CHAPTER 4

RESULTS AND DISCUSSION

4.1 System Design

System Design is a process by which a system is designed and configured that meets a required set of requirements with its system development. It involves the estimation of physical needs, skills and sufficient availability of funds to supports its development and its operational duties as being applied. System design can be interpreted as after the analysis phase of system development cycle, defining on functional requirements, preparation for design and implementation, describes the system that will be established in the form depicting of planning, sketching, arrangement of several separate elements into a unified whole and functioning software components and hardware system.

4.1.1 System Design Objectives

1. Scheduling Application course for the Physic Class at the University of Papua New Guinea (UPNG) Based on Online Learning, intended to facilitate the user or student to see the schedules for lectures and lecturing period at anytime and anywhere.

2. With the Scheduling Application course in the Physic Class Based on Online Learning, students can have access to the course schedule or

changes of class schedule, despite of distances as long as there is Internet connection available.

4.1.2 Overview of the Proposed System

The proposed system of Scheduling Application course in the Physic Class Based on Online Learning is to use the concept of client-server, to the client-user Web-based devices and using a PHP and MySQL and will be done online, where the user or client can access the application by using Accessible from internet provider or wifi connection.

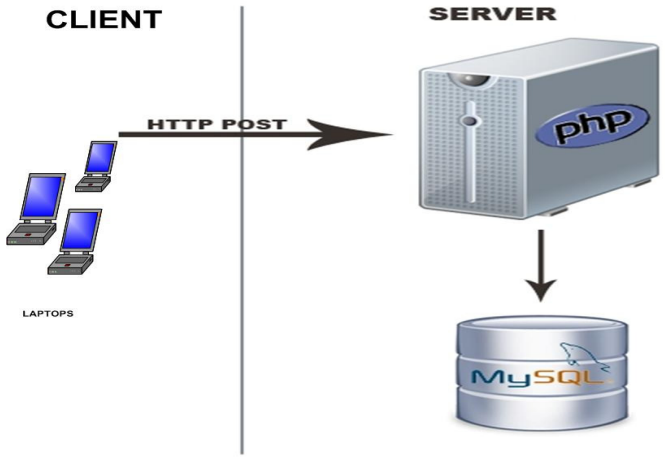


Figure 4.1 Client-Server Scheme Web Browsers and PHP MySQL

4.1.3 Proposed Designed Procedure

Designing includes the use case diagram, activity diagram, sequence diagram, class diagram, component deployment diagram that produces a better system. Designing processes are broken down into several sections that can be formed into single unified system components.

4.1.3.1 Use Case Diagram

Use case describes an interaction between one or more actors with the information system created. On the other hand, use case is used to determines what function is use and who is eligible to use it in the information system created. The following is a use case diagram of scheduling courses in the Physic Class at UPNG proposed with Web-based.

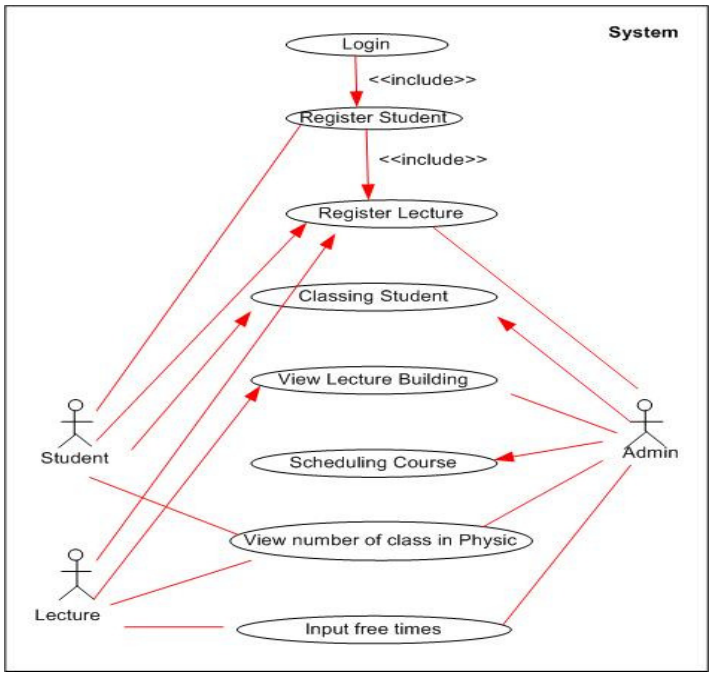


Figure 4.2 Use Case Diagram-based scheduling system subjects Web-based

4.1.3.2 Use Case Scenarios

Use case scenarios are used to make it easier and simple to analyze the scenario that will be used in subsequent phases by conducting an assessment of the scenario. The following use case scenarios have been proposed.

1. Use Case Scenario Client Register

   The client register use case scenario in the lecture's scheduling system proposed is as follows;

   1. Name of Use Case : Register
   2. Primary Actors : Students
   3. Objective : Create an account for students or users to log into the course scheduling application for access course schedule is given

Student	System
1. Login	2. Main page displays login and registration form
3. Click register to create an account to log into the application	
	4. View register form
5. Input full name, ID and password	
	6. Receives students' registration form, full name, ID and

	password

Table 4.1 Client Use Case Scenario proposed

2. Use Case Scenario Client Login

The Client Use Case Scenario in the proposed system of lecture's scheduling is as follows:

1. Name of Use Case : Login
2. Primary Actor : Student
3. Objective: To view the schedule given by the secretary

Student	System
1. Login Application	
	2. View Client Login Form
3. Enter name, ID, password and Login into application	
	4. Login Valid, log into application
Alternative Scenario	
	5. Invalid Login
6. Login again	

Table 4.2 Client Login Use Case Scenario proposed

3. Use Case Scenario Admin Login

The admin login use case scenario in the lecture's scheduling system proposed is as follows:

1. Name of Use case: Login
2. Primary Actor: Secretary
3. Objectives: Master input data consisting of data subjects, lecture's data, student's data room allocation and course schedule.

Secretary	System
1. Sign Scheduling Application	
	2. Admin Login form displays
3. Enter username & Password	
	4. Login valid, go into scheduling application
Alternative	
	5. Invalid Login
Login again	

Table 4.3 Admin Login Use Case Scenario Proposed

4. Course Scheduling Use Case Scenario

The proposed course scheduling use case scenario is as follows:

1. Use Case Name: Course Scheduling
2. Primary Actor: Secretary
3. Objective: Data provided to students for course schedule

Secretary	System
1. Input master data in the form of data subjects, lecture's data, room data & course scheduling	
	2. Generate course schedule
	3. Complete lecture's schedule
4. Receive course schedule	
5. Provides student's class schedule	
6. Logout of schedule application	
	7. Logout of system

Table 4.4 Use case scenario for proposed course scheduling

5. Use Case Scenario View Lectures Schedule

The use case scenario of Lectures Schedule is as follows:

1. Name of Use Case: View Schedule
2. Primary Actors: Students
3. Objectives: Schedule for students attending class/courses

Student	S
1. Login the application	
	2. of course schedule
3. Select Menu appears on Course Schedule	
	4. of Course Schedule
5. View timetable about Course	

Table 4.5 Use Case Scenario View of Course Schedule

6. Use Case Scenario Print Teaching Task and Hour of Class (HC)

The use case scenario of printing tasks/assignment and scheduling system and HC is as follows:

1. Name of Use Case: Print task/assignment and HC

2. Primary Actors: Secretary

3. Objectives: For teaching, task/assignment and news of various faculties and assigned lectures

Secretary	System
1. Selecting of lectures, teaching duties output & HC	
	2. Printing of teaching task/assignment & HC
3. Receiving teaching task/assignments documents & HC	

Table 4.6 Use case scenario of printing of teaching tasks/assignments and HC

4.1.3.3 Activity Diagram

The activity diagram shown below depicts logic of data flow but not considering the physical environment which the data flow. Following is the proposed activity diagram of course scheduling for Physic Class at UPNG.

1. Activity Diagram,*Client Register*

It describes the workflow of the system register proposed client that purposely to view the proposed system that is being running. The activity diagram is as follows:

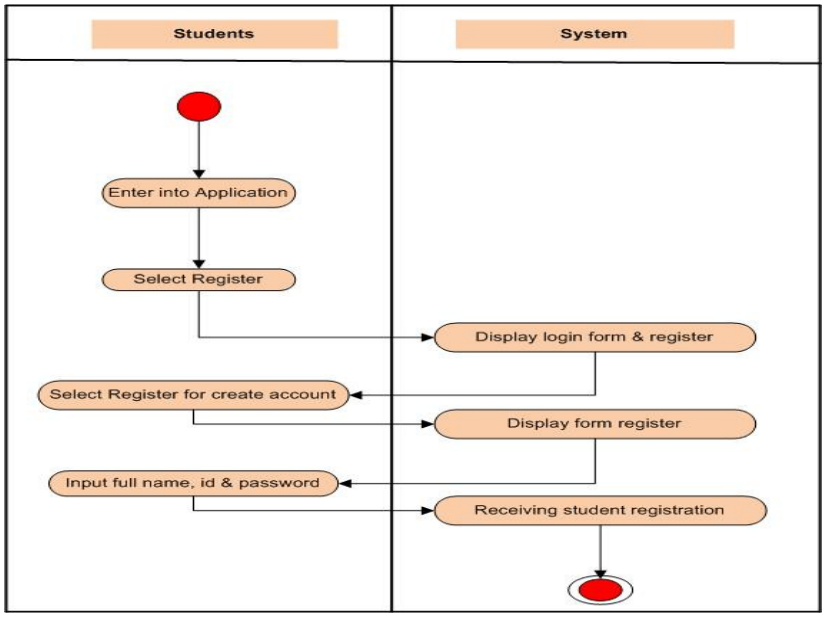


Figure 4.3 Activity Diagram proposed Client Register

The above diagram depicts the flow of a client register of the course scheduling application proposed on Web-based. Students will select register t create an account when the system display a registration form by entering full name, ID and password. The system will receive the registration form for student automatically and the student will have an access as he or she is already registered with the system.

