**CHAPTER ONE**

1. **Introduction**
   1. **Background**

Ambo University is located in Ambo, the capital of West Shewa Zone of Oromia Regional State. It was established in 1939 E.C (1947), and is one of the oldest higher learning institutions in Ethiopia. It was originally a school. In 1951 E.C (1958) the school was renamed as **Ambo Agriculture and Forestry Secondary School** with the addition of Forestry Department. In 1960 E.C (1967) the school was promoted to the level of ‘institute’ and named as **Ambo Institute of Agriculture** and started to offer a two-year post-secondary diploma course in General Agriculture. In 1969 E.C (1974) the institute was granted a Junior College status and named as **Ambo Junior College of Agriculture** with an added objective of research and extension apart from teaching. Consequently, the College launched a continuing education program in 1973 E.C (1980) and continuously started.

In 1980 E.C (1987) some pedagogical courses were added to the existing curriculum and a Teacher Education option was added to train agricultural teachers. In 1984 E.C (1992) the "junior" status was shed off and the institution was named **Ambo College of Agriculture**. In 1995 EC (2003) the institution started to offer undergraduate degree programs in the fields of Crop Production, Animal Production, Applied Chemistry and Applied Biology. In the meantime, the college was affiliated to Jimma University by the name **Jimma University - Ambo College**.

On Megabit 3, 2000 E.C (12 March, 2008), the Government of the Federal Democratic Republic of Ethiopia promoted the College to the status of an autonomous University College –**Ambo University College**. In 2009, it was named as **Ambo University**. Presently the University runs eight graduate and thirty seven undergraduate programs which are divided into eight colleges/institutes and thirty academic departments in main campus at Ambo, and branches at Awaro campus and Wolliso Campus.

* 1. **Statement of the problem**

Ambo University, as a higher education institute performs examination process that instructors give the exam papers to students manually. As a starting point for problem definition, we tried to see how the examination process was involved in the University. We have also tried to get some information by having a short discussion with heads of the departments, instructors and other staffs as well as students.

We recognized that there are many problems in terms of examination giving process with required quality in the university. Generally, we have noticed the following problems.

* There is high cost to buy copy machines, printers, papers for hard copy as well as payment for duplicators and invigilators.
* High human power wastage.
* Wastage of time to print and to wait for copying in duplicate office.
* It is wastage of time for instructors while correcting exam papers and giving result back.
* Some pages of exam paper may be jumped by error while duplicating.
* The result of students may be lost.

These problems will be solved by Online Examination System (**OES**) for Ambo University project by changing manual examination giving process into intranet based or online examination system.

* 1. **Objective of the Project**
     1. **General Objectives of the Project**

The general objectives of this project is to develop and implement a web-based examination system for Ambo University .That is to develop and provide a full intranet application, then can be accessed by students as well as by instructors. It helps to use time and other resources effectively and efficiently on examination giving process.

* + 1. **Specific Objectives of the Project**

The specific objectives of Online Examination System for Ambo University project is:

* To make the process time and cost effective and efficient.
* Time minimizing
* Cost (resource) minimizing
* To enable student to use their time properly while taking exam (timer will start automatically and show the student how much time is left).
* To solve problems of students forgetting to write their name and ID on the exam paper.
* To enable the students to get exam result from the system as soon as they finish exam.
* To provide an interface through which student can appear for examination online.
* To enable instructor save their time while correcting exam paper.
* To increase security of the examination system through authentication.
  1. **Scope and Limitation of the Project**
     1. **Scope of the project**

The scopes of the project are the following:

* + OES (Online Examination System) will be developed for Ambo University.
  + The system handles all the operations, and generates reports as soon as the test is finish, that includes name, mark, time spent to solve the exam.
  + It can be used to solve many problems occurred in the university on examination giving process.
  + It can enable instructors to easily prepare exam papers and see the result of students.
  + It enables students to take exam properly and get fair correction and result.
    1. **The Limitations of the project**

The Limitations of the project are the following:

* + Only multiple choice, matching and true/false type of questions are automated, subjective questions are checked manually.
  + If the time is finished student cannot read the questions again and the answer is automatically submitted and the result is displayed with the correct answer.
  + It cannot work out of the campus since it is intranet based.
  1. **Methodology and Software used**

Starting from proposed system we gathered information and data through different mechanisms.

