ST. MARY'S UNIVERSITY COLLEGE
FACULTY OF INFORMATICS
DEPARTMENT OF COMPUTER SCIENCE

E-LEARNING SYSTEM
FOR
ST. MARY'S UNIVERSITY COLLEGE

BY

PARWEEN ALI SULEYMAN	RCD/1946/2001
ZUHOOR ALI SULEYMAN	RCD/1965/2001
ZULFIQAR ALI SULEYMAN	RCD/1947/2001

JULY 2011
SMUC
ADDIS ABABA

ADVISOR
MR. MICHAEL MELESSE

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E-LEARNING SYSTEM
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ST. MARY'S UNIVERSITY COLLEGE

A SENIOR PROJECT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE OF ST. MARY'S UNIVERSITY COLLEGE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHLOR OF SCIENCE
IN
COMPUTER SCIENCE

AUTHOR

NAME	ID NO	ROLE
PARWEEN ALI SULEYMAN	RCD/1946/2001	PROJECT MEMBER
ZUHOOR ALI SULEYMAN	RCD/1965/2001	PROJECT MEMBER
ZULFIQAR ALI SULEYMAN	RCD/1947/2001	PROJECT MANAGER

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APPROVED BY THE COMMITTEE OF EXAMINERS

Chairman of the Department	Signature
Advisor	Signature
Internal Examiner	Signature
External Examiner	Signature

CHAPTER ONE

PROJECT INTRODUCTION

1.1. INTRODUCTION

Description about the current system

In the recent 10 years, Electronic Learning (E-learning) shows tremendous growth. The reason behind this, E-learning represents an innovative shift in the field of learning, providing rapid access to specific knowledge and information. It offers online instruction that can be delivered anytime and anywhere through a wide range of electronic learning solutions such as Web-based courseware, online discussion groups, live virtual classes, video and audio streaming, Web chat, online simulations, and virtual mentoring.

E-learning enables organizations to transcend distance & other organizational gaps by providing a cohesive virtual learning environment. Companies must educate and train vendors, employees, partners, and clients to stay competitive and E-learning can provide such just-in-time training in a cost-effective way.

Like no other training form, E-learning promises to provide a single experience that accommodates the three distinct learning styles of auditory learners, visual learners, and kinesthetic learners. Other unique opportunities created by the advent and development of E-learning are more efficient training of a globally dispersed audience; and reduced publishing and distribution costs as Web-based training becomes a standard.

E-learning also offers individualized instruction, which media, cannot provide, and instructor-led courses allow clumsily and at great cost. In conjunction with assesses needs, E-learning can target specific needs. And by using learning style tests, E-learning can locate and target individual learning preferences.

Additionally, synchronous E-learning is self-paced. Advanced learners are allowed to speed through or by pass instruction that is redundant while novices slow their own progress through content, eliminating frustration with themselves, their fellow learners, and the course.

In these ways, E-learning is inclusive of a maximum number of participants with a maximum range of learning styles, preferences, and needs.

What is Electronic Learning?

Learning using electronic means: the acquisition of knowledge and skill using electronic technologies such as computer- and Internet-based courseware and local and wide area networks [Internet & Microsoft Encarta Premium]

1.2. BACKGROUND OF THE ORGANIZATION

St.Mary's University College is one of the pioneer private higher education institutions in Ethiopia.

Its main campus is in Addis Ababa with over 100 distance education branches in other parts of the country. The University College offers training in the departments of Accounting, Computer Science, Secretarial Science, Law, Language, Social Science, Marketing, Management, Mathematics and Natural Science.

SMUC is an outgrowth of St.Mary's Language School, which is established in 1991 in Addis Ababa. The language was upgraded in 1995 and has solely been devoted to the improvement of English Language Proficiency of students. It is very quickly established itself as a leading language center in the capital. It was in this language center that the University College was born as a college, named as ***St.Mary's College.***

St.Mary's was established as a college in 1998 under St.mary's General Educational Development PLC with its head office in Awassa and a branch in Addis Ababa. It evolved from St.Mary Language School, which was established in 1989 in Addis Ababa. The Language School was upgraded to a language center and then developed into a private higher education institute.

Over the last ten years St.Mary's has shown a remarkable growth imprinting its mark on the Ethiopian Higher Education Scene. It has graduated thousands of students in both regular/extension and distance education programs. It has managed to organize international conferences on private higher education for 7 years in a row. It extensively engages in community services providing free scholarships to the needy and working with local authorities and schools in upgrading the skills of their work force. [Internet & Microsoft Encarta Premium]

1.3. ORGANIZATIONAL CHART OF SMUC

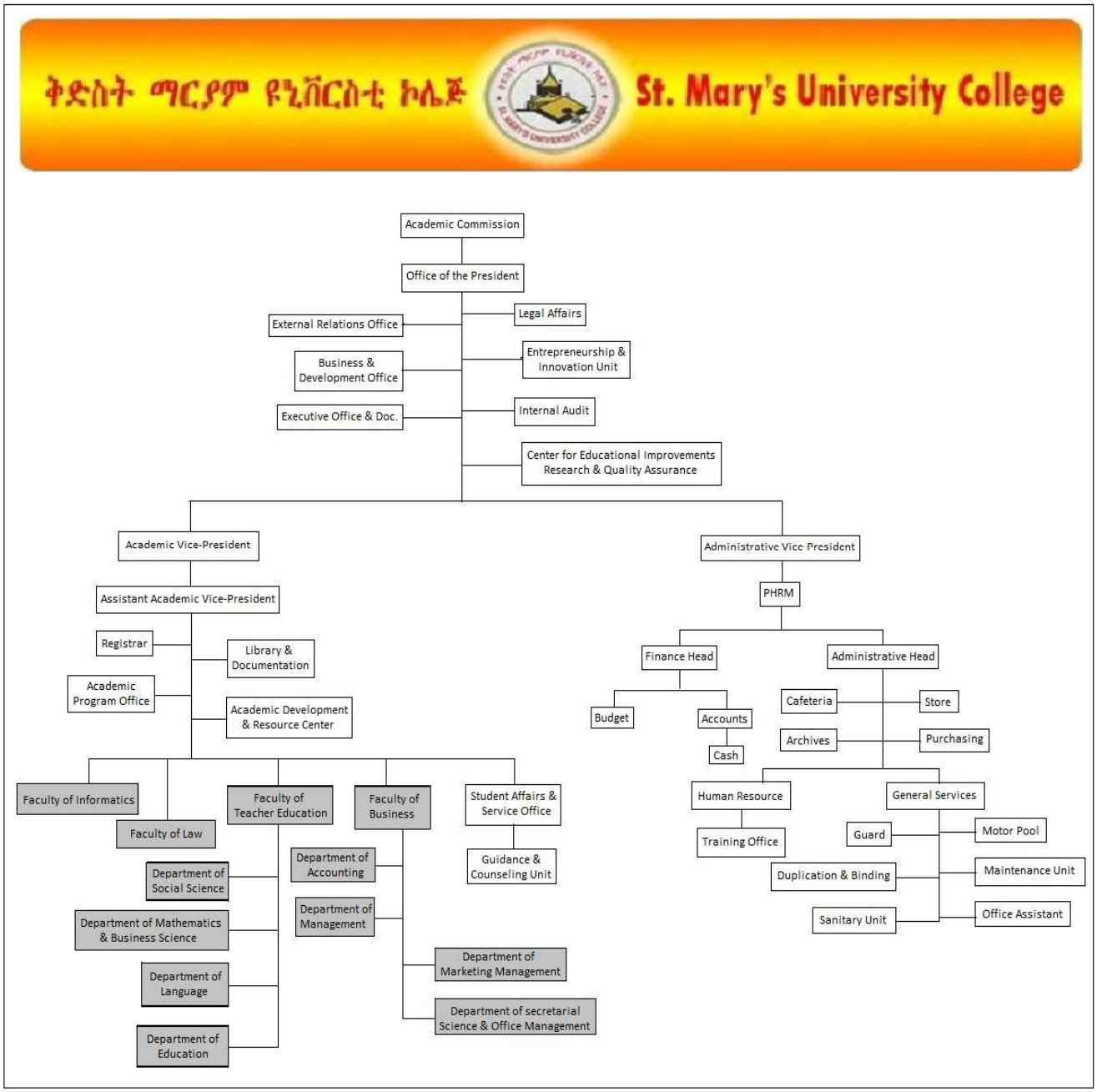

Fig. 1.1 Organizational Structure of SMUC

1.4. STATEMENT OF THE PROBLEM AND JUSTIFICATION

The existing system was implemented in an instructor-led strategy, where the students and teachers must meet in a class rooms so that the learning process could start. But now in our system they don't need to meet in the class room or staff rather he /she can get that subject in our website within PDF or other file and also recorded in video. Though this implementation was used for many years and is still in use it doesn't have full advantages of E-learning.

- Most of the time, distance learners might not fully spend their time just on the learning process they may be engaged in other activities; which makes it difficult for them to attend classes frequently and do the assignments given on time*. So the system is improving the flexibility of course delivery by managing the training development and initiatives.*
- Students might not understand the subject matter equally and if it is given in mass they might feel uncomfortable to ask questions which increase stress and reduce interest. *Therefore the scheme will be self-pacing for slow or quick learners to reduce stress and increase satisfaction in view of the fact that they can slow whenever they have difficulties or skip redundant information which are familiar with them.*
- Learners have to wait until the hand-outs are printed and copied before using them for reference, which make the learning process difficult if it doesn't reach on time. *So the system facilitate the learners also increase their confidence since quick reference materials are available on the site.*
- Instructors might not be fully available due to different reasons this also adds another limitation on learning progression; that means this can bring compress at the end of the class schedule. *Thus the organism accessibility the students to complete training conveniently at off-hours or from home.*
- Also not to mention the burden (trouble) that the organization face for costs associated with meeting room rentals, and instructors travel, lodging (room), and meals are directly quantifiable. *So the scheme is reducing overall cost associated with instructor's salaries, meeting room rentals, papers and other related costs.*

1.4.1. Advantages of E-learning

By implementing E-learning both the *trainers* and *learners* get magnificent advantages from it. By adopting E-learning trainers will be able:

- ✓ To improve flexibility of course delivery by managing the training development and initiatives.
- ✓ Moreover, the organization will have the chance to expand the capabilities of the business.
- ✓ On-demand availability enables students to complete training conveniently at off-hours or from home.
- ✓ Learners also increase their confidence since quick reference materials are available on the site

1.5. OBJECTIVE OF THE PROJECT

1.5.1. General Objective:

The main objective of the project is to develop new ELS for SMUC which could be convenient for the user of the system.

The general objective of this project is to develop an E-learning Management System for SMUC which improve the learning process into new level by providing the subjects anywhere and anytime.

1.5.2. Specific Objective:

In order to fulfill the general objective, we need to accomplish the following specific objective were can be summarized as follow:

- To reduce the need for classroom training
- To reduce time away from the job
- To support business objectives
- To make learning available anytime and anywhere
- To reduce learning costs
- To improve flexibility of course delivery

1.6. SCOPE OF THE PROJECT

By scope, it is to show how wide and complex is the system to be developed. It also includes which parts of the E-learning will be included and which parts to be left as it is due to different factors. Here is the specification of *in scope* and *out scope* perspective of our project.

1.6.1. In Scope

We are planning to include the following parts which are common in most E-learning applications. These are:

- Registration
- Quiz preparation
- Exam result viewer
- Learning materials
- Authenticated log ins (Accounts)
- Notifications
- Downloading and uploading PDF file and others
- View learning in video

REGISTRATION

The registration encloses student, course, instructors and other types of registrations which are included and essential in our system.

EXAM AND ASSIGNMENT SYSTEM

Since there is learning there must be exams and assignments which are given frequently to the students. The exams are given in a defined date whereas assignments are given randomly within the academic schedule.

RESULT VIEWER

After taking the exam the student will see the result of the quiz he/she has taken.

LEARNING MATERIALS

Every material of the courses that are taken by the students can be accessed on the site. Even they can *download the course outline*, *hand-out*, and *course reference books* or *tutorial* and *links to websites* if there are available. This help the students read about the course, as they like. He/she can get extra information on the internet if they want to get more information.

AUTHENTICATED LOGIN (ACCOUNT)

After registration the students will have accounts through which they can access the pages for which they are authenticated for. The accounts are created by the web site administrator and the student and instructors will also have their account through web site administrator.

NOTIFICATION

This could be on the homepage in which the students will be informed with the announcement about the on-going current academic events by the St.Mary's University College.

DOWNLOADING AND UPLOADING PDF FILE & OTHERS

Every material of each course in the PDF and others file form that is only found in Computer Science Department can be downloading and uploading on the site. Even if the course outline, hand-out, and course reference books or tutorial. This help the students read about the course, as they like.

VIEW LEARNING IN VIDEO

This could be help the applicant to study at home if he/she miss the lecture when it given at the class time (i.e. the lecture that was given at the class time is recorded. So they don't need to be worry missing of the class lecture.).

1.6.2. Out of Scope

The following points will not be included in our project because lack experience in the subject matter and the limit of time.

Some of the points are:

- Online Payment System
- Video conference (Discussion)
- Online Chat
- Preparing grade report

1.7. LIMITATION OF THE PROJECT

Limitation of the project describes the reasons why the system cannot provide some functionality. The team cannot include some functionality that other St. Mary's University College may have due to time constraint, shortage of enough finance and technologies as well as lack of expertise. But the registration is included without the online method.

1.8. METHODOLOGY OF THE PROJECT

There are many types of approaching of software Engineering methodologies. But our team is to choose Object Oriented System. Because, using OOS, the analysis and design will provide us the following advantages over other systems when compared with structured approach.

- Simplicity
- Lower development time and cost
- Easy to maintain
- Code Reusability
- It gives an adequate modeling ways through UML diagrams
- Security and Data hiding feature

1.8.1. Data Collection Method

Data collection is a process that helps to understand the current system and its problems. These are some of the techniques interviewing the staffs, using questioners and observing the actual process. During data collection we have used some techniques to extract necessary information from the E-learning System.

- **Interview :-** is one of the primary data gathering methods. It is conducted the appropriate person for the system. This assists as to determine use requirements, and to identify our scope.

- **Observation on-site :-** is another method for gathering data about the existing system. This helps us to understand events as they occur and gives us first hand information to the 'real' system being studied. Examining of observation helps us to enhance our understanding of the existing system problems.

- **Analysis of Document :-** is also another important method of data collection which can help us to review procedural manual, from the internet sites and also different related documents describes about E-learning System are used.

1.8.2. System Development Methodology

The Project team has planned to use object oriented approach for analysis and design phases rather than structural approach, because object oriented approach comprises component reusability, extensibility and there is no re-event the wheel. Not only reusability but also object oriented concepts like inheritance, polymorphism, and many other features that structural approach doesn't include.

- ✓ **Reusability**, because objects are independent entities, so the reuse of objects reduce the time and cost of both development and maintenance.
- ✓ **Extensibility**, maintaining and modifying one module without affecting other modules is possible.
- ✓ **It enables** us to adopt the real world easily using object oriented programming concept**;** it gives adequate modeling powers through UML diagram.

1.8.3. Tools and Technique

1.8.3.1. For Techniques

The technique decided to use is the UML techniques like:

- Use Case Diagram
  - ⇨ Are used during requirements elicitation and analysis to represent the functionality of the system. Use Case focus on the behavior of the system an external point of view.
- Activity Diagram
  - ⇨ Are used to describe the structure of the system and show all the workflow of the system.
- Sequence Diagram
  - ⇨ Are used to formalize the behavior of the system and to visualize the communication among objects. They are useful for identifying additional objects that participate in the use case.
- Class Diagram
  - ⇨ Shows a collection of classes, interfaces, associations, collaborations and constraints. It is also known as a *structural diagram*. It is are used for Describing the static view of the system, Showing the collaboration among the elements of the static view, describing the functionalities performed by the system.

These techniques are very helpful to identify the user and E-learning System in an understandable way using standard diagrams and symbols.

1.8.3.2. Development Tools

For the development and implementation of this proposed system we have decided to use the following listed components:-

- ✓ Wamp server
  - ➢ MySQL
  - ➢ PHP
- ✓ Adobe Dreamweaver CS5 or Macromedia Dreamweaver CS4
- ✓ Net Bean Environment
- ✓ Microsoft Office 2010
- ✓ Microsoft Visio 2010
- ✓ Microsoft Office Project 2007

- **Wamp server** : is the most popular and power full web server software available today than the other else.
- **MySQL :** is a multi-user database management software (DBMS) which it can download free of charge from http://www.mysql.com and is available for both Web and embedded applications form. It used to store our database in an organized format.
- **PHP** : is one of the server side languages in a web based application development, even though there are different alternative server side languages, but web page is not scripted with all of the server side languages. It is a powerful tool for making dynamic and interactive pages, used to design webpage on the server and delivered to the browser.
  In contrast PHP script is a fully fledged programming language with its own syntax and semantics so it can accesses data base. So the PHP and MySQL are available to develop dynamic web based applications. [Internet & Microsoft Encarta Premium]
- **Adobe Dreamweaver CS5 or Macromedia Dreamweaver CS4 :** it is the one of the WHAT YOU SEE IS WHAT YOU GET (WYSIWYG) tools, which can be easily used to develop an interactive websites
- **Net Bean Environment:**
- **Microsoft Office 2010 :** is for text editing.
- **Microsoft Visio 2010 :** is used for modeling tools.

1.9. APPLICATION OF THE PROJECT

The project is designed to assist for the distance learning in the St.Mary's University College to be used as a learning tool. Using our project the college will gain magnificent benefits both in cost and learning quality which will make it dominant. That is because E-learning is continuing to grow in a marvelous (excellent) rate.

Moreover, the project could be used for a different type of organization with a little modification. It could be used for communication between colleges of the university in data transferring. This in turn helps to increase speed and security of data transformation among the colleges.

1.10. FEASIBILITY ANALYSIS

This study is concerned with examining different factors which could affect the continuity of the project and allow the project team to decide whether the proposed system is worthwhile or not before further resources and efforts are wasted. Issues related to technical, operational, political, economical, and time are taken into consideration before conducting this undertaking.

1.10.1. Technical Feasibility

The proposed system needs a person who is specifically responsible for data collection and updating the information of the database of the system. But the customers no need of taking training to use the system because the system will be user friendly and not sophisticated. The proposed system is technically feasible because the technology needed to develop and run the project is available on market and the sector that can afford the money to buy.

1.10.2. Operational Feasibility

The propose system will make the ELS to be transparent and interactive. So as to achieve the administer, instructor, student and guest support department in ELS for SMUC. It facilitates the organization's main objective and also it will not be against the organization mission and vision.

The proposed system is operationally feasible because

- The system satisfies the user need or requirement.
- Provide adequate throughput response time.
- Very easy to use.
- Easy access and manages the clients, instructor & administer very fast.
- Easy access and download the resources by clients and instructor.

1.10.3. Political feasibility

The purpose of political feasibility is to evaluating how key stakeholders within the organization view the proposed system. The system can be said to be political feasible because it will solve the problem of the ELS for SMUC.

1.10.4. Economical feasibility

The purpose of economic feasibility is used to identify the financial benefits and costs associated with the development of the project. Economic feasibility is often referred to as a cost-benefit analysis.

Benefits: Benefits are further divided into tangible and intangible benefits.

1. ***Tangible benefits***: Is a benefit from the creation of an information system that can be measured in capital and with consistency. The team has identified the following tangible benefits.

    - Efficient in terms of time and cost.

- Reducing the risk of catastrophic loss of hard copy resources
- Efficient use of human resource.

2. ***Intangible benefits:*** benefits are derived from the creation of an information system that cannot be easily measured in capital and with certainty. The team identified the following intangible benefits.

   - Cost of maintaining resources is minimal.
   - Operational cost.
   - Efficient use, generation and dissemination of information
   - Updating relevant stakeholders with the necessary information

1.10.5. Schedule feasibility

Schedule feasibility is the process of assessing the degree to which the potential time frame and compilation dates for all major activities within the project meets organizational deadlines and constraints for affecting changes. The project is well planned and organized and the project team at this point cannot predict reasons why a successful system will not be delivered within the time frame the department require with major functionalities. The occurrence of some obstacles is of course unavoidable but we will tackle them as much as possible while developing this system as they appear.

1.11. SCHEDULE OF THE PROJECT

To do this project or E-learning, there are 2 basic phase, namely

- System Analysis Phase,
- Database Phase, and

1.11.1. System Analysis Phase

This phase help us to analyses the system. When we say analysis, it includes:

- Collecting information about the system
- How the system works
- Documentation part
- Physical structure of the system

1.11.2. Database Phase

This is the most important stage, because without careful design of database entities we cannot have a functional system.
The entire user they have similar privilege as we know. In this phase we have a 3 privilege are given, namely

- Administrator,
- Instructor, and
- User or Students

Administrator is the master of all; he/she can create, delete, or modify an account or do all the process of the instructor and student. He/she also can add or remove notes or tutorial.

Instructor privilege is less privilege than administrator and has more privilege than user, or simply between them. He/she can create account to the student, activate the exams and post the course outline and hand-outs. However, he/she cannot create an account to another instructor.

User or student privilege most of the time is called guest privilege. This account cannot do anything that the administrator or the instructor privilege can do. He/she can do only read what new things is added, contact the instructor or download file, like course hand-out PDF file.

CHAPTER TWO

SOFTWARE REQUIREMENT SPECIFICATION

2.1. INTRODUCTION

The purpose of this document is to briefly state the functional and non-functional requirements of the new system.

After successful completion of the requirements gathering and analysis phase, the framework for the system is developed, providing the foundation for all future design and development efforts.

Since the requirements form the basis for all future work on the project, from design and development to testing and documentation, the Project Team is trying to create a complete and accurate representation of all requirements that the system must accommodate.

As it has been mentioned on the previous chapter, the existing system has several limitations, which needs to be addressed in this chapter. To solve most of the problems this chapter will clearly demonstrate the user requirements in detail. The next section will try to demonstrate the current system and the new system respectively. The following sections will briefly introduce the issues addressed in the new system. The subsequent sections deal with the functional and non-functional requirements as well as the system model.