2. Activity Diagram,*Client Login*

In this section, it depicts the workflow on the proposed client login system that aim to see the flow of the system.

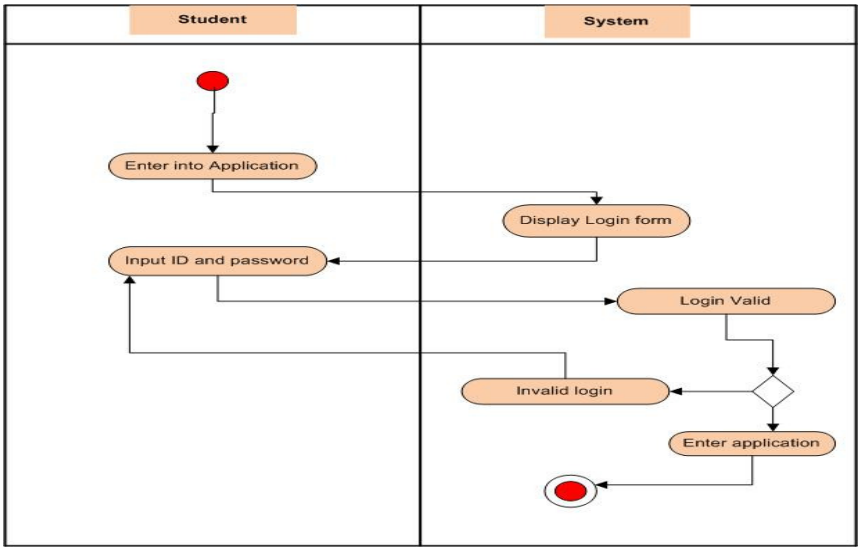


Figure 4.4 Activity Diagram proposed Client Login

The diagram above depicts the login of client/user-based scheduling application web-based proposed. Student or user enter the application which the system displays the login form after entering username, ID and password. The system will verify whether the login is valid or otherwise. If the login is invalid, the system will alert for username of password is wrong.

3. Activity Diagram,*Admin Login*

In this area, it describes the workflow on admin login system proposed that encourage to view the flow of the system that is being proposed. The activity diagram is as follows:

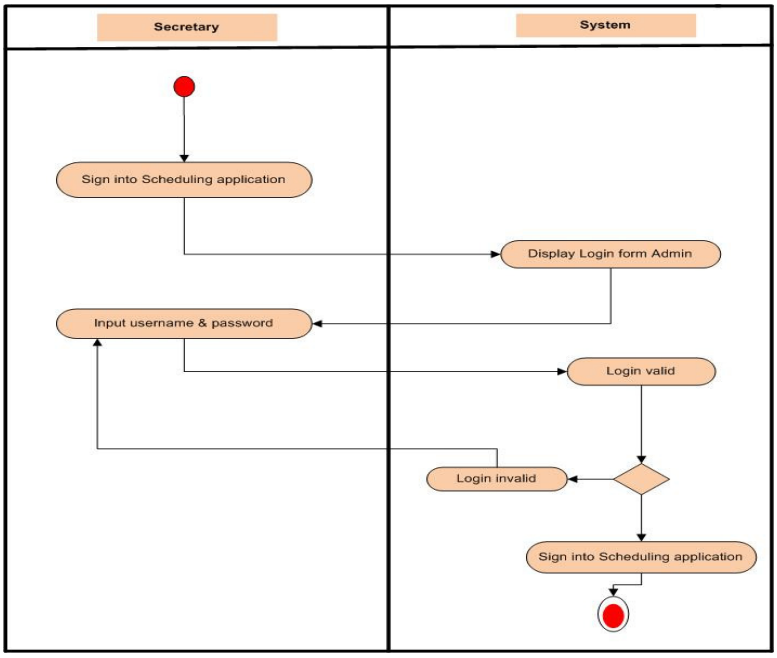


Figure 4.5 Activity Diagram proposed Admin Login

The diagram above describes the admin login or secretary login of the course scheduling application proposed. Firstly the secretary enters the course scheduling application so the system will display the admin login form. Once the input of admin username and password is entered, the system will check for verification whether the username and password is the proper one. The system will alert for resign if it finds out certain variables input is incorrect.

4. Activity Diagram, *Course Scheduling*

In the section, it describes the course scheduling system proposed which aim to view flow of the system that is being proposed.

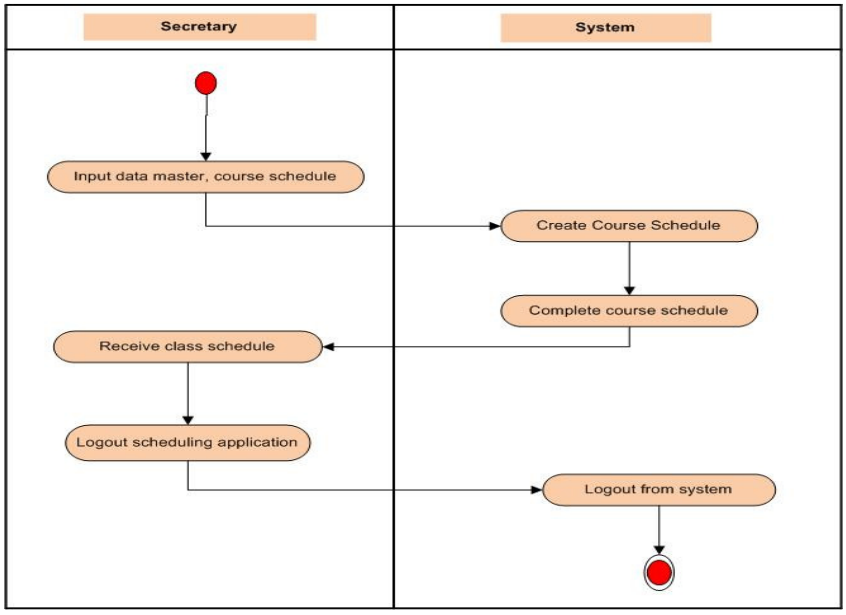


Figure 4.6 Activity Diagram Course proposed scheduling

The picture above depicts the flow of course scheduling. Secretary initially inputs the master data in the form of subjects, lecture, student and room. The system will generate all schedules that have been created. After receiving class schedule, the secretary provides it to students of the Physic Class and logout of the system

5. Activity Diagram, Course Schedule

In this area, it describes the workflow in the system of course schedule proposed.

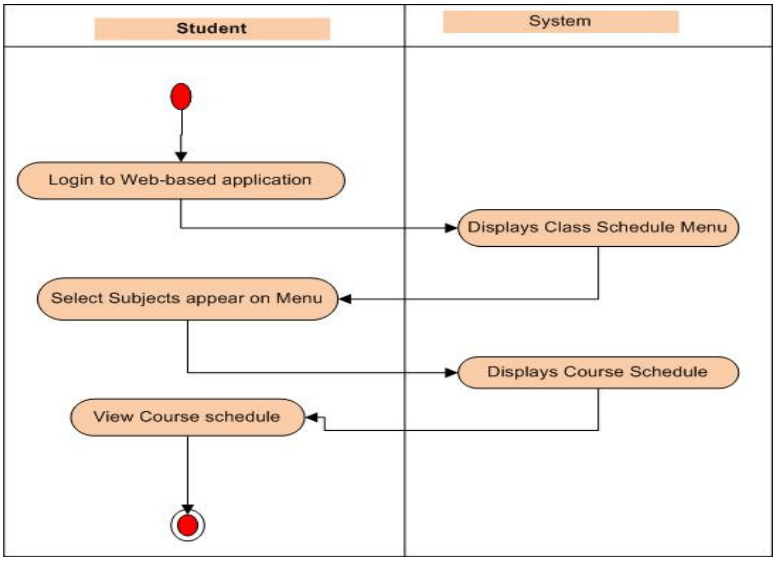


Figure 4.7 Activity Diagram, view of schedule proposed

The diagram above depicts the viewing of the course schedules. Students will firstly login into Web-based Schedule application for accessing system. The system will display the menu that appears after the course schedule for students to choose courses menu that will also appears to view the course schedule.

6. Activity Diagram, Print Teaching Task and HC

In the assigned area, it gives knowledge of the workflow of teaching task and HC making a system document form that will be endorsed or validated by Vice Chancellor Academic and will be provided to the lectures in a question form and will be focusing on seeing the process flow of the system proposed.

