test the software thoroughly. More emphasis will be placed on integration testing and unit testing.

3.14.3 User Interface

In order to develop a user-friendly interface, Mandel's 3 golden rules as stated in [10] for interface designing will be followed.

3.14.4 Hierarchical organization of source code

MS Thesis Portal is the main directory which contains separate folders for frontend and backend.

- **settings.py file** – contains information about pre-installed apps, database being used and names of applications being made.
- **urls.py** – consists of all the endpoints of our web-app.
- **models directory** – this directory consists of different classes/models that will be used in our system.
- **views directory** – contains all the files that basically interact with the clients.
- **serializers directory** – contains serialized data fields of all the models.
- **node_modules directory** – this folder consists of all node dependencies.
- **src directory** – contains react components.

To conclude, this chapter provides all the details related to the requirements and design of our web application i.e., MS Thesis Portal. Moreover, this chapter also explains the functionalities that are given to each user; detailed working of each functionality has been explained with the help of use cases. It also sheds light on the development methods that we have used throughout this project.

Chapter 4: Implementation and Test Cases

A general overview of how our system is working is provided in this chapter. It explains the main components of our system along with their implementation. Moreover, this section also comprises of all the relevant test cases required for testing the web-application.

4.1 Implementation

The system has been developed to cover all the core functionalities required to ease and promote research. Functionalities like filtered search, research trends and newsfeed of upcoming IT related seminars and conferences can help students to excel in the areas of research. Apart from that, this system has separation of privileges for different users, which aims to provide different functions and access rights to the users based on their role. Adding to

Implementation and Test Cases

this, backend has been implemented using Django and the frontend using JavaScript's library React. In Django, particularly REST framework is used to build customized web APIs for this repository. These APIs help to retrieve the data effectively as compared to using simple Django. Moreover, in React, functional components are used as they help to effectively deal with the components that are more dependent upon their state using hooks. Addition to this, functional components are easier to manage as compared to the class components. Furthermore, PostgreSQL is used for relational database management, which apart from being most suitable with Django, has many other benefits like security, reliability, and scalability. Following is the basic implementation detail of the major functionalities.

4.1.1 Filtered Search

This is the main element of this repository that allows filtered search based upon various filters like, topic, year, author, advisor, thesis type and domain. For this, a search component is created in frontend, which on search passes selected filter values to the 'search' API. The API provides theses retrieved for the particular filter(s), from the database, in form of arrays, which are then used to render (display) the theses.

4.1.2 Authentication and Session Handling

This prototype provides accounts for faculty, admin and student. As previously mentioned, admin has all of the root functionalities of the repository as compared to the other users. Here, security of the privileges and sessions come into play. Proper sign in 'modals' are used to get data from the user which is then given to the authentication API to look into the database. If the user is not authenticated an error message is displayed otherwise a session is created for that user. The session provides unique token ids to the currently logged in users to separate their activities. The session is terminated when the sign out link is clicked.

4.1.3 Accounts Handling

As the admin is responsible for the root functionalities, so the creation of user accounts is one of the responsibilities given to the admin. The admin is given rights to create faculty and student accounts. Moreover, admin can also modify the information of the accounts. Information of the respective user is provided to the API. Now, the API first checks the presence of the details provided in the database. If the details are new, an account is created and a default password is assigned. API returns a status code to the frontend that confirms the status of the account creation request. This status code is used to prompt relevant message to the user. When an admin updates the account information, an account update API is called to update the account of the user. Moreover, if a delete account request is made, a confirmation is requested from the user in order to avoid accidental deletion of the data. Upon action, delete account API is called to delete the account from the database. However, the users of the account can also change their default passwords using change password component and API.

4.1.4 Thesis View

User can view both major details of a thesis and/or a complete pdf of a thesis. When a user requests to view a thesis, relevant API is called, for relevant state of the user, which takes a thesis id and finds that thesis in the database. Upon retrieval, the thesis is rendered in the thesis view component.

4.1.5 Thesis Edit

Thesis edit rights are only provided to the admin and faculty. Faculty can only edit the abstract and grade of the thesis for which they are advisors, while the admin can edit every information

of the thesis. When the theses are rendered, the above-mentioned users can click the edit button to edit the thesis. Only the editable text boxes can be changed to update the information. When the user presses save button the present values of the input fields and text areas are send to the edit thesis API. This API updates the thesis information and returns a status code for confirmation. In addition to this, admin has a right to delete a thesis as well. If a delete request is made, a confirmation is requested from the user in order to avoid accidental deletion of the data. Upon action, delete thesis API is called to delete the thesis from the database.

4.1.6 Comments handling

Faculty can add comments to a thesis in order to provide reviews to the student as well as the other faculty members. In thesis view, the commentators can add, delete and update their comments. List of comments shows the name and role of the commentator, timestamp when the comment was made and the comment. When a user wishes to create a comment, a modal component is displayed to get information for the comment. When post button is clicked, make comment API is called. This API adds comment to the list of already existing comments of that thesis. After this, updated list is rendered. When an update comment request is made, the comment is updated by the user and the API created for updating the comments, updates that comment. Moreover, when a user wishes to delete a comment, delete thesis API is called to delete the comment from the database.

4.1.7 Research Trends

This functionality provides a bigger picture of the overall research trends of the university. The domains are divided into different visualizations to help the views get an intuition of the domains which are researched more.

4.1.8 Research Suggestions

The faculty members can provide research suggestions to the students. The suggestions will be visible on the website to help the students find a research topic.

4.1.9 Web Crawler

Web crawling is the process of indexing data on web pages by using an automated script. A web crawler enables the user to retrieve any information on one or more pages. This web application includes a web crawler that crawls the internet and retrieves information about the dates and venues of conferences and seminars related to information technology. The crawler starts crawling through the URL www.computer.org and then discovers new pages. The newly discovered URLs are added to the crawl queue so that they can be crawled later. In this way, the web crawler is able to index every page that is connected to the previously mentioned URL.

The aforementioned implementation details cover the major part of the portal.