2.1.1. Description about Existing System of SMUC

The ELS website would be taken as an application because it has some futures on it. For instance, it has the progress report, live chat services and so on. But when the teams observed and make analysis that the existing system doesn't give full functionality. According to the current system, ELS for SMUC library and class room are one of the resources that one can get detailed knowledge.

- In order to get book, student who are seeking for the knowledge must come to campus and get in library. So he/she must come to campus to get the resource whether they can or not.
- The existing system was implemented in an instructor-led strategy, where the students and teachers must meet in a class rooms so that the learning process could start.
- Also in the existing system, learners have to wait until the hand-outs are printed and copied before using them for reference, which make the learning process difficult if it doesn't reach on time

2.1.2. *Describe about the requirement analysis*

During requirement elicitation a project is initiated and planned by determining what the new system should do, after gathering all the existing information on what the system should do form as many concerns as possible.

The purpose of this system is to explain the *software requirement specification* of E-learning for SMUC. The E-learning system should overall be able to provide this system efficiently by getting information on the short period of time.

The information that we gathered takes many forms: Such as

I. Interview
II. Observation on-site
III. Analysis of Document

- **Interview :-** It is conducted the appropriate person for the system. This assists as to determine use requirements, and to identify our scope.

- **Observation on-site :-** The Methodology helps us to understand events as they occur and gives us first hand information to the 'real' system being studied. Examining of observation helps us to enhance our understanding of the existing system problems.

- **Analysis of Document :-** Review procedural manual, from the internet sites and also different related documents describes about E-learning System are used.

2.1.3. *Purpose*

The main purpose of System Requirement Specifications document is to understand and identify basic requirements that the system need and should meet in order to be acceptable. These requirements can be seen in two different perspectives, one is what the system should do and the other perspective is what it needs in order to accomplish its work correctly.

The first perspective tries to study and understand the ***functional requirements*** that the system is going to include. These functional requirements are studied one by one using use cases and activity diagrams to have a clear understanding of what the system is going to do. In short, it includes the features that are supported by the system.

On the other hand, the second perspective studies about ***non-functional requirements*** which are necessities of the new system but are not directly related to the functionality of the proposed system. These necessities can be in terms of external interface requirement like user interfaces, software interfaces and communication interface; or it can be in terms of performance requirement and security requirement.

2.1.4. Intended Audience and Reading Suggestions

The software requirement specification "SRS" document is written for the developers, project managers, users, testers, and documentation writers which describe the system which is going to be developed and also to identify its requirements in general.

The SRS document contains different topics and sub-topics which help us in understanding the proposed system and its requirements. In order to have this understanding we divided the SRS into five sections.

- **The first section** is the *introductory section*; in this section we will have a highlight about the purpose of the project, document convention, project scope and descriptions of any references used while writing the SRS.

- **The second section** tries to describe *the overall description of the project* starting with product perspective and features, user classes and their characteristics, operating environment, design and implementation constraints that are found on the project and user documentation & assumptions and dependencies made.

- **The third section** is an important section which describes *the functional requirement (system features) of the system* being proposed. It contains a detail description of all the functional requirements with their use cases & activity diagrams.

- **And the next two sections** discuss about *the external interface requirements* like user interface, hardware interface, software interface and communications interfaces requirements that are needed for the correct functioning of the system. And in the last section we will try to list the non-functional requirements that are needed to be met. For example, security and performance requirements, and also software quality attributes.

2.2. Overall Description

2.2.1. Product Perspective

There are different reasons behind the context and origin of this project. The reason is that we find E-learning interesting and challenging to develop among other titles that were available. Since E-learning is a *Web Based Application* it will help us to be familiar and know more about *Web Application* and *Software* for developing web applications.

Finally, we want to improve the distance learning to reduce the need of class room training, increases their confidence since quick materials are available on the site, never miss the lecture that are given in the classroom, and also save our time, etc… that is currently used in our country. Since the current system doesn't take under consideration what the rest of the world has reached using internet and E-learning. It is true that the traditional learning system has given us some remarkable changes and also brilliant peoples, but still it was not the ideal strategy for all kinds of students.

2.2.2. Product Features

This system will have the following features like registration for the student and instructor, exam preparation and will also provide course materials for students which is done by the instructors, notification for all the users of the system, also it will enable the student to view his/her result and view course material.

2.2.3. User Classes and their characteristics

We anticipate there will be four types of user classes who are going to browse the web site. These four user classes are differentiated based on frequency of use, security or privilege levels, roles they play and subset of product functions used.

Here are the four user classes which are supported on our system.

a) Administrator
b) Instructor
c) Students
d) Guests

ADMINISTRATOR
The administrator is the most crucial element from the user classes that are listed above. This is because the administrator has higher privilege than the rest, since the administrator body is responsible for controlling the overall functionality of the website.

INSTRUCTOR
Users with the instructor privilege are responsible for posting assignments and projects that they are currently teaching. Also they are responsible for uploading course materials which might help their students in understanding the subject matter or for doing their assignments and projects. In addition, they are obligated to submit exams for their courses. Also instructors are responsible to check or correct assignment which the students submit and give each student their respective values.

STUDENTS
Whereas, users who have student privileges will have limited access to the pages found on the web. They are allowed only to open pages which are designed for users with a student privilege. After being authenticated they can view either their result, course material available on the site or attend exams on schedule and do assignments given by their instructors on time.

GUEST
These classes of users are arbitrary users who might surf the websites home page occasionally or for some issue on the web. So these classes of users are only allowed to browse the homepage and see any notifications of the college.

2.2.4. Operating Environment

We are using the Hyper Text Markup Language as a development platform/webpage and MySQL as a database system. It needs a server with an operating system. For example, Window XP/2000 or Window 7 and other latest version of Microsoft operating systems are acceptable for installation on the server like WAMP server. Other software that might be used is anti-viruses and anti-spyware to protect the server from malicious program, cookies, malware and viruses. In addition to browsers which make the system available on other hosting computers rather than the server.

2.2.5. Assumptions and Dependencies

We have assumed that the system will work properly as per the requirement or the points we have considered whereas on the other hand when we see the hardware components the computer need to have NIC or other network devices that are crucial for establishing the internet connection.

2.3. SYSTEM REQUIREMENT OF THE NEW SYSTEM

In many organizations, services and tasks over the system can be categorized based on *functional* and *non-functional requirement*.

2.3.1. Functional Requirements

Functional Requirement is related directly to the functioning or working aspects of the system and it is describing what a system dose or is expected to do.

Functional Requirement can describe as, the direct interaction between the system and environment independently. It defines specific behavior or functions of the system. In general, functional requirements define what a system is supposed to do.

The following are list of Functional requirement of the system:-

- ✓ Manage Account.
- ✓ Take Exam.
- ✓ View Exam Schedule.
- ✓ View Exam Result.
- ✓ Login.
- ✓ Learning Material
- ✓ Assignment and Project Submission.
- ✓ Notification/Message

A. Manage Account

Description:

Here the Administrator has a right to manage the student, instructor and also administer account. These are creating account, Edit account, and Delete account and also view account.

- *Create an account:* This Sub-system let the administrator to make the student, instructor and administer itself to be a member to the system by creating account for them. This is account allows the customers to see by see the construction progress of their house and to participate directly on finishing stage.
- *Edit an account :* This Sub-system lets the admin to edit the account.
- *Delete an account:* This system let the admin to delete the account when there is reason to delete the customers
- *View an account:* This Sub-system allows the admin to view his/her account using login the user name and password and then gets the given services such as viewing (progress, notification, profile, etc.) and finishing participation from their account interface.

B. Take Exam/Quiz

Description:

Here the Student has a right to take the exam that was provided by their instructor with its course name and then they will get that exam by click the check exam button at navigation side.

C. View Exam Schedule

Description:

The student will be in formed by the administrator some time. But most of time, the instructor send the exam day and time with the course title in the notification.

D. View Exam Result

Description:

In here, the student can get their exam result immediately when they click on submit result button. But they have to go to view score which is found in navigation side.

E. Login

Description:

In here, the administrator, instructor and student must firstly type the URL to get the login web site. Then they will write their name and password to authenticate it.

F. Learning Material

Description:

Here instructor and student can find/get the book that they want to be read, which will be provide by the instructor only.

G. Assignment & Project Submission

Description:
Student will submit their assignment or project that will send by their instructor or advisor with the dead line.

H. Notification/Message

Description:
For Student: The system notifies when there is an exam (i.e. exam day and what titles are taken), assignment or project submission day and also re-registration day and some good news.
For instructor: The system notifies whenever there is a meeting or taking fee.

2.3.2. Non-Functional Requirements

The non-functional requirements are those describe the aspects of the system that are concerned with how well it provides the functional requirements. And these kinds of requirements are cover aspects of the system which are user-visible and are not directly related to the functional behavior of the system, so they include the requirements of the system that are needed for the improved quality and performance are listed below:-

- **Usability:** The system should be easy to use and understand.
- **Performance:** The system must allow thousands of concurrent or parallel connections.
- **Error Handling:** The system must provide robust exception and error handling (management) features. It must allow be able to recover from system crashes. And also that entering invalid data to the system, it will handle the error by displaying message to the user and give them chances to enter a correct data again.
- **User interface:** is the key for non-functional requirement which need to be designed very carefully. The system must not contain heavy graphics and unnecessary controls. The interface should be easy to use, clear and relevant. User interface is an interface which acts as a bridge between the system and the system users.
- **System modification:** The system should be easily modifiable.
- **Documentation:** Is the most important process and components which is very helpful to make the system easily maintainable and repairable. The activity and output of each system development stage in the project work flow must be properly documented.

- **Hardware Consideration:**
  The *server provider* computer (server) should be a minimum of 200 GB storage capacity, RAM of 1 GB & above and dual core processor with speed of 2.23 GHZ.
  In the *client side* computer, at least of a minimum of Intel Pentium with a monitor screen size of minimum is 14" LCD, processor speed of 2.00 GHZ with the memory space of 1 GB minimum and the hard disk size is 120 GB, preferable 160 GB.

Other Non-Functional Requirements

I. Security Requirements

Client side security

To protect the information that is found in the web from being accessed by unauthorized person, we use a role based authentication technique. Classifying users based on the role they play which will help us to prevent unauthorized person from accessing information which are not public to all.

The system main actors as described before are administrator, instructor, students and guest. Among these four actors only a user with guest role is not authenticated to enter into the system but can only view the home page while surfing the web since they are allowed to access the web page which contains the homepage. So the other, three must provide the correct username and id number so that they can have access to other web pages. In this way we can grant that every page on the website is accessed by the authorized person only.

Server side Security

On other hand we can prevent our database from being accessed behind the scenes by installing anti-spyware software on the server. This will help us to protect the computer from spyware, adware and malicious programs.

II. Software Quality Attributes

Some of the quality attributes our software enclosed are its adaptability, flexibility, interoperability, maintainability, portability, robustness, reusability, testability, and usability. We will see each of the attributes one by one.

Adaptability

The web site design should be a well designed so that there will not be difficulties for first time users while interacting with the web pages found on the site. This is done by taking under consideration designs for normal window application that are familiar for most of the users.

Flexibility

Since it is a web based application it should be easy to add and change information found on the websites.

Interoperability

The ability of the component parts of the system to operate successfully together is crucial for the overall performance of the system, that is why it must be studied and design well by the design team. This in turn will help the maintenance team to debug any error that might occur in the future.

Portability and Robustness

While developing the project the coding team should think twice about portability of the system on different browser software and hardware platforms to strength software performance.

Usability and Testability

The software should be able to retain its usability for some extent of time in addition to reusability for creating new versions. In addition, it must be able to pass the testing phase with both wrong and correct data by displaying error message whenever applicable with the system crush.

Reliability

Any new system that is going to be developed should not be subjected to failure during operation. This means the system should operate smoothly without causing any trouble. So our system should address this concept specifically.

CHAPTER THREE

Object Oriented Analysis & Modeling

3.1. INTRODUCTION

During analysis, developers aim to produce a model of the system that is correct, complete, consistent, unambiguous, realistic and verifiable. Developers transform the use cases produced during requirements elicitation into an object model that completely describes the system.

During this activity, we discover ambiguities and inconsistencies in the use case model that they resolve with the client. The result of analysis is an object model annotated with attributes, operations and associations.

The Object Oriented Analysis approach helps to clearly observe the E-learning System and reduce the complexity of the system. In addition, it helps us to demonstration each of functionality more elaborately.

The object-level design or model of the system to be developed will give us a better chance of understanding the final system. This is done through studying each sub-system individually and by designing the follow of each transaction found on every subsystem. As a result this phase is considered as the most important of the development lifecycle. Because it is the only way in which we can identifying the functions supported by each subsystem. In addition, it helps to identifying the relationship between the sub-systems found on the system that we are anticipated to develop.

3.2. BUSINESS RULE

The organization has its own rules and regulation for the achievement of the goal, objective, mission and benefits. There are many regulations that involve in each daily activity of the organization. These rules and regulation can server the organization for its managerial and planning stuffs. The rules that are major and common once and that involve in our proposed system are discussed in this section of use case details.

Some lists of business rules are: -

- The student must be register by their matric result
- To control the system, the system administrator and instructor(who have the priority to be an administer e.g. faculty dean) must login first
- A system administrator must have administrator account, user name and password.

3.3. ANALYSIS MODEL

This model is the abstraction of real world's entity. Analysis model is a model that abstract process and entities that are involved in the System. While it is used to describe how each components of the system interact and produce out from a given input. This modeling is a general purpose modeling language for the systems engineering application.

We will use the UML modeling language which is available in object oriented software development approach. UML stands for *unified modeling language*. It is a notation that resulted from the unification of object modeling techniques. This modeling will describe the scenarios, use case diagram, activity diagram and sequence diagram.

This part helps to defined:-

- Defined the processes that serve the needs of view under the consideration
- Represent the behavior of the processes and the assumptions on which the behavior is based.
- Represent all linkages (including output) that will enable the engineer to better understand the view.
- It supports the specification, analysis, design, verification and validation of a broad range of the system and systems-of-systems.

The project team has presented the following system models. These are:-

- Use Case Diagram
- Activity Diagram and
- Sequence Diagram
- Class Diagram

3.4. USE CASE DIAGRAM

The System use case diagram used to specify or describe the aspect of the system from user point of view. It represents discrete and meaningful set of work performed by a user meaning.

System use case describes the functionality of the system in terms of its actual current design committed to specific inputs & output technologies. Therefore, System use case can be developed only after the design decisions have been made. Additional use case is a sequence of action that is provides a measurable value to an actor. Another is that it describes a way in which a real world actor interacts with the system. ***Actor*** is an entity that interacts with one or more services of the system.

Here are some discrete & meaningful set of work performed by a user:

- ELS01 Login
- ELS02 Manage Account
- ELS03 Registration
- ELS04 Provide Course Material
- ELS05 Exam, Assignment & Project Preparation
- ELS06 Notification

- ELS07 View Course Material
- ELS08 Take Exam
- ELS09 View Result
- ELS10 Assignment & Project Submission
- ELS11 Downloading & Uploading Files
- ELS12 View Video Learning

Actor list

In our system, we have the following actors (participant)

ADMINISTRATOR: is one of the participants of the system and who controls and have all authentications of the system.

INSTRUCTOR: is one of the participants of the system and who does some tasks like posting assignments, projects, exam and uploading course materials & some other tasks.

STUDENT: also one participant who wants to be member of the system and also who wants to ge`t the service.

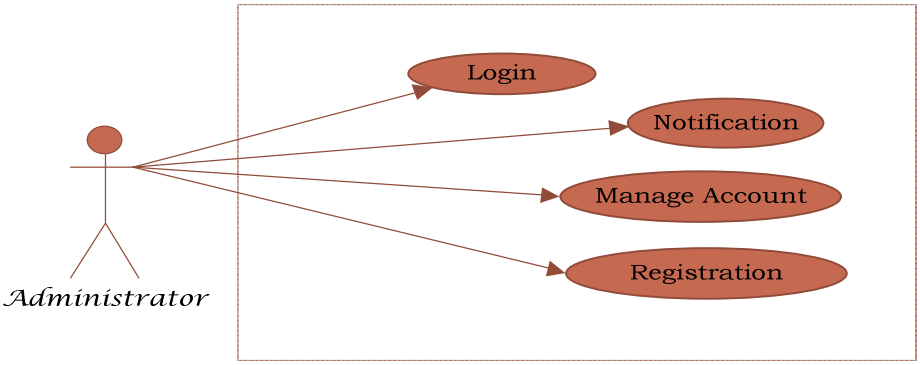

Figure 3.1 Administrator System Use Case Diagram

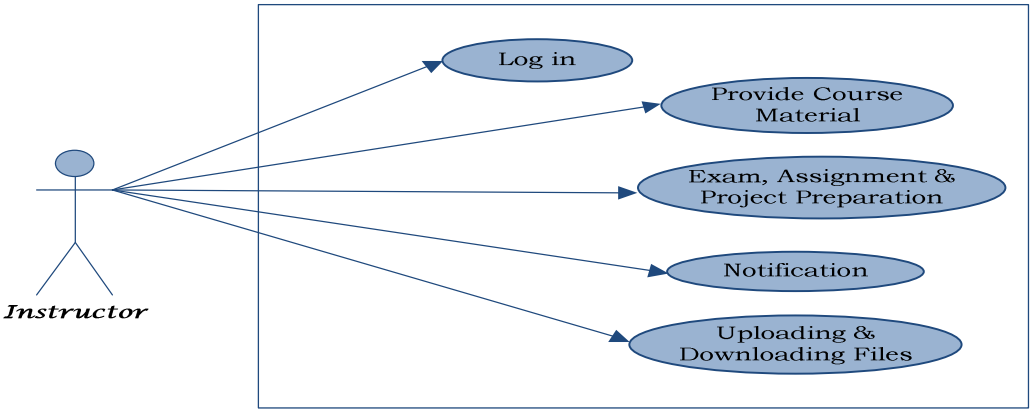

Figure 3.2 Instructor System Use Case Diagram

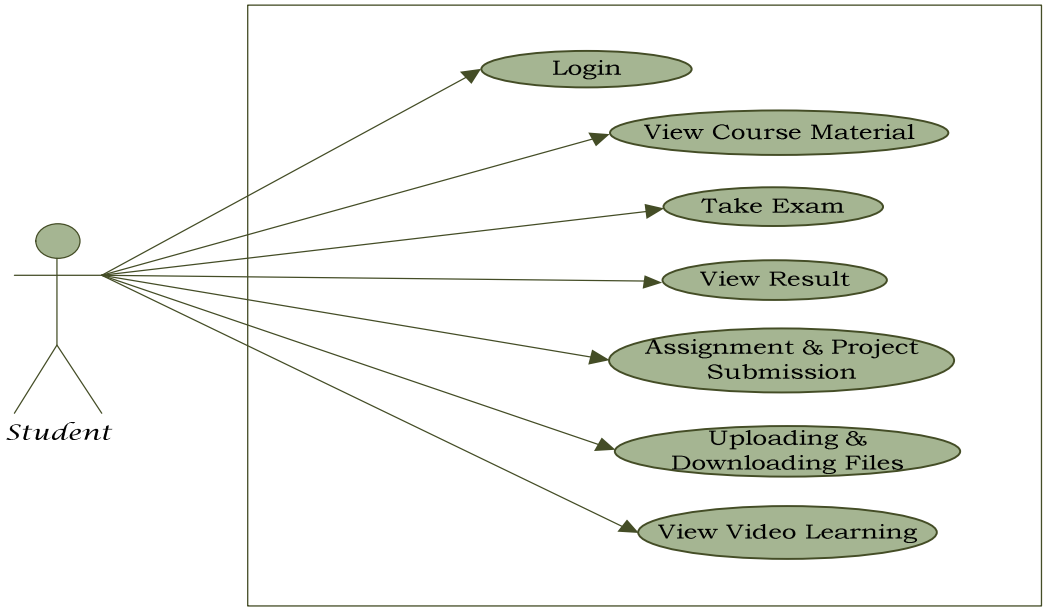

Figure 3.3 Student System Use Case Diagram

3.4.1. *Block Diagram for Use Case*

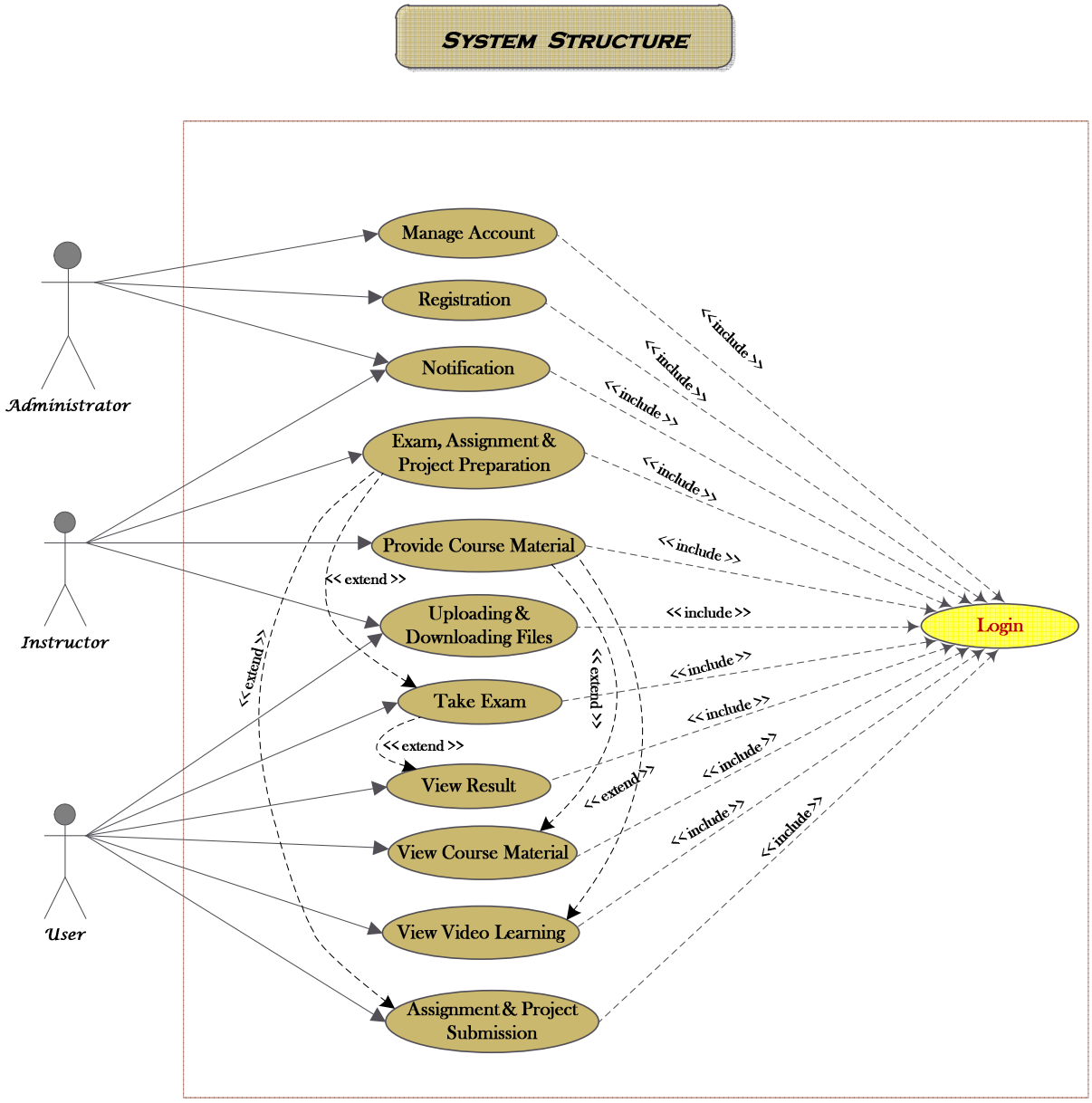

Figure 3.4 Description of use case & their relation

3.4.2. Scenario Description of Use Case in Detail

I. Login

Use case ID	ELS01
Use case name	Login
Participating Actors	Student, Instructor and Administrator
Pre-condition	The Client should have a username and password account.
Flow of event	***Main Flow*** 1. The Actor firstly activates the E-learning login system to services. 2. The Actor selects the button from the activated site so as to get in the system. 3. Then the system displays the login interface. 4. The Client inserts the username and password on the space provided. 5. And then click the login button. 6. The system validates the correctness of the client name and password. 7. Finally displays the privileged page accordingly and ends the use case. ***Alternative Flow*** 6.1. If the client doesn't fill the name and password correctly, then the system notifies the client to complete the empty space. 6.2. If the client inserts invalid username/password, then the system or E-learning System notifies the client about the invalid of the username and/or password then allow them to re-try again.
Post-condition	The Actors are able to login to the E-learning for SMUC.
Extends:	None
Include:	None
Exception Path	None