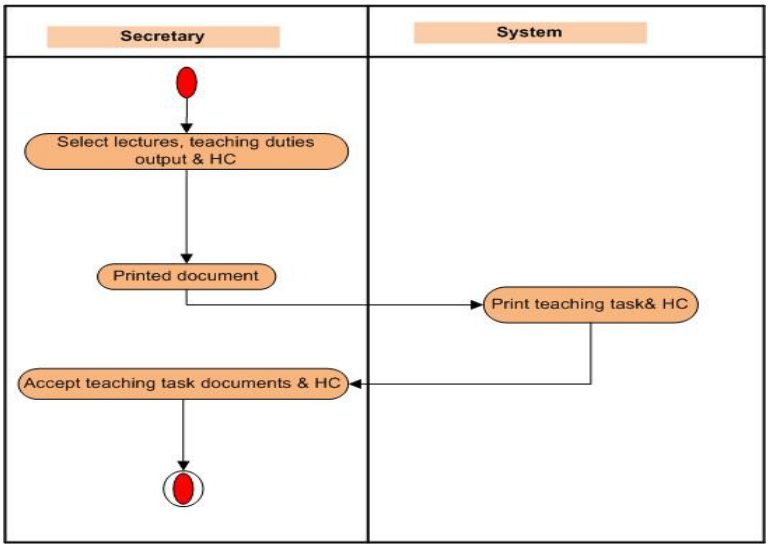


Figure 4.8 Activity Diagram Printing Teaching Task and HC proposed

The image above depicts the flow of teaching task and HC. The secretary will firstly select the name of lectures, teaching task and HC and print out document. The secretary will choose whether to print out as pdf or excel format where the system will print the result of a document and it will be endorsed or validated by VCA for teaching duties assigned to lectures. As soon as it is endorsed, it will then be returned to the secretary for distribution to lectures concern.

4.1.3.4 Sequence Diagram

Sequence diagrams are used to describe the interaction between objects in a time sequence. In addition it is basically use for abstracting a layer of object model. The usefulness of it is a series of sent messagesshown between an objectand also an interaction of objects. And the execution flows through the system at a certain. Its main component consist of objects with a rectangular box

where a message is depicts by a line with an arrow and time depicts by a vertical process. Here are the sequence diagrams that exist in the Scheduling Application Course in Physic Class at UPNG Web-based, that is;

1. Sequence Diagram, *Client Register*

   Here is a sequence diagram that depicts the client register user register process or students on the course scheduling application based on Web-based.

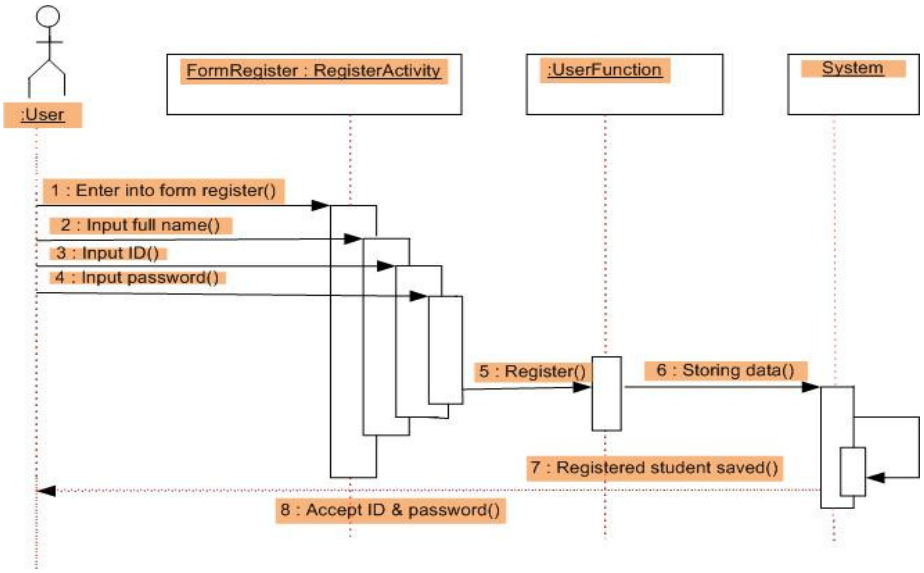


Figure 4.9 Sequence Diagram of proposed Client register

2. Sequence Diagram, *Client Login*

   Sequence diagram illustrates the lecture's timetable after client login the process into the application. Here the client can immediately view the course schedule that has been given by the admin through schedule menu appearance.

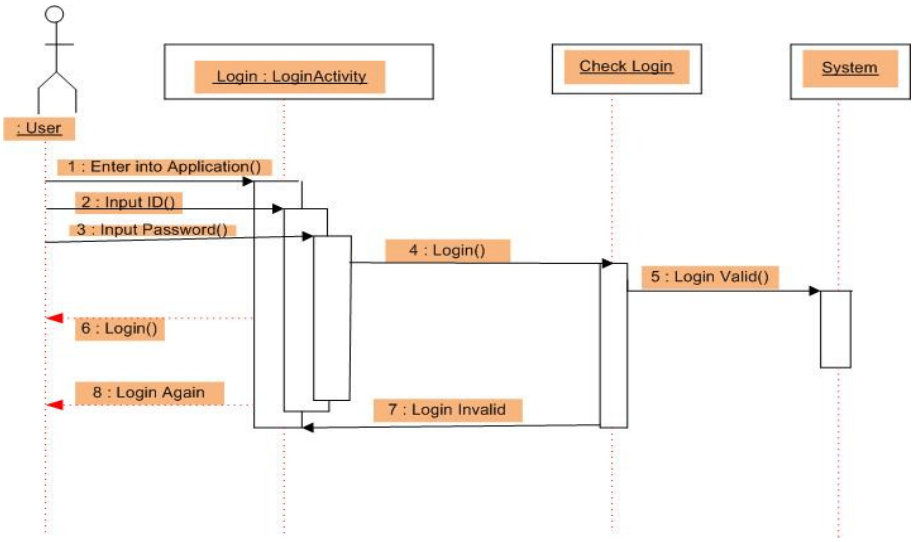


Figure 4.10 Sequence Diagram, Client Login proposed

3. Sequence Diagram, *Admin Login*

Sequence Diagram depicts the admin login Secretary Login process. Firstly the secretary enters the login form and then admin login by entering username and password into the course scheduling application. The system will validate the login process. If successful, admin can login and use the system.

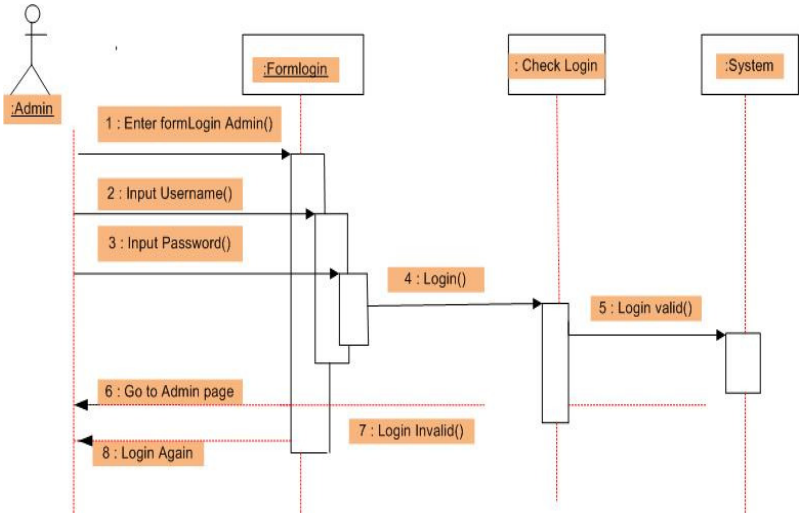


Figure 4.11 Sequence Diagram proposed, *Admin Login*

4. S

equence Diagram, Course Scheduling

Sequence diagram portrays steps of scheduling admin master data entry form. Such as students' data, lectures' data, data of subjects, room data and the performance of scheduling data. The course scheduling is than provided to students and it is solely performed by the admin after selecting the input menu.

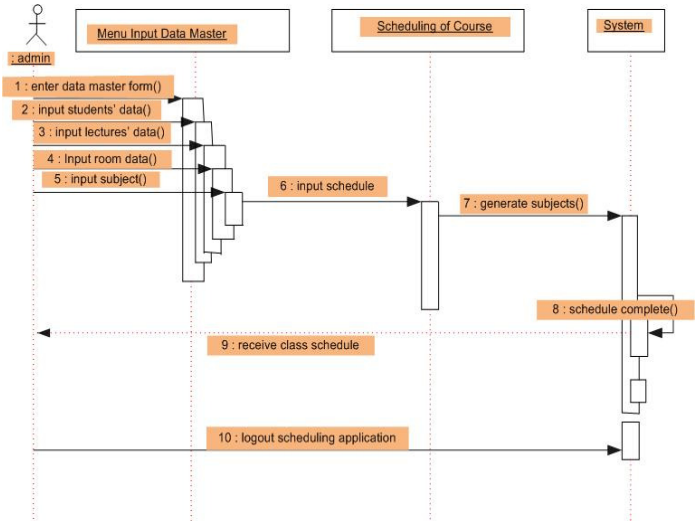


Figure 4.12 Sequence Diagram, proposed Subjects Scheduling

5. S

equence Diagram, Course Schedule View

The sequence diagram below depicts the lecture's timetable after client login process of the course scheduling application. Here the can view the schedule of courses or subjects provided by the admin through its appearance on the schedule menu.