* + 1. **Data collection methods**

Having interview with the heads of the some departments at Ambo University, other staffs of the departments, as well as students, making questionnaires and observing in the around problems. Also we collected raw data or documents which are useful for the project should be implemented. We also, referred related books, searched from an internet that is related to our project. Also we have referred other senior projects.

* + 1. **For development, software’s used are:**

We will use the following programming tools:

* + PHP to develop user interface prototypes (front end).
  + My SQL to make the back end (database part)
  + Microsoft Office Visio 2003 for UML Diagram
  + Microsoft Office 2007 for documentation writing
  1. **Feasibility of the Project**
     1. **Economic feasibility**

The newly developed system will provide many benefits to the University, especially for the instructors and students. The newly being developed system will improves the examination speed, and saves resources.

* + - 1. **Benefits**

1. Tangible benefits

* There is no cost for copy machines, printers and papers on examination preparation.
* Problem that was occurring on exam paper correction is strictly avoided.
* There is no time wasted by instructors as previously wasted on correcting and rechecking.
* There is no cost wastage for duplicators, invigilators and coordinators.

1. Intangible benefits

* The University will be happy because there is no difficulties while preparing examination and scheduling, and also, delivered from wastage of money.
* The instructors will be happy because their time is saved by the system.
* Student gets satisfaction and freely working space from the system.
  + - 1. **Cost**

1. One-time cost
   * + - * The cost to buy server computer.
         * The cost to buy client computers and network connection devices.
         * The cost paid for system designers and system analysts.
         * The cost of Software to be acquired to build and run the system.
2. Recurring cost

* The cost to train students and instructors how to use the system.
* The cost to maintain computers if there is problem with computers.
* Salary of system administrator to be hired to administer and maintain the system.
  + 1. **Technical feasibility**

The proposed system is technically feasible. Because it can generate outputs in a given time, response time is minimum, easy to communicate and generally it satisfies the end-user’s requirement.

* + 1. **Operational feasibility**

The proposed system OES is operationally feasible because it is simple to access and all operations will be performed easily.

* + 1. **Schedule feasibility**

The proposed system OES will be developed totally and begin to give services according to the time given. Therefore, it is feasible in schedule.

* 1. **Project Plan Activities**

Project activity can be shown by pert chart or Gantt chart which is calendar-based, the expected elapsed time, and when the activity is scheduled to begin and end. Our team is working as the following project plan or schedule which is given by Gantt chart to develop the proposed system OES. We used Gantt chart because it is simple to create and it is clear to read or understand.

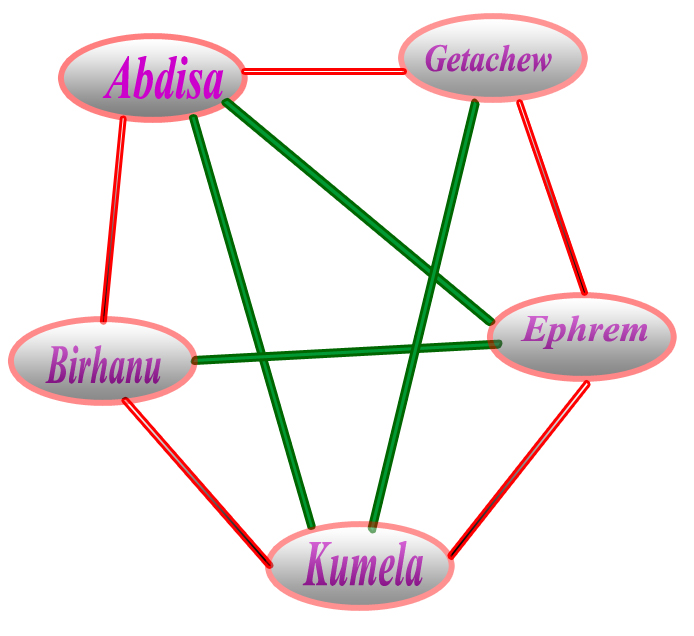


**Figure 1.1:** The diagram of project schedule by Gantt chart

* 1. **Project Organization**

Since this is a small project we will use the waterfall model which is easy to manage and use and since our requirements are very well known clear and fixed. Each phase will be processed and completed once at a time, having its specific deliverables and a review process.

Among the three (Centralized, Decentralized and Mixed) team organization types we selected the decentralized team organization to develop our project. The communication and overall works of the members can be described by the following diagram.