Table 3.1 Use Case Description of Login

II. Manage Account

Use case ID	ELS02
Use case name	Manage Account
Participating Actors	Administrator
Pre-condition	The Administrator should be logged in.
Flow of event	***Main Flow*** 1. The Administrator activates the Manage Account Service. 2. Then the E-learning system displays the Manage Account interface. 3. The Actor selects one of the lists that specific by "Manage Account". 4. Then the E-learning system displays the selected service. 5. After that the administrator performs the selected service. 6. The use case end. ***Alternative Flow*** - If the E-learning system is fails by provide a wrong service then it notifies the failure and advices the actor to try again.
Post-condition	The administrator is able to manage (view, update, delete, create) users account.
Extends:	Login
Include:	None
Exception Path	None

Table 3.2 Use Case Description of Create User Account

III. Registration

Use case ID	ELS03
Use case name	Registration
Participating Actors	Administrator
Pre-condition	The Administrator should initiate the system.
Flow of event	***Main Flow*** 1. After the Administrator login successfully to the system then click the applicant registration button. 2. The system displays the registration form page. 3. The administrator fills all the details information in registration form and submits it. 4. Then the system verifies the correctness and completeness of the details of registration form. 5. The systems display confirmation for the SMUC and notify successful registration. 6. Then the use case ends. ***Alternative Flow*** 4.1. If the administer doesn't fill the required information correctly into the form, then E-learning system notifies the administrator about the failure and asks to retry to fill the information again. 4.3. The use case continues at step2 on the basic course of action.
Post-condition	The system lead successful information that record into the database. And also a new user is able to get an account with username and password.
Extends:	Login
Include:	None
Exception Path	None

Table 3.3 Use Case Description of Registration.

IV. Provided Course Material

Use case ID	ELS04
Use case name	Provide Course Material
Participating Actors	Instructors
Pre-condition	The instructor firstly login to the system. The instructor should have to upload material which was taken from the site.
Flow of event	***Main Flow*** 1. After successfully login to the system, the instructor click on the provide course button from the instructor interface. 2. Then the E-learning system display the provide course material form page. 3. The instructor uploads the course and its title with the detail information. 4. Add it and then displays confirmation for successful provide course material. 5. The use case ends. ***Alternative Flow*** 4.1. If the system notifies the instructor about the failure and asks to re-fill it. 4.2. The use case continues at step 3 on the basic course of action.
Post-condition	The system upload the provide course material information successfully.
Extends:	Login
Include:	None
Exception Path	None

Table 3.4 Use Case Description of Provide Course Material.

V. Exam, Assignment & Project Preparation

Use case ID	ELS05
Use case name	Exam, Assignment & Project Preparation
Participating Actors	Instructors
Pre-condition	The Instructor need to log-in into the system before performing anything.
Flow of event	***Main Flow*** 1. After effectively login in to their account the instructor clicking preparation button from instructor account interface. 2. The system displays which subject to be select. 3. Then the instructor must choice which button to click in order to prepare an exam, assignment or a project title. 4. At that time, the instructor sends to the student all the information. 5. The system lists it to notification dialog by adding it. 6. Then log-out from the system. 7. The use case ends. ***Alternative Flow*** 4. The verification fails. 4.1. The system notifies the instructor about the failure and requests to retry the details. 4.2. The use case continues at step 4 on the basic course of action.
Post-condition	This exam, assignment and project will be notice in the notification dialog. Then the student must click on that button to read it.
Extends:	Login
Include:	None
Exception Path	None

Table 3.5 Use Case Description of Exam, Assignment & Project Preparation.

VI. Notification

Use case ID	ELS07
Use case name	Give Advice / Notification
Participating Actors	Instructor, Administration
Pre-condition	The Actors should login to the system.
Flow of event	***Main Flow*** 1. The Instructor activates the 'give advice' service. 2. Then the E-learning system displays the interface containing notification form. 3. 3.1. If the actor is Instructor, then the instructor sends the detail message to the students and click submit button. 3.2. If the actor is Administrator, then the administrator sends the detail message to students and/or also to instructor and then click submit button. 4. Then clicks the cancel button to logout from the page. 5. Then the use case end. ***Alternative Flow*** None
Post-condition	The Instructor lead a message for exam, assignment and others thing information successfully. And the administrator lead a message for instructor and student.
Extends:	Login
Include:	None
Exception Path	None

Table 3.6 Use Case Description of Notification.

VII. View Course Material

Use case ID	ELS08
Use case name	View Course Material
Participating Actors	Students
Pre-condition	Student should be login in correctly by the user name and Id number.
Flow of event	***Main Flow*** 1. In order to access the form, the student must have to login to the system. 2. The system display the main student page and click on E-book button to view that course material are provided. 3. Then the system will display the E-learning system course material interface. 4. Write the name of the course you want and click on the search button. 5. After students click it, there will be list of the material available for that specific course. 6. The use case end. ***Alternative Flow*** 4.1. If the name is not correct, then it notifies the student to rewrite again. 4.2. If the name is not find, then it list the related name to the space provide. 4.3. The use case continues to step 4, with some list of name that are related.
Post-condition	The system displays course material provides.
Extends:	Login
Include:	Provide Course Material
Exception Path	None

Table 3.7 Use Case Description of View Course Material.

VIII. Take Exam

Use case ID	ELS09
Use case name	Take Exam
Participating Actors	Students
Pre-condition	The student should know that once starting the exam there is no turning it off. Otherwise, he/she will be disqualified with exam.
Flow of event	***Main Flow*** 1. After successfully login to the system, the student activates the "Take Exam" service. 2. Student types his/her fill name and admission number. 3. Then the system display the main form of exam page to the student. 4. After entering to the exam page, the student is expected to choice which subject they should take by click on that subject button. 5. Student answers the question on the form. 6. Then students finish the exam and click on logout button to end the exam. 7. Then the use case end. ***Alternative Flow*** None
Post-condition	The student must make sure that he/she have done and sent the exam successfully.
Extends:	Login
Include:	Exam, Assignment & Project Preparation
Exception Path	None

Table 3.8 Use Case Description of Take Exam.

IX. View Result

Use case ID	ELS10
Use case name	View Result
Participating Actors	Students
Pre-condition	The Student should have a Username & Password account in-order to login to a system.
Flow of event	***Main Flow*** 1. Firstly the students must go to a place where they get an internet access. 2. Then they type the URL of the system. 3. The E-learning System display login form. 4. After display it, the Student provides their full name and ID number. 5. The forms display to the student. 6. After view it, click the logout button. 7. The use case ends. ***Alternative Flow*** 5. If the result is not correct. 5.1. The student re-send a notices to the advisor/instructor to check it back, click to log-out button. 5.2. The use case ends.
Post-condition	The system display the exam result to the student
Extends:	Login
Include:	Take Exam
Exception Path	None

Table 3.9 Use Case Description of View Exam Result.

X. Assignment & Project Submission

Use case ID	ELS11
Use case name	Assignment & Project Submission
Participating Actors	Students
Pre-condition	Register for some courses
Flow of event	***Main Flow*** 1. After the student is successfully login to the system, the E-Learning system display the students interface page. 2. Then the student click on the compose button to send the assignment or project to the instructor/advisor. 3. After that, the student insert the name of the instructors for whom the assignment to be submitted. 4. Finally they give the destination for the assignment or project and click on the submit button. 5. The uses case ends. ***Alternative Flow*** None
Post-condition	Submitting according to the schedule.
Extends:	Login
Include:	Exam, Assignment & Project Preparation
Exception Path	None

Table 3.10 Use Case Description of Assignment & Project Submission

3.5. ACTIVITY DIAGRAM

It's a kind of flow char to represent the business logic flow and the events that cause decisions and actions in the code to take place. We use activity diagrams to identify the flow and activities which are performed during each step.