4.2 Test case Design and description

4.2.1 Sign In

Thesis Portal Management					
Account Operations					
Test Case ID:	1	QA Test Engineer:	Ayesha Azhar		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Sign In UC (1)		
Revision History:	None				
Objective	<i>To check if the user signs in to the system successfully.</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	None				
Pre-Requisite:	<i>The user is already registered in the database.</i>				
Step No.	Execution description		Procedure result		
1	<i>The user clicks on the 'Login as Admin' or 'Login as Faculty' or 'Login as Student' button.</i>		<i>The sign in page is displayed asking for email and password.</i>		
2	<i>The user enters a valid email and password.</i>		<i>The system verifies the email and password, establishes a session for the user and redirects the user to the home page.</i>		
Comments: The user signs in to the system successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.2 Sign In with Invalid Email Test Case

Thesis Portal Management			
Account Operations			
Test Case ID:	2	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Sign In UC (1)
Revision History:	None		
Objective	<i>To test sign in functionality when user enters invalid email</i>		
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>Sign in button is clearly visible to the user.</i>		
Pre-Requisite:	<i>The user is already registered in the database.</i>		
Step No.	Execution description		Procedure result

1	<i>The user clicks on the 'Login as Admin' or 'Login as Faculty' or 'Login as Student' button.</i>	<i>The sign in page is displayed asking for email and password.</i>
2	<i>The user enters an invalid email and valid password.</i>	<i>The system responds with an error message: "Invalid Email"</i>
Comments: The user can't sign in to the system.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.3 Sign In with Invalid Password Test Case

Thesis Portal Management			
Account Operations			
Test Case ID:	3	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Sign In UC (1)
Revision History:	None		
Objective	<i>To test sign in functionality when user enters invalid password</i>		
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>Sign in button is clearly visible to the user.</i>		
Pre-Requisite:	<i>The user is already registered in the database.</i>		
Step No.	Execution description	Procedure result	
1	<i>Click on the 'Login as Admin' or 'Login as Faculty' or 'Login as Student' button.</i>	<i>The sign in page is displayed asking for email and password.</i>	
2	<i>Enters a valid email and invalid password.</i>	<i>The system responds with an error message: "Invalid Password"</i>	
Comments: The user can't sign in to the system.			
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed			

4.2.4 Filtered Search Test Case

Thesis Portal Management			
Search Thesis			
Test Case ID:	4	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Filtered Search for Public UC(2)
Revision History:	None		
Objective	<i>To test if search engine searches and returns required theses</i>		

Implementation and Test Cases

Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>None</i>				
Step No.	Execution description		Procedure result		
1	<i>Enter the student's name and/or roll number and/or title and/or select value for one or more fields from the drop-down menus of advisor name, year, thesis type and/or selects domain(s).</i>				
2	<i>Click on the 'search' button.</i>		<i>The system displays a list of theses based on the values given in filters.</i>		
Comments: This test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.5 Filtered Search with Incorrect Input Test Case

Thesis Portal Management					
Search Thesis					
Test Case ID:	5	QA Test Engineer:	Ayesha Azhar		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Filtered Search for Public UC(2)		
Revision History:	<i>None</i>				
Objective	<i>To test the working of search engine when invalid input is entered</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>None</i>				
Step No.	Execution description		Procedure result		
1	<i>Enter incorrect value(s) for any of the input fields.</i>				
2	<i>Click on the 'search' button.</i>		<i>The system responds with a message: No results found.</i>		
Comments: This test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.6 View Thesis for Faculty and Admin Test Case

Thesis Portal Management			
View Thesis			
Step No.	Execution description	Procedure result	
1	<i>Click on the title of the thesis to be viewed.</i>	<i>The system displays thesis title, abstract, associated domains, year, type, grade, student's name, roll number, advisor's name, committee and comments.</i>	
Comments: The user can view the selected thesis successfully.			
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed			

4.2.7 View Thesis for Public Test Case

Thesis Portal Management			
View Thesis			
Step No.	Execution description	Procedure result	
1	<i>Click on the title of the thesis that they want to view.</i>	<i>The system displays the thesis title, abstract, associated domains, year, thesis type, student's name, roll number and advisor's name.</i>	

Implementation and Test Cases

Comments: The user can view the selected thesis successfully.
--

<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed
--

4.2.8 Filtered Search with Sign In Test Case

Thesis Portal Management					
Search Thesis					
Test Case ID:	8	QA Test Engineer:	Ayesha Azhar		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Filtered Search UC(5)		
Revision History:	None				
Objective	<i>To test if the user is able to perform filter search successfully after signing in as faculty, admin or student</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be logged in as faculty, admin or student</i>				
Step No.	Execution description	Procedure result			
1	<i>Enter the student's name and/or roll number and/or title and/or selects value for one or more fields from the drop-down menus of advisor name, year, thesis type and/or selects domain(s).</i>				
2	<i>Click on the 'search'</i>	<i>The system displays a list of theses based on the values given in filters.</i>			
Comments: This test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.9 Filtered Search with Sign and Invalid Input In Test Case

Thesis Portal Management					
<Reference>					
Test Case ID:	9	QA Test Engineer:	Ayesha Azhar		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Filtered Search UC(5)		
Revision History:	<i>None</i>				
Objective	<i>To test the working of search engine when invalid input is entered after signing in as faculty, admin or student</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be logged in as faculty, admin or student</i>				
Step No.	Execution description	Procedure result			
1	<i>Enter incorrect value(s) for any of the input fields.</i>				
2	<i>Click on the 'search' button.</i>	<i>The system responds with a message: No results found.</i>			
Comments: This test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.10 Edit Thesis for Faculty Test Case

Faculty Component			
Thesis Management			
Test Case ID:	10	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Edit Thesis for Faculty UC(6)
Revision History:	<i>None</i>		
Objective	<i>To test if the faculty is able to edit a thesis successfully</i>		
Product/Ver/Module:	<i>Faculty Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be logged in as faculty and the system must be on the list of theses supervised by that user's page.</i>		
Step No.	Execution description	Procedure result	
1	<i>Click on the 'Edit' button next to the thesis that is to be updated.</i>	<i>The system displays thesis title and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type, domain, advisor name and committee</i>	

Implementation and Test Cases

		<i>members' names are editable through drop-down menus.</i>
2	<i>Edit thesis title and/or select value for one or more fields from the drop-down menus of advisor name, year, thesis type, domain(s), grade and/or committee members' names.</i>	
3	<i>Click on the 'Save changes' button.</i>	<i>The system updates the changes in the database and redirects the user to the thesis list page.</i>
Comments: The faculty can edit the thesis successfully.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.11 Edit Thesis for Faculty with Cancel Button Test Case

Faculty Component			
Thesis Management			
Test Case ID:	<i>11</i>	QA Test Engineer:	<i>Ayesha Azhar</i>
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>
Test Date:	<i>14-05-2022</i>	Use Case Reference(s):	<i>Edit Thesis for Faculty UC(6)</i>
Revision History:	<i>None</i>		
Objective	<i>To test if the cancel button works as required</i>		
Product/Ver/Module:	<i>Faculty Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be logged in as faculty and the system must be on the list of theses supervised by that user's page.</i>		
Step No.	Execution description		Procedure result
1	<i>Click on the 'Edit' button next to the thesis that is to be updated.</i>		<i>The system displays thesis title and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type, domain, advisor name and committee members' names are editable through drop-down menus.</i>

2	<i>Edit thesis title and/or select value for one or more fields from the drop-down menus of advisor name, year, thesis type, domain(s), grade and/or committee members' names.</i>	
3	<i>Click on the 'Cancel' button.</i>	<i>The system does not save the changes in the database, redirects the user to the thesis list page.</i>
Comments: The user is redirected to the thesis list page without making any changes in the database.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.12 Sign Out Test Case