**Figure 1.2:** The diagram of project organization control form

* 1. **Definitions, Acronyms and Abbreviations**
     1. **Definitions**

|  |  |
| --- | --- |
| **Words** | **Definitions** |
| Feasibility | the state or degree of being easily or conveniently done |
| One-time cost | costs incurred to develop the IS and to put it in place |
| Recurring cost | costs incurred to use and maintain the system once it has been developed |
|  |  |
|  |  |

**Table-1.1.** Table that shows some of definitions of words used in the documentation

* + 1. **Acronyms**

|  |  |  |
| --- | --- | --- |
| **No** | **Acronym** | **Meaning** |
| 1 | OES | Online Examination System |
| 2 | HW | Hardware |
| 3 | SW | Software |
| 4 | UI | User Interface |
| 5 | GB | Giga Byte |
| 6 | MB | Mega Byte |
| 7 | HTML | Hypertext Markup Language |
| 8 | PHP | Hypertext Preprocessor |
| 9 | CD | Compact Disk |
| 10 | GHZ | Giga Hertz |

**Table 1.1:** Table that shows Acronyms used in the documentation

* 1. **References**

1. Project Management Institute (2004), “Guide to the Project Management Body of Knowledge”, third edition, PMI press.
2. Software Engineering (2009), “A Practitioner’s Approach”, Seventh Edition, Roger S. Pressman, Ph.D.
3. Software Engineering for Students (2005), “A Programming Approach”, Fourth Edition, Douglas Bell.
4. Internet

**CHAPTER TWO**

1. **Current System**
   1. **Description of the current systems**

The whole process of assigning exam and evaluating scores of students after the exam, in the University was done manually till date. Processing the exam paper i.e. checking and distributing respective scores is used, and it is time consuming and loose of effort.

* 1. **Practices to be preserved from the existing system**
     1. **Overview of practices of the existing system**

The major practices of examination process in the University are the following. The instructor prepares the exam and brings to the Exam Committee of the department. The Exam Committee then checks the exam and approved it. The approved exam will be printed and taken to the dean of college or institute for sign. Then the exam paper will be taken to duplicate office.

The duplicator then duplicates the exam paper with ordered number of copies and keeps there until 30 minutes left for exam time. The instructor takes the exam paper and gives to the assigned invigilator(s).The invigilator distributes exam paper to students in the assigned exam room, and student does the exam and submits to invigilator. The invigilators then gives the exam papers back to the instructor. The instructor then corrects the exam paper and shows the result to student.

* + 1. **Forms used in the existing system**

**Forms that instructors used to record scores of students**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Ambo University**  **Course Title:\_\_\_\_\_\_\_\_\_\_\_\_\_ Department: \_\_\_\_\_\_\_\_\_**  **Course No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Target Group:\_\_\_\_\_\_**  **Class Year:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Semester: \_\_\_\_\_\_\_** | | | | | | |
| **No** | **ID No** | **Name** | **Sex** | **Marks** | | |
| **40%** | **60%** | **100%** |
| **1** |  |  |  |  |  |  |
| **2** |  |  |  |  |  |  |

**Table 2.1.** Table instructors use to record the marks of students

**Forms that used for attendance of students**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ambo University**  **Office of Registrar**  **Department: \_\_\_\_\_\_\_\_ Group: \_\_\_\_\_\_\_\_\_**  **Course Title:\_\_\_\_\_\_\_\_ Class Year: \_\_\_\_\_\_\_\_\_**  **Course Code:\_\_\_\_\_\_\_\_ Semester: \_\_\_\_\_\_\_\_\_\_\_** | | | | | |
| **No** | **ID No** | **Sign** | **No** | **ID No** | **Sign** |
| **1** |  |  | **4** |  |  |
| **2** |  |  | **5** |  |  |
| **3** |  |  | **6** |  |  |
| Sign of Instructor: \_\_\_\_\_\_\_\_  Sign of Invigilator: \_\_\_\_\_\_\_\_ | | | | | |

**Table 2.2.** Table of exam attendance

* 1. **Players in the existing system**

The major players in the existing examination system of the University are instructors, students, duplicators and exam committees. Their duties are described as follows.

1. **Instructor:**

* Prepares exam for the student on the course he is giving.
* Takes the exam paper to the Exam Committees.
* Takes exam paper which is approved by Exam Committee to the duplicate office.
* Gives the exam paper from duplicate office to assigned invigilator(s).
* Takes the worked exam paper from invigilator(s) and corrects it.
* Finally, shows the result to students.

