Course Tracking Management System

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Dr. Syed Akhter Hossain, Professor and Head, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

In the present context of digital transformation, education is the core to determine the digitalization in the teaching and learning. Worldwide, learning management system is being used by universities and educational institutes. Besides, MIT has their courseware and other universities are customizing Moodle and similar products to take the advantage of the digital transformation. It has been found that beside digitalization, tracking is significantly important to ensure the desired goal and quality aspects of the course. From this perpective, the proposed project "Course Tracking Management System (CTMS)" has been conceived. This intends to provide a secure and scalable web-based course management system based on the courses directions from Daffodil International University. The system is designed to simplify, streamline, and auto-mate many aspects of the workflow associated with running a large course, such as course creation, importing course files, management of student attendance, online submission of assignments, assignment of graders, grading, handling regrade requests, and preparation of final grades. This system also helps with a Department of a University for the quality assessment & maintenance for the quality education with Course outline & assessment section. Not only these, in this CTMS course teacher can scan or save the examination sheets & marks for further use in future for quality checking. This system is very much effective for the Accreditation system & for maintaining the files in a university in an easy way.

In contrast, other course management systems of which we are aware provide only specialized solutions for specific components, such as grading. CTMS is increasingly widely used for course management system. In this paper we articulate the principles we followed in designing the system and describe the features that users found most useful for the system.

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CHAPTER 1

Introduction

1.1 Introduction

In every universities/ institutes there are lots of courses conducted by a Department with its credit hours. The courses have their uniqueness, credits, grading, hands on work & own outcome for the students. Managing the course is a complex work for the teachers, course moderators & department. Many factors may add complexity for the system: large enrollments; a course staff including several roles such as instructors/ teachers, moderators, teaching assistants, staffs, lab consultants, and accreditors; both individual and group assignments; student workgroups during the course; given assignments whose grading may be partitioned across problems; online student submissions comprising many files; requests for regrading; administration of sensitive information such as scores, statistics, and final grades at an appropriate level of security; and the need to track the progress of these various steps and notify students where appropriate. After that when the accreditation time comes each and every institute have to show the quality assessments of the courses of theirs. But what we have right now is a manual system for the whole system. A system that we have to do all the mentioned work in hand to hand with hard copies tons of papers. The institutes have to preserves the files, assessments, results, examination sheets for the future purpose of rechecking, results or accreditation after whole two to four years.

Accreditation is a process of validation in which colleges, universities and other institutions of higher educations are evaluated. The standards for accreditation are set by a peer review board whose members include faculty from various accredited colleges and universities. The board aids in the evaluation of each potential new school accreditation or the renewals of previously accredited colleges/schools. UGC [1], IEB [2] are such accreditation agencies in our country.

These agencies/ organizations requires academic institutions to maintain course files to assess the overall quality and effectiveness of each individual course. A course file is a document evidence of teaching and learning that helps the accreditation board to review and improve teaching-learning process of that course. It also presents the strength and accomplishment of each faculty as it includes the document that narrates the quality of their teaching abilities and performance. A course file is the collection of Course Outline [3], Lecture Content, Assessment Papers and Evaluation Papers of students.

Our present systems maintain these course files in paper. The major drawbacks of our present manual system are huge paper usage, retrieval of information, management of these papers and most of all more man power. It has also lack of security in terms of accidental disaster like. The sharing of these information is also hard and the printing costs is huge. It also creates problems during the period of accreditation.

To ease the flow of this file management, we are proposing a Course Tracking Management System (CTMS) to automate the organizing and management of files via user friendly interface. The proposed system aims to replace the paper-based management of files and introduce a central database system to keep the record of course files. This system will not only ease the work of faculties and management but also the information will be a click away to the agencies interested in reviewing the course material for accreditation purpose.

1.2 Motivation

A careful survey shows that course files are typically maintained manually. A course file is a documented evidence of teaching and learning which helps us to review and improve both teaching and learning process taken place in the institutions. This compilation has many disadvantages such as limited sharing, information retrieval, physical storage, paper and printing costs, time conservative, number of required man-hours, disposal of old files, wastages of natural resources and environmental impact. As our motive is to automate the accreditation process easier. As a part of any campus sustainability programs, one should focus on improving energy efficiency, conserving resources and enhancing environmental quality by using Information Technology. That why we proposed a digital system, where all course files are available in online. Our proposed course file is not only a collection of syllabus, assignments and evidence of student's achievements but also it includes analysis and reflection on the failure or success of each individual course.

1.3 Objectives

The objectives of the proposed project are as follows:

- To develop an integrated smart information system for e-course file management for the universities
- To incorporate learning analytics for measuring effectiveness with the project
- To save valuable time, place & money for the current manual system of course file management
- To make an easy solution for accreditation
- To replace the current manual system & manage the course files at one place

1.4 Expected Outcomes

The outcomes are the changes or results that we are expecting to be achieved after the successful completion of the project. Our developed system Course Tracking Management System (CTMS) have some outcomes or benefits:

- Acquiring the whole course files in one place with no harassment
- Helping with the accreditation
- Saving time, money, working place & vast amount of employee for management of the course files
- Obtaining easiest user experience for using the system
- Storing the course files in cloud & remove the hard copies
- Managing all the courses files in one place for a department of an institution
- Checking if the requirements of a course is meet with the outcomes
- Generalizing the system with easy user permission
- Validating the security of the course files
- Ensuring a quality education

CHAPTER 2

Background

2.1 Introduction

Currently in Bangladesh, accreditation for program in an institution is maintained manually. This process needs the papers for exams, marks sheet, student's attendance sheet, project and lab reports, assignments etc. As these are the main criteria of a course filing system, a teacher has to preserve all documents till the course duration is over. For the accreditation of an institution, it has to preserve all the papers for checking their quality in a place.

The current system for a course file management is entirely paper based and completely manual. These paper-based files are maintained manually which presents a variety of disadvantages that include physical storage, retrieval issues, management of papers and recurring paper and printing costs. Moreover, the extensive paper uses required to maintain cost, storage cost and complex system for further checking for the accreditation.

It is interesting to explore that the storage space and cost for a course file in terms of money and man-hours. The size of the course file that is presently used to maintain one paper-based course file is 9cm x 29cm x 32cm (8352 cubic cm) and it may contain between 200-300 pages. According to our estimate a medium range university which passed minimum four years in a varsity and offers 500 courses per academic year would require a storage space of approximately 15 cubic meters. This space would be required to house 18 files cabinets. In addition, roughly around 30,00,000 BDT would be needed to cover the paper & printing cost of 500 courses files. The estimated number of man-hours spent to prepare paper-based courses files will be around 1000. For the accreditation and assessment purposes of an undergrad degree program, the institutions generally maintain a complete record of all course files for a period of four years. Therefore, maintaining the course files of the entire program for a period of four years becomes a challenging task (see Appendix A).

The proposed project intends to reduce the space and working hours. The accreditation process system will be lot easier as the whole course files are in one place. There is no digital archiving system as such and the current file system is complex. The motivation for accreditation process will be better as the whole course file is maintained digitally in one place.

2.2 Related Works

Our work with the plan of Course Tracking Management System in the cloud doesn't meet any kind of similar workings right now. Mainly in our country, there is none of mentioned system or application for generalizing the course files management & preserving them in a secure cloud storage for future purpose.

Our work is attempting to create a web application, which provides fast, easy to use interface for documents publication and management. The main target of the work is to create platform independent Web Application to manage and distribute electronic documents just using Web browser. The point is to create application that do not need printable copies of documents.

However we find some sort of work like student portal, course enrollment & registration system for a semester in online for the students. For example for the student of Daffodil International University there is a web management system for seeing the live result, registered courses & payment ledger of the enrolled courses. This is called “DIU Student Portal” [4]. The course teacher have another system for uploading marks, attendance etc. [5] For the North South University there is also a web system for the students called rds3 or Portal for the Student [6]. There are also another services for the teachers. [7] For most of the cases most of the university or educational institution uses third party system like Google Classroom or social media, mailing system for sharing the content of the courses.

As per the discussion & in the time of writing this project report, we do not have witness any type of solution or system application that meets our problems & requirements in our country. But there are some solution for the eLearning course management system in other country or organization like Udemy [8], Udacity [9]. These are not our focusing area of Course Tracking Management System or course file management system for an Institute for accreditation, as they are only for the online course education system.

There are some universities like Cornell University, NY [10]; University of Tabuk, Saudi Arabia [11]; Howard University, Washington [12] etc. uses Learning Management System (LMS) [13] or Course Management System (CMS) [14] for having a record of the courses for future further checking & accreditation. But we find the complexness & hardly user satisfactory to using the tools for the Course Management. Most of them are at research level, Most of them are not user friendly, most of them just haven’t the full requirements for our country and others are only using for themselves.

2.3 Comparative Studies

Comparative studies means doing examine between one or more developed/ existing system with the self-project/ developed system. Here one can find the similarities & differences between the exiting project /system or educational tools [15] with the new one.

This method is carrying the most important part of our project which helps us finding the uniqueness, proper solution of the current system. We do case study with other exiting system to find out the similarities & our uniqueness. Here is some case study which can show the comparative studies as well.

- Case Study 1: Google Classroom [16]: Google classroom is one of the most commonly used & popular for course file management & eLearning system. But the goal or objectives of the classroom haven’t any scope of assessments or other stuffs. This system is very much efficient for learning & sharing. But there is no organizer or maintenance or some other vital features for accreditation or preservation of an entire course files.
- Case Study 2: Course File Management System: Computer Science Department, University of Tabuk, Tabuk 71491, Saudia Arabia[17]. The team shows how they find solution for the CMS (Course Management System). Though they also worked with

file management system but their work isn’t for the entire department/ school or whole university system. What their system does is System, file & accreditation committee management. There is no assessment part, no preservation of entire result of an individual section. They just skip the complex part of it. But our system does have a view of section, moderator, and user management.