Thesis Portal Management					
Account Operations					
Test Case ID:	12	QA Test Engineer:	Ayesha Azhar		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Sign out UC(7)		
Revision History:	<i>None</i>				
Objective	<i>To test if the user's session is successfully terminated once the signout button is clicked</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Sign Out' button</i>	<i>The system signs the user out and redirects to the default main page.</i>			
Comments: The user signs out successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.13 View Supervised Thesis Test Case

Faculty Component					
View Thesis					
Test Case ID:	13	QA Test Engineer:	Ayesha Azhar		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	View Supervised Thesis UC(8)		
Revision History:	None				
Objective	<i>To test if the signed in faculty is able to successfully view the list of supervised thesis</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	None				
Pre-Requisite:	<i>The user must be signed in as faculty</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on 'View Supervised Thesis' button.</i>	<i>The system displays a list of all the thesis supervised by the particular user/faculty member.</i>			
Comments: The user can view the thesis supervised by them.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.14 Edit Thesis for Admin Test Case

Admin Component			
Thesis Management			
Test Case ID:	14	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Edit Thesis for Admin UC(9)
Revision History:	None		
Objective	<i>To test if the admin is able to edit thesis successfully</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	None		
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of thesis' page.</i>		
Step No.	Execution description	Procedure result	
1	<i>Click on the 'Edit' button next to the thesis that is to be updated.</i>	<i>The system displays thesis title, student's name, roll number and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type,</i>	

		<i>domain, advisor name and committee members' names are editable through drop-down menus.</i>
2	<i>Edit the thesis title and/or student's name and/or roll number and/or select value for one or more fields from the drop-down menus of advisor name, year, thesis type, domain(s), grade and/or committee members' names.</i>	
3	<i>Click on the 'Save changes' button.</i>	<i>The system updates the changes in the database and redirects the user to the thesis list page.</i>
Comments: The admin can edit the thesis successfully.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.15 Edit Thesis for Admin with Invalid Input Test Case

Admin Component			
Thesis Management			
Test Case ID:	15	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	<i>Edit Thesis for Admin UC(9)</i>
Revision History:	<i>None</i>		
Objective	<i>To test if the system responds with an error message when invalid input is entered</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of thesis' page.</i>		
Step No.	Execution description		Procedure result
1	<i>Click on the 'Edit' button next to the thesis that is to be updated.</i>		<i>The system displays thesis title, student's name, roll number and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type, domain, advisor name and committee</i>

Implementation and Test Cases

		<i>members' names are editable through drop-down menus.</i>
2	<i>Enter the incorrect format for the student's roll number and click the 'Save changes' button.</i>	<i>The system responds with a message: 'Incorrect roll number format'.</i>
Comments: The system does not display the error message.		
<input type="checkbox"/> Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.16 Edit Thesis for Admin with Cancel Button Test Case

Admin Component			
Thesis Management			
Test Case ID:	<i>16</i>	QA Test Engineer:	<i>Ayesha Azhar</i>
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>
Test Date:	<i>14-05-2022</i>	Use Case Reference(s):	<i>Edit Thesis for Admin UC(9)</i>
Revision History:	<i>None</i>		
Objective	<i>To test the system response when the cancel button is clicked.</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of thesis' page.</i>		
Step No.	Execution description	Procedure result	
1	<i>Click on the 'Edit' button next to the thesis that is to be updated.</i>	<i>The system displays thesis title, student's name, roll number and abstract in the form of text boxes so that the user can make changes in the desired fields. Grade, thesis year, type, domain, advisor name and committee members' names are editable through drop-down menus.</i>	
2	<i>Edit thesis title and/or student's name and/or roll number and/or select value for one or more fields from the drop-down menus of</i>		

	<i>advisor name, year, thesis type, domain(s), grade and/or committee members' names.</i>	
3	<i>Press the 'Cancel' button.</i>	<i>The system doesn't save the changes in the database, redirects the user to the thesis list page.</i>
Comments: The user is redirected to the thesis list page without making any changes in the database.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.17 Register Faculty Member Test Case

Admin Component			
Accounts Management			
Test Case ID:	17	QA Test Engineer:	Ayesha Azhar
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Register Faculty Member UC(10)
Revision History:	<i>None</i>		
Objective	<i>To test if the admin is able to register a faculty member successfully.</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin.</i>		
Step No.	Execution description		Procedure result
1	<i>Click on the 'Register Faculty Member' button.</i>		<i>The registration page is displayed asking for the faculty member's name and email.</i>
2	<i>Enter a name and valid email and click on the 'Register' button.</i>		<i>The system verifies if the email is in correct format and doesn't already exist in the database of registered members.</i>
3			<i>The system then generates a password and saves the information in the database.</i>

Implementation and Test Cases

4		<i>It responds with an 'Account successfully created' message and redirects to the registration page.</i>
Comments: The admin can register faculty successfully.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.18 Register Faculty Member with Invalid Email Test Case

Admin Component					
Accounts Management					
Test Case ID:	<i>18</i>	QA Test Engineer:	<i>Izna Zubair</i>		
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	<i>14-05-2022</i>	Use Case Reference(s):	<i>Register Faculty Member UC(10)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the system responds with an error message when invalid email is entered.</i>				
Product/Ver/Module:	<i>Admin Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Register Faculty Member' button.</i>	<i>The registration page is displayed asking for the faculty member's name and email.</i>			
2	<i>Enter a name and invalid email and click on the 'Register' button.</i>	<i>The system responds with an error message: Incorrect email. Redirects the user to the registration page.</i>			
Comments: The system does not display the error message.					
<input type="checkbox"/> Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.19 Register Faculty Member with Registered Email Test Case

Admin Component Accounts Management					
Test Case ID:	19	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Register Faculty Member UC(10)		
Revision History:	<i>None</i>				
Objective	<i>To test if the system responds with an error message when an already registered email is entered.</i>				
Product/Ver/Module:	<i>Admin Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Register Faculty Member' button.</i>	<i>The registration page is displayed asking for the faculty member's name and email.</i>			
2	<i>Enter a name and a registered email and click on the 'Register' button.</i>	<i>The system responds with an error message: User already registered. Redirects the user to the registration page.</i>			
Comments: The system does not register the faculty member.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.20 Register Faculty Member Cancel Button Test Case

Admin Component Accounts Management			
Test Case ID:	20	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Register Faculty Member UC(10)
Revision History:	<i>None</i>		
Objective	<i>To test the system response when the cancel button is clicked.</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		

Implementation and Test Cases

Assumptions:	<i>None</i>	
Pre-Requisite:	<i>The user must be signed in as admin.</i>	
Step No.	Execution description	Procedure result
1	<i>Click on the 'Register Faculty Member' button.</i>	<i>The registration page is displayed asking for the faculty member's name and email.</i>
2	<i>Enter a valid name and email.</i>	
3	<i>Click on the 'Cancel' button.</i>	<i>The system redirects the user to the list of all members.</i>
Comments: The system redirects the user to the list of all members without making any changes.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.21 Register Student Test Case