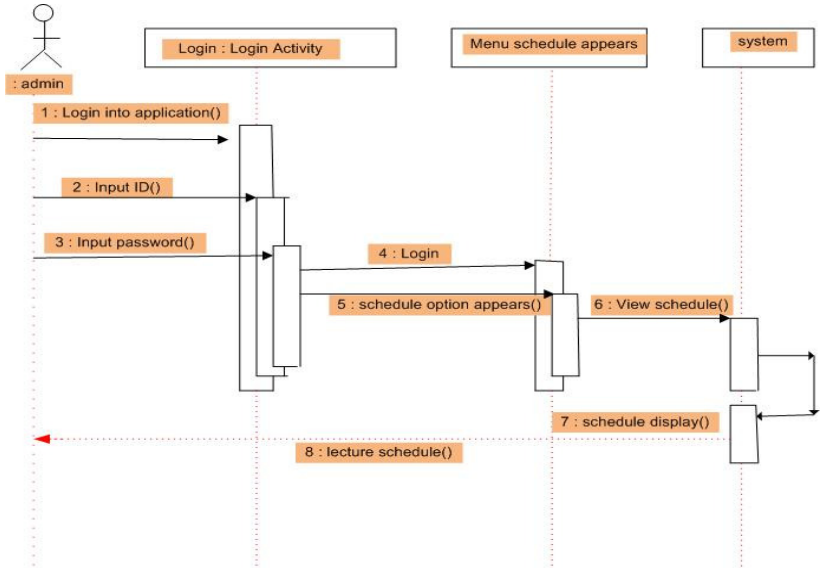


Figure 4.13 proposed schedule view

6. S

equence Diagram, print teaching task and HC

Sequence diagram below depicts the teaching duties and HC for printing of task that will be performed by admin. Teaching duties and task for lectures will be given to VCA and HSD for validation and endorsement. After VCA's endorsement, it will be given to each concern lectures to carry out their teaching duties according to the schedules.

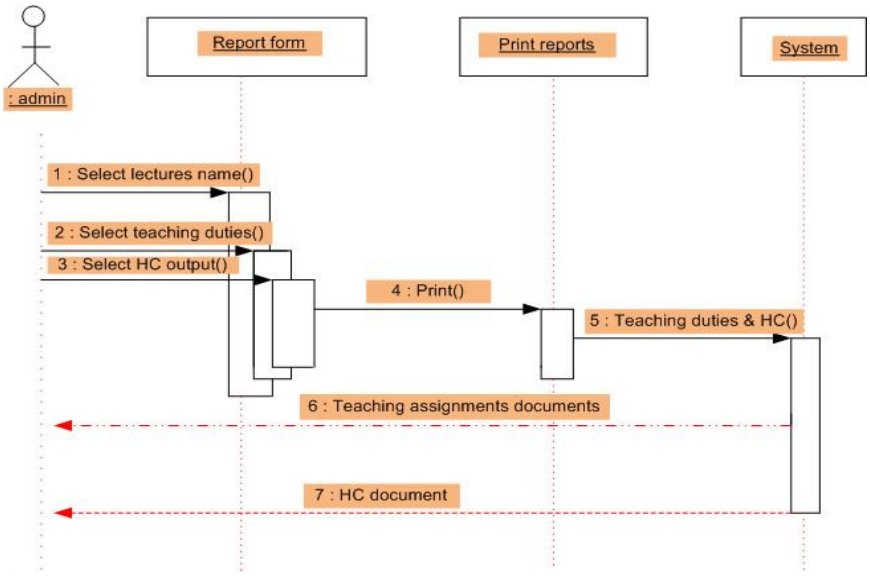


Figure 4.14 Sequence Diagram, Print teaching duties and HC

4.1.3.5 Class Diagram

Class diagram purpose is to describe the static structure of classes in the system. Class is the representatives of the functions that are executed by the system. The following class diagram of course scheduling application proposed in the Physic Class at UPNG Web-based.

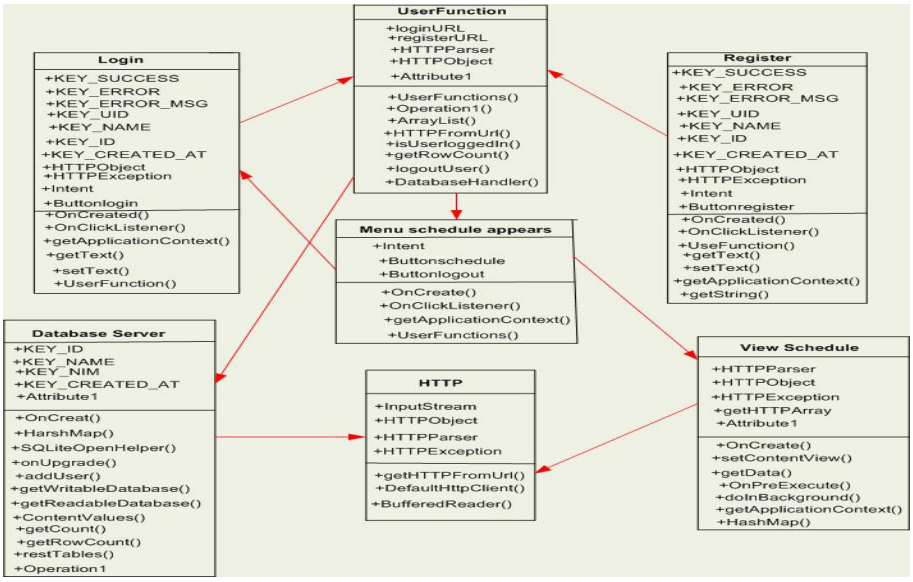


Figure 4.15 Class Diagram

4.1.3.6 Deployment Diagram

Collaboration diagram is another form of sequence diagram. Sequence diagram is structured by time. Considering that, collaboration diagram is ordered according to room and space.

1. Collaboration diagram, Client register

Below is a collaboration diagram, Client Register

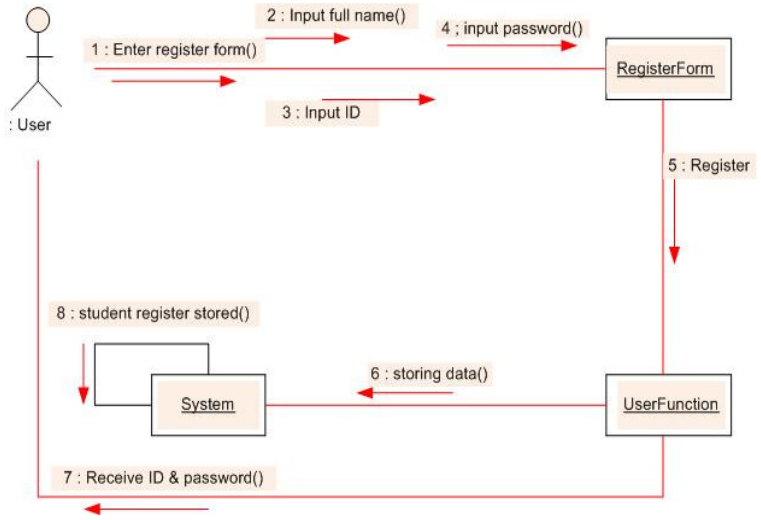


Figure 4.16 Collaboration Diagram, Client Register proposed

2. Collaboration Diagram, Client Login

Below is a collaboration diagram of Client Login:

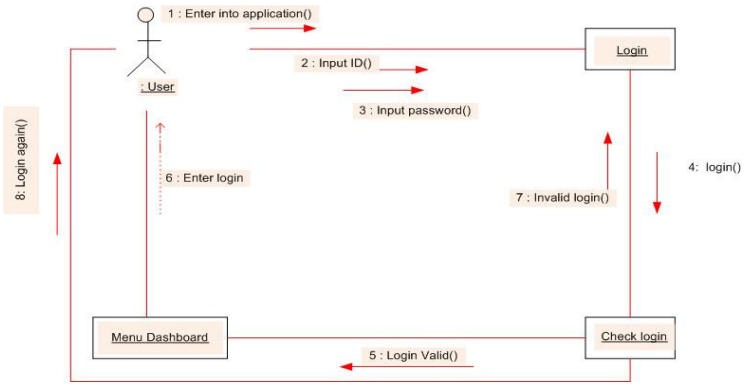


Figure 4.17 Collaboration Diagram of Client Login

3. Collaboration Diagram, Login Admin

Below is a collaboration diagram of Admin Login

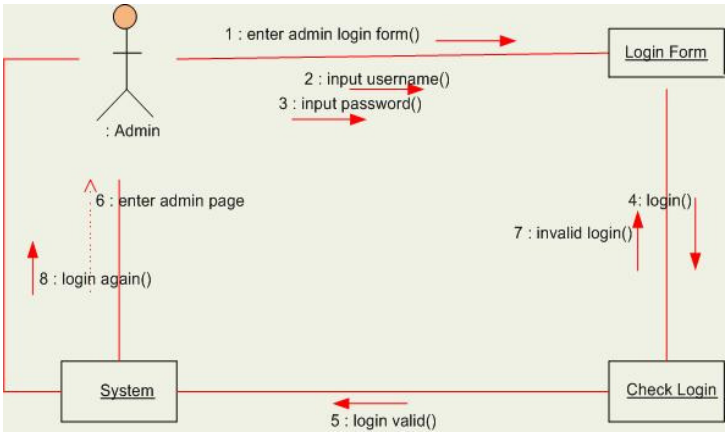


Figure 4.18 Collaboration Diagram proposed Admin Login

4. Collaboration Diagram Course Scheduling

Below is collaboration diagram of Course Scheduling

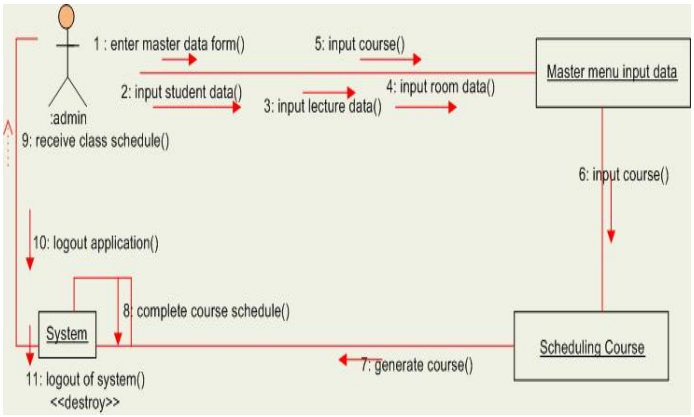


Figure 4.19 Collaboration Diagram, proposed Course Scheduling

5. Collaboration Diagram, View Course Schedule

Below is the collaboration diagram

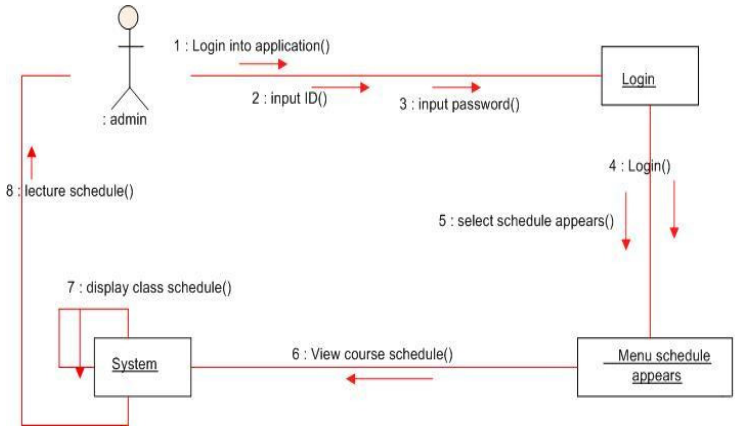


Figure 4.20 Collaboration view proposed schedule

6. Collaboration Diagram, printing of teaching task and HC

Below is the collaboration diagram of printing of task and HC

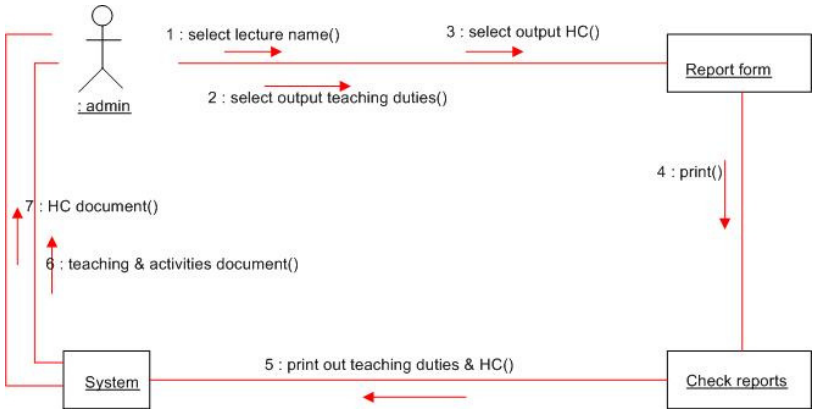


Figure 4.21 Collaboration Diagram, print teaching task and HC

4.1.3.7 Component Diagram

Component diagrams are designed or created to display the organization and dependencies among a collection of components in a system. The design of the menu that was proposed application component images is described by the following diagram:

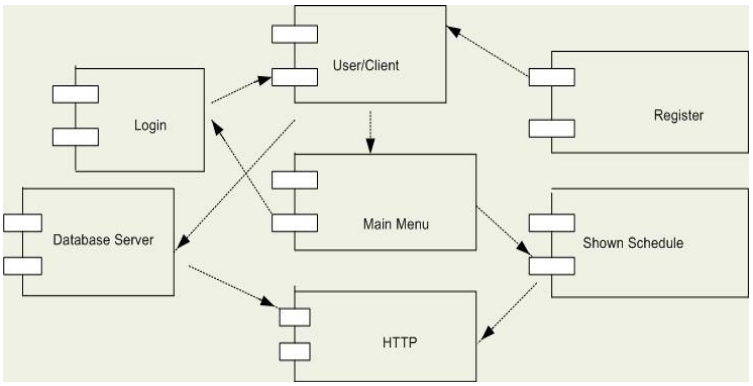


Figure 4.22 Component Diagram Course Scheduling Application in the Physic Master Class Web-based proposed

4.1.3.7 Deployment Diagram

A deployment or a physical diagram depicts is an illustration of giving information in more details of giving how the component was deployed in the infrastructure system will be stationed (in a machine, server or a hardware).

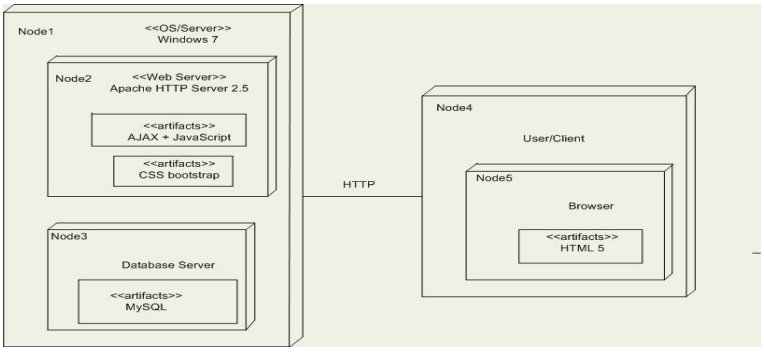


Figure 4.23 Deployment Diagram Course Scheduling Application in Physic Class Web-based proposed

4.2 Interface Design

The blueprint of this is the final foundation as a user interface that will bring into play by the system that will be invented.

4.2.1 User Structure Menu

The menu user structure is comprised of login, register, display schedule and the schedule list.Here is the proposed view of user structure menu.

1. FormLogin and FormRegister User

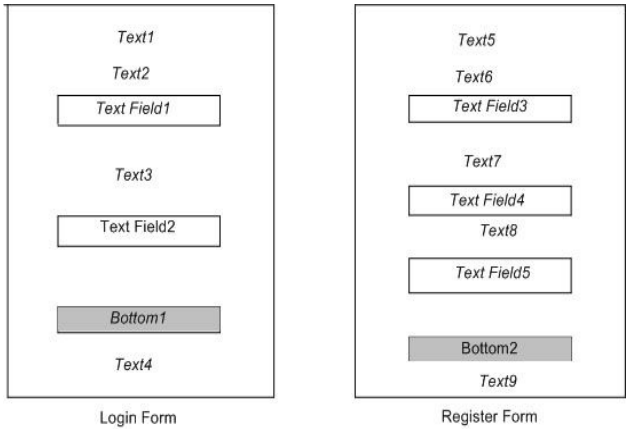


Figure 4.24 Login form Menu structure and User Register Form

Caption user login form

1. Text1 displays ” Login”
2. Text2 displays “Username” and textfield1 is the field where “Username” of a student is entered.
3. Text3 is display name “Password” and Field2 Text is where “Password” of students’ is entered.
4. Bottom1 is a key to log into the main menu.
5. Text4 displays name of “Register” and contains a hyperlink to have an access for registration form.

Caption register form

1. Text5 displays name of “Register”.

2. Text6 is display of name “Full Name” and Text Field3 is a field where “Full Name” of the student is entered.

3. Text7 is display name of “Username” and Text Field4 is where student name is entered.

4. Text8 is display name of “Password” and Text Field5 is where the “Password” of student is entered.

5. Button2 is a key to register to enter the main menu.

6. Text9 is a name display to return to the login form contains a hyperlink for further access of a login form.

2. Select Semester Menu

User menu interface structure of selecting the semester is designed as a place where a user to view the course schedule according to their preferences.