1. **Student:**

* Readies for exam.
* Arrives at class room assigned for that exam on the scheduled time and sit as invigilator ordered.
* Writes his name and identity number (ID) on the exam paper.
* Read and write the answer on the space provided.
* Finally, Returns the exam paper to the invigilator(s).

1. **Duplicator:**

* Duplicates the exam papers given by instructors.
* Give the duplicated exam papers to respective instructors.

1. **Exam committees:**

* Check the exam prepared by respective instructors.
* Then gives back to the respective instructor.
  1. **Business rules**

1. The student must be registered for each course he/she is going to take exam.
2. The student must attend the class for that course in order to take exam of that course.
3. The instructor prepares the exam for the course he is giving.
4. The exam will be checked by exam committee and get approved.
5. The printed exam will be taken to duplication office and stay there until 30 minutes left for exam time.
6. Student will sit for exam as the invigilator assigned.
7. Any cheating on the exam leads the mark of student to zero or F grade.
8. The student must fill the attendance form for taking exam.
9. The instructor corrects student’s exam and show the result to the respective student.
   1. **Alternative solution**

The existing examination system in the University is paper based, time consuming, less flexible. The chance of loss of records is high and also record searching is difficult.

Maintenance of the system is also very difficult and takes lot of time. Result Processing is slow due to paper work and requirement of staff. To solve these problems they required a computerized system, which is used as a core alternative solution to handle all the works. This alternative solution is the system we are going to develop that will provide a working environment that will be flexible and will provide ease of work and will reduce the time for report generation and other paper works.

**CHAPTER THREE**

1. **Proposed Systems**
   1. **Overview of the proposed system**

The Online Examination System (OES) automates each and every activity of the manual system and increases its throughput. It is created for taking online examination that has the following features.

* + - In comparison to the present system, the response time of the system is very less and it works very fast.
    - Result will be very precise and accurate and will be declared in very short span of time because calculation and evaluations are done by the system itself.
    - The proposed system is very secure since all users inter to the system by their user accounts.
    - The logs of appeared students and their marks are stored and can be for backup for future use.
    - The proposed system will reduce cost of examination process.
    - It saves the instructors from time wasting while correcting exam papers and they can get the results of their students from the system immediately.
    - It can generate various reports when and where required.

In this system we used waterfall model to apply these ideas, which help us to separate each step and when we finish a one phase the output of it is the input to the next phase.

* 1. **Functional requirements**

The user requirement for this system is to make the system fast, flexible, less prone to error, reduce expenses and save the time. Using the online examination system the following functional requirements are performed by each actors of the system.

* + 1. **Functional Requirements for Administrator**
* The system administrator should be able to manage account of users, colleges/institutes, departments, courses and exams by logging into the system.
* The system administrator should be able to create schedule of the exam.
* The system administrator should be able to correct subjective type of questions manually.
  + 1. **Functional Requirements for Instructor**
* Instructors should be able to manage questions by logging in to the system by selecting institute/college, department and courses.
* The instructor should be able to see the result of all students.
  + 1. **Functional Requirements for Exam Committee**
* The Exam committees should be able to check the exam prepared by instructors and approve the exam.
* The Exam committees should be enabled to select the institute/college, department and course belonging to.
  + 1. **Functional Requirements for Student**
* Student should be able to take exam and submit answer to the system by his own user account and password.
* The student should be able to see his/her own result that displayed by system.
* The System should be able to show the schedule of the exam before the exam time.
* The system should be able to authenticate through login its users (Administrator, Exam committee, Instructor and Student) by checking their information.
* The system should enable users to change their password.
  1. **Non functional requirements**
* **Performance**
* The system is very fast since it is automated.
* The software shall support use of multiple users at a time.
* It works very well with short response time, high throughput and high availability.
* **Error Handling**
* The system must have error handling.
* The system should display error message if the user input invalid information.
* **Security**
* Authenticated user with predefined access right will only enter to the information related to database.
* Every users should use strong passwords especially admin.
* One student cannot see the result of another student.
* HTTP must be secured by adding the security capabilities of SSL/TLS to standard HTTP communications.
* Using SSL/TLS data flow between client and server will be encrypted.
* **Availability**
* There is no delay in the availability of any information, whatever needed, can be captured very quickly and easily.
* The server should be always on to be available.
* **Maintainability**
* Backups for database and other sensitive information are available for recovery if damage is happen.
* Second server should be used if one server failed
* **Accessibility**
* The system provides access right control for each of its user and every user can access the data which belong to them.
* **Accuracy**
* The Online Examination System provides the uses a quick response with very accurate information regarding the users etc. Any details or system in an accurate manner, as and when required.
* **Response in time**
* The system will let the all users (Administrator, Student, and Instructor) to access the needed information more quickly. That means the response time of the system is very low.
* **User-Friendly**
* The Online Examination System has a very user-friendly interface. Thus the users will feel happy since it is easy to work on it. The software provides accuracy along with a pleasant interface. Make the present manual system more interactive, speedy and user friendly.
  1. **User Interface**
     1. **User Interface introduction**