- Case Study 3: CMS[18]: Chaoyun Peng,Jie Ren,Jianping Zhang, Developed a General-Purpose Online Course Platform, Based-on Asp.Net. There are many kinds of Online Courses platform, like Webct, Blackboard, MoodIe and so on, and have a very fast speed of development. But some people begin to find they couldn't bear the platform that frequent upgrades and feature updates. Perhaps no other innovation in higher education has resulted in such rapid and widespread use as the CMS. But the process of CMS is quite different with our motivation. What they are trying to do is a simple online instruction with file management. But we have to organize in a better and smart way for many things.
- Case Study 4: AssessTrack by Harry N. Keeling, Ph.D., Howard University, Washington[19]. AssessTrack, a web-based learning management system (LMS) that Assesses and Tracks key elements of engineering education. In this they have introduce the tutoring, self study report based on tags that are used while uploading course. But they only do this with the behavior of students & the courses not with the outcomes. Though it is a great initiative but our need is pretty much specific. We need proper assessment with files to validate the process.

2.4 Scope of the Problem

Now days, course files are maintaining manually and in an university or an institute have to manage the course file such like assessments, lectures, quizzes, lab reports, assignment etc. have to preserve till the semester end and course files examination book etc. have to preserve at least two to four years for the accreditation. E learning and e Course file management system are now great initiative both for students and teachers. For the solution of the file management many universities working to solve the problem, but none can come to the perfect solution where the assessment preservation, course file preservation, course intend learning outcome, 360degree education platform both for teachers and students and multi user preference, feedback and learning outcome for quality assurance etc. couldn’t meet. After finding these problems we come up a better solution. So, the problems we have met earlier our solution is the scope of the problem. The scopes for the proposed system “Course Tracking Management System” are:

- Uniqueness: Right now some existing solution in the time of writing this paper, no other solution are working with the mentioned problem. So, no doubt that our proposed system is unique.
- Universal: Our system is fully responsive and created dynamically so that every organization and institute can have their own e-Course File Management System or portal. Every user such as teacher, moderator, department head, administration and

student can access the system with internet in any kind of device support browsing capability from anywhere.

- Economize Time, Place and Money: Current existing manual system costs many time and money for the searching pf a course file while accreditation or re-checking, staffs and places for the preservation of the course files. With our proposed system none of these are even matter. With our digital solution every course file and assessment preserve in the cloud storage. So, it is time saving, place saving and money.
- Easier Process: Our proposed system helps automate the accreditation process easier. As a part of any campus sustainability programs, one should focus on improving energy efficiency, conserving resources and enhancing environmental quality by using Information Technology.
- Our Exceptional and Dynamic Solution: Our developed system have features of collaboration, share and give feedback on course file will lead to gradual improvement of syllabus, teaching learning activity and ultimately intended learning outcome.

2.5 Challenges

For a system which doesn’t exist at all there are so much challenges and complexities to work on. For a development project there are challenges for solving the real-life problem with proper solution designing the requirements, system development and making the application usable for a user there are challenges. While we are developing the system we have faced some challenges and for future scope there are some challenges and also there are challenges for maintaining the system. The challenges we have facing so far:

- Professionalism: We have some lack of professional experience so, our work doesn’t meet 100% satisfaction but our work meets the A grade solutionism.
- Technologist Stacks: Since we are developing a system which is dynamic and light weight we are using different types of technologist stacks. We are using Django, Vue, Nuxt. Mem Cached, PostgreSQL etc. This are the primary technology of our system but as this are quite often used in our technology sometimes it is difficult for us to work with this kind of technology.
- Poor Workstation: Running server continuously & developing the system consume too much hardware process. With our limited small resources, we have to straggle.
- Server Deployment: As our system is different from most of the used environment we have to setup a Virtual Private Server (VPS) with some technology for the deployment of our system. The management & some setup process are complex & this one of the most challenge for our system.

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling

Our Business Process Modeling is easy. We have user, our system & database for storing data or archiving data.

Here is our business process model:

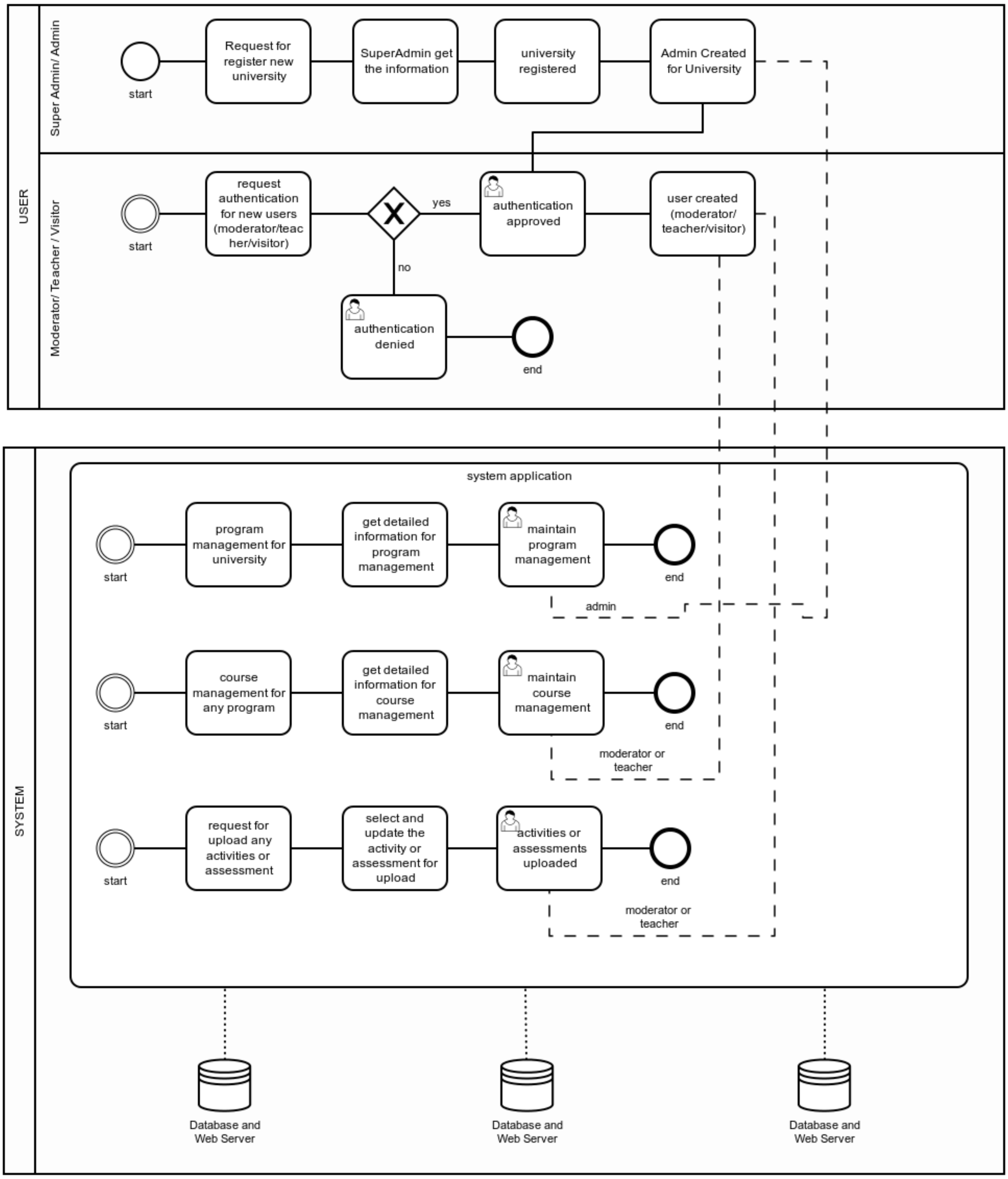
USER
Super Admin/ Admin
start
Request for register new university
SuperAdmin get the information
university registered
Admin Created for University
Moderator/ Teacher / Visitor
start
request authentication for new users (moderator/teacher/visitor)
yes
no
authentication approved
user created (moderator/ teacher/visitor)
authentication denied
end
SYSTEM
system application
start
program management for university
get detailed information for program management
maintain program management
end
admin
start
course management for any program
get detailed information for course management
maintain course management
end
moderator or teacher
start
request for upload any activities or assessment
select and update the activity or assessment for upload
activities or assessments uploaded
end
moderator or teacher
Database and Web Server
Database and Web Server
Database and Web Server

Figure 3.1 Business Process Modeling

3.2 Requirement Collection and Analysis

3.2.1 System Description

The architecture of the system is built in a way that the faculty can easily upload contents in an organized manner. Besides, manages and upload course files, exam papers of every courses and other academic activities.

The proposed system will govern processes based on specific term and semester with taught courses. The system will provide upload of contents such as PDF, videos and other resources categorized by lectures or teaching sessions. The system will provide also creation of assessment section for uploading of questionnaire and also standard solutions to the given problems or assignments. The system will also provide upload of assessment marks for each student in the assessment section.

In the proposed system, along with the faculty members, a course moderator will be given responsibility for the management of a course in the running semester. Moderator will be able to view all the contents of the course assigned. Moderator will also be able to see and evaluate these course contents.

Other academic members of educational institute will also be able to view the activities of any programs along with courses. These contents and courses will be available in an organized way that is categorized by term and courses. These contents can be accessed from anywhere by anyone with proper authentication. If one selects Semester, then select a course and all the course contents will be visible to that user. The user can be anyone including members from accreditation team.

3.2.2 User Requirement Specification

Our proposed system will be available to different types of users such as student, teacher, moderator and admin. The system will provide different features based on different types of users with different permissions, accessibility and different actions on the platform. There will be a registration form for enrolment of an institute as well. Teacher/ Faculty member will have the privileges to enrol students. The full system workflow of different users is described below:

a. **Admin User**

- Admin user add new program in the system. The admin user views all the programs and able to update and delete them as necessary.
    - Admin can edit program profile such as add a syllabus as Text Format.
    - Admin can add Program Outcome to each program.
- Admin add Course to the system (e.g. Data Mining, Machine Learning). Admin provide course code, credit and which program that course belongs to. They can also update and delete any course anytime. The upload function will be also provided for the bulk.
- Admin create new Course Offer (e.g. Machine Learning - Summer 2018). A course offer is a course that is offered to the students in each semester. Admin is able to update and delete any course offer. The upload function will be also provided for the bulk.
- Admin add moderators to a specific course offer among the teachers in the system. The upload function will be also provided for the bulk.