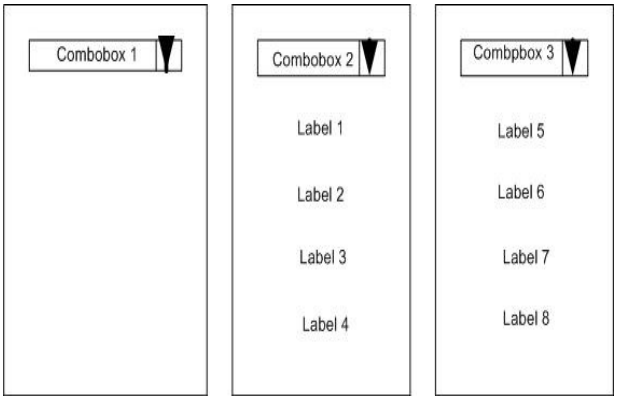


Figure 4.25 Select Semester Structure Menu

Caption Select Semester

1. Combobox1 is the display name of " Semester Choose"

2. Combobox2 is the display name of "Odd Semester" and Labels 1-4 is semester 1, 3, 5 and 7.

3. Combobox3 is display name of "Semester" and Labels 5-8 is the name of 2nd semester 2, 4, 6 and 8.

4.2.2 Admin Structure Menu

Admin menu structure is consisting of login administrator, input schedule, lectures' data, subjects/course data, room data and logout. Below is the view of admin menu structure.

1. Admin Main Menu

2. Admin main menu structure is constructed especially for the admin or secretary for making a process of course scheduling. The main menu structure display the admin as follows:

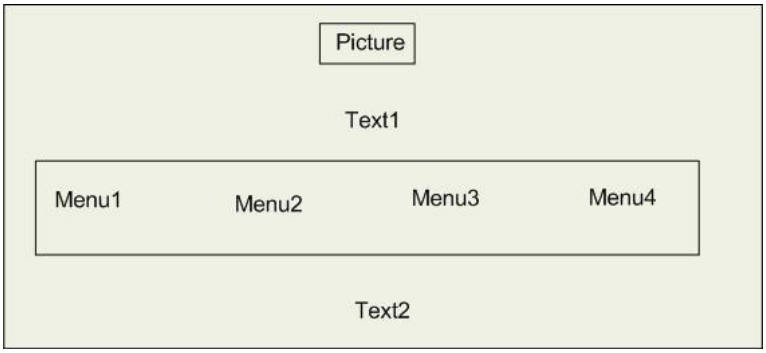


Figure 4.26 Admin Main Menu Structure

Caption, Admin Main Menu Structure

1. Picture, displaying of an Admin image

2. Text1 displays, “Welcome to UPNG Physic Department”.

3. Menu1 is input course, menu2 input data menu, menu3 view data menu, menu4academicmenu, menu5 data input menu and menu6 is room data and logout menu for admin or Secretary.

4. Text2 is the time and date of course scheduling application.

4.2.3 Design Input

Design input is constructed as a channel in which the user /client can have easy access to the application. The design of the course scheduling Web-based Master Physic Class is as follows:

1. Client Login

Designing of input client login is designed or constructed as a channel for students to log into the Web-based application as user.

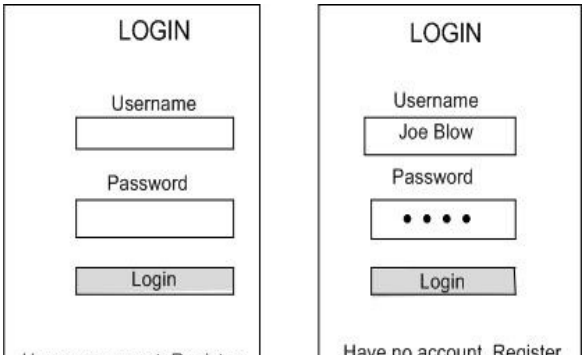


Figure 4.27 Design Input User Login Form

2. Client Register

Designing of client register form input is designed as a channel of form to register those students who have no existing account to have an access in the course scheduling application.

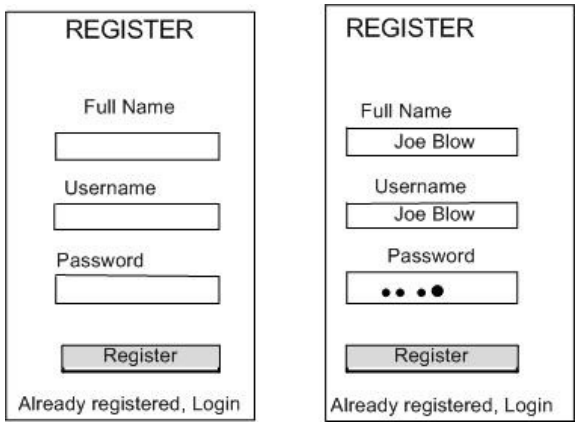


Figure 4.28 Design Input User Register Form

3. Administrator Login

The design of the admin login input is designed so that an area is held for the admin or secretary to log into the main menu of the course scheduling application.

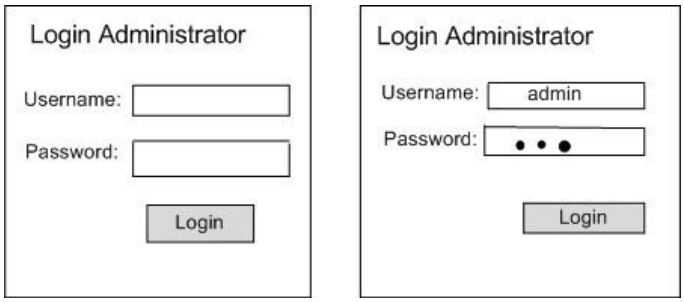


Figure 4.29 the design of the admin login input

4. The Schedule Input

Design input schedule in the admin section is designed as a container or place where admin or Secretary for scheduling courses. Below is the input schedule of the course design:

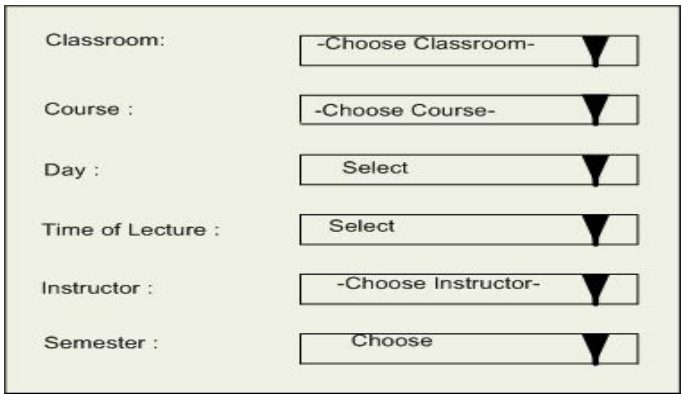


Figure 4.30 Admin Schedule design input

4.2 Architectural Network Design

The layout of the network architecture built using the concept of client-server network is using PHP Web Server and client using lap top, desk top, and mobilephones using Web-based system.

Web Server is a web that aims to connect an application platform so that every application can communicate with one and other. Web server in this particular study was built using PHP programming language combined with HTTP. HTTP or JavaScript Object Notation represents a data interchange format between computers with a computer or mobile device with a computer.

The database is used to store data needed by the applications in this section and implemented using MySQL.

4.3 Database Implementation (SQL Syntax)

Database implementation design taken based on database. Below is the table structure that is implemented in the database.

1. ‘administrator’

```
CREATE TABLE ‘administrator’ (‘id’ inter (2), ‘name’varchar (40), ‘username’ varchar (30), ‘password’ varchar (30), PRIMARY KEY (‘id’))
```

2. ‘instructor’

```
CREATE TABLE ‘instructor’ (‘uid’ int(12), ‘unique id’ varchar(23), ‘name’varchar(50), ‘id’ varchar(10), ‘encrypted_password’ varchar(80), ‘salt’ varchar(10), ‘created_at’ ‘updated_at’ datetime, PRIMARY KEY (‘uid’))
```

3. ‘table_lecture’

```
CREATE TABLE ‘table_lecture’ ‘nip’ int(20), ‘name_lecture’ varchar(50), ‘tlp’ varchar(20), PRIMARY KEY (‘nip’));
```

4. ‘table_student’

```
CREATE TABLE ‘table_student’ ‘nim’ int(10), ‘name_student’ varchar(40), ‘semester’ varchar(20), ‘address’ varchar(60), ‘tlp’ varchar(15), PRIMARY KEY (‘nim’));
```

5. ‘table_course’

```
CREATE TABLE ‘table_course’ (‘Code_Course’ varchar(15), ‘Name_Course’ varchar(50), ‘Semester’
```

```
varchar(20), 'Credits' varchar(2), "Day' varchar(10),
'Time' varchar(40), PRIMARY KEY ('Code_Course'));
```

6. 'lecture_classroom'

```
CREATE TABLE 'lecture_classroom' ('Name_Room'
varchar (30), 'Day' varchar (20), 'Time' varchar (20),
PRIMARY KEY ('Name_Room'));
```

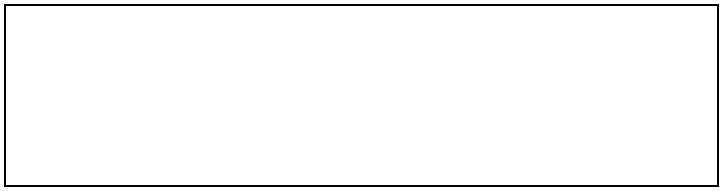
7. 'table_schedule'

```
CREATE TABLE 'table_schedule' 'id' int(10), NOT
NULL, 'Code_Course' varchar(40), 'Name_Course'
varchar(40), 'Semester' varchar(30), 'Grades' varchar(2),
'Day' varchar(15), 'Time' varchar(40), 'Room'
varchar(40), 'Name_Lecture' varchar(40), 'nip_lecture'
varchar(40), 'Class' varchar(40), 'Secretary' varchar(40),
PRIMARY KEY ('id));
```

8. 'table_depar

tment'

```
CREATE TABLE 'department' 'id' int(30), NOT
NULL,
'Name_Course' varchar(40), 'Name_lecture'
varchar(30),
'Time' varchar(25),
PRIMARY KEY ('id'));
```



4.4 Implementation Interface

Implementation Interface Course Scheduling application Web-based at the UNPG Physic Class consist of some of the views in between the logged on user, user register, dashboard menu appears schedule, list of courses scheduled and logged out users. Following is the implementation of the interface applications.