I. Login

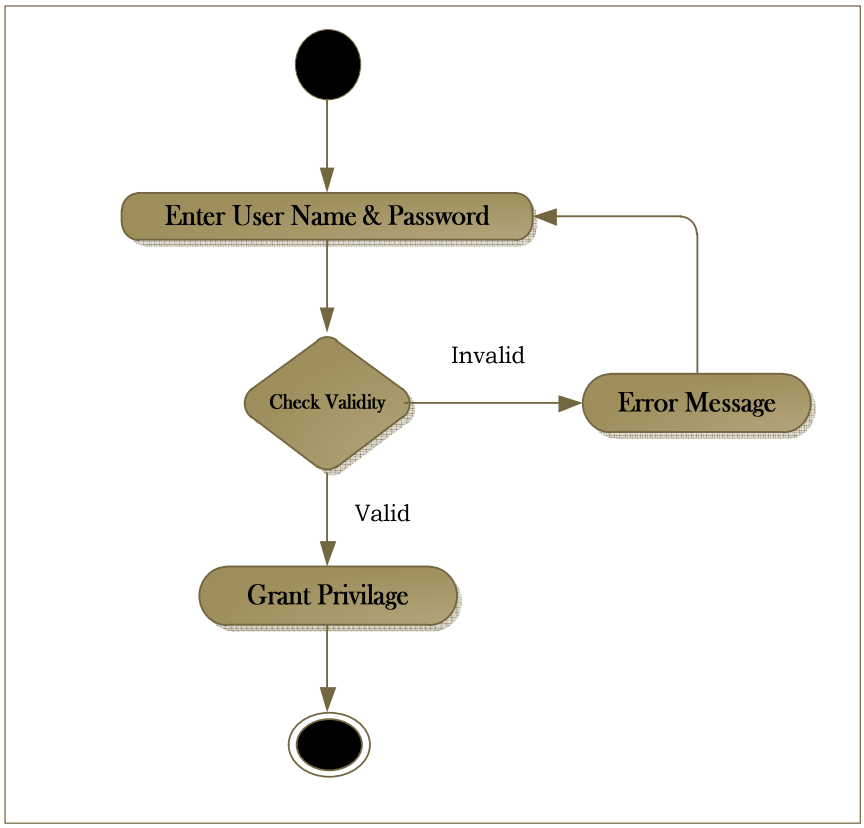

Figure 3.5 Activity Diagram for Login

II. Manage Account

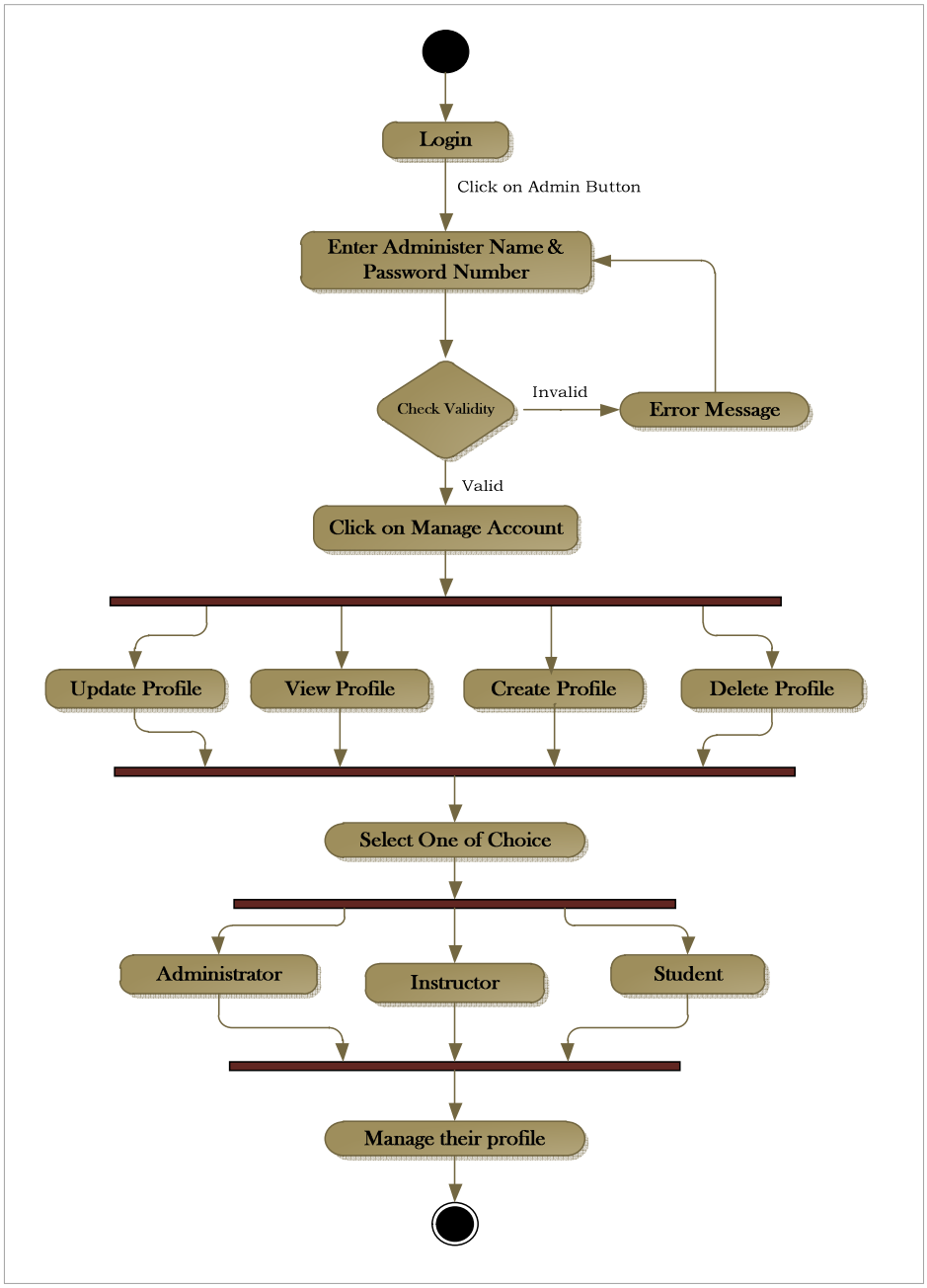

Figure 3.6 Activity Diagram for Manage Account

III. Student Registration

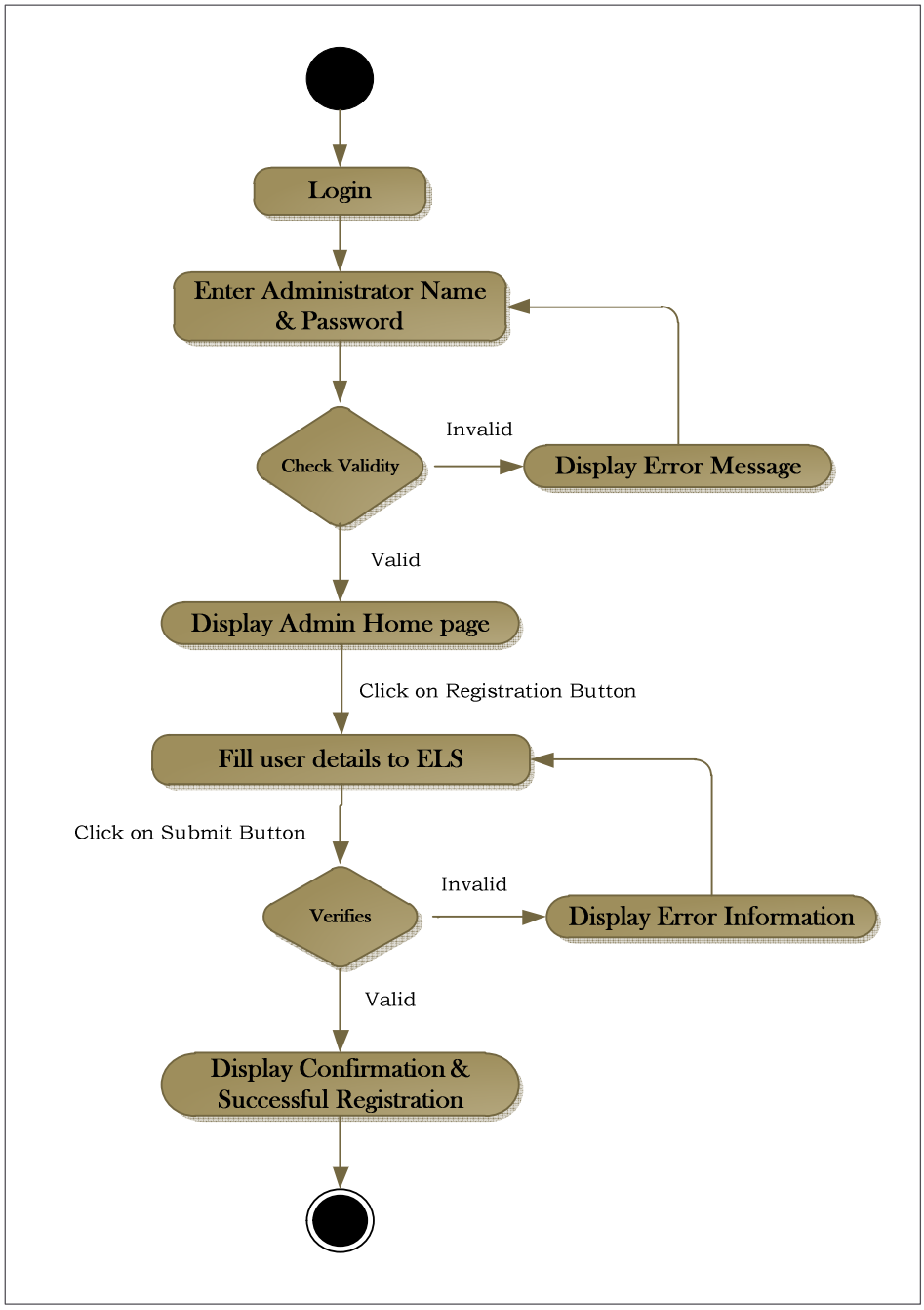

Figure 3.7 Activity Diagram for Registration

IV. Provide Course Material

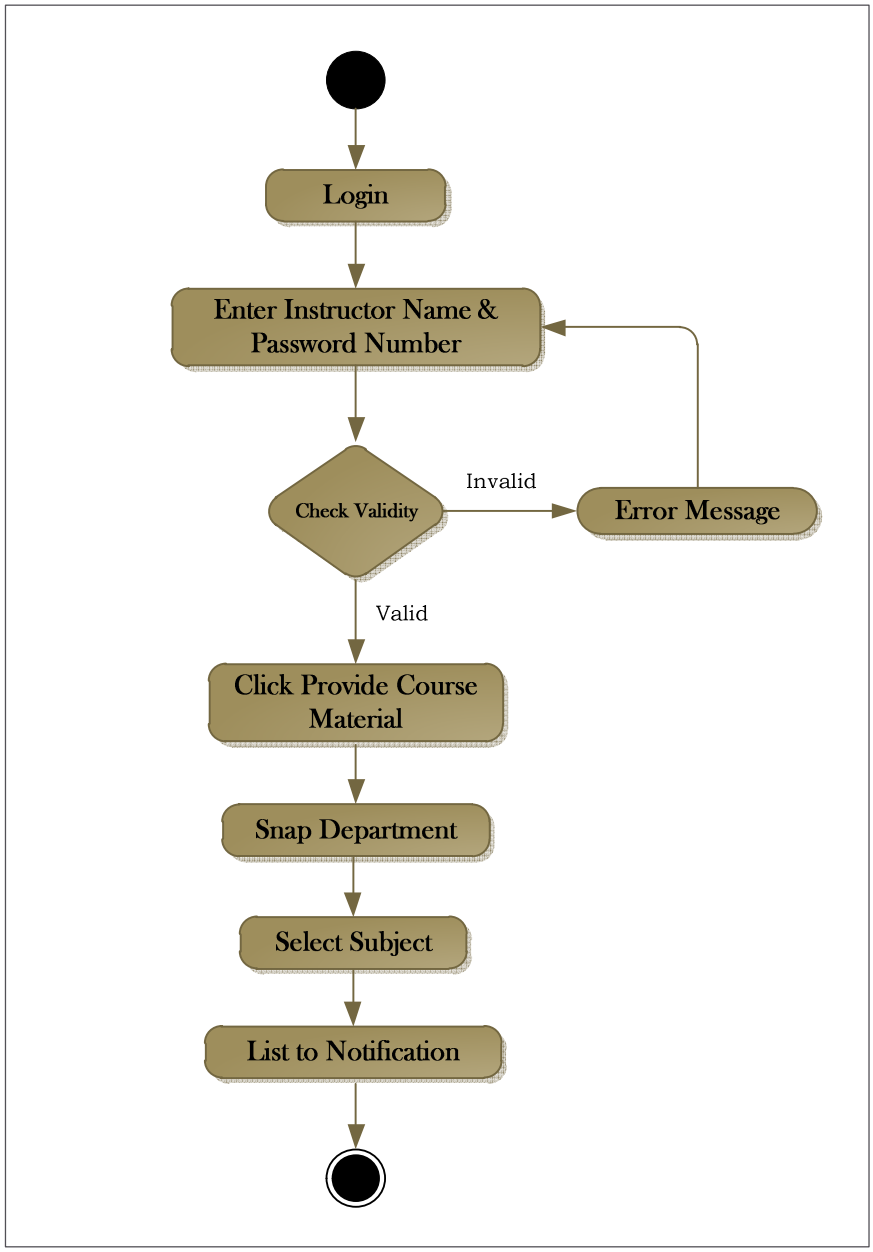

Figure 3.8 Activity Diagram for Provide Course Material

V. Exam, Assignment and Project Preparation

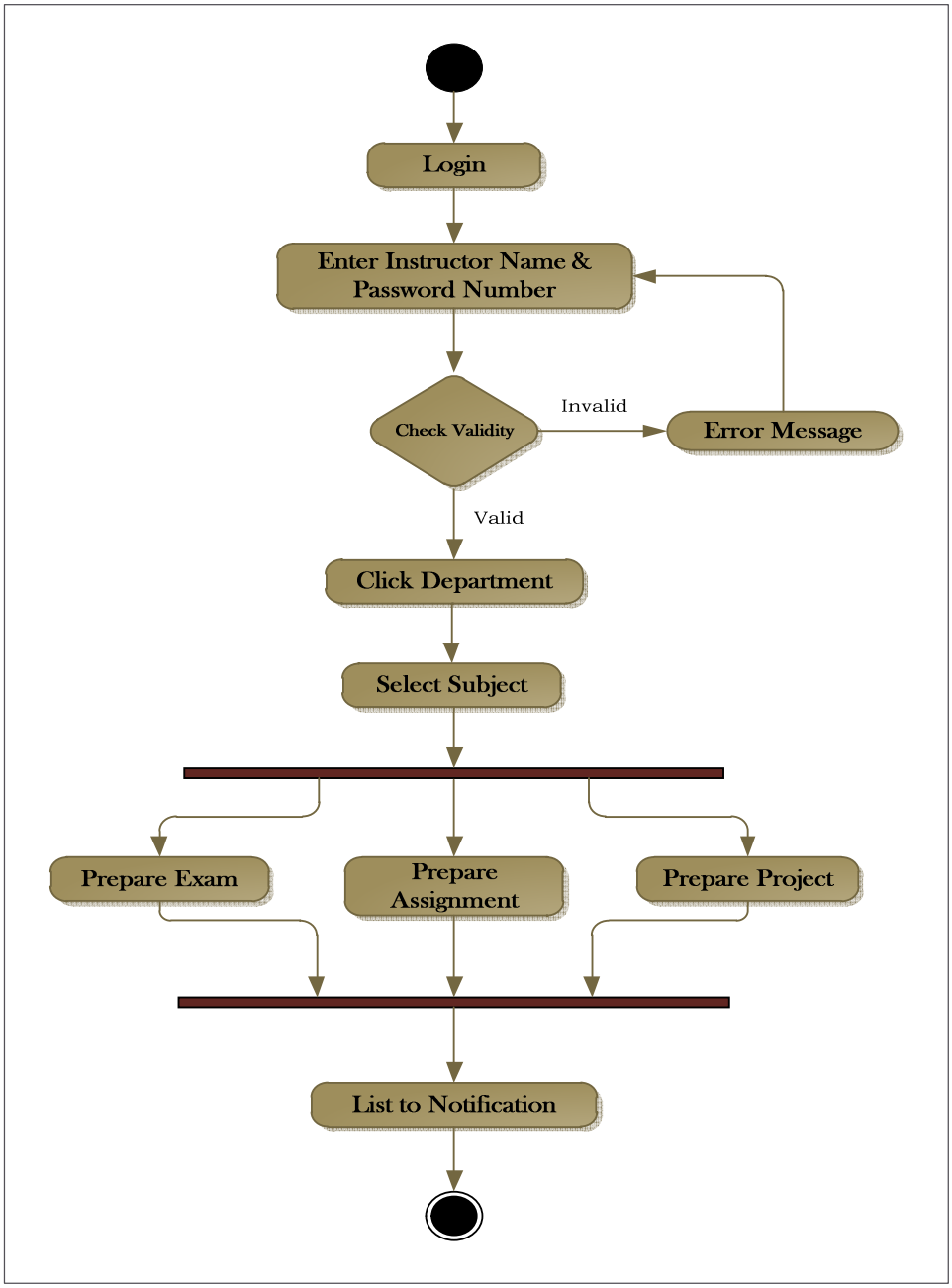

Figure 3.9 Activity Diagram for Exam, Assignment & Project Preparation

VI. Assignment & Project Submission

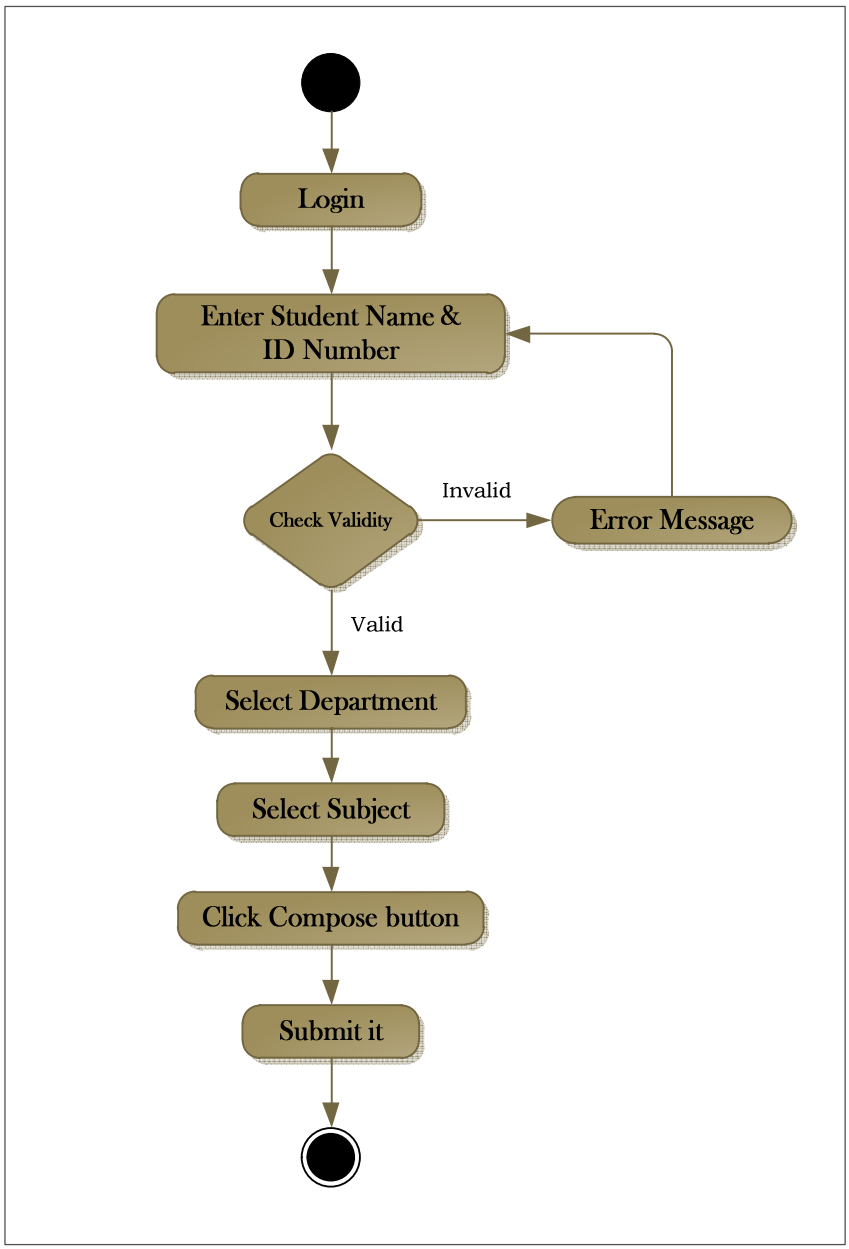

Figure 3.10 Activity Diagram for Assignment & Project Submission

3.6. SEQUENCE DIAGRAM

Sequence Diagram is one of the diagrams used in *unified modeling language (UML);* they are used to formalize the behavior of the system and to visualize the communication among objects. Sequence Diagram depicts the interaction among the objects during a certain periods of time. Because the pattern of interactions are varies from one use case to another. Each sequence diagram show only the participating objects by their life line and the interaction among those object arranged in time sequence by the message they exchange with one another.

The following sequence diagrams show the interaction of each use case with their alternate course of action.