- Admin add new users or block specific user in the system. (Admin, Teacher, Head, Visitor). The upload function will be also provided for the bulk.
- Admin update own profile. (Update profile Avatar, Name, Password etc).
- Admin manage permissions of access of different user level (Teacher, Head, Moderator, Visitor) in the system.

b. Teacher User

Teachers see all the available sections of all the course offer in specific semester they are assigned to. They can view individual sections to manage and update more details.

- Teacher view Course information such as - Course Description, Syllabus and Textbook Reference.
- Teacher view Course Intended Learning Outcome (CILO) [20] added by the moderators and admins.
- Teachers view Lesson Delivery Plan created by the moderators and admins. Teacher can keep updating the moderators about their progress of the course by ticking lesson delivery plan that has been completed.
- Teacher view the content in each lesson that has been uploaded by the moderators.
- Teacher submit any improvement issue that may be reviewed by the moderators.
- Teacher submit lesson progress and feedback on lesson plan with improvement issue that may be reviewed by the moderators.
- Teachers add assessment to their sections. They can update and delete any specific assessment. Quiz, Class Test, Assignments, Presentation Mid Term, Final Term all falls under the assessment block of the system.
    - Teacher upload assessment questions and answers.
    - Teacher upload attendance record for the assessment.
    - Teacher upload student Marks record.
    - Teacher upload Best, Average and Worst scripts of that assessment.
    - Teacher select among the Course Intended Learning Outcome (CILO) that the assessment covers.

c. Moderator User

Moderators are actually teachers in the system. They are assigned to a specific course offer by the admins or other moderators which allows them some special actions to that specific course offer that teachers do not have.

- Moderator view all the course offer that admin has add them to. Moderator cannot add new course offer or update, delete any course offer.

    - Moderator add more moderators to a specific course offer among the teachers in the system.
    - Moderator update Course Information such as - Course Description, Syllabus and Textbook Reference.
    - Moderator add or remove Course Intended Learning Outcome (CILO).
    - Moderator design Assessment Rubrics for each specific course offer.
    - Moderator create Lesson Deliver Plan. Lesson delivery plan will be divided into sections and lessons (e.g. Week 1 - Introduction to Machine Learning, Machine Learning Algorithms) that makes this block of the system more interactive.
    - Moderator upload content to lessons in the Lesson Delivery Plan.
    - Moderator create multiple sections under specific course offer and assign teacher to that section.
    - Moderator design Feedback Question for each specific course offer.
- Moderators are also teachers. All the sections in all courses offer they are assigned to will be available to view in on single page. From there they can access individual sections for further actions same as Teachers.

d. Visitor/ Head User

Head is in the charge of a department. Head or visitor is assigned to a program by the admin. This user has access in every part of their program inside the system. But only have read access to their program. The user views any content, user, files, to their respective program. Here the visitor plays a role, when re-checking the system, quality, assessment or in the time of accreditation.

- View all the programs in his program.
    - Can view program profile such as add a syllabus as Text Format.
    - Can view Program Outcome to each program.
- User can view Course along with course code, credit of their program.

- Visitor/ Head can view all the Course Offers (e.g. Machine Learning - summer 2018) in their program. A course offer is a course that is offered to the students in each semester.
    - View all moderators to a specific course offer.
    - View Course Information such as - Course Description, Syllabus and Textbook Reference.
    - View Course Intended Learning Outcome (CILO).
    - View Assessment Rubrics for each specific course offer.

- View Lesson Deliver Plan.
- View content to lessons in the Lesson Delivery Plan.
- Head/ visitor view multiple sections under specific course offer and assigned teacher to that section.
- Visitor/ Head visit each section under each course offer.
    - View Improvement Issues.
    - Monitor Lesson Delivery progress for each section.
    - View different assessment modules (Questions, Answers, Scripts, Marks etc) for every assessment inside each section.
    - View Feedback Question for each specific course offer.

3.3 Use Case Modeling and Description

The following use case diagrams provide representation of the various functionalities the system needs to support.

At first let's start with the Admin user based on its user requirement specification:

Use Case 1: Admin

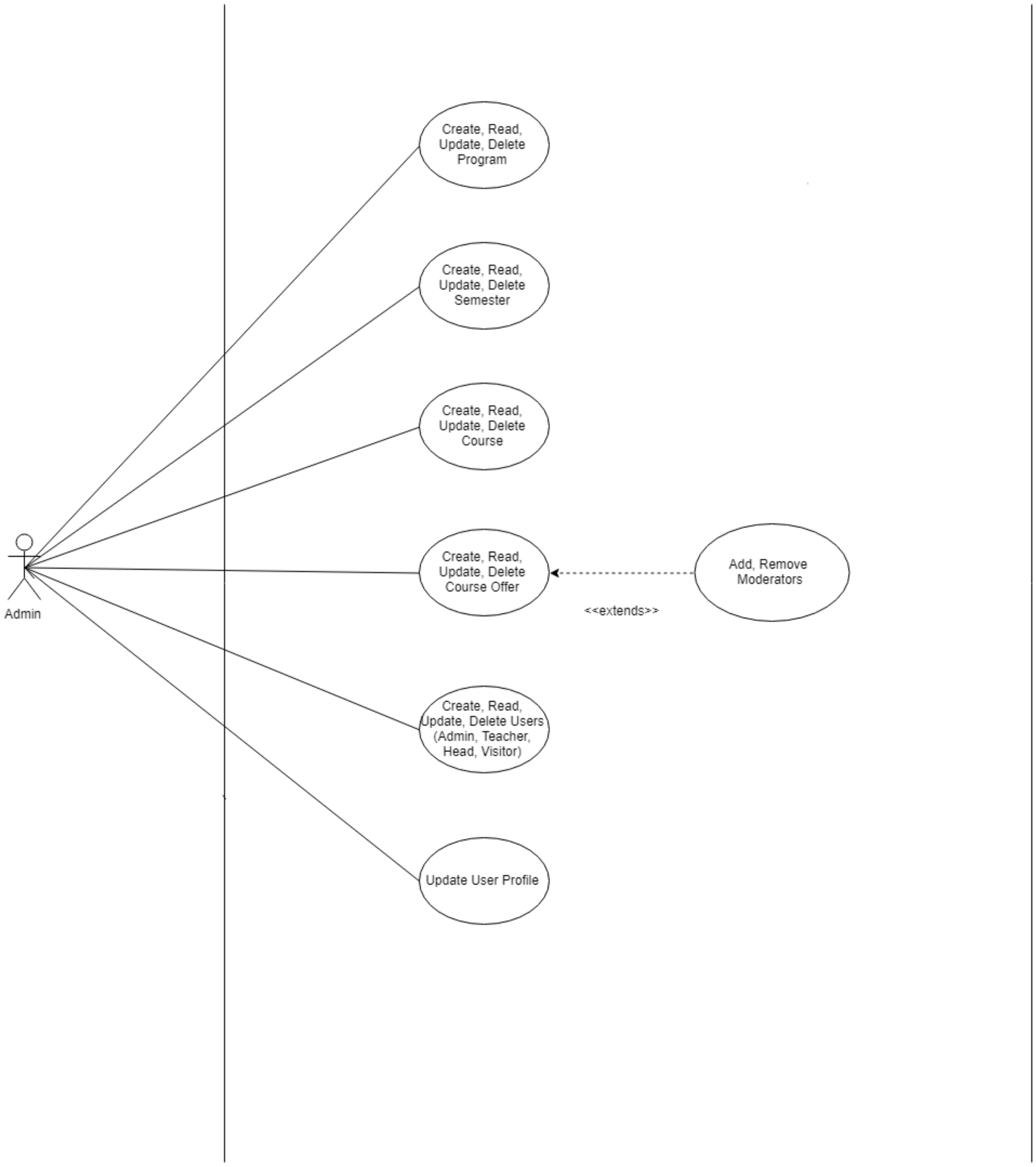
Create, Read, Update, Delete Program
Create, Read, Update, Delete Semester
Create, Read, Update, Delete Course
Create, Read, Update, Delete Course Offer
Add, Remove Moderators
<<extends>>
Admin
Create, Read, Update, Delete Users (Admin, Teacher, Head, Visitor)
Update User Profile

Figure 3.3.1 Use Case Diagram- Admin

Use Case Description: Admin

Use Case Name	Create Program
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Admin clicks on “Program” on the sidebar. a. Admin is presented with a form to create Program. 2. Admin writes program name on the input field. 3. Admin clicks “Create” button.
Exit Conditions	A new program is created.
Alternate flow	1. a. Login: Username and password does not match. Please re-enter. 2. Create Program: Fill up the required input field, this field cannot be empty.

Use Case Name	Edit Program
Actor	Admin
Pre-Condition	Login, select a program to edit.
Flow of Events	1. Admin clicks on edit icon on the desired program. a. Program creation form is updated with desired program details. 2. Admin changes program name as required. 3. Admin clicks “Update” button to save or “Cancel” button to revoke.
Exit Conditions	Desired program is changed or remain same.
Alternate flow	1. Enter a valid Program name, This field cannot be empty.