1. Login User

   An initial view after opening the course scheduling application, the user first enter into the student's login form accountand then enter Username and Password where the student can enter the system.

5. The Main Menu Admin

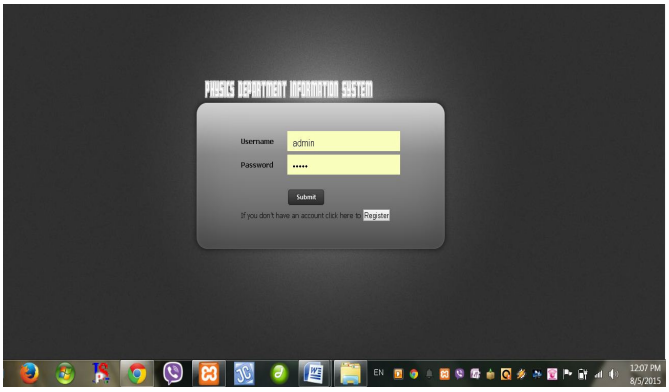


Figure 4.32 Main Admin Menu Page of the UPNG Physic Class

6. The Main Home Page

It is where the first page that displays as the home page as admin or student login into the system.

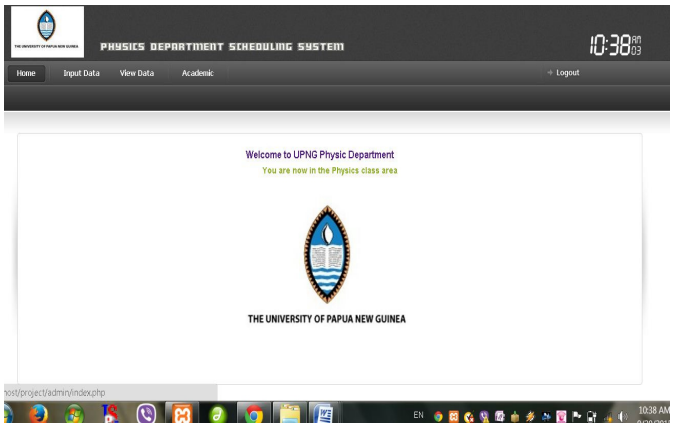


Figure 4.33 the Main Home page of the UPNG Physic Class

7. Data Instructor

This page is where it shows the data of lecturers or instructors of different courses at the University.

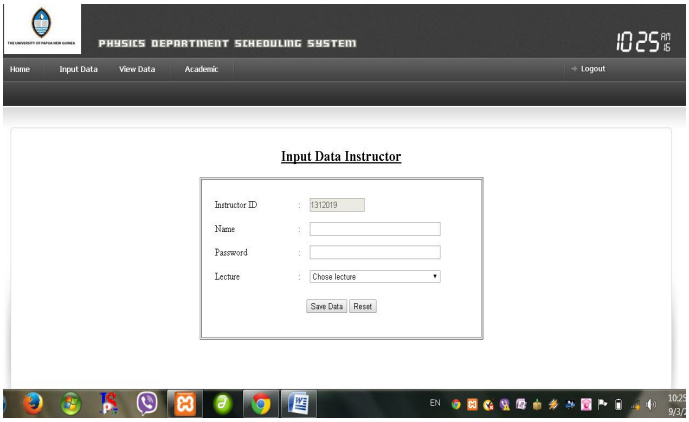


Figure 4.36 page displays of instructor/lecturers data

8. Input Data Instructor

This page shows the Instructors' data input page where the admin or secretary input all staff's data into the system.

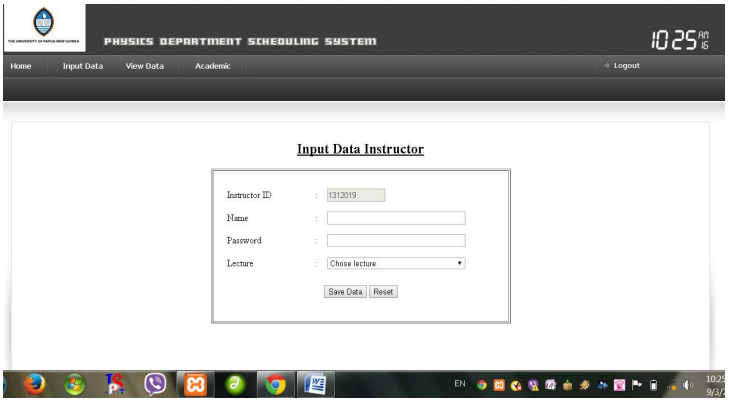


Figure 4.37 shows the Instructors' Data Input page

9. Instructors' Data

This page shows when the instructor's data is put into the system and being saved.

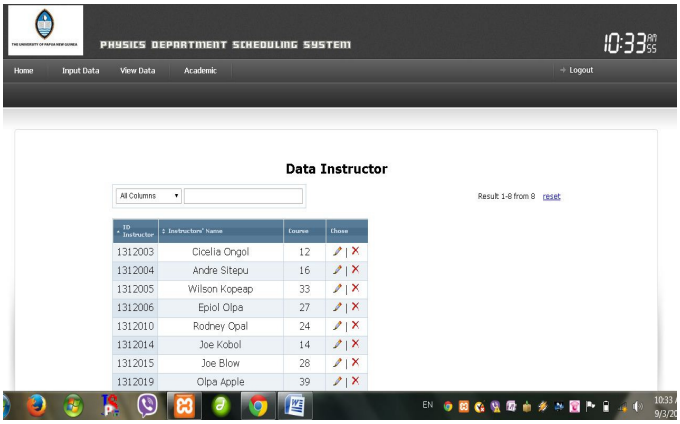


Figure 4.38 shows saved data for lectures/instructors

10. Data Course

This page displays the courses that input and editing of each subjects

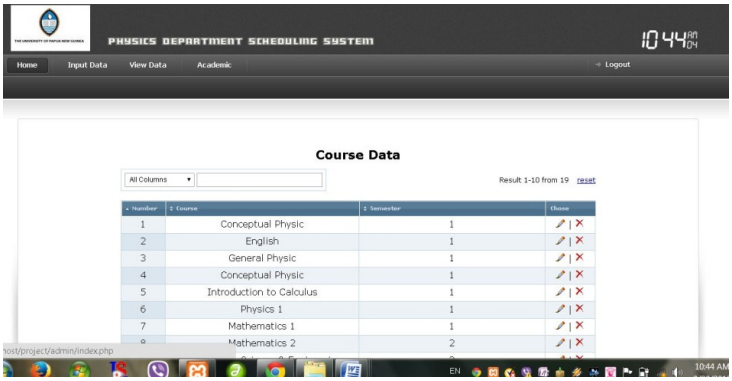


Figure 4.39 shows Course Data

11. Schedule Input

This page shows the schedule input at the UPNG Physic Class

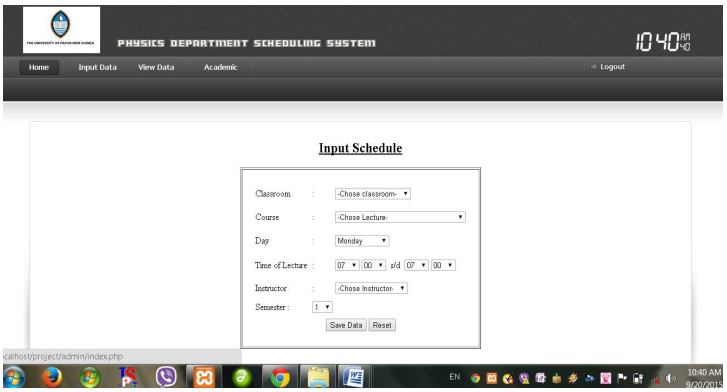


Figure 4.40 shows the schedule input

12. Class Schedule

This page shows the class schedule after the input of data such as time, day, lecturer and the assigned classroom. After view the schedule can be downloaded.

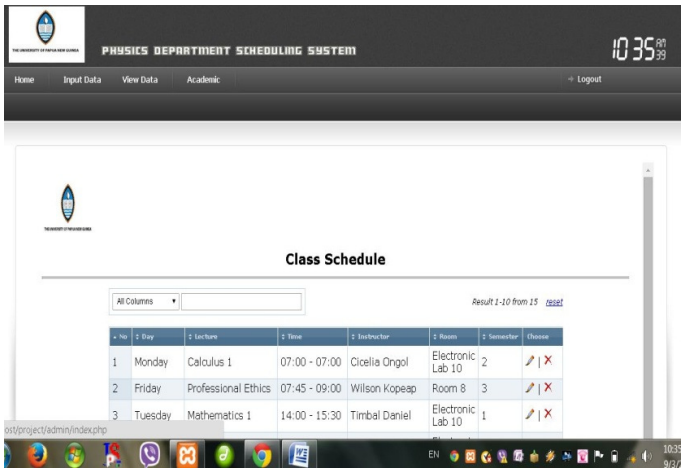


Figure 4.41 Class schedule display

13. Course Data display page

This page displays the courses that is offered at the UNPNG Physic Class is displayed for viewing.