Admin Component			
Accounts Management			
Test Case ID:	21	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Register Student UC(11)
Revision History:	<i>None</i>		
Objective	<i>To test if the admin is able to register a student successfully.</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin.</i>		
Step No.	Execution description	Procedure result	
1	<i>Click on the 'Register Student' button.</i>	<i>The registration page is displayed asking for the student's name, roll number and email.</i>	
2	<i>Enter email, name, roll number, select the student's status from drop-down and click on the 'Register' button.</i>	<i>The system verifies if the roll number and email are in correct format and the email doesn't already exist in the database of registered students.</i>	
3		<i>The system then generates a password and saves the information in the database.</i>	

4		<i>It responds with an 'Account successfully created' message and redirects to the registration page.</i>
Comments: The admin can register student successfully.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.22 Register Student with Invalid Email Test Case

Admin Component					
Accounts Management					
Test Case ID:	22	QA Test Engineer:	<i>Izna Zubair</i>		
Test case Version:	1	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	14-05-2022	Use Case Reference(s):	<i>Register Student UC(11)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the system gives an error message when invalid email is entered.</i>				
Product/Ver/Module:	<i>Admin Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Register Student' button.</i>	<i>The registration page is displayed asking for the student's name, roll number and email.</i>			
2	<i>Enter invalid email, name, roll number, select the student's status from drop-down and click on the 'Register' button.</i>	<i>The system responds with an error message: Incorrect email. Redirects the user to the registration page.</i>			
Comments: The system does not display error message.					
<input type="checkbox"/> Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.23 Register Student with Invalid Roll Number Test Case

Admin Component Accounts Management					
Test Case ID:	23	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Register Student UC(11)		
Revision History:	<i>None</i>				
Objective	<i>To test if the system gives an error message when invalid roll number is entered.</i>				
Product/Ver/Module:	<i>Admin Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Register Student' button.</i>	<i>The registration page is displayed asking for the student's name, roll number and email.</i>			
2	<i>Enter email, name, incorrect roll number, select the student's status from drop-down and clicks on the 'Register' button.</i>	<i>The system responds with an error message: Incorrect roll number format. Redirects the user to the registration page.</i>			
Comments: The system does not display error message.					
<input type="checkbox"/> Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.24 Register Student with Registered Email Test Case

Admin Component Accounts Management			
Test Case ID:	24	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Register Student UC(11)
Revision History:	<i>None</i>		
Objective	<i>To test if the system gives an error message when an already registered email is entered.</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin.</i>		
Step No.	Execution description	Procedure result	

1	<i>Click on the 'Register Student' button.</i>	<i>The registration page is displayed asking for the student's name, roll number and email.</i>
2	<i>Enter an already registered email, name, incorrect roll number, select the student's status from drop-down and click on the 'Register' button.</i>	<i>The system responds with an error message: User already registered. Redirects the user to the registration page.</i>
Comments: The system does not register the student.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.25 Register Student with Cancel Button Test Case

Admin Component			
Accounts Management			
Step No.	Execution description	Procedure result	
1	<i>Click on the 'Register Student' button.</i>	<i>The registration page is displayed asking for the student's name, roll number and email.</i>	
2	<i>Enter an already registered email, name, incorrect roll number, select the student's status from drop-down and click on the 'Cancel' button.</i>	<i>The system redirects the user to the list of all students.</i>	
Comments: The system redirects the user to the list of all students without making any changes.			
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed			

4.2.26 View Registered Faculty Test Case

Admin Component					
View Account					
Test Case ID:	26	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	View Registered Faculty UC(12)		
Revision History:	<i>None</i>				
Objective	<i>To test if the system displays the list of registered faculty members whose details are saved in the database.</i>				
Product/Ver/Module:	<i>Accounts Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin.</i>				
Step No.	Execution description		Procedure result		
1	<i>Click on the 'View Registered Faculty' button.</i>		<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		
Comments: The system displays the list of registered faculty members successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.27 View Evaluated Thesis Test

Faculty Component					
View Thesis					
Test Case ID:	27	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	View Evaluated Thesis UC(13)		
Revision History:	<i>None</i>				
Objective	<i>To test if the system displays the list of evaluated thesis of the signed in faculty.</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as faculty.</i>				
Step No.	Execution description		Procedure result		
1	<i>Click on the 'View Evaluated Thesis' button.</i>		<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		
Comments: The system displays the list of all the evaluated thesis by a faculty member successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.28 Delete Thesis Test Case

Admin Component					
Thesis Management					
Test Case ID:	28	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Delete Thesis UC(14)		
Revision History:	<i>None</i>				
Objective	<i>To test if the user is able to delete a thesis successfully.</i>				
Product/Ver/Module:	<i>Admin Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of thesis' page.</i>				
Step No.	Execution description		Procedure result		
1	<i>Click on the 'Delete' button beside the specific thesis.</i>		<i>The system displays an alert message: Do you want to delete?</i>		
2	<i>Click on the 'Yes' button.</i>		<i>The system deletes the thesis from the database, displays the 'Thesis successfully deleted!' message and redirects to the list of all thesis.</i>		
Comments: This test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.29 Delete Thesis with Cancel Button Test Case

Admin Component			
Thesis Management			
Test Case ID:	29	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Delete Thesis UC(14)
Revision History:	<i>None</i>		
Objective	<i>To test the system response when cancel button is clicked.</i>		
Product/Ver/Module:	<i>Admin Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of thesis' page.</i>		
Step No.	Execution description		Procedure result

Implementation and Test Cases

1	<i>Click on the 'Delete' button beside the specific thesis.</i>	<i>The system displays an alert message: Do you want to delete?</i>
2	<i>Click on 'Cancel' button.</i>	<i>The system redirects the user to the list of all theses.</i>
Comments: The system redirects the user to the list of all theses without deletion.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.30 View Registered Students Test Case

Admin Component					
View Accounts					
Test Case ID:	30	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	View Registered Students UC(15)		
Revision History:	<i>None</i>				
Objective	<i>To test if the system displays the list of registered students whose details are saved in the database.</i>				
Product/Ver/Module:	<i>Account Operations Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin.</i>				
Step No.	Execution description		Procedure result		
1	<i>Click on the 'View Registered Students' button.</i>		<i>The system displays the list of all registered students.</i>		
Comments: The system displays the list of all registered students successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.31 Update Student Test Case

Admin Component			
Update Account			
Test Case ID:	31	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Update Student UC(16)
Revision History:	<i>None</i>		
Objective	<i>To test if the user is able to update student information successfully.</i>		

Product/Ver/Module:	<i>Account Operations Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of students' page.</i>				
Step No.	Execution description		Procedure result		
1	<i>Click on the 'Update' button beside the specific student's details.</i>		<i>The system displays all the name, status and password related to that student.</i>		
2	<i>Select the attributes that are to be updated.</i>		<i>The system prompts for new inputs for the selected fields.</i>		
3	<i>Enter an updated name and/or new password and/or select an option from the status drop-down and click on the 'Update' button.</i>		<i>The system updates the attributes in the database, displays the 'Updated successfully!' message and redirects to the list of all students.</i>		
Comments: The admin can edit the student information successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.32 Update Student with Cancel Button Test Case