Application will be accessed through a Browser Interface. The software would be fully compatible with Microsoft Internet Explorer, Mozilla Firefox and Google Chrome. No user would be able to access secured part of the application (such as exam page, result, account settings etc.) without logging on to the system. The system should be accessed over LAN. The OES is also user friendly that it is simple to be used by any users. The user interface of this application is shown bellow.



**Figure 3.1:** User Interface of the Online Examination System.

* + 1. **Detailed description of user interfaces**

|  |  |  |
| --- | --- | --- |
| **UI-ID** | **UI Name** | **UI Description** |
| **UI-1** | **Home Page** | User interface part where main page of the OES will be viewed and link for related topics (websites). |
| **UI- 2** | **Login Page** | It is a page which enables user of system log into system by entering their user name and password. |
| **UI-3** | **Schedule Page** | It is the page where the schedule of the exam will be displayed. It does not need login information, everyone can use it. |
| **UI-4** | **About Us Page** | It is the page that contains detailed information about the website. |
| **UI-5** | **Help Page** | The page that provide help information or guides for users when they need help regarding to this system. |
| **UI-6** | **Admin Page** | The system Admin Page is the page that enables the system Administrator to manage account (delete, add, and change the user account for users of the system), manage institutes/colleges, manage departments, and manage courses manage questions and manage users. |
| **UI-7** | **Instructor Page** | It is the page contains all activities that will be done by instructor. Enables instructor to manage question (add questions, edit questions, view questions), change password and see result. |
| **UI-8** | **Exam\_Committee Page** | It is the page that provides access to Exam Committee in order to check the exam prepared by respective department and change their password. |
| **UI-9** | **Student Page** | This page is where student do every activities like taking exam, submitting answers, seeing result and changing password. |

**Table-3.1:** Table that shows detailed descriptions of major User Interfaces

* 1. **Hardware/software requirement**

## Hardware requirements

* One server computer with :-
  + 500MB of RAM,
  + 2.97GHZ of Intel Pentium processor speed
  + about 50GB hard disk size
* Category 5 UTP cable.
* Network Interface Card for each computer on the network
* 8-ports switch(s).
* Two or more client computers: -
* Operating System: Windows 7 or above, MAC or UNIX.
* Processor: Pentium III or 2.0 GHz or higher.
* RAM: 256 Mb or more
* Output device:
* Monitor –with highest resolution
* External storage devise:
* Flash disc 1-16 GB
* Compactable CD-ROM 700 MB
* External hard disc 300 GB

## Software requirements

* UNIX OS:-This OS is installed on the server computer, by which can manage client computers on the network.
* Windows 7 ultimate or later versions OS: - this operating system is installed on the client computers enable to join the domain of the network.
* My SQL: - on which the records and all other data stored on.
* Driver software is also needed for the server and client.
* UML 2.0 designer (Visio):-to design and UML modeling the system
* Notepad ++ to edit PHP codes.
  1. **Security and safety procedure**

**Authorization:**

* System Admin has authorized to give permission to all users.
* System Admin should give different level of access to users.

**Authentication:**

* Only registered user can enter to the system and access it.
* Every registered user has different and unique UserId.

**Information Integrity:**

* Only System admin has right in the modification of the information.
* The system should use secured http (https) to keep information integrity.
* The user can only access the information that belongs to them only.

**CHAPTER FOUR**

1. **System Model Using OO Paradigm**
   1. **Use case diagram**

Use Case Diagram represents user requirements gathered during requirement elicitation, contains use case, actors, system boundary and their relationships. Use Case diagram of our system is shown as follows with respective description.