Use Case Name	View/ Read Program
Actor	Admin

Pre-Condition	Login, select a program to view.
Flow of Events	1. Admin clicks on "Program Name" or "Open the Program" button on the desired program. a. Program details is popped up with desired program details. 2. Admin clicks "Edit" button to edit the details, "Update" button to save or update and clicks "Cancel" button to remain as it is.
Exit Conditions	Desired program is viewed.
Alternate flow	N/A

Use Case Name	Delete Program
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a program to delete. 2. Admin clicks on delete icon on the desired program. a. A confirmation popup show up to confirm if admin wants to delete the program. 3. Admin clicks "Confirm & Delete" button to delete the Program or "Cancel" button to revoke.
Exit Conditions	Desired program is deleted if "Confirm & Delete" is hit otherwise remain same.
Alternate flow	1. Select a Program name to delete.

Use Case Name	Create Semester
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Admin clicks on "Semester" on the sidebar. a. Admin is presented with a form to create a Semester. 2. Admin writes in the input field named "semester name". 3. Admin clicks "Create" button.

Exit Conditions	A new Semester is created.
Alternate flow	1. Please fill the required Input field with valid name, This field cannot be empty.

Use Case Name	View Semester
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a semester to view. 2. Admin clicks on “Semester Name” or “Open the Semester” button on the desired Semester. a. Semester details is popped up with desired Semester details. 2. Admin clicks “Edit” button to edit the details, “Update” button to save or update and clicks “Cancel” button to remain as it is.
Exit Conditions	Desired Semester is viewed.
Alternate flow	N/A

Use Case Name	Edit Semester
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Navigate to Semester & select a Semester to edit. 2. Admin clicks on edit icon on the desired Semester. a. ‘Semester details form/ card’ is popped up with desired Semester details. 3. Admin changes Semester name/ details as required. 4. Admin clicks “Update” button to save or “Cancel” button to revoke.
Exit Conditions	Desired Semester is changed or remain the same.
Alternate flow	N/A

Use Case Name	Delete Semester
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a Semester to delete. 2. Admin clicks on delete icon on the desired Semester. a. A confirmation popup show up to confirm if admin wants to delete the Semester. 2. Admin clicks "Confirm & Delete" button to delete the Semester or "Cancel" button to revoke.
Exit Conditions	Desired Semester is deleted if "Confirm & Delete" is hit otherwise remain same.
Alternate flow	1. Select a Semester to delete.

Use Case Name	Create Course
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Navigate to the Course section. 2. Admin clicks on "Course" on the sidebar. a. Admin is presented with a form to create Course. 3. Admin writes Course name on the input field. 4. Admin writes Course Code & Credit in those fields as well. 5. Admin clicks "Create" button.
Exit Conditions	A new Course is created.
Alternate flow	1. Fill the required field, this field cannot be empty. 2. Please input valid character

Use Case Name	View Course

Actor	Admin
Pre-Condition	Login
Flow of Events	1. Navigate to the Course section, select a Course to view. 2. Admin clicks on “Course Name” or “Open the Course” button on the desired Course. a. Course details is popped up with desired Course details. 3. Admin clicks “Edit” button to edit the details, “Update” button to save or update and clicks “Cancel” button to remain as it is.
Exit Conditions	Desired Course is viewed.
Alternate flow	N/A

Use Case Name	Edit Course
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a Course to edit. 2. Admin clicks on edit icon on the desired Course. a. Course creation form is updated with desired Course details. 3. Admin changes Course name as required. 4. Filled up with the Course Information, CILO & Books fields. 5. Admin clicks “Update” button to save or “Cancel” button to revoke.
Exit Conditions	Desired Course is changed or remain same.
Alternate flow	1. No changes Saved 2. Please input valid name, this field cannot be empty. 3. Please fill the required field in the from

Use Case Name	Delete Course
Actor	Admin

Pre-Condition	Login
Flow of Events	1. Navigate to the Course Section & select a Course to delete. 2. Admin clicks on delete icon on the desired Course. a. A confirmation popup show up to confirm if admin wants to delete the Course. 3. Admin clicks “Confirm & Delete” button to delete the Course or “Cancel” button to revoke.
Exit Conditions	Desired Course is deleted if “Confirm & Delete” is hit otherwise remain same.
Alternate flow	1. Please select a course to Delete.

Use Case Name	Create Course Offer
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Navigate to Course Offer 2. Admin clicks on “Course Offer” on the sidebar. a. Admin is presented with a form to create a Course Offer. 3. Admin choose Course Offer name from dropdown box. 4. Admin choose Semester from next dropdown box. 5. Admin clicks “Create” button.
Exit Conditions	A new Course Offer is created.
Alternate flow	1. This field cannot be empty. 2. Please enter valid character

Use Case Name	View Course Offer
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a Course Offer to view. 2. Admin clicks on “Course Offer” button on the desired Course

	Offer. a. Course Offer details is popped up with desired Course Offer details. 3. Admin clicks “Edit” button to edit the details, “Update” button to save or update and clicks “Cancel” button to remain as it is.
Exit Conditions	Desired Course Offer is viewed.
Alternate flow	1. Please select a Course to view.

Use Case Name	Edit Course Offer
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a Course Offer to edit 2. Admin clicks on edit icon on the desired Course Offer. a. Course Offer creation form is updated with desired Course Offer details. 3. Admin changes the semester or course name if needed/ required. 4. Admin clicks “Update” button to save or “Cancel” button to revoke.
Exit Conditions	Desired Course Offer is changed or remain same.
Alternate flow	1. Please select a Course Offer. 2. This field cannot be empty. 3. Please enter a valid character.

Use Case Name	Delete Course Offer
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Select a Course Offer to delete. 2. Admin clicks on delete icon on the desired Course Offer, with the cross button icon to delete.

	a. A confirmation popup show up to confirm if admin wants to delete the Course Offer. 3. Admin clicks "Confirm & Delete" button to delete Course Offer or "Cancel" button to revoke.
Exit Conditions	Desired Course Offer is deleted if "Confirm & Delete" is hit otherwise remain same.
Alternate flow	1. Please select a Course offer to Delete.

Use Case Name	Add Moderator
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Navigate to Course Offer. 2. Admin clicks on Course Offer from the Navigation Menu. 3. Admin Selects a Course Offer from the list. 4. Admin Navigate to Sections to add a Moderator. a. In the Teacher Box Admin input the desired Moderator name, The Teacher Name is shown up. Admin select the Teacher and Click the ADD button to add the Moderator of a Course.
Exit Conditions	Moderator is added to a specified Course Offer.
Alternate flow	1. Please select a course offer 2. Please select a Section 3. There is no match with this Moderator keyword.

Use Case Name	Delete/ Remove Moderator
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Navigate to Course Offer. 2. Admin clicks on Course Offer from the Navigation Menu. 3. Admin Selects a Course from Course Offer from the list. 4. Admin Navigate to Sections to remove a Moderator.

	a. In the Teacher Box Admin go to Manage Couse Moderation section. b. From the box, select a Teacher whom to remove, click the cross/ Delete button to remove the Moderator.
Exit Conditions	Moderator is Deleted/ Removed from a specified Course Offer.
Alternate flow	1. Please select a course offer 2. Please select a Section 3. Sorry! There is no match in Teachers with this keyword.

Use Case Name	Create User
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Admin clicks on "Users" on the sidebar. a. Admin is presented with a dropdown menu to choose from two different option: "Admins" & "Teachers". b. Admin clicks "Admin" or "Teachers" section from the dropdown menu. 2. Admin give the user name (in Teacher/ Admin section) on the input field. 3. Admin selects the permission from the check box in the Permission section for a Teacher/ Admin to specify them. 4. Admin clicks "Create & Save" button.
Exit Conditions	A new Admin/ Teacher is created for a Program or Varsity.
Alternate flow	1. Please select an option from dropdown 2. This input field cannot be empty.

Use Case Name	Remove User
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Admin clicks on "Users" on the sidebar. a. Admin is presented with a dropdown menu to choose

	from two different option: “Admins” & “Teachers”. b. Admin clicks “Admin” or “Teachers” section from the dropdown menu. 2. Admin give the user name (in Teacher/ Admin section) on the Search Box to find the desire user, and select a user. 3. Admin click the cross icon which is Delete/ Remove button to remove the user. 4. Admin clicks “Delete & Save” button.
Exit Conditions	A new Admin/ Teacher is Removed for a Program or Varsity.
Alternate flow	1. Please select an option from dropdown 2. Please select a user name to Remove.

Use Case Name	Update User Profile
Actor	Admin
Pre-Condition	Login
Flow of Events	1. Admin clicks on “Users” on the sidebar. a. Admin is presented with a dropdown menu to choose from two different option: “Admins” & “Teachers”. b. Admin clicks “Admin” or “Teachers” section from the dropdown menu. 2. Admin give the user name (in Teacher/ Admin section) on the Search Box to find the desire user, and select a user. 3. Admin click the edit icon which is to edit & update button to update the selected user. 4. Admin gives desire input to change for a user role or permission. 4. Admin clicks “Update & Save” button.
Exit Conditions	A new Admin/ Teacher is Updated for a Program or Varsity.
Alternate flow	1. Please select a course offer 2. Please select a Section 3. Sorry! There is no match with this keyword.