I. Login

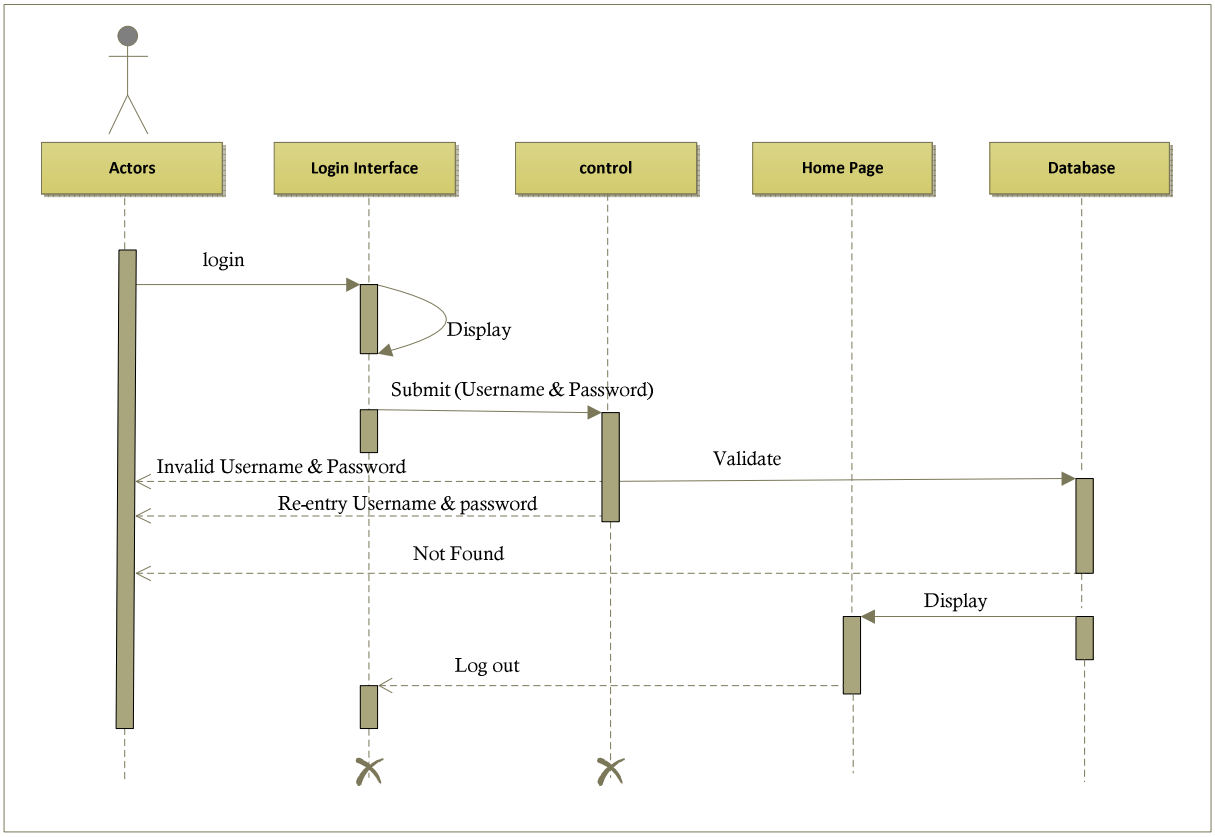

Figure 3.11 Sequence Diagram of Login

II. Registration

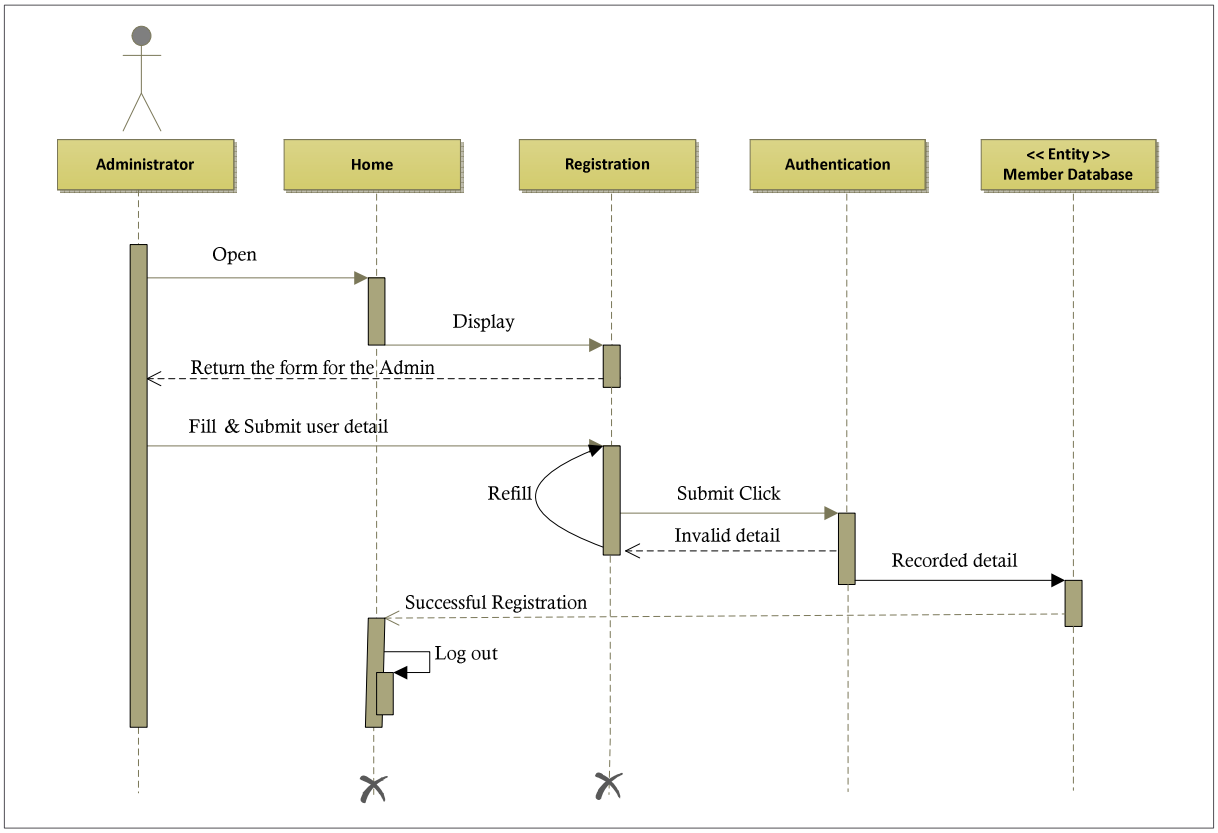

Figure 3.12 Sequence Diagram of Registration

III. Take Exam

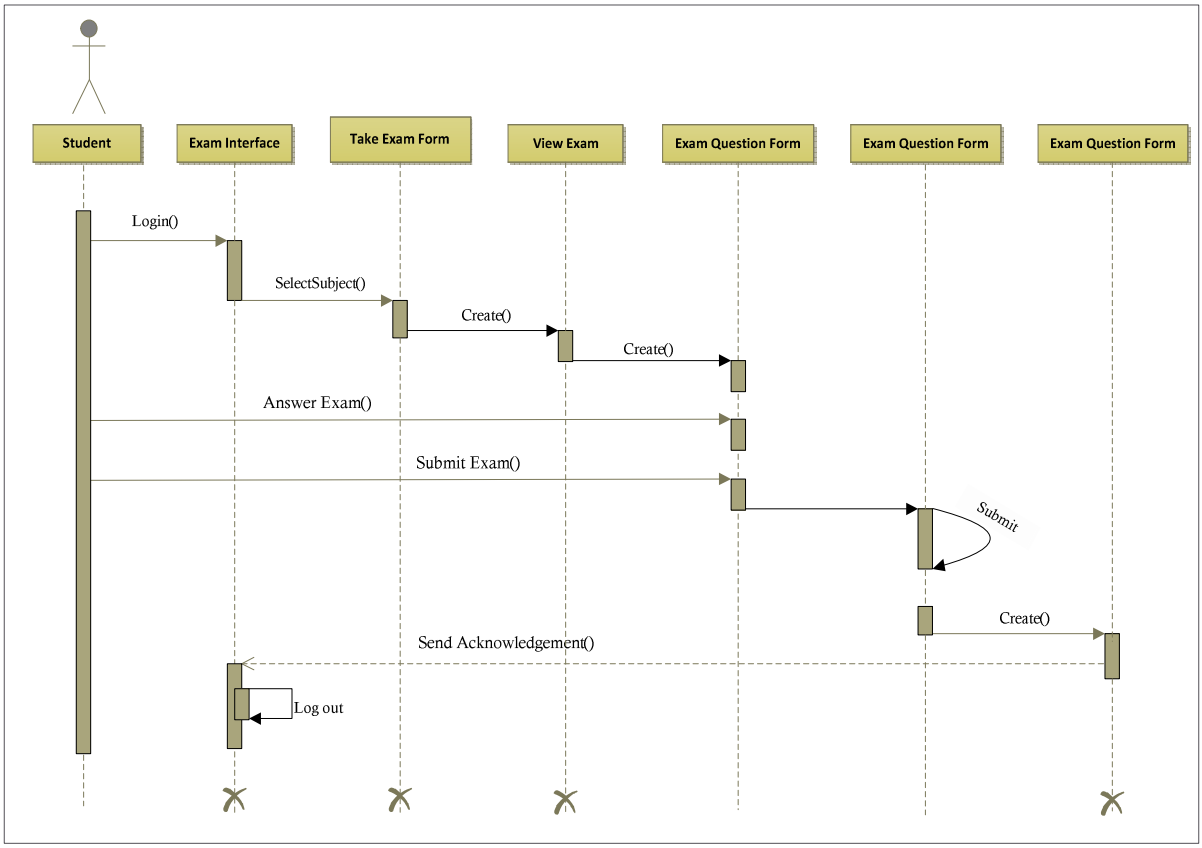

Figure 3.13 Sequence Diagram for Take Exam

IV. View Exam Result

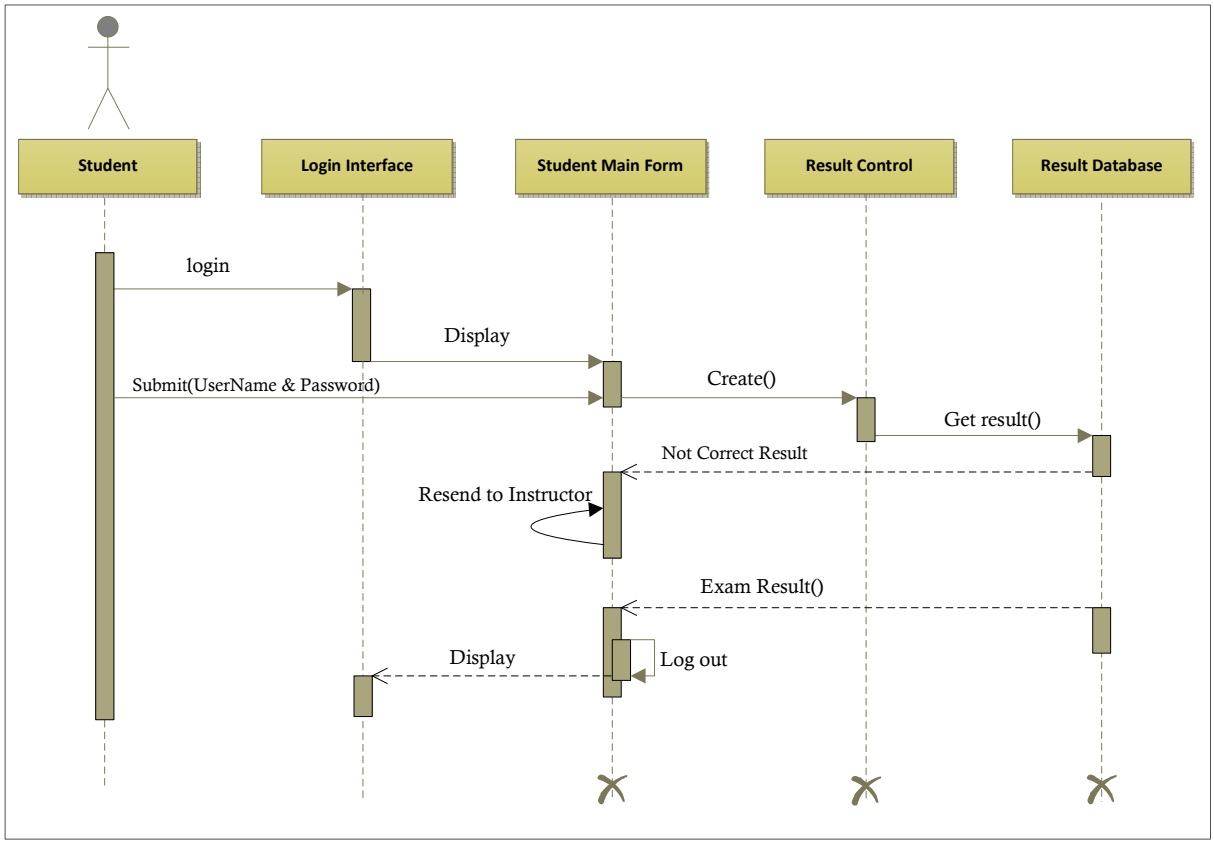

Figure 3.14 Sequence Diagram of View Exam Result

V. Provide Course Material

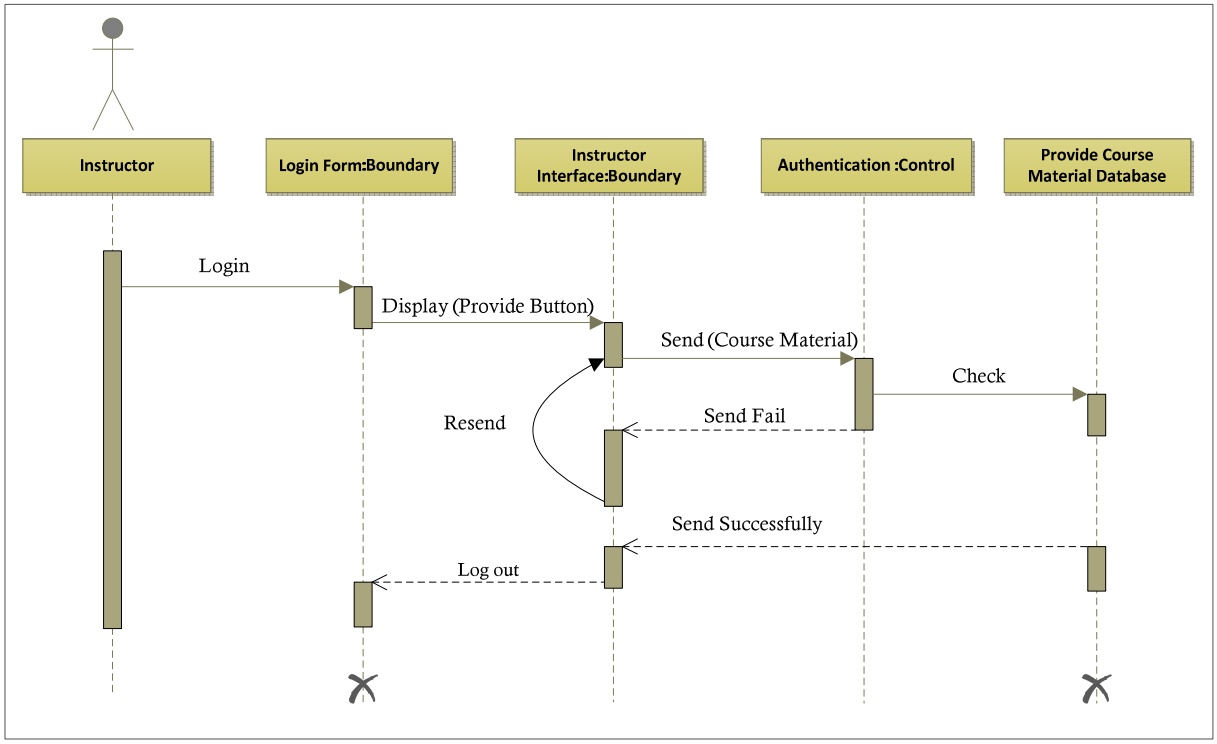

Figure 3.15 Sequence Diagram for Provide Course Material

VI. Preparation of Exam, Assignment & Project.

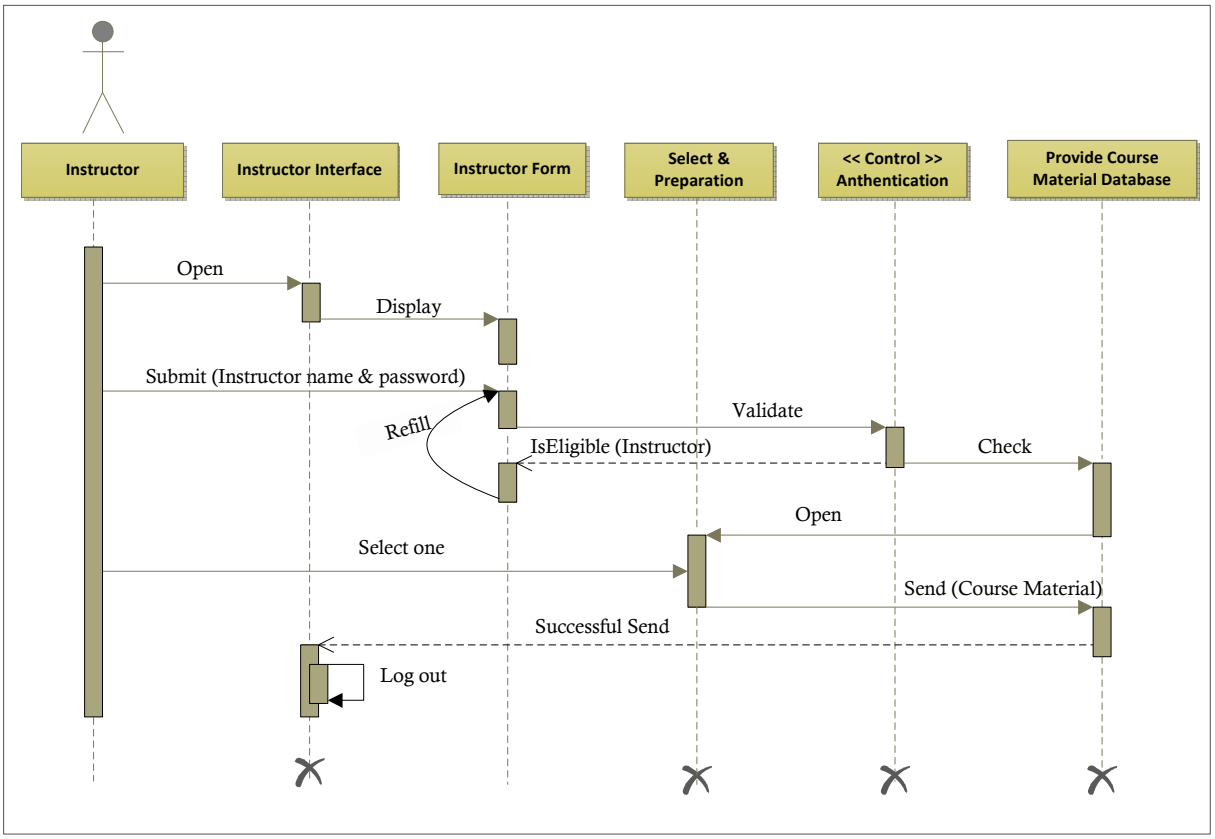

Figure 3.16 Sequence Diagram for Preparation of Exam, Assignment & Project

VII. Manage Account

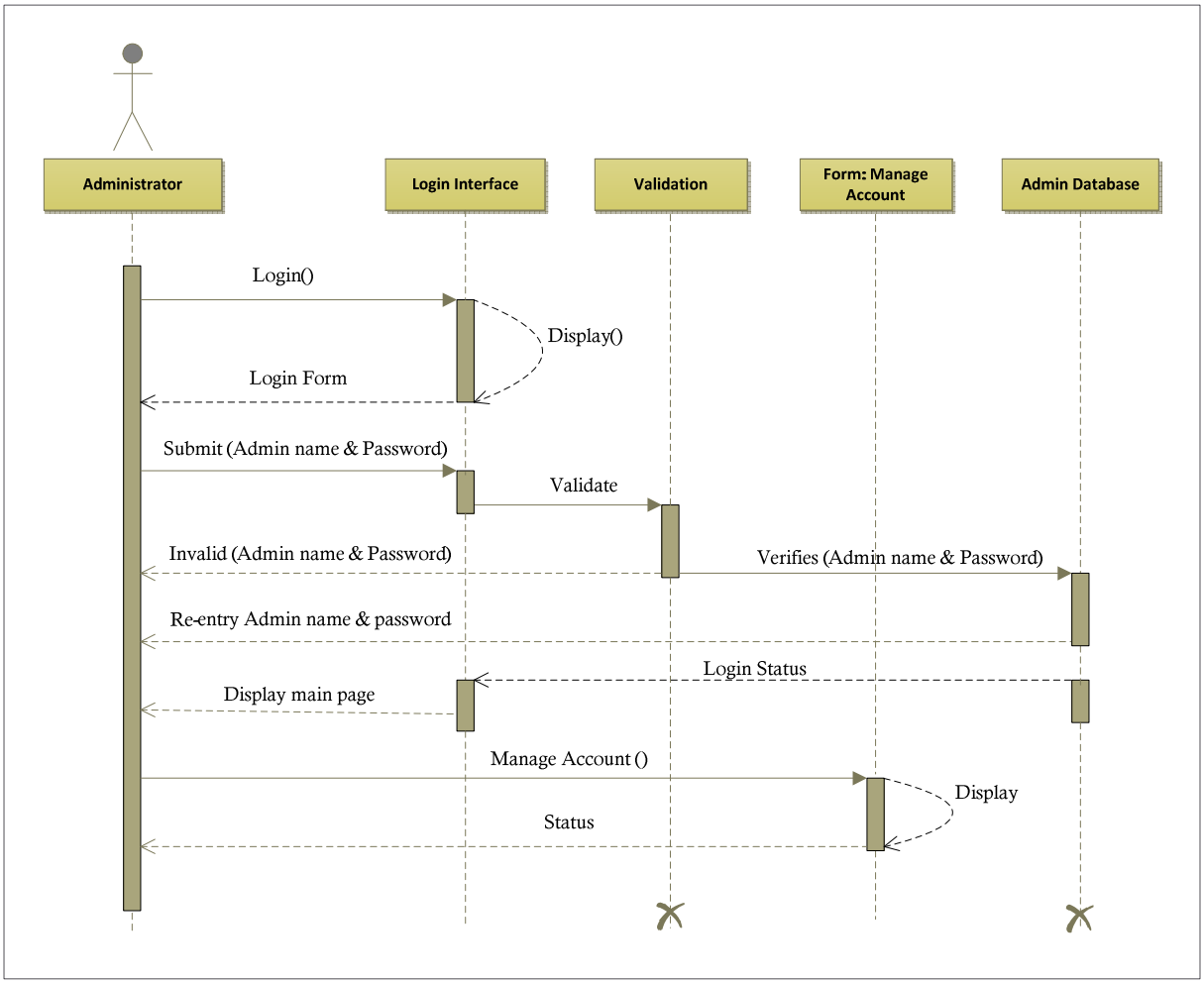

Figure 3.17 Sequence Diagram for Manage Account

VIII. View Course Material

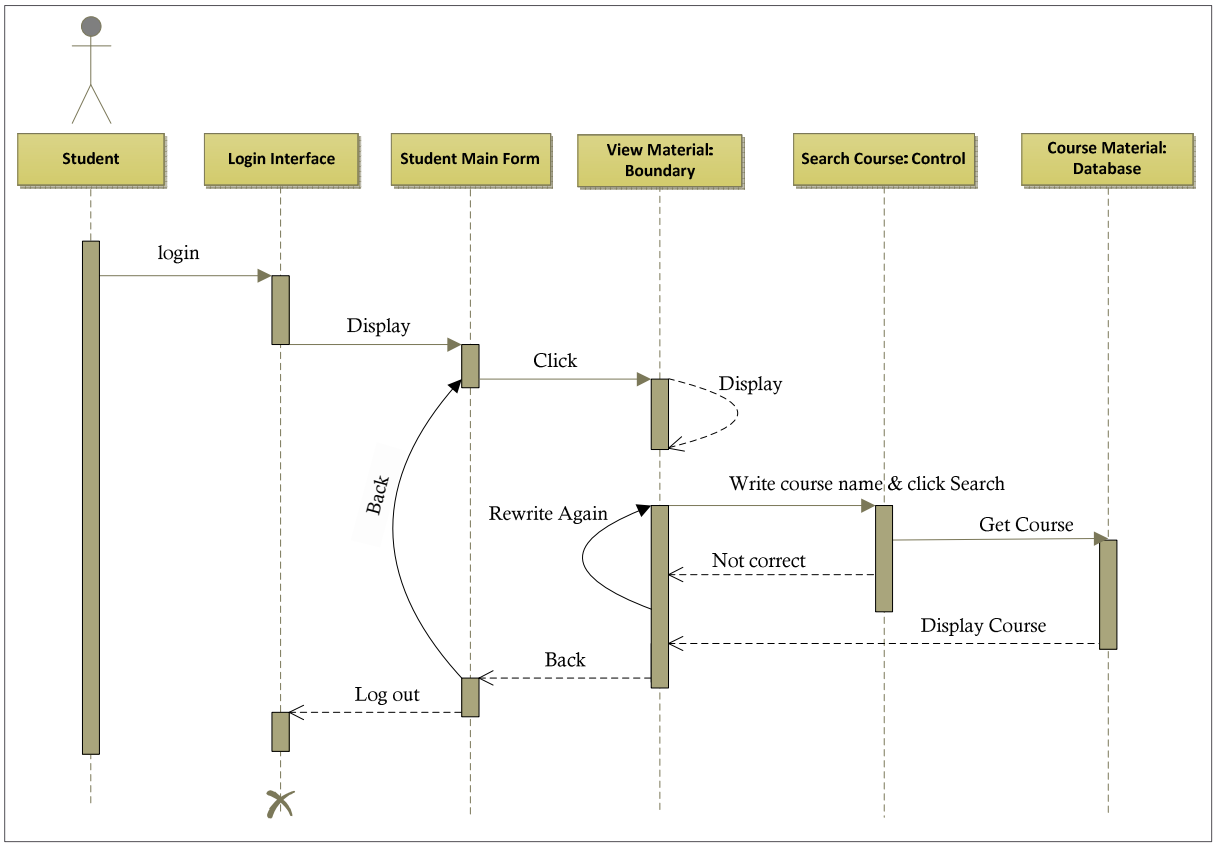

Figure 3.18 Sequence Diagram of View Course Material

IX. Notification

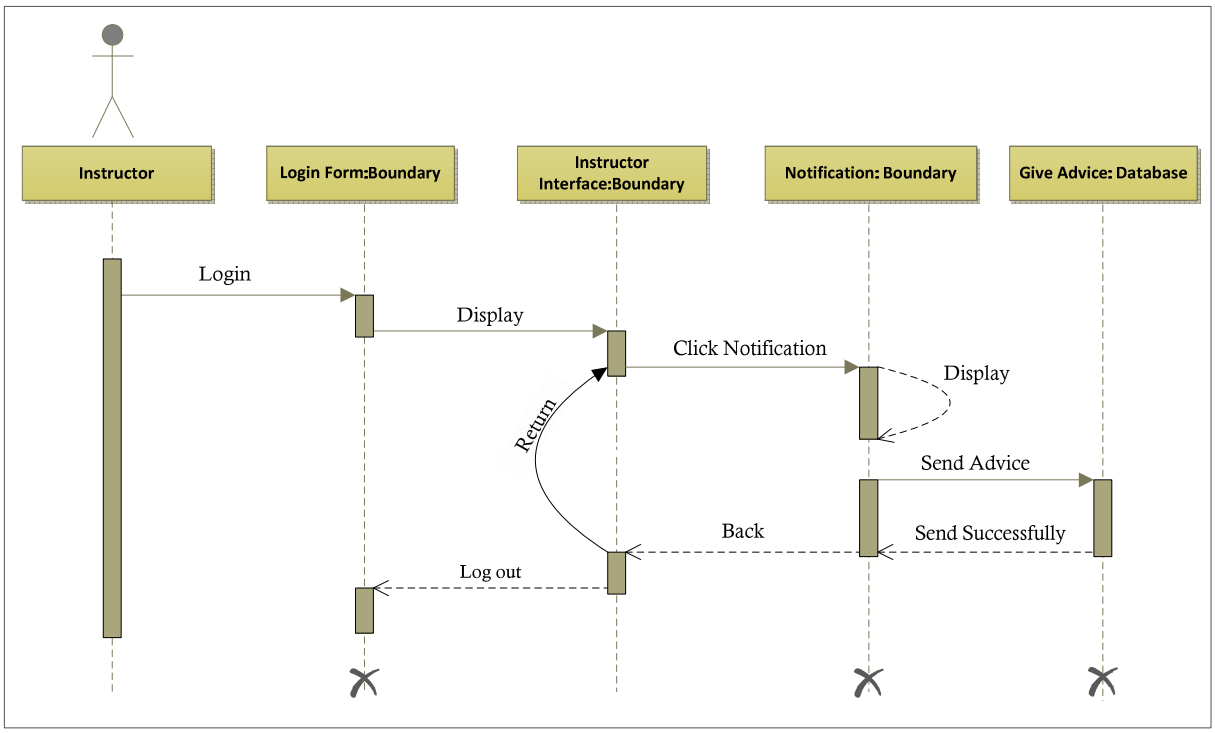

Figure 3.19 Sequence Diagram for Give Advice

X. Assignment and Project Submission

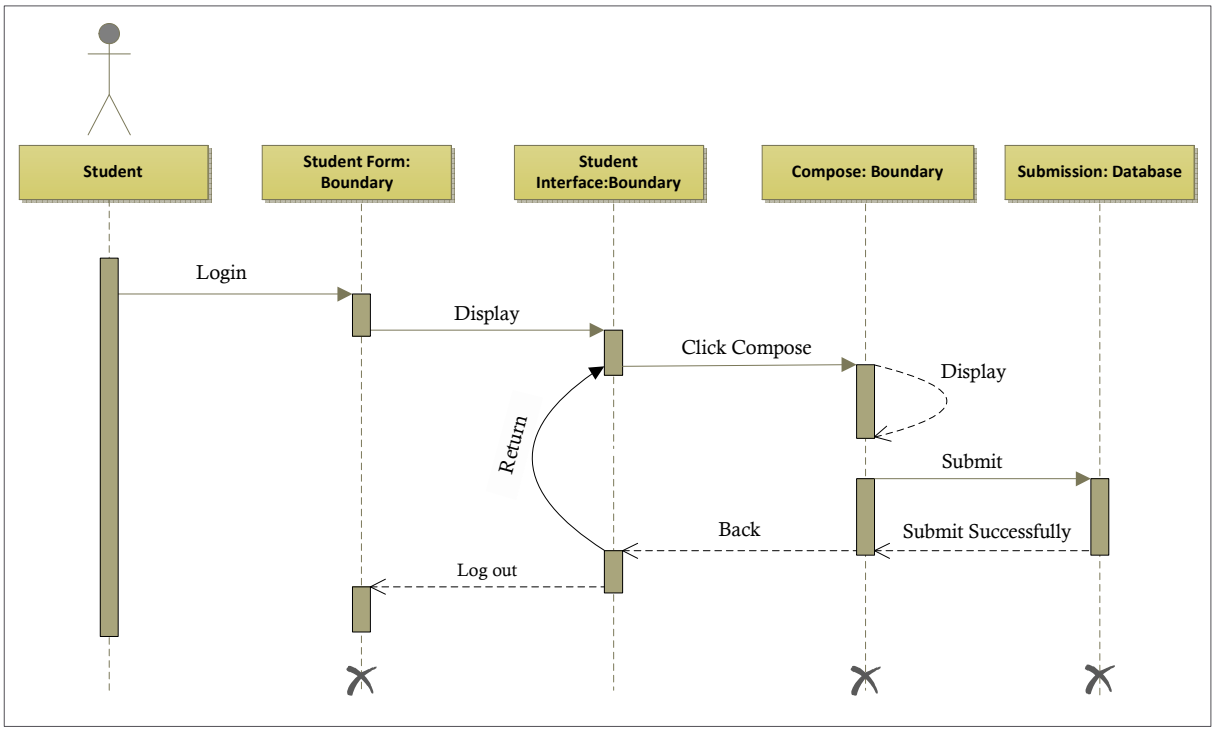

Figure 3.20 Sequence Diagram for Assignment & Project Submission

3.7. CLASS DIAGRAM

The class diagram shows a collection of classes, interfaces, associations, collaborations and constraints. It is also known as a structural diagram. It is are used for describing the static view of the system, showing the collaboration among the elements of the static view, and describing the functionalities performed by the system.