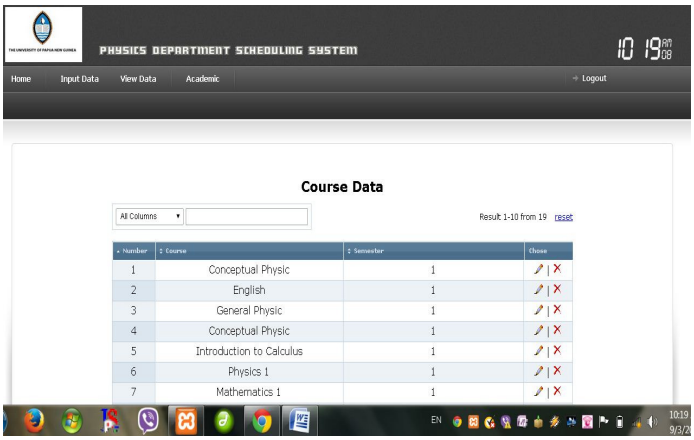


Figure 4.42 Course Data display

14. Course Input

This page shows the input of courses after editing it by the admin or the secretary and saved.

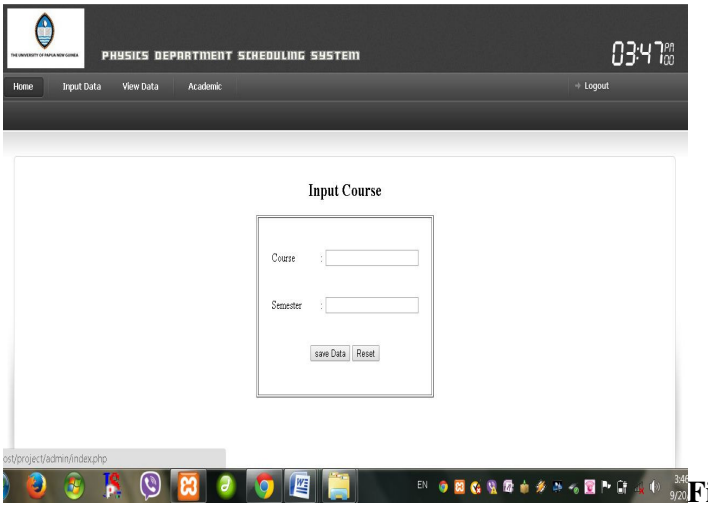


Figure 4.43 Course input display and saved data

15. Classroom Input

This page shows the assigned lecture rooms for each class.

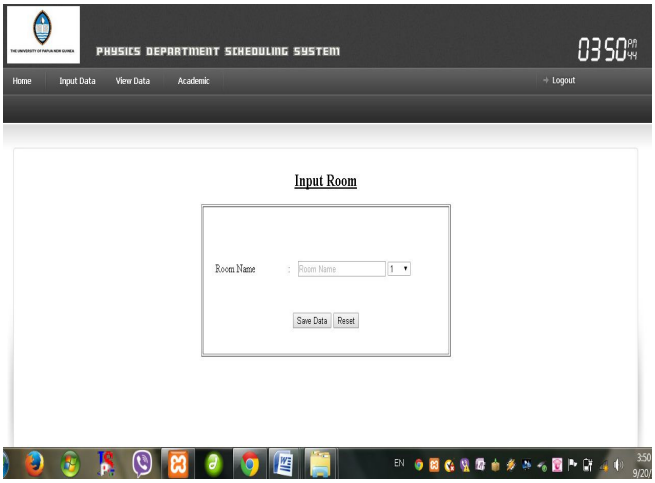


Figure 4.44 display input of lecture room

16. Classroom Data

This page shows the edited classroom data updated by the admin for students to observe and attend the assigned lecture room.

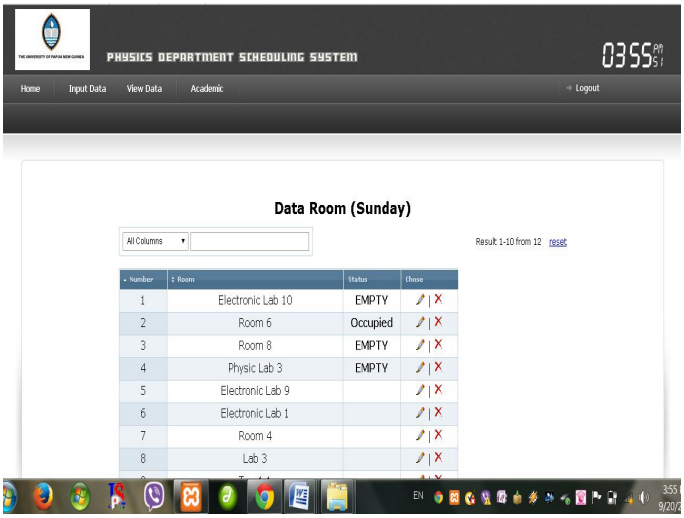


Figure 4.45 Display classroom data

4.5 Testing

Here testing performance is carried out to make sure the proposed system is functioning according to its initial purposes. The method used to carry out the testing was Black Box Testing to make sure all functions are functioning accordingly.

4.5.1 Testing Plan

Black box testing technique is used here to carry out the testing as mentioned above. How the testing is carried out is tabulated below for reference. Below are the testing results from Black Box Testing of the Application On-Line Education Scheduling Course at the University of Papua New Guinea Web-based.

		Scenario	
1	Display Admin Login	Display Admin Login form	Black Box
2	Display register Login	Display register Login form	Black Box
3	Display Input Student Data	Displaying of student's input data	Black Box
4	Display Course Input	Displaying course input	Black Box
5	Display Student Data	Student's Data display	Black Box
6	Display input & update student data	Displaying students' data input & edit	Black Box
7	Display Input Schedule	Displaying of the Schedule Input	Black Box
8	Class Schedule Display	Displaying of Class Schedule	Black Box
9	Display Input Room Data	Room data input display	Black Box
10	Input Classroom Display	Displaying classroom input	Black Box
11	Display Instructor's Data Input	Displaying of instructor's data input	Black Box
12	View Student's data input	Display student's data input view	Black Box

Table 4.7 showing testing plan

4.5.2 Cases and Test Results

Following is the case that has been used to test the software which was built using a method based on the table black box testing plans which was made earlier.

No.	Test Cases	Component Tested	Expected Results	Testing Results
1	Display admin login form	Shows admin form	When you first open the application, will bring up the login form for admin	Accepted [x] Rejected [ ]
2	Display register login	Shows the register login form	When you first open the app, register login form will be shown	Accepted [x] Rejected [ ]
3	Display student input data	Shows the student's input data menu	As soon as the data input is click on, the student's input data page displays	Accepted [x] Rejected [ ]
4	Display Course Input	Shows course input menu	As you click on course input menu, it will	Accepted [x] Rejected [ ]

			show the course input data page	
5	Display Student Data	Shows student's data menu	As soon as the student's data menu is click, it will display the page for student's data	Accepted [x] Rejected [ ]
6	Display Input & Update Student Data	Shows the students' update & input data men	As soon as you click menu input & update student's data, the page will display	Accepted [x] Rejected [ ]
7	Display Input Schedule	Will show the input schedule menu	As soon as you click input schedule menu, the page will be displayed	Accepted [x] Rejected [ ]
8	Class Schedule display	Shows the class schedule menu	As soon as you click the class schedule menu, the page will display	Accepted [x] Rejected [ ]
9	Display Input Room Data	Shows the input room data menu	As soon as you click the input room data menu, the page will display	Accepted [x] Rejected [ ]

10	Input classroom display	Shows the input classroom menu	As you click the input classroom menu, it will display the page	Accepted [x] Rejected [ ]
11	Display Instructor's Data Input	Shows the instructor's data input menu	As you click the instructor's data input menu, the page displays	Accepted [x] Rejected [ ]
12	Display View Student Data Input	Shows the student data input view menu	As soon as you click on student data input menu, it will display the page	Accepted [x] Rejected [ ]
13	View Instructor's Data	Shows the instructor's data view menu	As one click on the instructors' data view menu, the page displays	Accepted [x] Rejected [ ]
14	View Room data	Shows the room view data menu	As soon as you click on room data menu, the page displays	Accepted [x] Rejected [ ]
15	Display View Course	Shows the course view menu	As soon as you click on course view menu, the page displays	Accepted [x] Rejected [ ]

16	Display Course	Shows course menu	As soon as you click the course menu page, it display the courses page	Accepted [x] Rejected [ ]
17	Display logout page	Shows the logout page	The logout page display, as soon as you click on the logout menu, you will exit from the application	Accepted [x] Rejected [ ]

Table 4.8 showing cases and test results

4.6 Conclusion of the Testing and Results

Based on the testing carried with cases shown above, it can be concluded that the software is running without syntax error and functioning exceptionally as planned and expected.