Use Case 2: Teacher

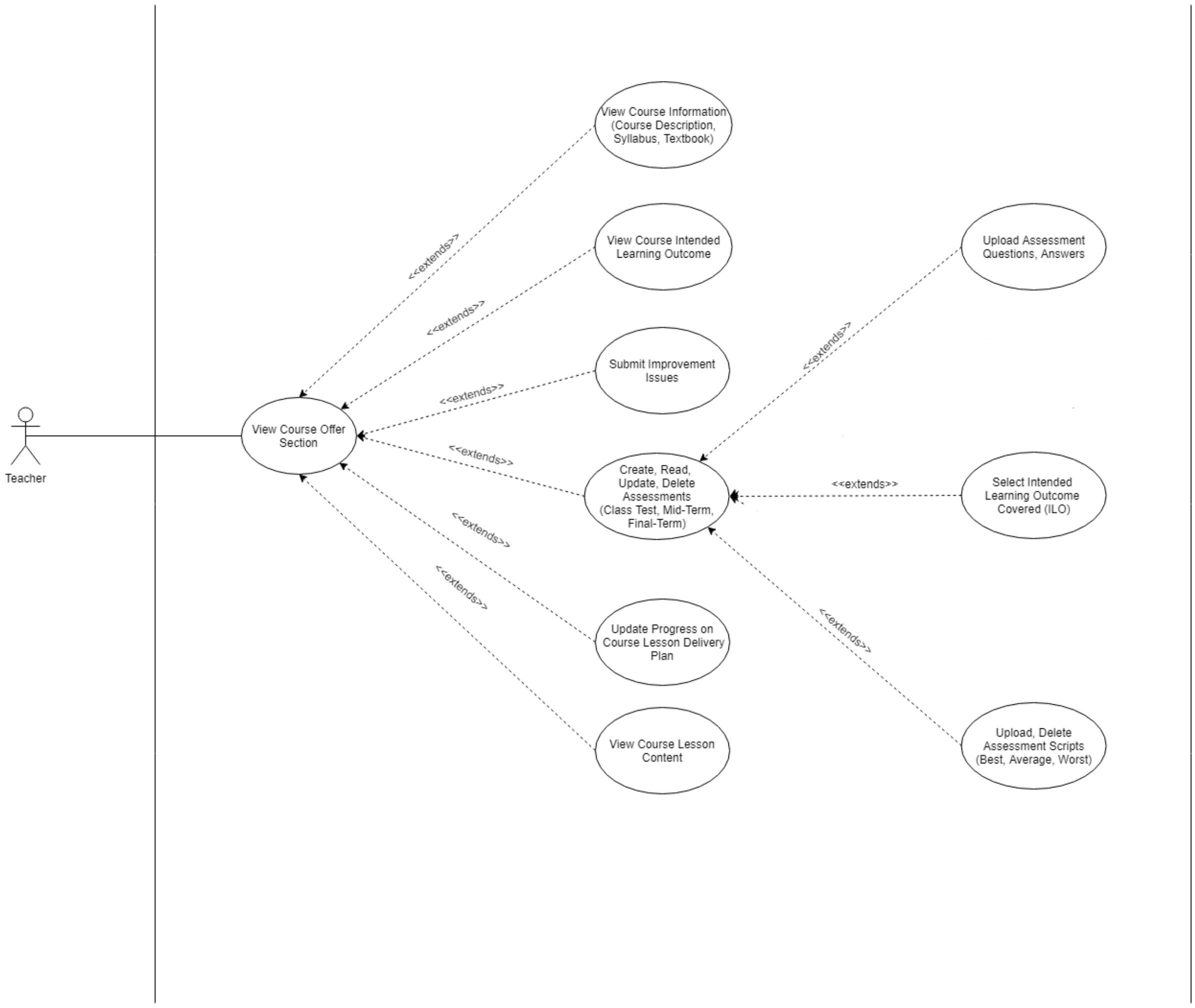
Teacher
View Course Offer Section
View Course Information (Course Description, Syllabus, Textbook)
View Course Intended Learning Outcome
Submit Improvement Issues
Create, Read, Update, Delete Assessments (Class Test, Mid-Term, Final-Term)
Update Progress on Course Lesson Delivery Plan
View Course Lesson Content
Upload Assessment Questions, Answers
Select Intended Learning Outcome Covered (ILO)
Upload, Delete Assessment Scripts (Best, Average, Worst)
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Figure 1.3.2 Use Case Diagram- Teacher

Use Case Description: Teacher

Use Case Name	View Course Offer Section
Actor	Teacher
Pre-Condition	Login
Flow of Events	1. After logged in, Teacher can see the list of course offer sections they are assigned to. (e.g. Machine Learning – Summer 2018, Section: D)
Exit Conditions	Viewing the list of all course offer sections.
Alternate flow	N/A

Use Case Name	View Course Information
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Information” Tab. (By default) 3. View Course Description. 4. View Course Syllabus. 5. View Textbook Reference.
Exit Conditions	Viewing course information.
Alternate flow	1. Please select a Course Offer Section.

Use Case Name	View Course Intended Learning Outcome
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Information” Tab. (By default) 3. View the list of Intended Learning Outcome related to the Course.
Exit Conditions	Viewing Course Intended Learning Outcome.
Alternate flow	1. Please select a Course Offer Section.

Use Case Name	Create Assessment
Actor	Teacher
Pre-Condition	Login, View Course Offer Section

Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Assessment” Tab. 3. Click on “Add Assessment” button. a. Popup appears with Assessment creating form. 4. Write Assessment Name on the input field. 5. Write marks for the assessment in the number input field. 6. Select date for the assessment. 7. Check Course Intended Learning Outcome covered. 8. Click “Create” button.
Exit Conditions	New assessment is created.
Alternate flow	1. Please select a Course Offer Section. 2. This field cannot be empty, 3. Please fill the field with valid information. 4. The date must be have dd,mm,yyyy.

Use Case Name	Edit Assessment
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Assessment” Tab. 3. Click on “Edit Icon” on the assessment wish to edit. a. Popup appears with edit form. b. Two buttons name “Update” and “Cancel” are on the bottom. 4. Make necessary changes. 5. Click “Update” button to save or “Cancel” button to revoke.
Exit Conditions	Assessment is updated or revoked action.
Alternate flow	1. Please select a Course Offer Section. 2. No changes saved.

Use Case Name	Delete Assessment
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Assessment” Tab. 3. Click on “Delete Icon” on the assessment wish to delete. a. Popup appears for user’s confirmation. b. Two buttons name “Yes” and “No” are on the bottom. 4. Click “Yes” to delete or “No” to return.
Exit Conditions	Assessment is deleted or revoked action.
Alternate flow	1. Please select a Course Offer Section.

Use Case Name	Upload Questions and Answers
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Assessment” Tab. 3. Select specific Assessment. **Upload Questions:** 1. Click on “Upload” button. 2. Select single or multiple files to upload. **Delete Questions:** 1. Click on “Delete Icon” on the question content want to delete. a. Popup appears for user’s confirmation. b. Two buttons “Yes” and “No” are on the bottom. 2. Click “Yes” to delete or “No” to return. **Upload Answers:**

	1. Click “Upload” button. 2. Select single or multiple files to upload. **Delete Answers:** 1. Click on “Delete Icon” on the answer content want to delete. a. Popup appears for user’s confirmation. b. Two buttons “Yes” and “No” are on the bottom. 2. Click “Yes” to delete or “No” to return.
Exit Conditions	Assessment questions and answers are uploaded, deleted or revoked action.
Alternate flow	1. Please select a Course Offer Section. 2. Please select what assessment type you are about to upload. 3. No file is selected for upload. 4. File you selected is not confirmed to Delete, User cancelled.

Use Case Name	Upload and Delete Scripts
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Click on “Assessment” Tab. 3. Select specific Assessment. **Upload Scripts:** 4. Select Script Type from Dropdown (Best, Average, Worst). 5. Click on the “Upload” button on the Scripts tag. 6. Select files from the computer to upload. **Delete Scripts:** 4. Click on “Delete Icon” for the content wish to remove. a. Popup appears for user’s confirmation. b. Two buttons name “Yes” and “No” on the bottom. 5. Click “Yes” button to delete or “No” to return.

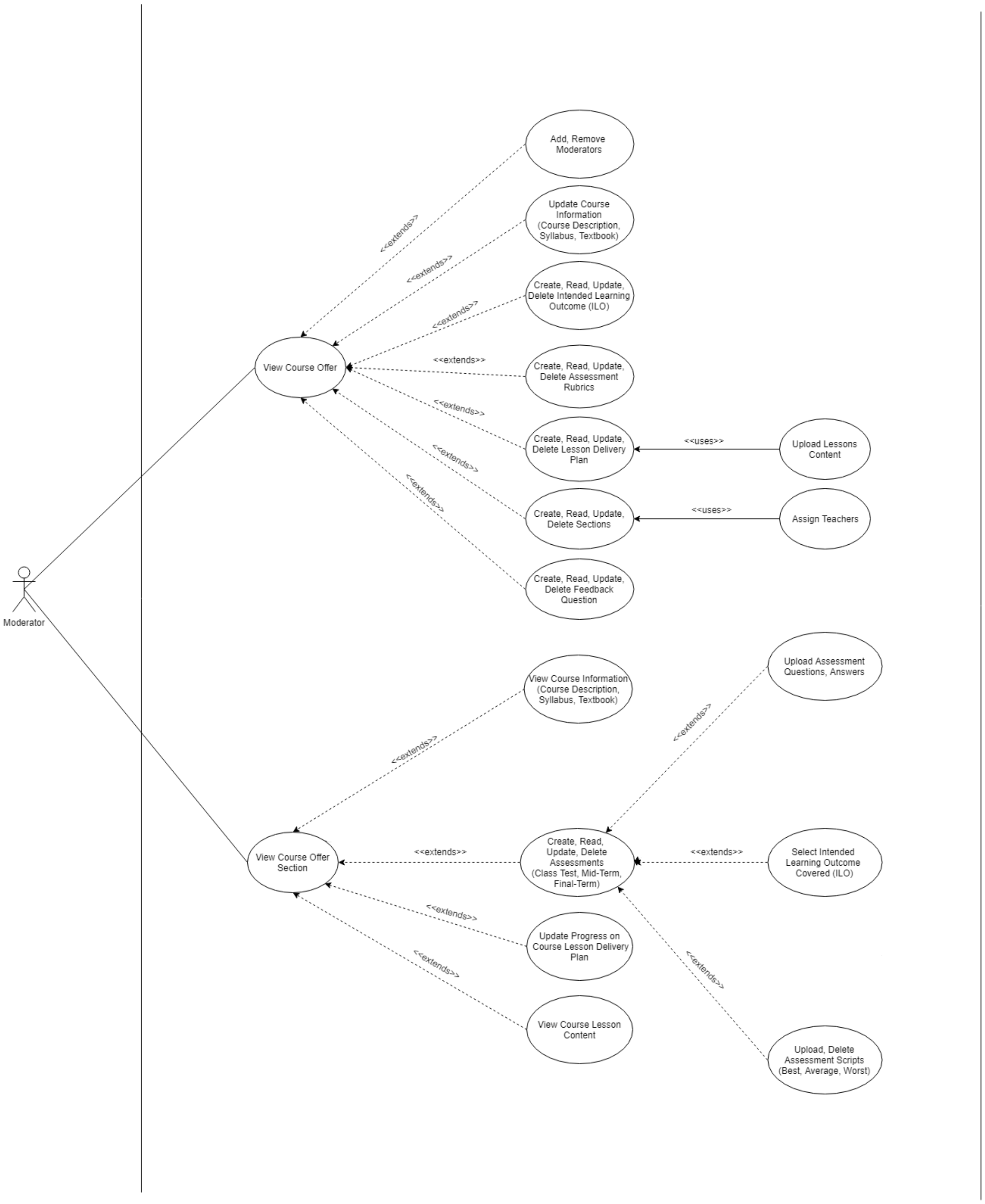
Exit Conditions	Scripts is uploaded and deleted or revoked action.
Alternate flow	1. Please select a Course Offer Section. 2. Please select a specific Assessment. 3. No file is selected for upload. 4. User didn't make change to delete the file.