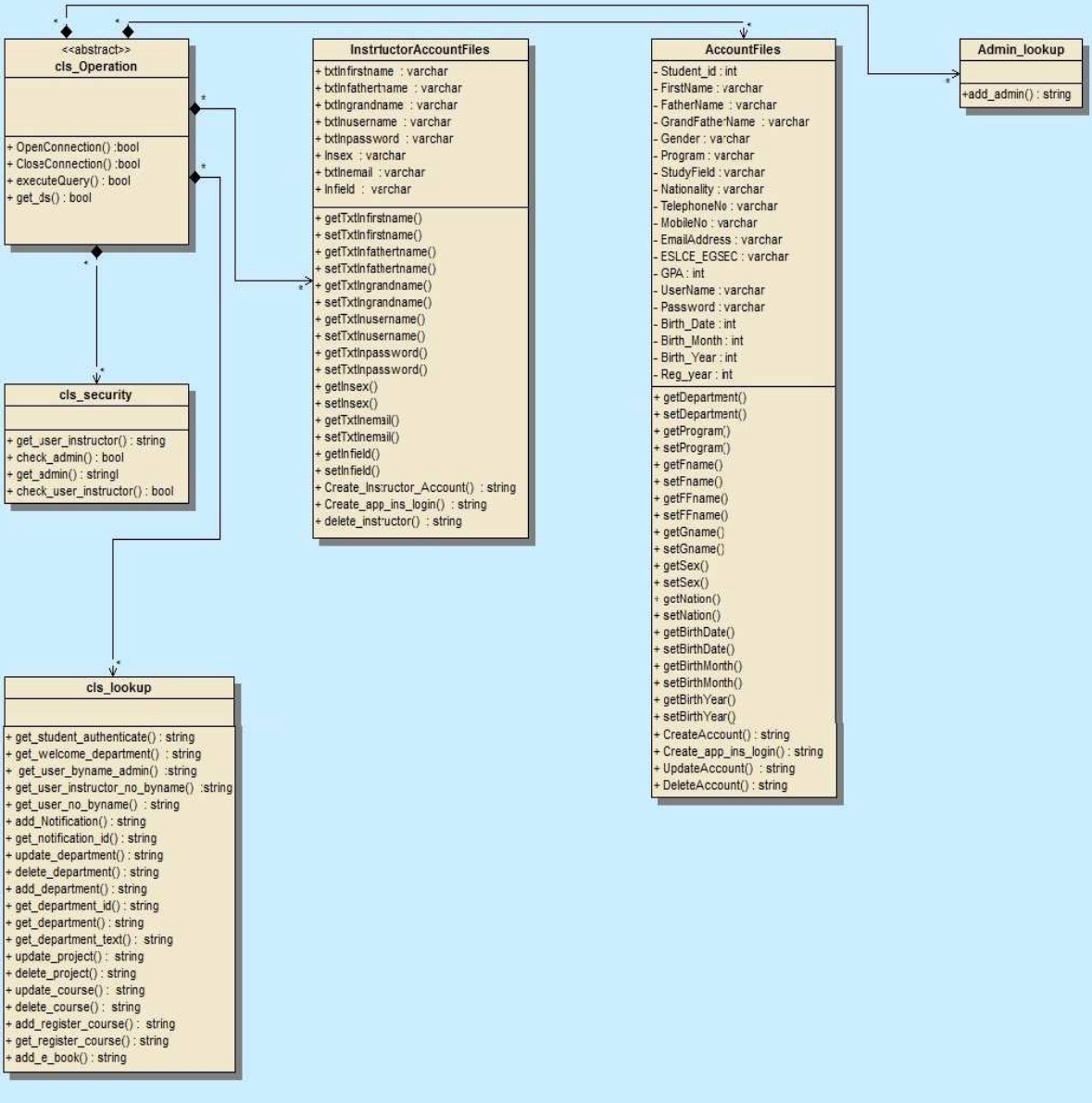

FIGURE 3.21 CLASS DIAGRAM

CHAPTER FOUR

System & Object Design

4.1. SYSTEM DESIGN INTRODUCTION

4.1.1. Document Overview

In the first phase of the project or in analysis the scope, the functionality, the reason behind for developing the proposed system and all other features were showed in detail. In this phase we will try to see the design part of the system in detail.

System design is the replenishment of the analysis model in to a system design model. Its purpose is to provide a brief overview of the software architecture and the design goals. It also provides references to other documents and traceability information.

During system design, developers fill the gap between the system specification produced during requirements elicitation and analysis; and concentrated on the purpose and the functionality of the system and focus on the process.

The general over view of the design of E-learning system is to show all features of the system so that students of St. Mary's University College can understand the all functionality of the system through observing the design document.

Here in the design phase of the E-learning system, the decomposition of the developed system is explicitly showed, the hardware software mapping is discussed in detail, the architecture of the similar system for the current system and the exact architecture for the proposed system is also the part of the design.

4.1.2. Class Type Architecture

In this document, the web site must be capable of separating the data access code from the business logic code and from the presentation code user interface so that the site is much more maintainable and scalable. This is called a multi-tier design. Isolate the data access architecture so that it can allow the support of different underlying data stores — without requiring changes to the business object layer when the underlying data store is changed. Similarly, changes to the business object or presentation layers should also be possible without changing another tier. Design the business object architecture to expose the data retrieved by the data access layer in an object-oriented format. Bind many user interface controls to the data retrieved by the business logic layer to minimize the amount of work needed in the user interface layer, and to put the role of managing data in the business logic layer instead of the user interface layer. The user interface should focus mostly on data presentation; the business logic layer should manipulate the data and apply business rules; and the data layer should only provide persistence data storage.

We have five layers in class type architecture. They are:

- User interface Layer
- Controller/process Layer
- Business/domain Layer
- Persistent Layer
- System Layer

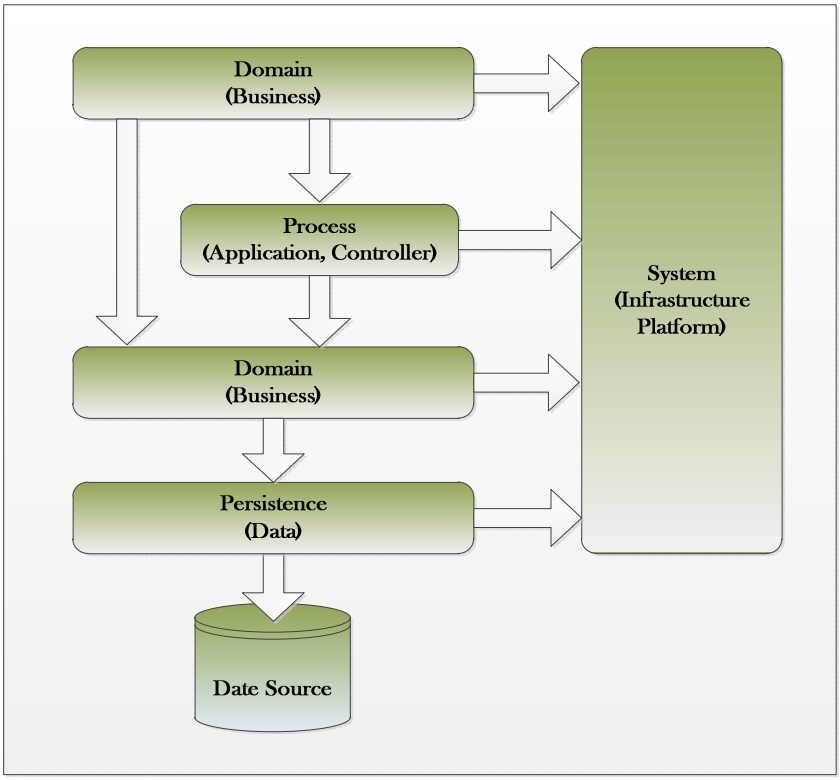

Figure 4.1 Class Type Architecture

4.1.2.1. Layer Description Skill Set

INTERFACE: This layer is an intermediate between the student & guest and also the system whenever the student wants to interact with the system, it should pass through the interface subsystem in order to feed a data into the system or to view an output from the system this layer wraps access to the logic of the system.

CONTROL/PROCESS: This Layer Bind many user/student interface controls to the data retrieved by the business logic layer to minimize the amount of work needed in the user/student interface layer, and to put the role of managing data in the business logic layer instead of the user/student interface layer. The controller classes of our system are: Main menu controller.

DOMAIN: This layer implements the concepts pertinent to our business domain such as System Admin, Instructor and Student, focusing on the data aspects of the business objects, plus behaviors specific to individual objects. It also design the business object architecture to expose the data retrieved by the data access layer in an object-oriented format the business logic layer should manipulate the data and apply business rules.

PERSISTENCE: This layer helps to isolate the application from changes to the permanent storage approach; that is it should only provide persistence data storage. Persistent classes encapsulate the capacity to store, retrieve and delete objects without revealing the underlying storage technology. Persistence classes interact with only system classes: Admin, Instructor, Student and Guest Site.

SYSTEM: This Layer provides operating system specific functionality for your applications, isolating your software from the operating system by wrapping operating system specific features, increasing the portability of your application.

4.1.3. Design goal

The main aim of the design is to show the different type of class type architecture such as user interface, process/control, business/domain, persistence and system layers and also different types of system modeling techniques that are used for the implementation of the system such as class, state chart, component, and deployment modeling. Also some system design techniques such as user interface, training and maintenance designs are also to be covered in this design chapter.

The design goals are derived from non-functional requirements that means non-functional requirement is the description of the feature characteristics and attribute of the system as well as any constraints that may limit the boundary of the proposed solution.

In short, non-functional requirement means the necessity of the system (new one) that is not directly related to the functional of the new system. These requirement don't directly affect the performance of the system but nevertheless important. In most cases the design goals of a system is similar to the non-functional requirement. The access control of the system, hardware, software mapping, boundary condition and similar features of the system is shown here.

The following are the design goals of the system:

- **Robustness:** The system will handles any incorrect input from the user. There is an error handling mechanisms and also recognize the input and prompt the user to make the necessary corrections.
- **Reliability:** the system should be reliable.

- **Fault Tolerance:** the system should be fault tolerant to loss of connectivity with the service
- **Extensibility:** The system can be extended by adding some class whenever necessary. We are doing to design the system in any time; if there is need of modification .It will modify any part of the system without corrupting the main system. When a system is designed, it is in way that it can be modified easily.
- **Security:** the system should be secure, i.e., not allow other users or no authorized users to access data that don't concern with them.
- **Modifiability:** the system should be modifiable for further modification and enhancement of the application.

4.2. CURRENT SOFTWARE ARCHITECTURE

Currently St. Mary's University College does not have an integrated and fully automated software system for E-learning System. Each applicant should come to campus and learn here. And it still now are used and every were.

4.3. PROPOSED SOFTWARE ARCHITECTURE

In the education sector the teaching learning process can be assisted with the application of computers that makes the educational system more efficient and better. This project is about assisting students and teachers using a computer teaching learning environment. The proposed teaching system will help students to explore knowledge by themselves. Here the teaching system will be interactive and offers features like pictures, educational videos or tutorial video.

The system will be web based Client/server architecture. This mean, the client/server architecture, a subsystem, the server, provides services to instances of other subsystems called the clients, which are responsible for interacting with the user. The client consists of different web browsers serving the user such as:

- ✓ Internet explorer,
- ✓ Mozilla Firefox ,
- ✓ Opera, or
- ✓ Any other browsers

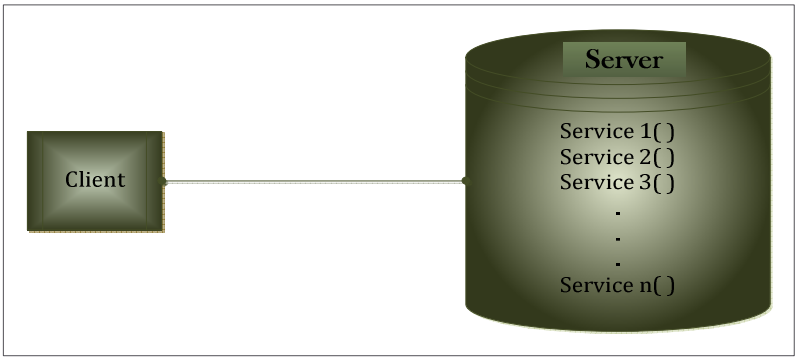

Figure 4.2 Proposed Software Architecture

4.3.1. Advantages of the proposed design

The proposed software architecture, client/server, discussed above is the most suitable way for designing the overall system. This is because it assists us on identifying and classifying the different subsystem that might be included in our system. The main reason behind dividing the overall system in different subsystem is that, it helps us on understanding each subsystems and their relationship with other subsystem. By studying each subsystem alone we can identify what feature we should include and not. While doing so it also gives us the opportunity to recognize the relation it has with other subsystem which are found in the system.

4.3.2. System Architecture

The system architecture sub division is based on the end users we intended to include in our system. By identifying the different classes of users that are found in our system we can classify each class's system and subsystems it incorporate. Based on the roles end users play we can have a number of operations that can be done by each class "end user". This will give us the chance to know each operation done by the different class of users in detail; which in turn gives us the chance to explore the system even into further subsystems. The major reason behind the sub division of the system based on end users is that if we are able to distinguish one user's operation from the other, then it would be easier to list out the operations done by that specific class user. And while doing so we have the opportunity to have more understanding about the relationship between each subsystem. Moreover, we can decide whether or not the subsystems need additional decomposition.

4.3.3. Hardware/Software mapping

In this section we are going to see Hardware/Software mapping or UML deployment diagram. UML deployment diagrams are used to illustrate the relationship among run-time components and hardware nodes. When the user wants to connect to ELS , the system user has to double click or open the ELS. Then the system will start to load the Search interface to client computer from local server. After entering item information, the system allows the user to access information based on his/her need.

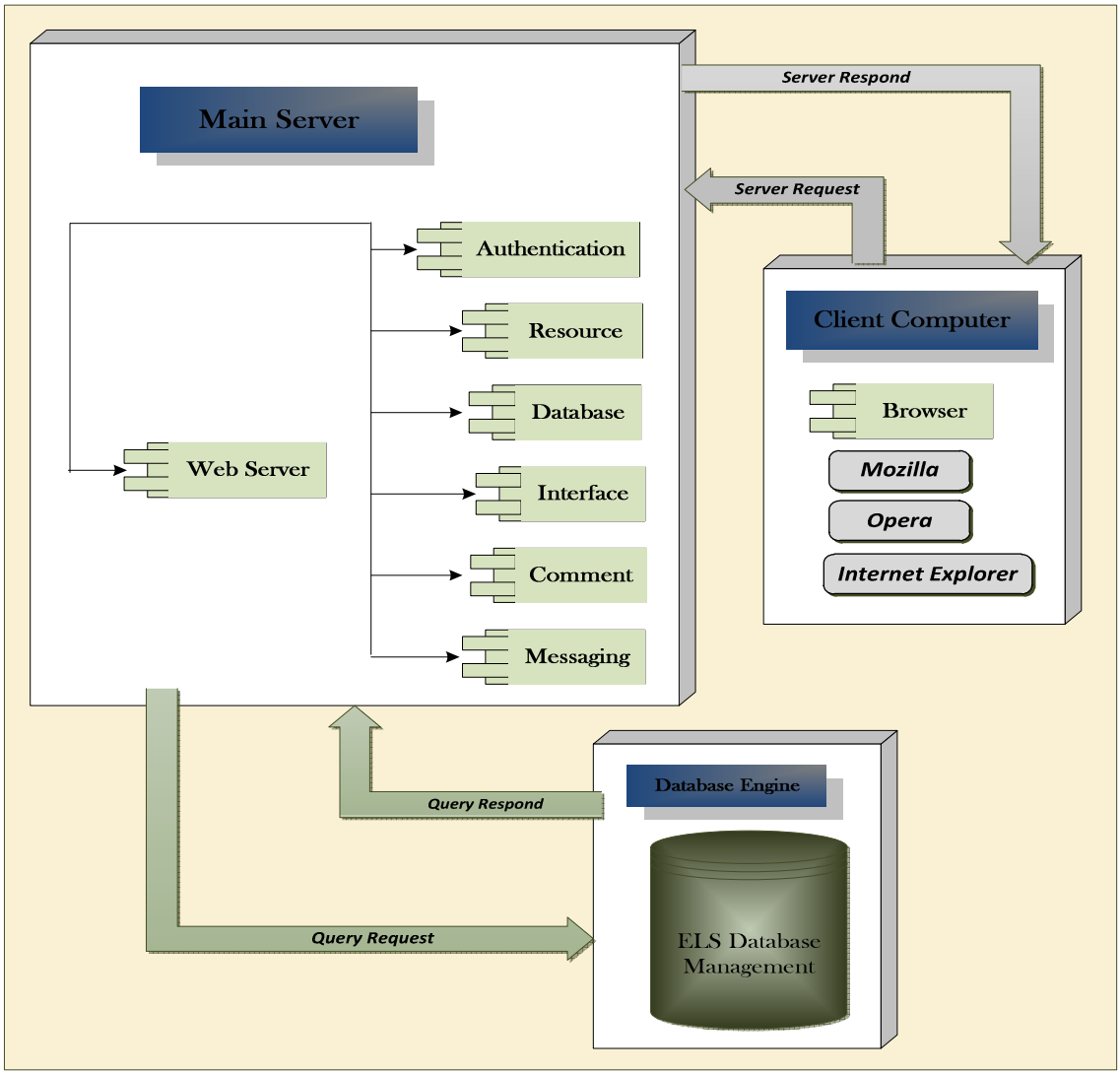

Figure 4.3 Software/Hardware Mapping

4.3.4. System Decomposition

System Decomposition is the act of breaking a system into its component subsystems, processes, and sub processes. It issued to reduce the complexity of the solution domain by minimizing dependencies among classes.

The E-Learning system has been decomposed, and each sub system functions independently. It is important to increase the performance of the system, it minimizes the failure of the system and also it is important for the maintainability of the system. In-order to increase the quality of the decomposition, we first partitioned the system in to top level systems which are responsible for specific functionality or which run on a specific hardware node. Let us see each of the sub systems.

I. LOG IN SUBSYSTEM

This subsystem is responsible to authenticate the actors (i.e. Administrator, Instructor or Applicant/User) which to use to get in the system.

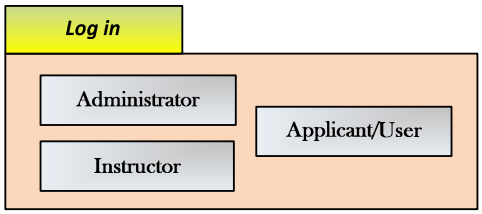

Figure 4.4 Login Subsystem

II. ADMINISTRATOR SUBSYSTEM

This subsystem is responsible to authenticate the user to access functionality of the system like manage profile (update, delete, create new and view), register course and etc.

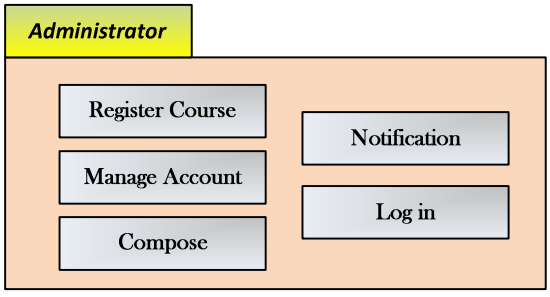

Figure 4.5 Administrator Subsystem

III. INSTRUCTOR SUBSYSTEM

This subsystem is responsible to uploading courses materials, posting assignments and notifications about the courses. And also give marks and grades to their students.

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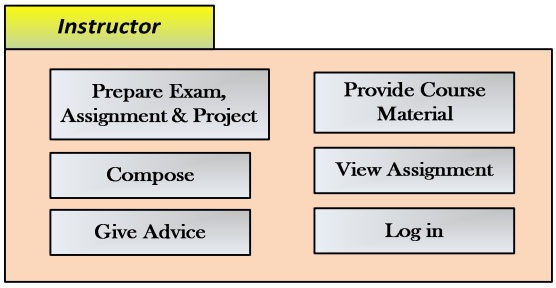

Figure 4.6 Instructor Subsystem

IV. USER INTERFACE SUBSYSTEM

This subsystem is an intermediate between the user and the system. Whenever the user wants to interact with the system, it should pass through the interface subsystem in order to feed a data into the system or to view an output from the system.

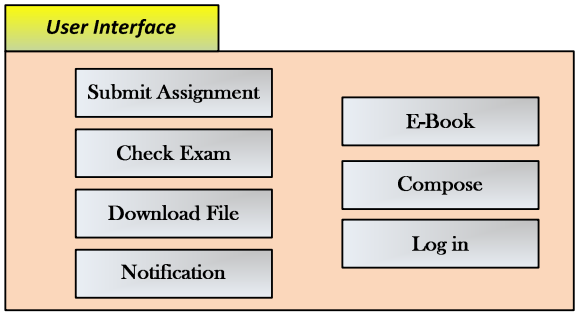

Figure 4.7 User Interface Subsystem

4.3.5. Persistent data management

This section will generally refer to our data storage on our server. All information which is kept in central database will be accessed by concerned employee or staff and always represent updated information. By this, it keeps the consistency and integrity of the data on the server. We are going to use client-server architecture because every time the client request the server to retrieve or store information and the server respond for the user based on the requested information.

Persistent database management referees to store, retrieve, and manage the collection of entity object permanently.

I. Database design

At the initial stage of the database design development, we will focus on identifying the major data to be stored in our database. From our early emphasis we were able to identify that the following information are needed to be stored permanently into the database.

And these data are information about:

- Colleges and departments
- Courses, library, assignment, grade report and exams
- Instructors, students
- User accounts
- Notifications

II. ER mapping to relational database model

In the following section we will try to see each table and the attributes it contains. In addition to value set, sub/super class relation and we also define the primary and foreign keys found under each table "entity".