* + 1. **Diagram of Use Case of OES**



**Figure 4.1:** The use case diagram of the system

* + 1. **Use Case description OES (Scenario)**

|  |  |  |
| --- | --- | --- |
| **UCID-01** | **UC Name** | Manage Account |
| **UC Description** | Enables System Admin to manage account (create, change, delete) of the Users of the System. |
| **Actor** | Administrator |
| **Precondition** | The users (instructors, students, Exam Committee) must be the member of the University. |
| **Flow of event** | 1. The administrator clicks Manage Account button on the Admin page. 2. The system displays the Manage Account page. 3. The administrator chooses the action (create, change, delete) to be performed. 4. The system displays the data entry page for respective action. 5. The administrator enters the required information of users of the system. [A1][A2] 6. The system save account of the Users.[B1] |
| **Post condition** | The account of the users altered (created, or changed or deleted) |
| **Alternative course of action** | **A1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 4.   **A2: Missing of Required Information Message**   1. The system displays “Enter all information!” massage. 2. The system resumes at step 4.   **B2: Invalid Action Message**   1. The system displays “Invalid Action!” massage. 2. The system resumes at step 4. |

**Table-4.1.** The scenario or use case description of the **Manage Account** use case

|  |  |  |
| --- | --- | --- |
| **UCID-02** | **UC Name** | Manage Institute |
| **UC Description** | Enables System Admin to manage institutes/colleges of the University. |
| **Actor** | Administrator |
| **Precondition** | The institutes or colleges must found in the university |
| **Flow of event** | 1. The administrator clicks Manage Institute button on the Admin page. 2. The system displays the Manage Institute page. 3. The administrator selects actions (adding, changing and deleting institutes) to be performed on institutes. 4. The system displays data entry page. 5. The administrator enters the **information** of institutes/colleges of the University. [A1][A2] 6. The system the actions performed on institutes or colleges. |
| **Post condition** | The institute or college of the system is managed. |
| **Alternative course of action** | **A1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 4.   **A2: Invalid action Message**   1. The system displays “Invalid Action!” massage. 2. The system resumes at step 4. |

**Table-4.2.** The scenario or use case description of the **Manage Institute** use case

|  |  |  |
| --- | --- | --- |
| **UCID-03** | **UC Name** | Manage Department |
| **UC Description** | Enables System Admin to manage departments of each institutes or colleges in the University. |
| **Actor** | Administrator |
| **Precondition** | The department must be registered to respective institutes. |
| **Flow of event** | 1. The administrator clicks Manage Department button on the Admin page. 2. The system displays the Manage Department page. 3. The administrator selects actions (adding, changing and deleting departments) to be performed on departments. 4. The system displays data entry page. 5. The administrator enters the **information** of departments of the institute or college. [A1][A2] 6. The system the actions performed on departments. |
| **Post condition** | The department every institute or college of the system is managed. |
| **Alternative course of action** | **A1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 4.   **A2: Invalid action Message**   1. The system displays “Invalid Action!” massage.   The system resumes at step 4. |

**Table-4.3.** The scenario or use case description of the **Manage Department** use case

|  |  |  |
| --- | --- | --- |
| **UCID-04** | **UC Name** | Manage Course |
| **UC Description** | Enables System Admin to manage courses of each department in the University. |
| **Actor** | Administrator |
| **Precondition** | The course must be registered to respective department. |
| **Flow of event** | 1. The administrator clicks Manage Course button on the Admin page. 2. The system displays the Manage Course page. 3. The administrator selects actions (adding, changing and deleting courses) to be performed on courses. 4. The system displays data entry page. 5. The administrator enters the **information** of courses of each department. [A1][A2] 6. The system the actions performed on courses. |
| **Post condition** | The course of every department is managed. |
| **Alternative course of action** | **A1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 4.   **A2: Invalid action Message**   1. The system displays “Invalid Action!” massage. 2. The system resumes at step 4. |

**Table-4.4.** The scenario or use case description of the **Manage Course** use case

|  |  |  |
| --- | --- | --- |
| **UCID-05** | **UC Name** | Manage User |
| **UC Description** | Enables System Admin to manage user of system |
| **Actor** | Administrator |
| **Precondition** | The user must be registered to respective department. |
| **Flow of event** | 1. The administrator clicks Manage User button on the Admin page. 2. The system displays the Manage User page. 3. The administrator selects actions (adding, changing and deleting) to be performed on users. 4. The system displays data entry page. 5. The administrator enters the **information** of system users. [A1][A2] 6. The system the actions performed on user. |
| **Post condition** | The users are managed as per their category . |
| **Alternative course of action** | **A1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 4.   **A2: Invalid action Message**   1. The system displays “Invalid Action!” massage.   The system resumes at step 4. |