Use Case Name	Update Progress on Lesson Delivery Plan
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Select "Lesson Delivery Plan" tab on the page. 3. Click a section. a. Section expands with list of lessons. 4. Check lessons that has been completed.
Exit Conditions	Lesson is marked as completed or not completed.
Alternate flow	1. Please select a Course Offer Section.

Use Case Name	View Course Lesson Content
Actor	Teacher
Pre-Condition	Login, View Course Offer Section
Flow of Events	1. Select a specific Course Offer Section. 2. Select "Lesson Delivery Plan" tab on the page. 3. Click a section. a. Section expands with list of lessons. 4. Click on a lesson. a. Popup appears with list of contents related with the lesson.
Exit Conditions	Lesson content is viewed.

Alternate flow	1. Please select a Course Offer Section. 2. Please Select a lesson.

Use Case 3: Moderator


Moderator
View Course Offer
Add, Remove Moderators
Update Course Information (Course Description, Syllabus, Textbook)
Create, Read, Update, Delete Intended Learning Outcome (ILO)
Create, Read, Update, Delete Assessment Rubrics
Create, Read, Update, Delete Lesson Delivery Plan
Create, Read, Update, Delete Sections
Create, Read, Update, Delete Feedback Question
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<<uses>>
Upload Lessons Content
Assign Teachers
View Course Offer Section
View Course Information (Course Description, Syllabus, Textbook)
Create, Read, Update, Delete Assessments (Class Test, Mid-Term, Final-Term)
Update Progress on Course Lesson Delivery Plan
View Course Lesson Content
Upload Assessment Questions, Answers
Select Intended Learning Outcome Covered (ILO)
Upload, Delete Assessment Scripts (Best, Average, Worst)

Figure 3.3.3 Use Case Diagram- Moderator

Use Case Description: Moderator

Use Case Name	View Course Offer
Actor	Moderator
Pre-Condition	Login
Flow of Events	1. Click “Moderation” on the topbar. a. View list of all the course offer the moderator is assigned to. 2. Moderator filter course offer by selecting semester from dropdown. a. View list of all course offer the moderator assigned to only for selected semester.
Exit Conditions	Viewing the list of all course offer.
Alternate flow	1. Select a semester to view course offer.

Use Case Name	Add Moderators
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Sections” Tab. 3. Type teacher name on a selectable input field. a. Suggest list of all existing teachers in the system in a dropdown. 4. Select a teacher from the suggested dropdown list. 5. Click “Add” button.
Exit Conditions	Moderator added successfully.
Alternate flow	1. Please select a course offer first. 2. This input field cannot be empty.

	3. Please select an option from the suggestion.

Use Case Name	Remove Moderators
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Sections” Tab. 3. Click “Remove Icon” on the right side of the item of moderator list wishing to remove. a. A popup box appears for user’s confirmation with “Yes” and “No” button. 4. I) Click “Yes” button to remove the moderator. 5. II) Click “No” button to revoke the action.
Exit Conditions	Remove specific moderator from the course offer or cancel the operation.
Alternate flow	1. Please select a course offer first. 2. This input field cannot be empty. 3. Please select an option from the suggestion. 4. No changes saved.

Use Case Name	Update Course Information
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Information” Tab. 3. Write course description in textarea. 4. Write course syllabus in WYSIWYG Editor. 5. Write textbook reference in a WYSIWYG Editor. 6. Click “Update” button.

Exit Conditions	Updated course information.
Alternate flow	1. Please select a course offer first. 2. This input field cannot be empty.

Use Case Name	Create Course Intended Learning Outcome (CILO)
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click "Information" Tab. 3. Write "Learning Outcome" in a input field. 4. Click "Add" button.
Exit Conditions	Course Intended Learning Outcome added.
Alternate flow	1. Please select a course offer first. 2. This input field cannot be empty.

Use Case Name	Edit Course Intended Learning Outcome
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click "Information" Tab. 3. Click "Edit Icon" on right side of the desired item from the Learning Outcome list. a. The input field of learning outcome creating form updates with the clicked item's information. 4. Make necessary changes to learning outcome. 5. Click "Update" button.
Exit Conditions	Course Intended Learning Outcome updated.

Alternate flow	N/A

Use Case Name	Remove Course Intended Learning Outcome
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Information” Tab. 3. Click “Delete Icon” on right side of the desired item from the Learning Outcome list. a. Popup appears for user’s confirmation. 4. I) Click “Yes” button to confirm delete. 4. II) Click “No” button to revoke delete.
Exit Conditions	Removed Course Intended Learning Outcome or revoked the action.
Alternate flow	N/A

Use Case Name	Create Lesson Delivery Plan
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Lesson Delivery Plan” Tab. **Create Section:** 3. Enter Section Name in the input field. (e.g. Week 1) 4. Select Starting Date for that section. 5. Select Ending Date for that section. 6. Click “Add” button. **Create Lessons Under Section:**

	3. Click on an existing section where want to add lessons. a. Section expands with list of lessons and lesson creation form. 4. Write Lesson Name in the input field. 5. Click “Add” button.
Exit Conditions	Section or Lesson added.
Alternate flow	1. Please select a course offer first. 2. This input field cannot be empty. 3. No changes saved.

Use Case Name	Edit Lesson Delivery Plan
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Lesson Delivery Plan” Tab. **Edit Section:** 3. Click “Edit Icon” on the right of the section want to edit. a. Popup appears with section edit form filled with the data from current section. b. There are “Update” and “Cancel” button. 4. Make necessary changes. 5. Click “Update” button to save or “Cancel” button to revoke. **Edit Lessons Under Section:** 3. Click on an existing section where want to edit lessons. a. Section expands with list of lessons and lesson creation form. 4. Click on “Edit Icon” on the right side of the lesson wants to edit. a. Popup appears with lesson edit form filled with current lesson name. b. There are “Update” and “Cancel” button on the bottom.

	5. Make necessary changes. 6. Click “Update” button to save or “Cancel” button to revoke.
Exit Conditions	Section or Lesson updated.
Alternate flow	N/A

Use Case Name	Upload Lesson Content
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Lesson Delivery Plan” Tab. 3. Select a section in the plan. 4. Click on the lesson where content will be uploaded. a. Popup appears with list of content uploaded. b. Upload button on the bottom. 5. Click “Upload” button. a. Opens File Manager on computer. b. Select files to upload.
Exit Conditions	Files uploaded.
Alternate flow	1. Please select a course offer. 2. Please select a section for uploading course plan. 3. Please select a file, No file is selected for uploading.

Use Case Name	Delete Lesson Content
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Lesson Delivery Plan” Tab.

	3. Select a section in the plan. 4. Click on the lesson where content will be uploaded. a. Popup appears with list of content uploaded. b. Upload button on the bottom. 5. Click “Delete Icon” on the right side of the content wish to delete. a. Popup appears for user’s confirmation. b. There are “Yes” and “No” buttons. 6. Click “Yes” to delete or “No” to return.
Exit Conditions	Content deleted or action revoked.
Alternate flow	1. Please select a course offer. 2. Please select a section for uploading course plan. 3. No changes saved.

Use Case Name	Create Sections
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Section” Tab. 3. Write Section Name in an input field. 4. Click “Create” button.
Exit Conditions	Section created.
Alternate flow	1. Please select a course offer. 2. Please select a section for uploading course plan. 3. This input field cannot be empty.

Use Case Name	Edit Sections
Actor	Moderator

Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Sections” Tab. 3. Click “Edit” button on the right side of the section wish to edit. a. Popup appears with form filled with current section name. b. Two buttons name “Update” and “Cancel” are on the bottom. 4. Click “Update” button to save or “Cancel” button to return.
Exit Conditions	Section updated or revoked action.
Alternate flow	1. Please select a course offer. 2. Please select a section for uploading course plan. 3. No changes saved.

Use Case Name	Delete Section
Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Sections” Tab. 3. Click “Delete” button on the right side of the section wish to delete. a. Popup appears for user’s confirmation. b. Two buttons name “Yes” and “No” are on the bottom. 4. Click “Yes” button to delete or “Cancel” button to return.
Exit Conditions	Section deleted or revoked action.
Alternate flow	1. Please select a course offer. 2. Please select a section for uploading course plan.

Use Case Name	Assign Teacher

Actor	Moderator
Pre-Condition	Login, View Course Offer
Flow of Events	1. Select a course offer. 2. Click “Sections” Tab. 3. Click “Assign Teacher” button on the right side of the section. a. Popup appears with selectable input form. Selectable input field is a select field with searching abilities. 4. Write teacher name on the input field. 5. Select teacher from the suggestion list in the dropdown. 6. Click “Save” button
Exit Conditions	Teacher is assigned to the section.
Alternate flow	1. Please select a course offer. 2. Please select a section for uploading course plan. 3. Please enter a valid keyword to search 4. This search couldn’t match with existing Teacher.