In this system database, there are 12 Tables:

- adminlogin → Administer login Account data table
- answer → Answer hold table data table
- applicantaccount → Applicant/Student Account data table
- app_ins_login → Applicant & Instructor Account data table
- department
- e_book_store →Store any book data table
- instructoraccount → Instructor Account data table
- lub_project
- question → Exam question table
- register_course → List of course in department
- task → List of send item hold table

The following Database table describes the tables name, attributes and data type of each class in ELS for SMUC.

adminlogin

Field	Type
A_id	int(4)
FirstName	varchar(15)
FatherName	varchar(15)
LastName	varchar(15)
Gender	varchar(6)
UserName	varchar(30)
Password	varchar(50)
Email_Address	varchar(40)

answer

Field	Type
_Answer_Id	int(3)
_Answer	longtext
_type	varchar(30)
_department_ans	varchar(50)
_ans_version	varchar(5)
_ans_field	longtext

app_ins_login

Field	Type
Number	int(11)
UserName	varchar(30)
Password	varchar(50)
Type	varchar(12)
Email	varchar(50)

applicantaccount

Field	Type
Student_id	int(4)
FirstName	varchar(20)
FatherName	varchar(20)
GrandFatherName	varchar(20)
Gender	varchar(6)
Program	varchar(20)
StudyField	varchar(20)
Nationality	varchar(20)
TelephoneNo	varchar(16)
MobileNo	varchar(15)
EmailAddress	varchar(30)
ESLCE_EGSEC	varchar(5)
GPA	int(4)
UserName	varchar(40)
Password	varchar(50)
Birth_Date	int(2)
Birth_Month	int(9)
Birth_Year	int(8)
Reg_year	int(4)

department

Field	Type
D_id	int(5)
_department_name	varchar(30)
_department_description	varchar(150)
C_id	int(5)

e_book_store

Field	Type
_e_course_title	varchar(150)
_e_course_type	varchar(150)
_e_book_author	varchar(100)
_e_department	varchar(50)
_e_attachment	varchar(500)

instructoraccount

Field	Type
Ins_id	int(4)
I_FirstName	varchar(20)
I_FatherName	varchar(20)
I_GrandFatherName	varchar(20)
I_Gender	varchar(6)
I_UserName	varchar(30)
I_Password	varchar(40)
I_Department	varchar(20)
I_Email_Address	varchar(50)

messagedb

Field	Type
No	int(11)
Department	varchar(20)
Message	varchar(500)
type	varchar(20)
Send_Date	date

lub_project

Field	Type
P_id	int(4)
_project_title	varchar(20)
_project_description	varchar(150)

register_course

Field	Type
C_id	int(4)
_course_title	varchar(150)
_course_code	varchar(10)
_course_credit_hrs	int(11)
_department_type	varchar(30)
_year	varchar(3)
_semester	varchar(3)

question

Field	Type
_question_ID	int(3)
_question	varchar(500)
_ques_choice_A	varchar(500)
_ques_choice_B	varchar(500)
_ques_choice_C	varchar(500)
_ques_choice_D	varchar(500)
_ques_choice_E	varchar(500)
_ques_answer	varchar(150)
_ques_exam_version	varchar(15)
_course_type	varchar(200)
_ques_department	varchar(40)
_choice	varchar(15)
_Year	varchar(10)
_Semester	varchar(10)

task

Field	Type
_id	int(4)
_project	varchar(20)
_module	varchar(30)
_version	varchar(20)
_summary	varchar(50)
_full_description	varchar(500)
_attachment	varchar(150)
_submitted_by	varchar(50)
_submitted_to	varchar(50)

Figure 4.8. Database Table

III. Entity Relationship Diagram

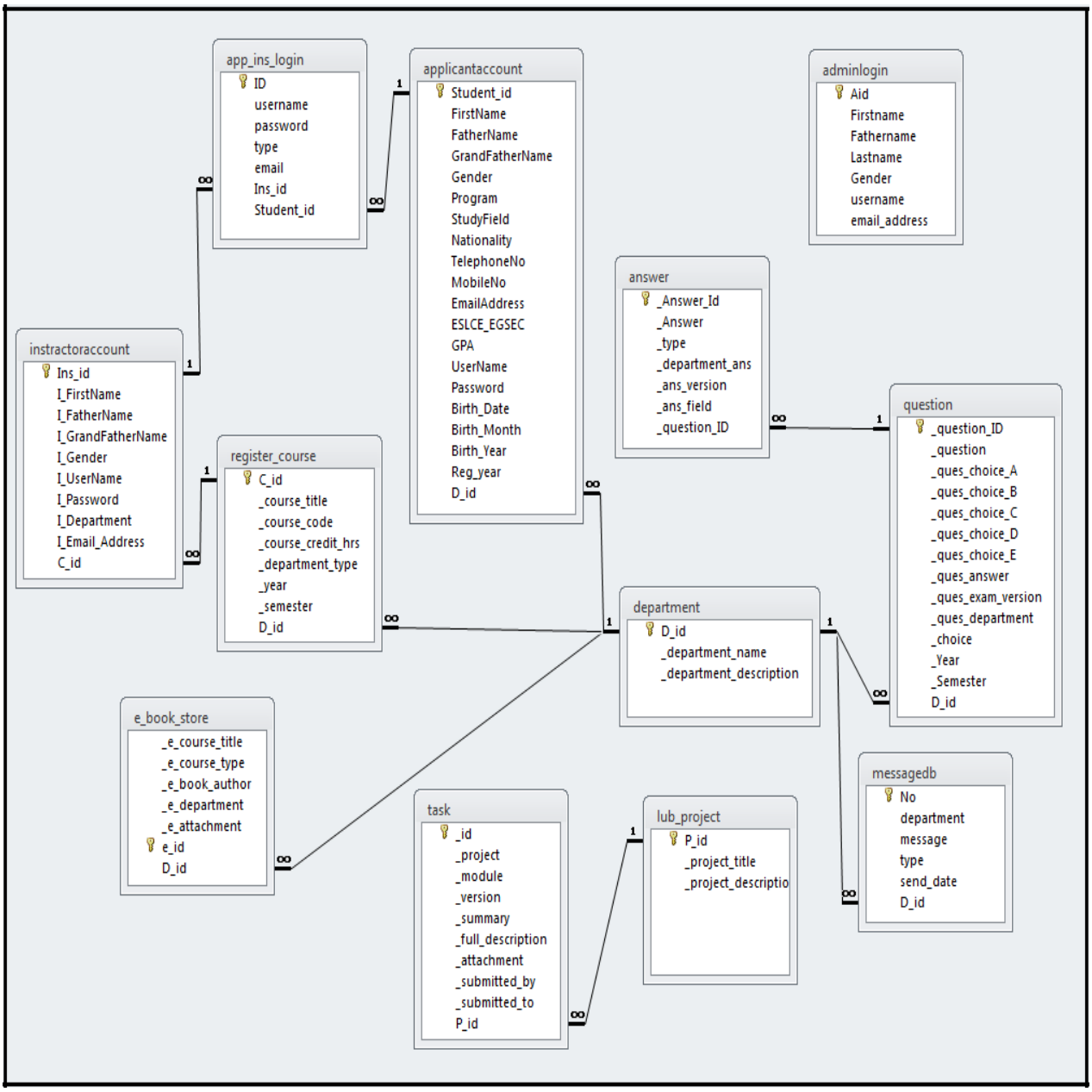

Figure 4.9. Entity Relationship Diagram

4.3.6. Access control and security

As we know, access control and security majors play an important role for the proper use of any system. Without "access control and security", it is difficult to implement functions of the system as desired. In order to avoid such cases we classify our users into four different types based on the role they play in our proposed system; and these are:-

- Administrator
- Instructor
- Student
- Guest

In the next section we will try to specify which actions are granted to which user under what condition for each class of users described above. A user with the privilege of administrator will have the highest degree above the other classes. This is done because the administrator is the only user who is granted the privilege of creating, modifying, managing and deleting user accounts. It is also granted to log in into other pages that are created for other group of users, so that he/she can check the correct functionality of the pages.

The second groups are users with instructor privilege. These groups of users are granted the privilege of uploading courses materials and posting assignments and notifications about the courses they are currently teaching. In addition, they are granted to give marks and grades to their students, including checking the status of their students, among other options which are given to these groups of users. And also manage an account, add or remove department and also project. But not all instructor, some of them who have a priority of Dean Faculty .

Users classified under the privilege of students are granted to look at and download the course materials and tutors, check their grade status, uploading the assignments and project and notifications posted by their instructors and colleges.

The last groups of users are guests who surf the website accidentally or occasionally. So these groups of users are granted only to leave comments or read the information found on the homepage.

4.3.7. Global software Control

This activity determines the sequencing actions in the system. The decisions for the sequence are based on external events generated by an actor and/or the passage of time. The global software control is based on threads where the web server creates separate trades for each user. By using the open standards of UML, we have decided to include an event driven subsystem that resides on the DB server.

4.3.8. Subsystem services

In this section we will try to discuss each subsystem services that we intend to include in our system.

I. INTERFACE SUBSYSTEM

This subsystem is responsible to handle the interface between subsystems. This system will have two main parts, the first one is responsible to take inputs from the user to the system the other one is responsible to display appropriate output from the system to the users of the system.

II. DATABASE SUBSYSTEM

Database subsystem is responsible for storing all the data necessary for system that we are hoping to develop. The data stored on this subsystem can be accessed as needed by authenticated user as the privileges offered for them.

III. AUTHENTICATION SUBSYSTEM

Authentication subsystem is responsible for user control. This subsystem tries to identify weather a person have a privilege to access the system resources or not. This subsystem gives user privilege as an administrator, instructor and registered users (students). Other user with no privilege in one of the above will not have an access to the systems which have been authenticated.

IV. RESOURCE SUBSYSTEM

The resource subsystem is needed for allocating resource for registered members and other authenticated users. These resources include video lessons, documents (PDF, PTT and other), links for other websites, findings and researches that are available in our final system.

V. MESSAGING SUBSYSTEM

The messaging subsystem is one of the subsystems which give us the opportunity for message exchange between system users and instructors. In the subsystem the instructors can receive message, send message and save messages as a draft. Also, the registered members (students) can also send message, check inbox.

VI. COMMENT SUBSYSTEM

Using this subsystem end users have the facility to give comments on the current features supported by the system. Also for unauthenticated users it gives them the chance to give their thought they have on the website.

4.4. BOUNDARY CONDITIONS

This activity decides by the system started, initialized and shutdown. We also decide how we deal with major failures such as data corruption, network outage, and software error and power outage.

I. **Start Up Condition:** On startup, the system administrator should starts the database server and the web server by power on it. After this, the system will display a home page to search and if it is necessary it asks the Log in function of the system and the administrator will give a privilege to the owner. Then the user can use ELS icon to log in to the system. At this time ELS will log in, at this time the user can access the functionality of the system.

II. **Shut Up Condition:** On Shut up, it might have many reasons. When either the web server or the DB server is down then the system will shut down. Or this includes due to maintenance purpose, power failure or when the user finishes their job and the administrator shut down the server. During maintenance, the server may need to be shut down and maintain either hardware or software part. During power failure the administrator has to shut down the system in order to protect the resource. To get time during power failure we will use UPS (uninterrupted power supply).During finishing of the job nothing is problem and the system safely shut down.

III. **Exception handling:** is the way by which a system handles an exception

- ***User error:-*** when the user enters information that is invalid then the system will display descriptive error message to the user, so that the user can correct the input.
- ***Hard ware failure:-*** When the database server or the web server fail then system will display descriptive message to the user or occurs when the hardware equipment fails and stops giving services.
- ***Software failure:-*** During the occurrence of this kind of failure, the system administrator will be in charge to correct it and if the problem is gigantic, then they can communicate us for further debug.

4.5. OBJECT DESIGN

4.5.1. Introduction

The object-level design of this project is dealing to be developed an E-learning system which give us a better chance of understanding the final system. This is done through studying each sub-system individually and by designing the follow of each transaction found on every subsystem. As a result this phase is considered as the most important of the development lifecycle. Because it is the only way in which we can identifying the functions supported by each subsystem. In addition, it helps us on identifying the relationship between the subsystems found on the system that we are anticipated to develop.

- The system is allows the user, instructor and administrator to login.
- The system able to Update, Delete, view and Insert operations.
- The system is able to registration/sign up of new users at the first glance.

In this section, we will identify tradeoff that will impair the efficiency of the system, identify additional objects, refine existing ones and group them into packages.

4.6. OBJECT DESIGN TRADE-OFF

During the design of the system and requirement analysis, many compromises were made. These compromises may sometimes be more of a limitation than solution. Below is a description of trade-offs made in the design of the system.

4.6.1. Memory versus Respond Time

Response time is a factor that most users want. The faster the speed the happier they are. But a fast response time requires a huge amount of memory depending on the number of users currently logged into the system. The system might be used by various users at the same time, these may create user not to get the service that they needed with the speed that they want. In order to defeat this, the system needs to have a good response time by proving a huge amount of memory.

4.6.2. Speed versus User Interface Design

The user interface is the part of the system that interacts with users. In order to increase response time, the interfaces should be limited in the amount of picture or any graphically reach materials that slow down the interaction process. Specially, that has animations, so that we almost have omitted such objects. However, this doesn't mean that we do not use any picture or clip. This is mainly due to the fact that pages which contain pictures or any graphical material take time to access.

4.6.3. Performance versus flexibility

Since our final project is a web based application its performance is highly dependent on the type of connection used to connect to the internet besides other hardware and software requirement as stated on the "SRS document". And as to maintain the flexibility of our system we will try to design the system so that it can be used for other similar system by adding new features that are needed by the alternative system.

4.6.4. Durability versus platform dependence

No need to repeat the same words again and again platform dependence is granted by using different web browsers.

4.7. INTERFACE DOCUMENTATION GUIDELINES

Since documentation is important for further improving the system and maintaining, we have followed specific interface documentation guidelines and conventions in order to make code more readable and easily reusable by others.

- Classes are named with singular noun or noun phrases. The first letter is capitalized.
- During coding comments will be included to make it more readable to others.
- When there is a need for additional functionality and maintaining.
- Methods defined with in the class are given a descriptive name so as to easily understand by anyone about their operation. And name with verb and verb phrases. When it is named with verb phrase the second verb will start with capital letter.
- Variable names should be descriptive to their use and named with singular nouns, verbs and noun phrase with first word being capital.

4.8. PACKAGE

A package is a collection of programs with related functionalities. During the process of system design, we have identified three packages. We will try to see them individually as follows:

I. USER INTERFACE PACKAGE

User Interface package is a modular between the user and the system. If users require interacting with the system, it should pass through the interface package in order to put data into the system or view an output from the system.

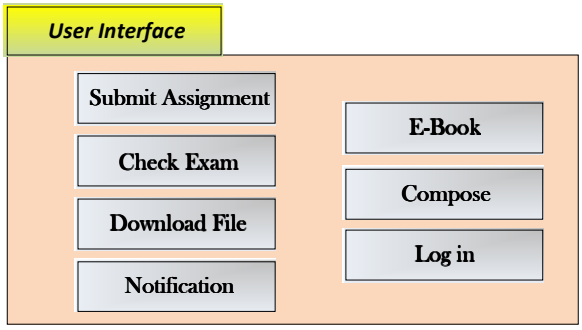

Figure 4.10 User Interface Package

II. DATA MANAGEMENT PACKAGE

The data management package handle user login authentication to log into a system. Data management package is used to perform all data retrieval processes and storage which ie required to the system.

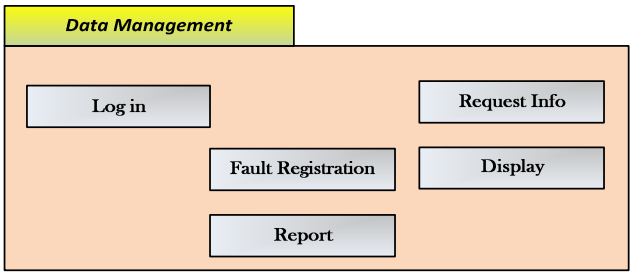

Figure 4.11 Data Management Package

III. ERROR HANDLER PACKAGE

These package is responsible to detect errors appeared in the process of using the system.

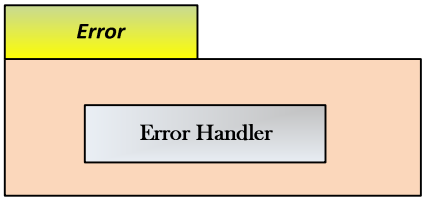

Figure 4.12 Error Handler Package

CHAPTER-FIVE

Object Oriented Implementation

5.1. INTRODUCTION

This chapter describes the object oriented implementation phase which is used to build the actual system, to develop the code that fulfills the system design. Furthermore, it is also used to provide the high light of issues dealt with during the implementation of the project. It generate include implementation issue and strategies.

5.2. IMPLEMENTATION ISSUES AND STRATEGIES

5.2.1. System conversion

It involves translating from the existing system to a new system using different conversation strategies. The first strategy is applying a direct conversion which is used to adoptee the new system directly. The other one is parallel conversion that involves running the old system and the new system hand in hand for sometimes other conversion method also can be used to implement one system but our team use parallel conversion because sometimes there is a need to have the existing system over the new system.

5.2.2. User training

User training must be provided to users in order to become familiar with the new system. But this training only includes those users in the organization.

5.2.3. User documentation

It is used by users of the system as a point of reference if they have any problem before, after, or during using of the system. It also leave significant advantage on their day to day activities.

5.2.4. Coding

Coding is part where all the works during analysis and design will be turned off to a functional system prototype. It also includes those interface, logical and database implementation.

5.2.5. User Interface Testing

Is the verification that the user interface follows the accepted standards chosen by the organization. It is important to ensure that the system has fulfilled the intended functionalities. There are different ways of testing mechanism or procedures. Therefore our team tested several small components, user interfaces whether they are no data entry error,

user interfaces pages are tested to ensure uniformity and linker also checked in order to make sure that they linked with the required page others also tested in the tested environment.

5.2.6. Hardware and software acquisition

For a typical full deployment of the system the hardware and software acquisition is necessary.

Hardware and software acquisition: -

- **Hardware acquisition**

  Any kind of server computer like

  - ✓ Hard disks: minimum of 200 GB
  - ✓ CPUs: 2.23 GHz
  - ✓ RAM: minimum of 1 GB
  - ✓ Cache-Memory: minimum of 1 GB
  - ✓ NIC with dual

  The reason is that not to be busy while using the site. Because most of in learning system, must not be busy while student and instructor are sending and downloading the resource, uploading, taking exam and etc… So instead of this, the specification which was list above must be fulfill to work perfectly.

- **Software acquisition**

  - ✓ *Browsers (client side):* Internet explorer, Mozilla, Opera
  - ✓ *Web application server (server side) :* Wamp server
  - ✓ *Database (server side) :* Apache Web server

5.3. IMPLEMENTATION TOOLS

To implement the proposal system the team has used:

- ℘ Adobe Dreamweaver CS4 & CS5 ➔ for the web interfaces designing.
- ℘ Net Bean Environment ➔ for the coding part.
- ℘ Apache Web Server
- ℘ JavaScript ➔ For script code.
- ℘ CSS ➔ Client Side Server.
- ℘ MySQL: as a database management system.
- ℘ PHP: as a programming language.