**Table-4.5.** The scenario or use case description of the **Manage User** use case

|  |  |  |
| --- | --- | --- |
| **UCID-06** | **UC Name** | Check­\_Question |
| **UC Description** | Enables Exam\_Committee to check the exam prepared by instructors. |
| **Actor** | Exam\_Committee |
| **Precondition** | The exam must be added to the system by instructor |
| **Flow of event** | 1. The Exam\_Committee clicks Check Question button on the Exam\_Committee page. 2. The system displays the department and course chooses form for Exam\_Committee. 3. The Exam\_Committee selects the Department, and course he/she want to check questions for. [A1][A2] 4. The Exam\_Committee reads the question and approve it. 5. The system sends the exam to student page. |
| **Post condition** | The account of the user is deleted; the user can not enter to the system or denied to access. |
| **Alternative course of action** | **A1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 2.   **A2: Invalid action Message**   1. The system displays “Question is not Added!” massage. 2. The system resumes at step 2. |

**Table-4.6.** The scenario or use case description of the **Check\_Question** use case

|  |  |  |
| --- | --- | --- |
| **UCID-07** | **UC Name** | Login |
| **UC Description** | Enables all users of the system to login. |
| **Actor** | Instructor, student, administrator, exam\_committee |
| **Precondition** | The instructor and student out of the system. |
| **Flow of event** | 1. The user of the system clicks Login button on the home page. 2. The system displays the Login page. 3. The users their user name and password to enter to the system. [A1][A2] 4. The system displays access page for the respective user. |
| **Post condition** | The user entered to the system and can access the system. |
| **Alternative course of action** | **A1: Information Not Filled Message**   1. The system displays “Please enter your user name and password!” message. 2. The system resumes at step 2.   **A2: Invalid Entry Message**   1. The system displays “Incorrect User Name or Password!” massage. 2. The system resumes at step 2. |

**Table-4.7.** The scenario or use case description of the **Login** use case

|  |  |  |
| --- | --- | --- |
| **UCID-08** | **UC Name** | Manage Question |
| **UC Description** | Enables instructors to add the questions with respective answer to the system. |
| **Actor** | Instructor, administrator |
| **Precondition** | Exam must be prepared |
| **Flow of event** | 1. The instructor clicks Add Question button from Instructor page. 2. The system displays the department and course chooses form for instructor. 3. The instructor chooses the department and course.   [B 1] [B 2]   1. The system displays the add Question page. 2. The instructor adds questions with respective answers and allowed time for the exam to the system with. [B 3] 3. The system finishes adding question. 4. If question has subjective part the admin checks manually and result is added to that of objective part |
| **Post condition** | Examination is added onto the system with answer and allowed time. |
| **Alternative course of action** | **B1: Choose Message**   1. The system displays, “Please choose department and course” message. 2. The system resumes at step 2.   **B2: Invalid Choice Message**   1. The system displays, “You are not teaching this course or You are not instructor of this department” message. 2. The system resumes at step 2.   **B3: Add time Message**   1. The system displays, “Please Add Allowed Time for exam!” message. 2. The system resumes at step 4. |

**Table-4.8.** The scenario or use case description of the **Manage Question** use case

|  |  |  |
| --- | --- | --- |
| **UCID-09** | **UC Name** | Take Exam |
| **UC Description** | Enables student to do examination. |
| **Actor** | Student |
| **Precondition** | Student must be registered for that course and attend the class |
| **Flow of event** | * 1. The student clicks Read Exam button from home page.   2. The system displays the department, year and course choose page for student.   3. The student chooses the department, year and course that he wants to read examination. [B 1] [B 2][B3]   4. The system displays the examination page.   5. The student reads the exam questions and selects choose which he/she realized to be correct answer and clicks Submit Answer button. [B 4]   6. The system closes the examination page and displays the result of the student. |
| **Post condition** | The student already taken exam. |
| **Alternative course of action** | **B1: Invalid Choice Message**   1. The system displays, “Incorrect Department choose, please enter the correct one!” message. 2. The system resumes at step 2.   **B2: Choose Message**   * + - 1. The system displays,” Please choose course you want to do exam for” message.       2. The system resumes at step 2.   **B3: Invalid Choice Message**   1. The system displays, “You are not taking this course, please!” message. 2. The system resumes at step 2.   **B4: Time is up Message**   1. The system displays, “The time allowed for this exam is over!” message. 2. The system resumes at step 6. |