Use Case 4: Visitor

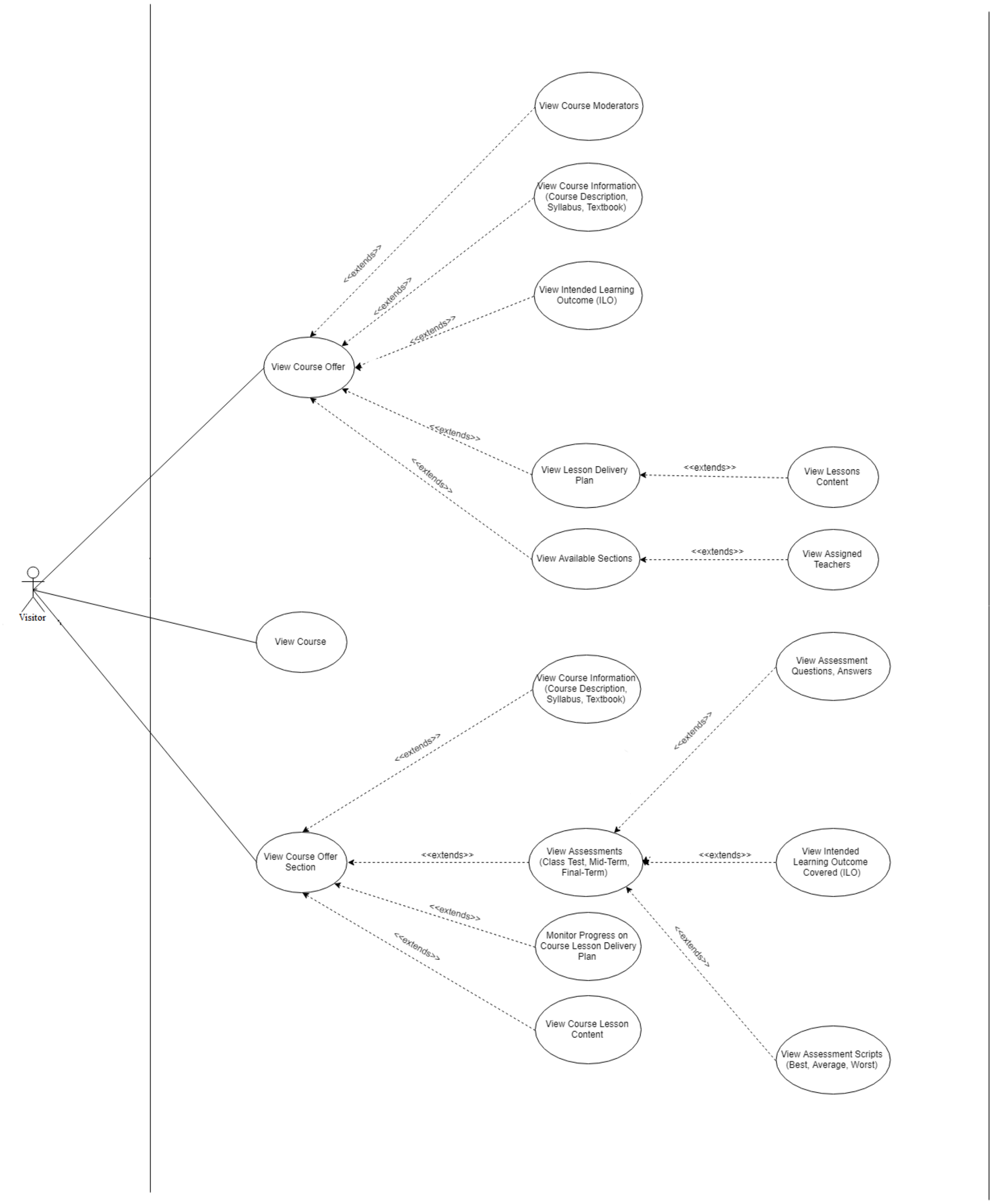

Visitor
View Course Offer
View Course Moderators
View Course Information (Course Description, Syllabus, Textbook)
View Intended Learning Outcome (ILO)
View Lesson Delivery Plan
View Lessons Content
View Available Sections
View Assigned Teachers
View Course
View Course Offer Section
View Course Information (Course Description, Syllabus, Textbook)
View Assessments (Class Test, Mid-Term, Final-Term)
View Assessment Questions, Answers
View Intended Learning Outcome Covered (ILO)
View Assessment Scripts (Best, Average, Worst)
Monitor Progress on Course Lesson Delivery Plan
View Course Lesson Content
<<extends>>

Figure 3.3.4 Use Case Diagram- Department Visitor

Use Case Description: Viewer/ Visitor

Use Case Name	View Course Offer
Actor	Visitor
Pre-Condition	Login
Flow of Events	1. Click "Moderation" on the top bar. a. View list of all the course offer the moderator is assigned to. 2. Moderator filter course offer by selecting semester from dropdown. a. View list of all course offer the moderator assigned to only for selected semester.
Exit Conditions	Viewing the list of all course offer.
Alternate flow	N/A

Use Case Name	View Course Moderators
Actor	Visitor
Pre-Condition	Login, Select a course offer
Flow of Events	1. Navigate/ Go to Course Moderator 2. Select a Course from the dropdown list. 3. View the Moderators of that particular Course.
Exit Conditions	Moderators are viewed.
Alternate flow	1. Please select a course from the list.

Use Case Name	View Course Information
Actor	Visitor
Pre-Condition	Login, Select a specific Course Offer Section

Flow of Events	1. View Course Description. 2. View Course Syllabus. 3. View Textbook Reference.
Exit Conditions	Viewing course information.
Alternate flow	N/A

Use Case Name	View Course Intended Learning Outcome
Actor	Visitor
Pre-Condition	Login, Select a specific Course Offer Section
Flow of Events	1. View the list of Intended Learning Outcome related to the Course.
Exit Conditions	Viewing Course Intended Learning Outcome.
Alternate flow	N/A

Use Case Name	View Lesson Delivery Plan
Actor	Visitor
Pre-Condition	Login, Select a course offer
Flow of Events	**1.** Navigate to Course offer from the sidebar/ side menu/ Navigation menu. **2.** Select a Course **3.** Go to Delivery Plan section.
Exit Conditions	Section or Lesson Delivery plan viewed.
Alternate flow	N/A

Use Case Name	View Lessons content

Actor	Visitor
Pre-Condition	Login, Select a course offer
Flow of Events	**1.** Navigate to Course offer from the sidebar/ side menu/ Navigation menu. **2.** Select a Course **3.** Go to Lesson section. **4.** Visitor can find the files & view them
Exit Conditions	Section or Lessons content viewed.
Alternate flow	N/A

Use Case Name	View Available Section
Actor	Visitor
Pre-Condition	Login, Select a course offer, Navigate to Course Section
Flow of Events	**1.** Navigate to Course offer from the sidebar/ side menu/ Navigation menu. **2.** Select a Course **3.** Go to desire course's section. **4.** Visitor can find available section & view them
Exit Conditions	Section content viewed.
Alternate flow	1. Please select a course offer.

Use Case Name	View Assigned Teacher
Actor	Visitor
Pre-Condition	Login, select a course offer.
Flow of Events	1. Click "View Assigned Teacher" button on the right side of the section. a. Popup appears with selectable desire file,

Exit Conditions	Visitor viewed the Assigned Teacher,
Alternate flow	N/A

Use Case Name	View Course Offer in a Section
Actor	Visitor
Pre-Condition	Login & Navigate to Course Offer Section
Flow of Events	1. View list of all the course offer is assigned to in a section. 2. Select desire Section 3. View the Course offered.
Exit Conditions	Viewing the section course offer.
Alternate flow	1. Please select a sction

Use Case Name	View Course Information
Actor	Visitor
Pre-Condition	Login, Select a specific Course Offer Section
Flow of Events	1. View Course Description. 2. View Course Syllabus. 3. View Textbook Reference.
Exit Conditions	Viewing course information.
Alternate flow	N/A

Use Case Name	View Assessment
Actor	Visitor
Pre-Condition	Login, Select a specific Course Offer Section

Flow of Events	1. Click on "Assessment" button. a. New tab/ section is opened with Assessment. 2. Visitor view Assessment Names, marks, dates, CILO on the saved fields.
Exit Conditions	Assessment is viewed.
Alternate flow	N/A

Use Case Name	View Assessment Records
Actor	Visitor
Pre-Condition	Login, Select a specific Course Offer Section, Select Assessment
Flow of Events	1. Click on "Assessment" button. a. New tab/ section is opened with Assessment. 2. Visitor view Assessment Names, marks, dates, CILO on the saved fields. 3. Select/ Click on the records, the assessment is viewed (Have to navigate Quiz, Mid, Final) 4. The Best, Average & Lower scripts is viewed upon click for view the record.
Exit Conditions	Assessment record is viewed.
Alternate flow	1. Please select an item to view

Use Case Name	View Course Lesson Content
Actor	Visitor
Pre-Condition	Login, select a course offer, select a section in Lesson Delivery Plan.
Flow of Events	1. Click on the lesson where content is uploaded by Moderators & Teachers. 2. View the files.
Exit Conditions	Viewed Course Lesson Contents.
Alternate flow	N/A

3.4 Logical Data Model

The schema showing the below figure indicates course tracking management system's logical data model.