Admin Component			
Update Account			
Test Case ID:	32	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Update Student UC(16)
Revision History:	<i>None</i>		
Objective	<i>To test if the system responds when the cancel button is clicked.</i>		
Product/Ver/Module:	<i>Account Operations Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of students' page.</i>		
Step No.	Execution description		Procedure result
1	<i>Click on the 'Update' button beside the specific student's details.</i>		<i>The system displays all the name, status and password related to that student.</i>

Implementation and Test Cases

2	Select the attributes that have to be updated.	The system prompts for new inputs for the selected fields.
3	Enter an updated name and/or new password and/or selects an option from the status drop-down and click on the 'Cancel' button.	The system redirects the user to the list of all students.
Comments: The system redirects the user to the list of all students without making any changes.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.33 Update Faculty Test Case

Thesis Portal Management			
Update Account			
Test Case ID:	33	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	Update Faculty UC(17)
Revision History:	None		
Objective	To test if the user is able to update faculty information successfully.		
Product/Ver/Module:	Account Operations Module in the website.		
Environment:	Website is up and running on the localhost.		
Assumptions:	None		
Pre-Requisite:	The user must be signed in as admin and the system must be on the list of faculty's page.		
Step No.	Execution description	Procedure result	
1	Click on the 'Update' button beside the specific faculty's details.	The system displays all the name, status and password related to that faculty member.	
2	Select the attributes that are to be updated.	The system prompts for new inputs for the selected fields.	
3	Enter an updated name and/or new password and/or select an option from the status drop-down and click on the 'Update' button.	The system updates the attributes in the database, displays the 'Updated successfully!' message and redirects to the list of all faculty members.	

Comments: The admin can edit the faculty information successfully.

<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed
--

4.2.34 Update Faculty with Cancel Button Test Case

Thesis Portal Management					
Update Account					
Test Case ID:	34	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	Update Faculty UC(17)		
Revision History:	<i>None</i>				
Objective	<i>To test if the system responds when the cancel button is clicked.</i>				
Product/Ver/Module:	<i>Account Operations Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of faculty's page.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Update' button beside the specific faculty member's details.</i>	<i>The system displays all the name, status and password related to that faculty member.</i>			
2	<i>Select the attributes that have to be updated.</i>	<i>The system prompts for new inputs for the selected fields.</i>			
3	<i>Enter an updated name and/or new password and/or selects an option from the status drop-down and click on the 'Cancel' button.</i>	<i>The system redirects the user to the list of all faculty members.</i>			
Comments: The system redirects the user to the list of all faculty members without making any changes.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.35 Delete Faculty Test Case

Thesis Portal Management					
Delete account					
Test Case ID:	35	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	Delete Faculty UC(18)		
Revision History:	<i>None</i>				
Objective	<i>To test if the user is able to delete a faculty member successfully.</i>				
Product/Ver/Module:	<i>Account Operations Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of faculty's page.</i>				
Step No.	Execution description		Procedure result		
1	<i>Click on the 'Delete' button beside the specific faculty member.</i>		<i>The system displays an alert message: Do you want to delete?</i>		
2	<i>Click on the 'Yes' button.</i>		<i>The system deletes the faculty member from the database, displays the 'Faculty member successfully deleted!' message and redirects to the list of all faculty members.</i>		
Comments: This test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.36 Delete Faculty with Cancel Button Test Case

Thesis Portal Management			
Delete Account			
Test Case ID:	36	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	Delete Faculty UC(18)
Revision History:	<i>None</i>		
Objective	<i>To test the system response when the cancel button is clicked.</i>		
Product/Ver/Module:	<i>Account Operations Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of faculty's page.</i>		
Step No.	Execution description		Procedure result

1	<i>Click on the 'Delete' button beside the specific faculty member.</i>	<i>The system displays an alert message: Do you want to delete?</i>
2	<i>Click on 'Cancel' button.</i>	<i>The system redirects the user to the list of all faculty members.</i>
Comments: The system redirects the user to the list of all faculty members without deletion.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.37 View Comments Test Case

Thesis Portal Management					
Comment Operations					
Test Case ID:	37	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	View Comments UC(19)		
Revision History:	<i>None</i>				
Objective	<i>To test if the user is able to view the details of all comments related to a thesis.</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The system must be displaying a particular thesis.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the "View Comments" button of a thesis.</i>	<i>The system displays a window containing all the comments on a thesis along with the commenter's name and timestamp.</i>			
Comments: The user can view the comments successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.38 Delete Student Test Case

Thesis Portal Management			
Delete Account			
Test Case ID:	38	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	Delete Student UC(20)
Revision History:	<i>None</i>		

Implementation and Test Cases

Objective	<i>To test if the user is able to delete a student successfully.</i>	
Product/Ver/Module:	<i>Account Operations Module in the website.</i>	
Environment:	<i>Website is up and running on the localhost.</i>	
Assumptions:	<i>None</i>	
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of student's page.</i>	
Step No.	Execution description	Procedure result
1	<i>Click on the 'Delete' button beside the specific student.</i>	<i>The system displays an alert message: Do you want to delete?</i>
2	<i>Click on the 'Yes' button.</i>	<i>The system deletes the student from the database, displays the 'Student successfully deleted!' message and redirects to the list of all students.</i>
Comments: This test case has not been executed yet.		
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed		

4.2.39 Delete Student with Cancel Button Test Case

Thesis Portal Management					
Delete Account					
Test Case ID:	39	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	Delete Student UC(20)		
Revision History:	<i>None</i>				
Objective	<i>To test the system response when the cancel button is clicked.</i>				
Product/Ver/Module:	<i>Account Operations Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as admin and the system must be on the list of student's page.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Delete' button beside the specific student.</i>	<i>The system displays an alert message: Do you want to delete?</i>			
2	<i>Click on 'Cancel' button.</i>	<i>The system redirects the user to the list of all students.</i>			
Comments: The system redirects the user to the list of all students without deletion.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.40 Make a Comment Test Case

Faculty Component Comment Operations					
Step No.	Execution description	Procedure result			
1	<i>Click on the text box beneath the stream of comments, type the comment and click on the 'Post' button.</i>	<i>The system posts/displays the comment at the end of the comment stream along with the faculty member's name and timestamp, saves the comment in the database and redirects to the current page, which also includes the newly posted comment.</i>			
Comments: The user can make a comment successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.41 Edit Comment Test Case

Faculty Component Comment Operations					
Step No.	Execution description	Procedure result			
1	<i>Click on the text box beneath the stream of comments, type the comment and click on the 'Post' button.</i>	<i>The system posts/displays the comment at the end of the comment stream along with the faculty member's name and timestamp, saves the comment in the database and redirects to the current page, which also includes the newly posted comment.</i>			
Comments: The user can make a comment successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