5.4. SAMPLE USER INTERFACE

I. Login Page

- **Administrator**

Figure 5.1. Administrator Login Site

- **Applicant & Instructor**

Figure 5.2. Instructor/Applicant Login Site

II. Home Page

℘ *Administrator Main Page*

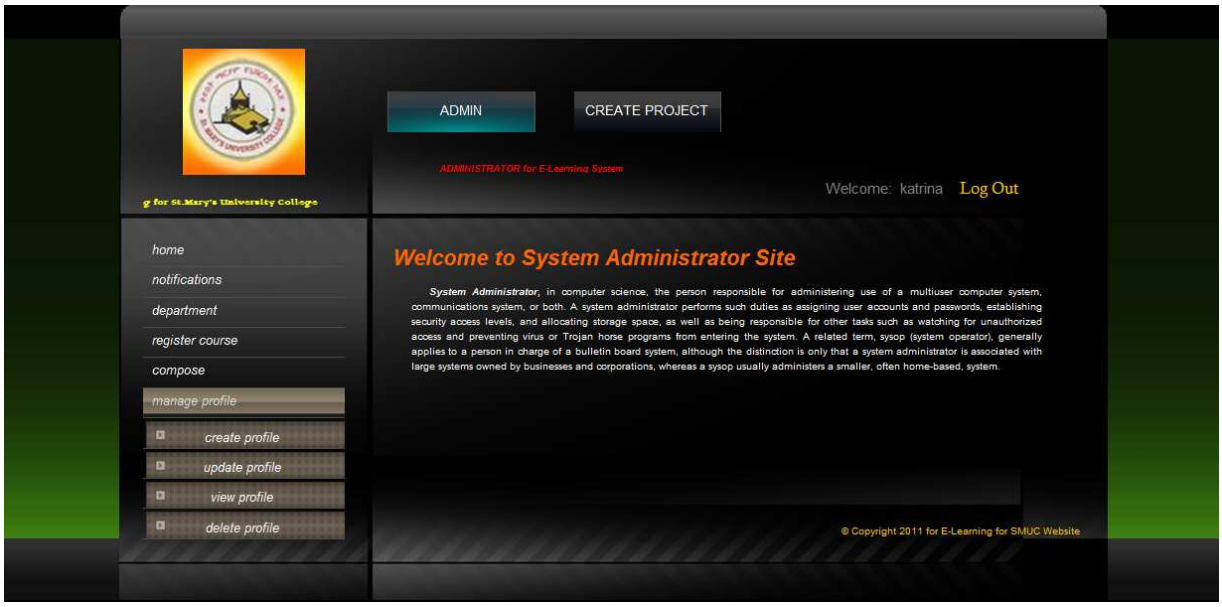

Figure 5.3. Administrator Home Page Site

℘ *Instructor Main Page*

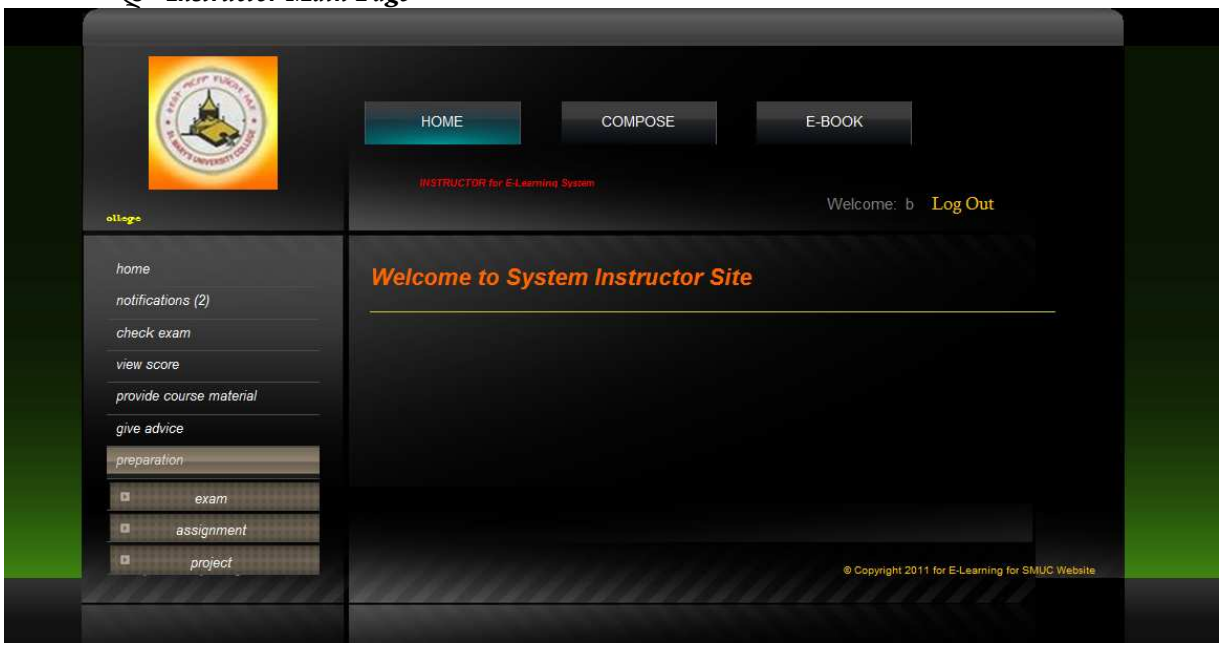

Figure 5.4. Instructor Main Page Site

- ***Applicant/Student Main Page***

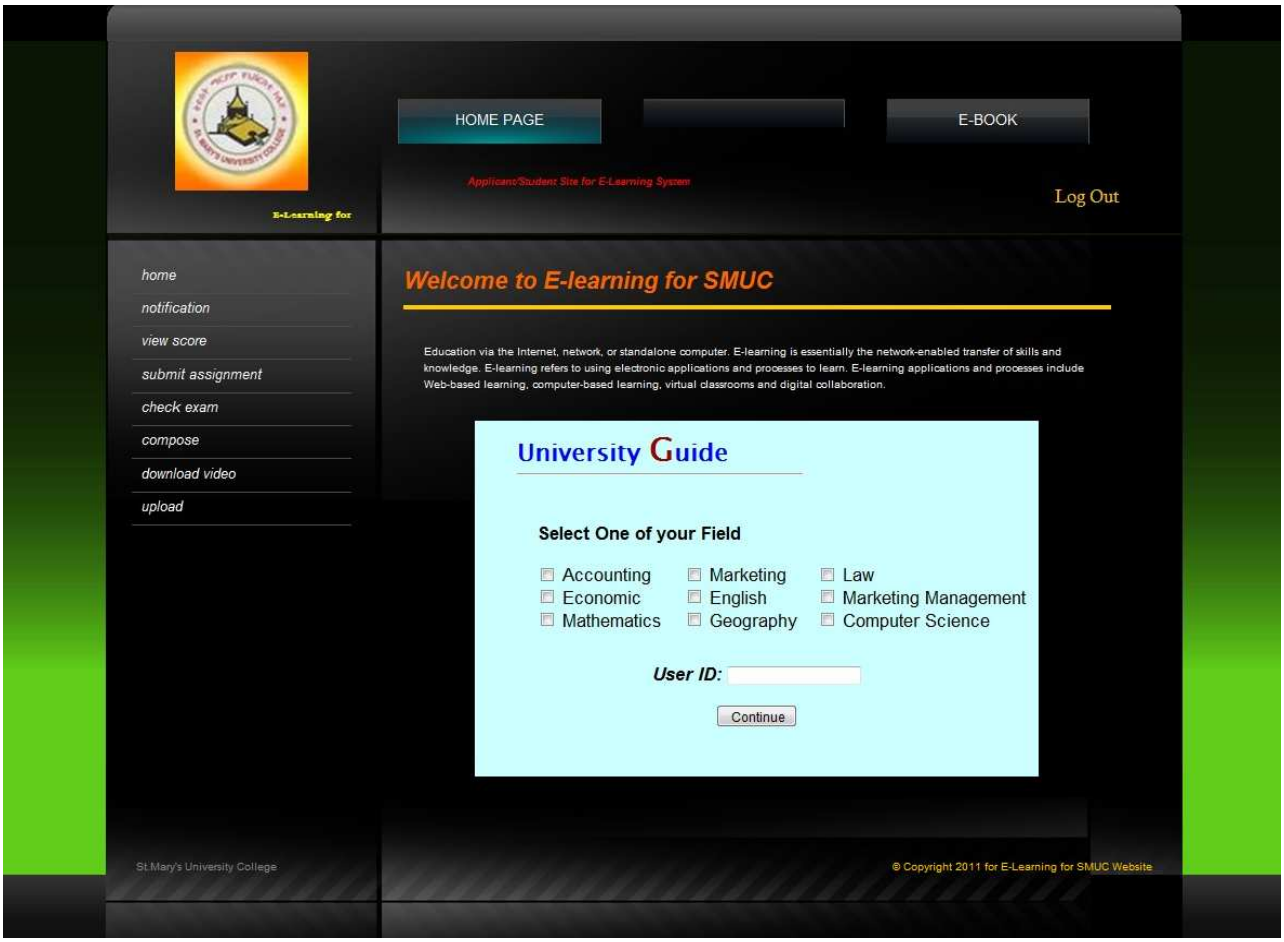

Figure 5.5. Applicant / Student Main Page Site

III. Create Account Interface

- This page is display for the administrator when they wants to create a new applicant, instructor or admin itself.

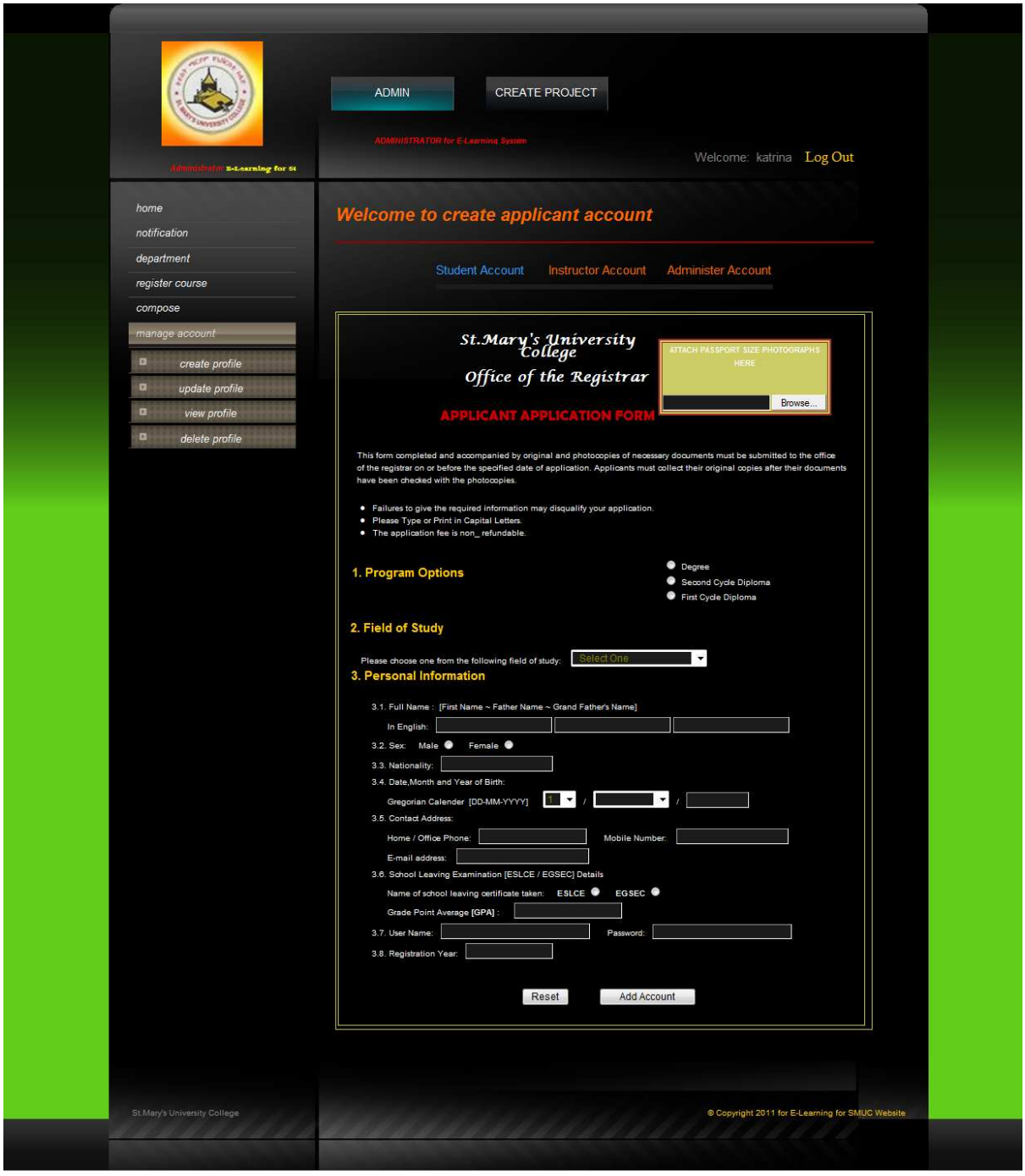

Figure 5.6. Create Applicant Form Site

5.5. CODES SNIPPETS

I. ConnectorCollection.php

```
<?php
        extract($_POST);

        if($_POST['ApplicantAccount'])          // for create new account
        {
                include_once('../Class PHP/Administrator Class/AccountFiles.php');
                $ApplicantAccount = new AccountFiles($Department, $Program,  $Fname, $FFname,
                                        $Gname,  $sex,  $nation,  $BirthDate,  $BirthMonth,
                                        $BirthYear,  $Homephone,  $Cellphone,  $Email,  $matrictype,
                                        $point, $Username, $Userpassword);

                $ApplicantAccount->CreateAccount();
        print("<script language='javascript'>location.href='CreateApplicantAccount.php';</script>");
        }

        else if($_POST['DeleteAccount'])        // for delete an account
        {
                include_once('../Class PHP/Administrator Class/AccountFiles.php');
                $DeleteAccount = new AccountFiles($Department, $Program, $Fname, $FFname,
                                        $Gname,  $sex,  $nation, $BirthDate,  $BirthMonth,  BirthYear,
                                        $Homephone, $Cellphone, $Email, $matrictype, $point,
                                        $Username, $Userpassword);

                $DeleteAccount->DeleteAccount();
        print("<script language='javascript'>location.href='DeleteApplicantAccount.php';</script>");
        }

        else if($_POST['UpdateAccount'])        //  for update a pervious account
        {
                include_once('../Class PHP/Administrator Class/AccountFiles.php');
                $UpdateAccount = new AccountFiles($Department, $Program,  $Fname,  $FFname,
                                        $Gname,  $sex,  $nation,  $BirthDate,  $BirthMonth, $BirthYear,
                                        $Homephone, $Cellphone, $Email, $matrictype,  $point,
                                        $Username, $Userpassword);

            $UpdateAccount->UpdateAccount();
           print("<script language='javascript'>location.href='UpdateApplicantAccount.php';</script>");
        }
  ?>
```

II. AccountFiles.php

```
<?php
	include_once '../Class PHP/Operations.php';
	class AccountFiles {
		private $Department , $Program, $sex, $nation;
		private $Fname,$FFname,$Gname;
		private $BirthDate, $BirthMonth, $BirthYear;
		private $Homephone, $Cellphone, $Email, $matrictype, $point;
		private $Username, $Userpassword;

		function __construct($Department, $Program, $Fname, $FFname, $Gname, $sex,
					$nation, $BirthDate, $BirthMonth, $BirthYear, $Homephone,
					$Cellphone, $Email, $matrictype, $point, $Username,
					$Userpassword)
		{
			$this->Department = $Department;
			$this->Program = $Program;
			$this->Fname = $Fname;
			$this->FFname = $FFname;
			$this->GName = $Gname;
			$this->sex = $sex;
			$this->nation = $nation;
			$this->BirthDate = $BirthDate;
			$this->BirthMonth = $BirthMonth;
			$this->BirthYear = $BirthYear;
			$this->Homephone = $Homephone;
			$this->Cellphone = $Cellphone;
			$this->Email = $Email;
			$this->matrictype = $matrictype;
			$this->point = $point;
			$this->Username = $Username;
			$this->Userpassword = $Userpassword;
		}

	public function getDepartment() { return $this->Department; }
	public function setDepartment($Department) { $this->Department = $Department; }

	public function getProgram() { return $this->Program; }
	public function setProgram($Program) { $this->Program = $Program; }

	public function getFname() { return $this->Fname; }
	public function setFname($Fname) { $this->Fname = $Fname; }

	public function getFFname() { return $this->FFname; }
	public function setFFname($FFname) { $this->FFname = $FFname; }

	public function getGname() { return $this->Gname; }
	public function setGname($Gname) { $this->Gname = $Gname; }
```

```
public function getSex() {  return $this->sex;  }
public function setSex($sex) {  $this->sex = $sex;  }

public function getNation() {  return $this->nation;  }
public function setNation($nation) {  $this->nation = $nation;  }

public function getBirthDate() {  return $this->BirthDate;  }
public function setBirthDate($BirthDate) {  $this->BirthDate = $BirthDate;  }

public function getBirthMonth() {  return $this->BirthMonth;  }
public function setBirthMonth($BirthMonth) {  $this->BirthMonth = $BirthMonth;  }

public function getBirthYear() {  return $this->BirthYear;  }
public function setBirthYear($BirthYear) {  $this->BirthYear = $BirthYear;  }

public function getHomephone() {  return $this->Homephone;  }
public function setHomephone($Homephone) {  $this->Homephone = $Homephone;  }

public function getCellphone() {  return $this->Cellphone;  }
public function setCellphone($Cellphone) {  $this->Cellphone = $Cellphone;  }

public function getEmail() {  return $this->Email;  }
public function setEmail($Email) {  $this->Email = $Email;  }

public function getMatrictype() {  return $this->matrictype;  }
public function setMatrictype($matrictype) {  $this->matrictype = $matrictype;  }

public function getPoint() {  return $this->point;  }
public function setPoint($point) {  $this->point = $point; }

public function getUsername() {  return $this->Username;  }
public function setUsername($Username) {  $this->Username = $Username;  }

public function getUserpassword() {  return $this->Userpassword;  }
public function setUserpassword($Userpassword) { $this->Userpassword = $Userpassword; }

public function CreateAccount()    //Create new user account
{
        $insert = new Operations();
        $str_sql = "SELECT MAX(Student_id) FROM `applicantaccount`";
        $ds = $insert->get_ds($str_sql);

        $id=0;
        if(mysql_num_rows($ds)>0)
        {
                $row = mysql_fetch_row($ds);
                $id = $row[0] + 1;
```

```
                $addquery = "INSERT INTO `elearningdatabase`.`applicantaccount`
                        (`FirstName`, `FatherName`, `GrandFatherName`, `Gender`, `Program`,


                    `StudyField`, `Nationality`, `TelephoneNo`, `MobileNo`, `EmailAddress`,
                    `ESLCE_EGSEC`, `GPA`, `UserName`, `Password`, `Birth_Date`,
                    `Birth_Month`, `Birth_Year`)
                    VALUES (\"$this->Fname\", \"$this->FFname\", \"$this->Gname\",
                    \"$this->sex\", \"$this->Program\", \"$this->Department\",
                    \"$this->nation\", \"$this->Homephone\", \"$this->Cellphone\",
                    \"$this->Email\", \"$this->matrictype\", \"$this->point\",
                    \"$this->Username\", '".md5($this->Userpassword)."',
                    \"$this->BirthDate\",\"$this->BirthMonth\",\"$this->BirthYear\");";

                $result = $insert->executeQuery($addquery);
                return $result;
            }
            else
            {
                $id=0;

                $addquery = "INSERT INTO `elearningdatabase`.`applicantaccount`
                        (`FirstName`, `FatherName`, `GrandFatherName`, `Gender`, `Program`,
                    `StudyField`, `Nationality`, `TelephoneNo`, `MobileNo`, `EmailAddress`,
                    `ESLCE_EGSEC`, `GPA`, `UserName`, `Password`, `Birth_Date`,
                    `Birth_Month`, `Birth_Year`)
                    VALUES (\"$this->Fname\", \"$this->FFname\", \"$this->Gname\",
                    \"$this->sex\", \"$this->Program\", \"$this->Department\",
                    \"$this->nation\", \"$this->Homephone\", \"$this->Cellphone\",
                    \"$this->Email\", \"$this->matrictype\", \"$this->point\",
                    \"$this->Username\", '".md5($this->Userpassword)."',
                    \"$this->BirthDate\",\"$this->BirthMonth\",\"$this->BirthYear\");";

                $result = $insert->executeQuery($addquery);
                return $result;
            }
        }

        public function DeleteAccount()    // Delete user account from the elearningdatabase
        {
            $deletequery = "DELETE FROM `elearningdatabase`.`applicantaccount`
                    WHERE `applicantaccount`.`UserName` = \"$this->Username\",
                    AND `applicantaccount`.`Password` = \"$this->Userpassword\",

            $delete = new Operations();
            $delete->executeQuery($deletequery);
        }
```

```
        public function UpdateAccount()    // Updat previous user applicantaccount from the elearningdatabase
        {
                $updatequery = "UPDATE `elearningdatabase`.`applicantaccount`
                        SET `FirstName` = \"$this->Fname\", `FatherName` = \"$this->FFname\",
                        `GrandFatherName` = \"$this->Gname\",
                        `TelephoneNo` = \"$this->Homephone\", `MobileNo` = \"$this->Cellphone\",
                        `EmailAddress` = \"$this->Email\"
                        WHERE `applicantaccount`.`ApplicantID` = \"$this->ApplicantID\" LIMIT 1;";

            $update = new Operations();
            $updatequery->executeQuery($updatequery);

        }

        public function Create_app_ins_login()
        {
                $user = $this->Username;
                $pass = MD5($this->Userpassword);
                $type = "Applicant";
                $add_email = $this->Email;

                $addquery = "INSERT INTO `elearningdatabase`.`app_ins_login` (`Number` ,
                        `UserName` ,`Password` ,`Type`, `Email`)
                        VALUES ( NULL ,'$user', '$pass', '$type', '$add_email');";

                $insert = new Operations();
                $result = $insert->executeQuery($addquery);
                return $result;
          }
    }
?>
```

III. Operations.php

```
<?php
        class Operations
        {
                public function OpenConnection()    // Connect to Server
                {
                        $dbhost = 'localhost';
                        $dbuser = 'guest';
                      //$dbpass = 'guest123';
                        $DateBaseName="elearningdatabase";

                        $conn = mysql_connect($dbhost, $dbuser);
                        if(! $conn ) {  die('Could not connect: ' . mysql_error());   }
```

```
                else
                {
                        mysql_select_db($DateBaseName);
                        return $conn;
                }
        }

        public function CloseConnection()
        {
                echo ("<script language='javascript'> alert('Connection Are closed!!!!!');</script>");
                if ($con)   mysql_close($con);
        }

        public function executeQuery($addquery)
        {
                $DBconnection = Operations::OpenConnection();
                //$DBconnection = new Operations;
                // $check = $DBconnection->OpenConnection();
                mysql_select_db("elearningdatabase", $DBconnection);

                $retval = mysql_query($addquery);
                if(! $retval)  {  die('Could not enter data: ' . mysql_error());  }
                else
                {
                        echo "Entered data successfully\n";
                        return $retval;
                }
        }

        public function readExecuteFromDatabase()  //to fetch from the database
        {
                $excute = Operations::executeQuery($addquery);
                return $excute;
        }
    }
?>
```

CHAPTER SIX

Conclusion & Recommendation

In the conclusion part, how the project works and finalizes the proposed system will be discussed. And in the recommendation part, the team has tried to put some point that the education in St. Mary's University College will focus in using the new system.

As the fulfillment of the E-Learning System (ELS), we have been working during the last four month and we conclude and recommend our project as follows:

6.1. CONCLUSION

Throughout our project after certain challenges we face and the constraint that hold us in our way to develop the new system we present our web site system for E-learning System in Ethiopia especially for St. Mary's University College as much as possible.

In doing the study, the team has tried to follow object oriented system analysis and design methodology. And to implement this system, we have develop by using web application like PHP-MySQL has been used as the technology. Because of PHP have numerous benefits such as platform, which is built-in security and simplicity. For this reason, to build software by using web application we need to have a skill or a basic programming language like HTML, CSS (Client Side Style), and script too. In this project, PHP is used to connect the client side browser to the web Server or Apache Server.

Since the success and failure of any system depends on gathering the right information through different facts-findings, techniques and user involvements, the team have made the best effort to gather requirements. After a detail review and study of the existing system of the St. Mary's University College have been designed to reflect the new systems that are supposed to solve problem.

In order to solve different problems the team has tried to propose a solution that at least reduce the existed problems and model the proposed system using different tools and methodologies. The team believe the different tools and techniques has helped us a lot in capturing real user requirements and models the right system for the users for their day to day activities.

In this document every required input and output gathered and worked over the current system well in order to determine how to build the system and information needed to drive the actual implementation.

6.2. RECOMMENDATION

The new system has user friendly interface to access the data. Each form is connected with the database, and so the user can get information from the data base. Each authorized user has his/her username and user password to enter to the system through user log-in form.

In this senior project we have tried our best to complete or to accomplish the task that what we state to accomplish in the beginning of this document that is in chapter one specifically in the scope section. So that we recommend other students to go further through this project and finish all the tasks that stated earlier in this project by adding additional way of improving or making the system.

The project was benefit for the user who wants to learn at home or in his work place. When this software implemented at the St. Mary's University College, we recommend it should be upgrade whenever there is any change in field or adding of new course and department.

The team recommends like:

- ✓ In the document the database design part must be done for database management.
- ✓ Include additional information that provided for the visitors (tourists).
- ✓ Edit the interface for better looking.

References

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- W. Jason G , **Beginning PHP and MySQL 5** From Novice to Professional Second Edition - Apress - 2006 -
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Interview Questions

Q1. What was the current problem that you are facing when you go to college ?

Q2. What do you think if ELS for SMUC will be develop ?

Q3. What is your aim to make a website based ?

Q4. What kind of service do you want to give through the website ?

Q5.