**Table-4.9.** The scenario or use case description of the **Read\_Question** use case

|  |  |  |
| --- | --- | --- |
| **UCID-10** | **UC Name** | See Result |
| **UC Description** | Enables student to see their own results after they finished the exam and instructors to see results of all students. |
| **Actor** | Instructor, Student |
| **Precondition** | The examination process must be taken place |
| **Flow of event** | * 1. The student or instructor clicks See Result button from home page.   2. The system displays the department, year and course choose page for student.   3. The student and instructor choose department, year and course that he wants to see result. [B 1] [B 2][B3]   4. The system displays the result page for student and instructor.   5. The student sees his/her own result for that exam.   6. The system closes the result page. |
| **Post condition** | The result is displayed to the respective user |
| **Alternative course of action** | **B1: Invalid Choice Message**   1. The system displays, “Incorrect Department choose, please enter the correct one!” message. 2. The system resumes at step 2.   **B2: Invalid Choice Message**   1. The system displays, “You are not taking this course, please!” message. 2. The system resumes at step 2.   **B3: Exam not Taken Message**   1. The system displays,” Exam is no taken you can’t see result” message. 2. The system resumes at step 2. |

**Table-4.10.** The scenario or use case description of the **See Result** use case

|  |  |  |
| --- | --- | --- |
| **UCID-11** | **UC Name** | **Submit Answer** |
| **UC Description** | Enables student to submit his/her answer while he/she is taking the exam |
| **Actor** | Student |
| **Precondition** | The student must attend for exam |
| **Flow of event** | 1. The student reads the question and choose correct answer and clicks the submit Answer button[A1] 2. The system checks the answer and record the result |
| **Post condition** | The result of the student calculated from the answer |
| **Alternative course of action** | **A1: Timer Message**   1. The system will displays the “The required time is ending” message. 2. The system submits the answer as wrong and calculates the result |

**Table-4.11.** The scenario or use case description of the **Submit Answer** use case

|  |  |  |
| --- | --- | --- |
| **UCID-12** | **UC Name** | **Change Pass** |
| **UC Description** | Enables all the users of the system to change their own password |
| **Actor** | Instructor, student, administrator, exam\_committee |
| **Precondition** | The account of every user must be created first. |
| **Flow of event** | 1. The user clicks the Change Pass button from respective page 2. The system displays change password page 3. The user enters the required information and clicks submit button[B 1] [B 2] 4. The system changes the password of user |
|  | **Post condition** | The password is changed; user can enter to the system only by new password. |
|  | **Alternative course of action** | **B1: Wrong data Entry Message**   1. The system displays “Wrong data Entry!” message. 2. The system resumes at step 2. |

**Table-4.12.** The scenario or use case description of the **Change Pass** use case

* 1. **Dynamic model**
     1. **Sequence diagram**

Sequence diagrams show a succession of interactions between classes or object instances over time. The Sequence diagrams of some classes are given bellow.

 **Figure 4.2:** The sequence diagram of **login** in the system



**Figure 4.3:** The sequence diagram of **Manage Account** in the system



**Figure 4.4:** The sequence diagram of **Manage Institute** in the system



**Figure 4.5:** The sequence diagram of **Manage Department** in the system



**Figure 4.6:** The sequence diagram of **Manage User** in the system

 **Figure 4.7:** The sequence diagram of **Manage Course** in the system



**Figure 4.8:** The sequence diagram of **Mange Question** and **Check Question** in the system



**Figure 4.9:** The sequence diagram of **Take Exam** in the system



**Figure 4.10:** The sequence diagram of See Result in the system

* + 1. **Activity Diagram**

Activity diagram used to emphasize the flow of control from activity to activity or to model the flow of an object as it moves from state at different points in the flow of control.



**Figure 4.11:** Activity diagram that shows activities of the administrator



**Figure 4.12:** Activity diagram that shows activities of the Instructor

 **Figure 4.13:** Activity diagram that shows activities of the Student



**Figure 4.14:** Activity diagram that shows activities of the Exam Committee