Implementation and Test Cases

1	<i>Click on the 'Edit' button underneath the previously made comment.</i>	<i>The system posts/displays the comment in a text box for editing.</i>
2	<i>Type in a new comment and click on the 'Post' button.</i>	<i>The system saves the comment along with its new timestamp in the database and redirects to the current page, which also includes the newly posted comment in its previous place.</i>
Comments: This test case has not been executed yet.		
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed		

4.2.42 Edit Comment with Empty Field Test Case

Faculty Component					
Comment Operations					
Test Case ID:	<i>42</i>	QA Test Engineer:	<i>Rimsha Tariq</i>		
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	<i>15-05-2022</i>	Use Case Reference(s):	<i>Edit Comment UC(22)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the system preserves the previous comments in case the faculty post the empty comment.</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as faculty and the system must be displaying a particular thesis.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Edit' button underneath the previously made comment.</i>	<i>The system posts/displays the comment in a text box for editing.</i>			
2	<i>Press the 'Post' button without typing anything in the comment box.</i>	<i>The system redirects to the current page, which includes the previous comments only.</i>			
Comments: The system redirects the user to the current page successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.43 Delete Comment Test Case

Faculty Component Comment Operations					
Test Case ID:	43	QA Test Engineer:	Rimsha Tariq		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	Delete Comment UC(23)		
Revision History:	<i>None</i>				
Objective	<i>To test if the faculty is able to delete a comment successfully that they posted.</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as faculty and the system must be displaying a particular thesis.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'x' button on the top-right corner of the posted comment.</i>	<i>The system responds with an alert message: 'Do you want to delete this comment?'</i>			
2	<i>Select the 'Yes' option.</i>	<i>The system deletes the comment from the database and redirects to the current page, which does not include the deleted comment.</i>			
Comments: The user can delete the comment successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.44 Delete Comment with Cancel Button Test Case

Faculty Component Comment Operations			
Test Case ID:	44	QA Test Engineer:	Rimsha Tariq
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	Delete Comment UC(23)
Revision History:	<i>None</i>		
Objective	<i>To test the system response when the cancel button is clicked.</i>		
Product/Ver/Module:	<i>Faculty Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in as faculty and the system must be displaying a particular thesis.</i>		
Step No.	Execution description	Procedure result	

Implementation and Test Cases

1	<i>Click on the 'x' button on the top-right corner of the posted comment.</i>	<i>The system responds with an alert message: 'Do you want to delete this comment?'</i>
2	<i>Select the 'Cancel' button.</i>	<i>The system redirects to the current page with an old comment stream.</i>
Comments: The system redirects the user to the current page without deletion.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.45 Change Password Test Case

Thesis Portal Management					
Update Account					
Test Case ID:	<i>45</i>	QA Test Engineer:	<i>Rimsha Tariq</i>		
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	<i>15-05-2022</i>	Use Case Reference(s):	<i>Change Password UC(24)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the user is able to change password successfully.</i>				
Product/Ver/Module:	<i>Account Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in to the system.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Change Password' button.</i>	<i>The system displays the old password, new password and new password confirmation fields.</i>			
2	<i>Enter the old password, new password and new password confirmation and press 'Save' button.</i>	<i>The system verifies the old password, replaces it with the new password and redirects to the homepage.</i>			
Comments: The user can change their password successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.46 Change Password with Incorrect Old Password Test Case

Thesis Portal Management			
Update Account			
Test Case ID:	<i>46</i>	QA Test Engineer:	<i>Rimsha Tariq</i>
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>
Test Date:	<i>15-05-2022</i>	Use Case Reference(s):	<i>Change Password UC(24)</i>

Revision History:	<i>None</i>	
Objective	<i>To test if the system displays the error message in case the user enters an incorrect old password.</i>	
Product/Ver/Module:	<i>Account Management Module in the website.</i>	
Environment:	<i>Website is up and running on the localhost.</i>	
Assumptions:	<i>None</i>	
Pre-Requisite:	<i>The user must be signed in to the system.</i>	
Step No.	Execution description	Procedure result
1	<i>Click on the 'Change Password' button.</i>	<i>The system displays the old password, new password and new password confirmation fields.</i>
2	<i>Enter an incorrect old password.</i>	<i>The system displays the 'Incorrect old password' message.</i>
Comments: The system displays the error message successfully.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.47 Change Password with Weak Password Test Case

Thesis Portal Management					
Update Account					
Test Case ID:	<i>47</i>	QA Test Engineer:	<i>Rimsha Tariq</i>		
Test case Version:	<i>1</i>	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	<i>15-05-2022</i>	Use Case Reference(s):	<i>Change Password UC(24)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the system displays the error message in case the user enters a weak password.</i>				
Product/Ver/Module:	<i>Account Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in to the system.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Change Password' button.</i>	<i>The system displays the old password, new password and new password confirmation fields.</i>			
2	<i>Enter a password that contains either only numbers or only alphabets.</i>	<i>The system responds with an error message: 'weak password'.</i>			
Comments: The system displays the error message successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.48 Change Password with Cancel Button Test Case

Thesis Portal Management					
Update Account					
Test Case ID:	48	QA Test Engineer:	Rimsha Tariq		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	Change Password UC(24)		
Revision History:	<i>None</i>				
Objective	<i>To test the system response when cancel button is clicked.</i>				
Product/Ver/Module:	<i>Account Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in to the system.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Change Password' button.</i>	<i>The system displays the old password, new password and new password confirmation fields.</i>			
2	<i>Click on the 'Cancel' button.</i>	<i>The system redirects to the user's homepage.</i>			
Comments: The system redirects the user to the homepage without making any changes.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.49 Suggest Topics Test Case

Thesis Portal Management			
Faculty Management			
Test Case ID:	49	QA Test Engineer:	Rimsha Tariq
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	Suggest Topics UC(26)
Revision History:	<i>None</i>		
Objective	<i>To test the system response if the new topics are added successfully.</i>		
Product/Ver/Module:	<i>Faculty Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed in to the system as faculty.</i>		
Step No.	Execution description	Procedure result	
1	<i>Click on the text box beneath the stream of suggested topics, type a topic and click on the 'Post' button.</i>	<i>The system posts/displays the newly added topic at the end of the topics stream along with the faculty member's name. It saves the topic in the database and redirects to the current page, which also includes the newly posted topic.</i>	

Comments: The user can add topic successfully.
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed

4.2.50 Suggest Topics with Empty Field Test Case

Thesis Portal Management					
Faculty Management					
Test Case ID:	50	QA Test Engineer:	Rimsha Tariq		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	Suggest Topics UC(26)		
Revision History:	<i>None</i>				
Objective	<i>To test the system response when the new topics are added with empty field.</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in to the system as faculty.</i>				
Step No.	Execution description		Procedure result		
1	<i>Press 'Post' button without typing anything in the text box.</i>		<i>The system redirects to the current page, which includes the previous topics only.</i>		
Comments: The system redirects to the current page without making any changes.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.51 View Suggested Topics Test Case

Thesis Portal Management			
Thesis Management			
Test Case ID:	51	QA Test Engineer:	Rimsha Tariq
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	View Suggested Topics UC(27)
Revision History:	<i>None</i>		
Objective	<i>To test if the user is able to view all the topics suggested by the faculty.</i>		
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>None</i>		
Step No.	Execution description		Procedure result

Implementation and Test Cases

1	<i>Click on the 'View Suggested Topics' button.</i>	<i>The system displays a window containing all the topics along with the commenter's name.</i>
Comments: The user can view the topic successfully.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.52 Delete Topic Test Case

Thesis Portal Management					
Faculty Management					
Test Case ID:	52	QA Test Engineer:	<i>Rimsha Tariq</i>		
Test case Version:	1	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	15-05-2022	Use Case Reference(s):	<i>Delete Topic UC(28)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the faculty is able to delete a topic successfully that they posted.</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as faculty.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'x' button on the top-right corner of the posted topic.</i>	<i>The system responds with an alert message: 'Do you want to delete this topic?'</i>			
2	<i>Select the 'Yes' option.</i>	<i>The system deletes the topic from the database and redirects to the current page, which does not include the deleted topic.</i>			
Comments: The user can delete the topic successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.53 Delete Topic with Cancel Button Test Case

Thesis Portal Management			
Faculty Management			
Test Case ID:	53	QA Test Engineer:	<i>Rimsha Tariq</i>
Test case Version:	1	Reviewed By:	<i>Sumren Fatima</i>
Test Date:	15-05-2022	Use Case Reference(s):	<i>Delete Topic UC(28)</i>
Revision History:	<i>None</i>		

Objective	<i>To test the system response when the cancel button is clicked.</i>				
Product/Ver/Module:	<i>Faculty Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The user must be signed in as faculty.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'x' button on the top-right corner of the posted topic.</i>	<i>The system responds with an alert message: 'Do you want to delete this topic?'</i>			
2	<i>Press the 'Cancel' button.</i>	<i>The system redirects to the current page with an old topics' stream.</i>			
Comments: The system redirects the user to the current page without deletion.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.54 View Complete Thesis Test Case

Thesis Portal Management					
View Thesis					
Test Case ID:	54	QA Test Engineer:	<i>Rimsha Tariq</i>		
Test case Version:	1	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	15-05-2022	Use Case Reference(s):	<i>View Complete Thesis UC(29)</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the user is able to view the pdf of the selected thesis.</i>				
Product/Ver/Module:	<i>Thesis Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The system is displaying the basic details of the thesis.</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'View Complete Thesis' button.</i>	<i>The system displays the pdf of the thesis.</i>			
Comments: The pdf of the thesis is not displayed.					
<input type="checkbox"/> Passed <input checked="" type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.55 Upload Thesis Test Case

Upload Thesis Component			
Upload Thesis			
Test Case ID:	55	QA Test Engineer:	<i>Rimsha Tariq</i>
Test case Version:	1	Reviewed By:	<i>Sumren Fatima</i>
Test Date:	15-05-2022	Use Case	<i>Upload Thesis UC(30)</i>

Implementation and Test Cases

		Reference(s):			
Revision History:		<i>None</i>			
Objective		<i>To test if the user is able to upload a thesis successfully.</i>			
Product/Ver/Module:		<i>Upload Thesis Management Module in the website.</i>			
Environment:		<i>Website is up and running on the localhost.</i>			
Assumptions:		<i>None</i>			
Pre-Requisite:		<i>The user must be signed into the system.</i>			
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Upload Thesis' button.</i>	<i>The system displays thesis title, abstract and future work in the form of text boxes. Grade, thesis year, type, domain, advisor name and committee members' names are displayed through dropdown menus. Upload pdf button is also displayed.</i>			
2	<i>Enter thesis title, abstract and future work and select value(s) from drop-down menus of advisor name, year, thesis type, domain(s), grade and committee members' names and/or upload a pdf of thesis.</i>				
3	<i>Click on the 'Upload' button.</i>	<i>The system saves the thesis details in the database and redirects to the Upload Thesis page.</i>			
Comments: The user can upload the thesis successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.56 Upload Thesis with Cancel Button Test Case

Upload Thesis Management			
Upload Thesis			
Test Case ID:	56	QA Test Engineer:	Rimsha Tariq
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	15-05-2022	Use Case Reference(s):	Upload Thesis UC(30)
Revision History:	<i>None</i>		
Objective	<i>To test the system response when the cancel button is clicked.</i>		
Product/Ver/Module:	<i>Upload Thesis Management Module in the website.</i>		
Environment:	<i>Website is up and running on the localhost.</i>		
Assumptions:	<i>None</i>		
Pre-Requisite:	<i>The user must be signed into the system.</i>		
Step No.	Execution description	Procedure result	

1	<i>Click on the 'Upload Thesis' button.</i>	<i>The system displays thesis title, abstract and future work in the form of text boxes. Grade, thesis year, type, domain, advisor name and committee members' names are displayed through dropdown menus. Upload pdf button is also displayed.</i>
2	<i>Enter thesis title, abstract and future work and select value(s) from drop-down menus of advisor name, year, thesis type, domain(s), grade and committee members' names and/or upload a pdf of thesis.</i>	
3	<i>The user presses the 'Cancel' button.</i>	<i>The system redirects the user to the homepage.</i>
Comments: The system redirects the user to the homepage.		
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed		

4.2.57 View Most Researched Areas Test Case

Thesis Portal Management					
View Trends					
Test Case ID:	57	QA Test Engineer:	Rimsha Tariq		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	View Most Researched Areas UC(31)		
Revision History:	None				
Objective	<i>To test if the user is able to view a visual representation of the most researched domains.</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>None</i>				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'View Most Researched Areas' button.</i>	<i>The system displays a graph depicting the most/least commonly researched areas.</i>			
Comments: The system displays the most researched domains in form of a graph successfully.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.58 View Upcoming Seminars Test Case

Thesis Portal Management					
View Upcoming Seminars					
Test Case ID:	58	QA Test Engineer:	Rimsha Tariq		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	15-05-2022	Use Case Reference(s):	View Upcoming Seminars UC(32)		
Revision History:	None				
Objective	<i>To test if the user is able to view a list of upcoming seminars and click on the hyperlinks.</i>				
Product/Ver/Module:	<i>Thesis Portal Management Module in the website.</i>				
Environment:	<i>Website is up and running on the localhost.</i>				
Assumptions:	None				
Pre-Requisite:	None				
Step No.	Execution description	Procedure result			
1	<i>Click on the 'Show all' button.</i>	<i>The system displays a list of hyperlinks for upcoming seminars.</i>			
2	<i>User clicks on a hyperlink.</i>	<i>The system directs the user to the corresponding website.</i>			
Comments: The test case has not been executed yet.					
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed					

4.2.59 Performance Test Case

Performance			
Test Case ID:	59	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Performance
Revision History:	None		
Objective	<i>To test if the system can load within 2 seconds and is capable of accommodating at least 100 users without crashing.</i>		
Product/Ver/Module:	<i>Complete web-application.</i>		
Environment:	<i>Website is up and running after integration with main website.</i>		
Assumptions:	None		
Pre-Requisite:	<i>The website is loaded.</i>		
Step No.	Execution description	Procedure result	
1	<i>The system is tested for the above-mentioned scenarios.</i>	<i>The system smoothly bears the above-mentioned scenarios.</i>	

Comments: This test case is not executed yet.
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed

4.2.60 Usability Test Case

Usability					
Test Case ID:	60	QA Test Engineer:	Izna Zubair		
Test case Version:	1	Reviewed By:	Sumren Fatima		
Test Date:	14-05-2022	Use Case Reference(s):	Usability		
Revision History:	None				
Objective	<i>To test if the system has consistent interfaces, effective navigation, and appropriate notifications.</i>				
Product/Ver/Module:	<i>Complete web-application.</i>				
Environment:	<i>Website is up and running after integration with main website.</i>				
Assumptions:	None				
Pre-Requisite:	<i>The website is loaded.</i>				
Step No.	Execution description	Procedure result			
1	<i>The system is tested for the above-mentioned features.</i>	<i>The system inherits the above-mentioned features.</i>			
Comments: The system has the effective usability features.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.2.61 Availability Test Case

Availability			
Test Case ID:	61	QA Test Engineer:	Izna Zubair
Test case Version:	1	Reviewed By:	Sumren Fatima
Test Date:	14-05-2022	Use Case Reference(s):	Availability
Revision History:	None		
Objective	<i>To test if the system is available 24/7 except when there is an impromptu system failure or an ongoing maintenance period.</i>		
Product/Ver/Module:	<i>Complete web-application.</i>		
Environment:	<i>Website is up and running after integration with main website.</i>		
Assumptions:	None		
Pre-Requisite:	<i>The website is loaded.</i>		
Step No.	Execution description	Procedure result	

Implementation and Test Cases

1	<i>The system is tested for the above-mentioned scenarios.</i>	<i>The system smoothly bears the above-mentioned scenarios.</i>
Comments: This test case is not executed yet.		
<input type="checkbox"/> Passed <input type="checkbox"/> Failed <input checked="" type="checkbox"/> Not Executed		

4.2.62 Extensibility Test Case

Performance					
Test Case ID:	62	QA Test Engineer:	<i>Izna Zubair</i>		
Test case Version:	1	Reviewed By:	<i>Sumren Fatima</i>		
Test Date:	14-05-2022	Use Case Reference(s):	<i>Extensibility</i>		
Revision History:	<i>None</i>				
Objective	<i>To test if the system is able to incorporate more features as modular coding scheme shall be used.</i>				
Product/Ver/Module:	<i>Complete web-application.</i>				
Environment:	<i>Website is up and running after integration with main website.</i>				
Assumptions:	<i>None</i>				
Pre-Requisite:	<i>The website is loaded.</i>				
Step No.	Execution description	Procedure result			
1	<i>The system is tested when more functionalities are added.</i>	<i>The system executes smoothly after the new functionalities are added.</i>			
Comments: The system can execute properly after new functionalities are added.					
<input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed <input type="checkbox"/> Not Executed					

4.3 Test Metrics

Metric	Value
Number of Test Cases:	58
Number of Test Cases Passed:	44
Number of Test Cases Failed:	5
Test Case Defect Density:	10.20
Test Case Effectiveness:	100
Traceability Matrix:	Included in a separate file.

Chapter 5: Conclusion

This project is designed to develop a MS thesis repository in order to provide theses and research information of FAST-NU computer science department. The main purpose of this portal is to promote research in the area of computer science as well as demonstrate the knowledge of the research areas focused in the university. In addition to this, digitizing theses information will help to keep track of the theses.

To cater the goals, implementation section (chapter 4) provides details of the functionalities. The functionalities focus on filtered search, accounts handling and thesis related functions e.g., showing trends in data and providing continuous newsfeed related to upcoming seminars and conferences.

Introduction section (chapter 1) covers the objectives and motivation of doing the project. This section clearly mentions the goals and scope of the project. Moreover, related work section (chapter 2) covers the details about the technologies available and the technologies that we are using for the web development. There benefits and motivation for React, Django REST framework and Postgres are explained. Requirements and design (chapter 3) covers the functional and nonfunctional requirements of the portal. System requirements covers the hardware and software requirements. Different diagrams provide an overview of the working of the portal. Moreover, GUI designs provide a pictorial representation of the web pages. In addition, development methods, design considerations and policies have been elaborated to give an idea of development principles and conventions followed. Lastly, chapter 4 covers implementation details of the prototype that focuses on filtered search, accounts handling and thesis related functions.

The core purpose of this web extension to FAST-NU existing website is to promote research. In order to further facilitate the students, this portal can be connected to other research websites. Moreover, working on digitizing the whole thesis document that can save the students from the hassle of formatting the document can also be considered. Also, advanced algorithms can be deployed to find different information from the theses.

References

- [1] J. Bloomberg “*Digitization, Digitalization and Digital Transformation: Confuse Them at Your Peril*” 2018 [Online]. Available: <https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/?sh=671291412f2c>
- [2] “*Digitization, Digitalization and Digital Transformation-What’s the Difference?*” July 14,2021. [Online]. Available: <https://www.asite.com/blogs/digitization-digitalization-and-digital-transformation-whats-the-difference>
- [3] M. Macura, “*Pros and Cons of Django as Web Framework for Python Developers*”, [Online]. Available: <https://www.softkraft.co/pros-and-cons-of-django-for-python-developers/>
- [4] “*Pros and Cons of Django as Web Framework*”. [Online]. Available: <https://techvidvan.com/tutorials/pros-and-cons-of-django/>
- [5] M.Poczwadowsky,“*Django Framework Review -Pros and Cons*”, June 11, 2020. [Online]. Available: <https://www.netguru.com/blog/django-pros-and-cons>
- [6] V. Rak, “*Pros and Cons of Ruby on Rails*”, May 2, 2021. [Online]. Available: <https://sloboda-studio.com/blog/pros-and-cons-of-ruby-on-rails/>
- [7] “*Pros and Cons of React.js*”. [Online]. Available: <https://www.javatpoint.com/pros-and-cons-of-react>
- [8] “*What is Vue.js? The Pros and Cons of Vue.js Framework*”, August 25, 2021. [Online]. Available: <https://www.spaceo.ca/what-is-vue-js-and-its-pros-and-cons/>
- [9] “*Angular 101: Pros,Cons, Features and More*”, May 8,2019. [Online]. Available: <https://www.pluralsight.com/blog/software-development/angular-101>
- [10] Roger S. Pressman, *Software Engineering, A Practitioner’s Approach*. New York: McGraw Hill, 2010.