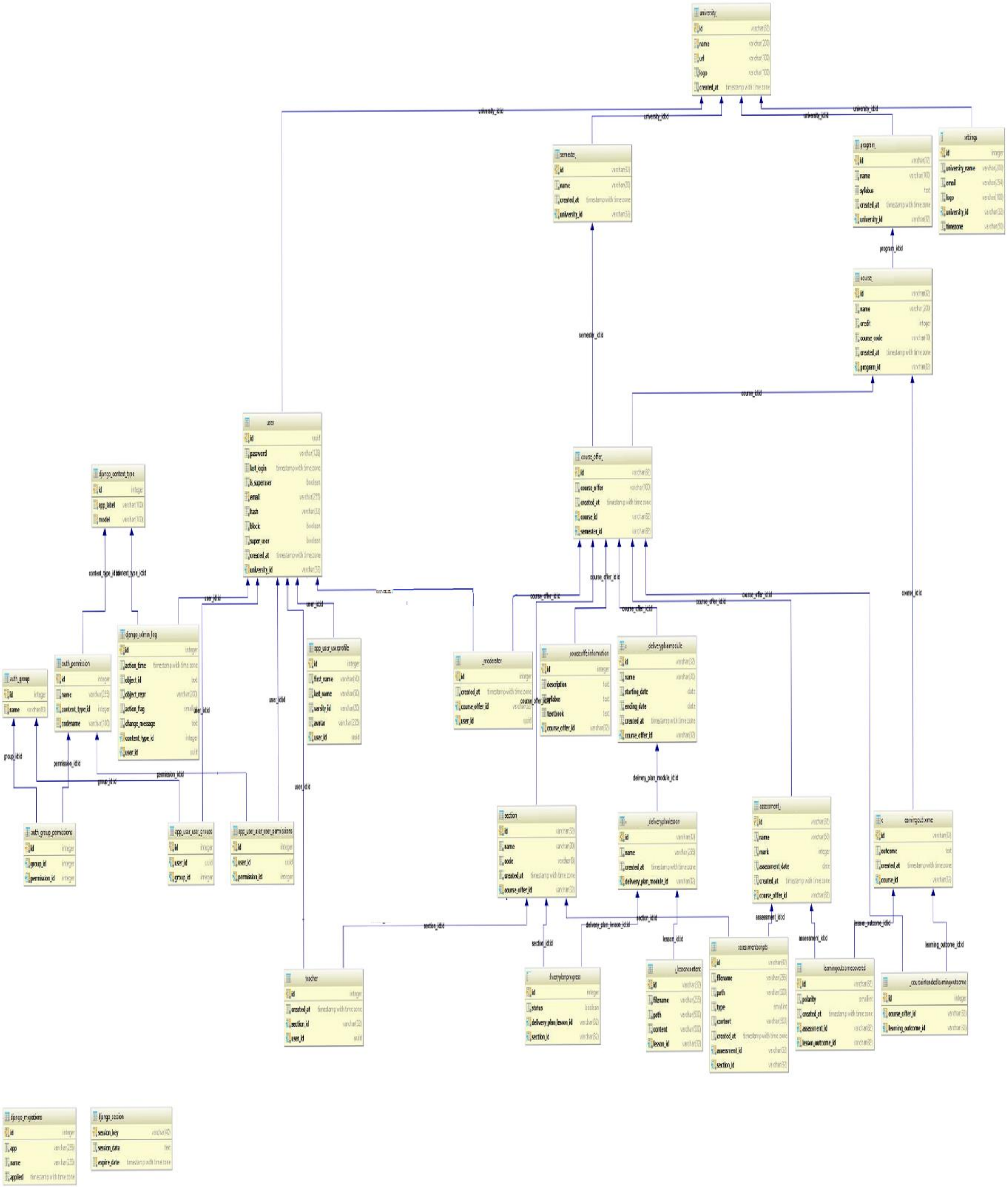


Figure 3.4.1: Schema Diagram | Logical data model

3.5 Design Requirements

Performance

The proposed system performance would be dependent on some factors. The loading time of the web system, cache files, server bandwidth, speed of the processes, good user interface & user experience should be meet the maximum performance.

Reliability

The proposed system will be reliable in terms of stability and security. The system will be hosted on cloud service in the future. This will ensure data safety from accidental loss or from low level hackings.

Security

The system would never disclose any personal information of any users and collect no personal information from its own users. The user name & password is the main privileges for login to the web platform. So, their data is encrypted in database. User of this system is responsible if they share their own login information.

Portability

Web Application, Mobile Application and Cloud Services makes the system portable to use from anywhere. User can take the whole system with them and have access to it.

Maintainability

The system is very easy to maintain because of our easy and great User Interface. The powerful backend makes the data more consistent and maintainable.

Usability

User can use this system by logging in. So, their account must be created by the end user. The user interface of the proposed system should in new design sense for better eye catch & understand. As the UI & UX will meet the performance, so usability of the system is efficient.

Multi lingual Support

There will be two different types of languages support for easy understand. The Bengali & English is supported initially.

Availability

The cloud service makes our application available online anytime from anywhere around the world. The data are available throughout the world to anyone who have access to our system. Different applications (Web, Mobile) will make our user access to the data anytime.

CHAPTER 4

Design Specification

4.1 Front-end Design

In our Course Tracking Management System we tried to have maximum level integration of User Interface, User Experience & Performance. So, we come up with a solution to have the system so much lightweight & simple front-end design for the better user experience. Our front-end design will be like as mentioned bellow with the all features:

- **Login/ Logout**

a. **Login:** The Host Server shall contain definitions for user names, passwords and access roles, e.g. Administrator role, User role for teacher, moderator, and head role. These definitions shall be local to the Host Server only and shall be inaccessible from the Client in any form. The login method shall be displayed at the user location. The login shall succeed or fail. In case of a failure, a default authentication page shall be displayed. The login shall be capable of cancellation. If cancelled the Home page shall be displayed. A login failure shall redisplay the logon method with all field blank. The password as entered shall display the character '*' in place of each password character entered.

b. **Logout:** After a successful login and the login page/ home page or dashboard page for the user is displayed, all subsequent displayed pages shall contain a logout control. When activated the logout control shall display a control asking for confirmation of logout. If confirmation id denied the logout confirmation is removed with no effect. If confirmed the Home Page is displayed and all subordinate windows are closed.

- **Dashboard**

  After login a user is presented with an interactive page which have a side menu which is a Navigation Menu with options to go another pages for those actions. The dashboard also show time, date and day with a welcome notice. User can view or edit their profile by clicking their profile/ name link.

  In Dashboard; Program, Course, Semester etc. pages can be found at navigation menu. User can navigate & find the proper page for him. The Dashboard Menu have different access pages for different roles of user. No user without such privilege won't be able to navigate or access to other pages, even they have page's web link. There are Dashboard for Super Admin, Admin, Teacher, Moderator, Visitor/ Head etc.

- **Program**

  Program page can be access from the dashboard menu. Only the users who have permission to access this page can view & interaction with it. Admin have rights to access of this features.

  In this section the user can find a list if there any previous program/s are available. User can add a program, edit & delete it. User will be given a warning when deleting an existing program. User also can cancel if they do not want to add or remove/delete the program. The Search option is quite helpful to find any desired program to find out. User can also have an option to upload a csv file having information to have the programs in listed.

- **Course**

  Course page can be access from the dashboard menu. Only the users who have permission to access this page can view & interaction with it. Admin, Moderator, Teacher have rights to access of this features.

  In this section the user can find a list if there any previous program/s are available. User can add a Course, edit & delete it. User will be given a warning when deleting an existing Course, which is already listed. User also can cancel if they do not want to add or remove/delete the Course. The Search option is quite helpful to find any desired Course. User can add detail like credit hour in this UI. User can also have an option to upload a csv file having information to have the Course in listed.

- **Semester**

  Semester page can be access from the dashboard menu. Only the users who have permission to access this page can view & interaction with it. Admin have rights to access of this features.

  In this section the user can find a list if there any previous Semester/s are available. User can add a Semester, edit & delete it. User will be given a warning when deleting an existing p Semester. User also can cancel if they do not want to add or remove/delete the Semester. The Search option is quite helpful to find any desired program to find out. User can also have an option to upload a csv file having information to have the Semester in listed.

- **Course Offer**

  From Course Offer a user can create a new course offer, can use a bulk option to upload a csv file to create course offers at a time. See the existing or previously created course offers, filter them by semester wise & also can find them by search option. Course offer can be edit, delete & view from the list. There will be pages for the list if there is lots of courses.

  For the user teacher & visitor the Course Moderation page will come up & they only have view permission to see the course & course offer.

- **User**

  There are users for the system who have different permission to access the data & system. These permissions are generated based on the type of their work criteria in a university or institution.

  The Super Admin can create & operate new or existing varsity/ institute in the system. Admin have access all the matters within in a university. Moderator can moderate a course offer. This user is actually a Teacher user having permission to this section only. Teacher can view course moderation & work with course offer. Moderator & Admin user have a great impact for the assessment section.

- **Settings**

  In settings page/ section an Admin can vies & update the information of their university info and save them. They can set the location & time zone.

- **Course Offer Delivery Plan**

  In this section user who have permission to access this page, there are lot of things to deal with. User can navigate the part of Lesson Delivery Plan under a course. Here user can add a new section with a teacher. Add, edit or delete new Module for lesson delivery plans week or monthly or user choice wise.

  User can add, edit & delete assessment. View, edit the course information from the upper information section. There is a course offer information, course syllabus section. Book name can be referred. New user named as Moderator can be add for their workings in a section.

  The course intended outcome can be save in this section. User can create them or add them.

  New lesson delivery plan module is featured with date. User can set dates when to start & when to end the plan. This section the Course Files, plans, media can be attached.

- **University**

  Super Admin have the privileges to add a University or Institute, edit them, set their location & remove them from the Data store of the system.

4.2 Back-end Design

Our application follows modern application structure which is Universal Application that enables our front-end pages and assets to be rendered on server-side. The application consists of two parts – Backend and Frontend. When a user sends request to the server, it primarily gets handled by Nginx webserver. Nginx then redirects the request to frontend Nuxt server that receives the request and find the necessary assets and components. Now, Nuxt application sends an API request to the backend application for necessary data for rendering the page. The backend application send handles the API request by fetching data from database and send it to Nuxt as a JSON response. Nuxt will finally get the data, render the page with these data and other components and send it to Nginx. In the last step, Nginx will send the page as a response to the user and the user will see his desired page.

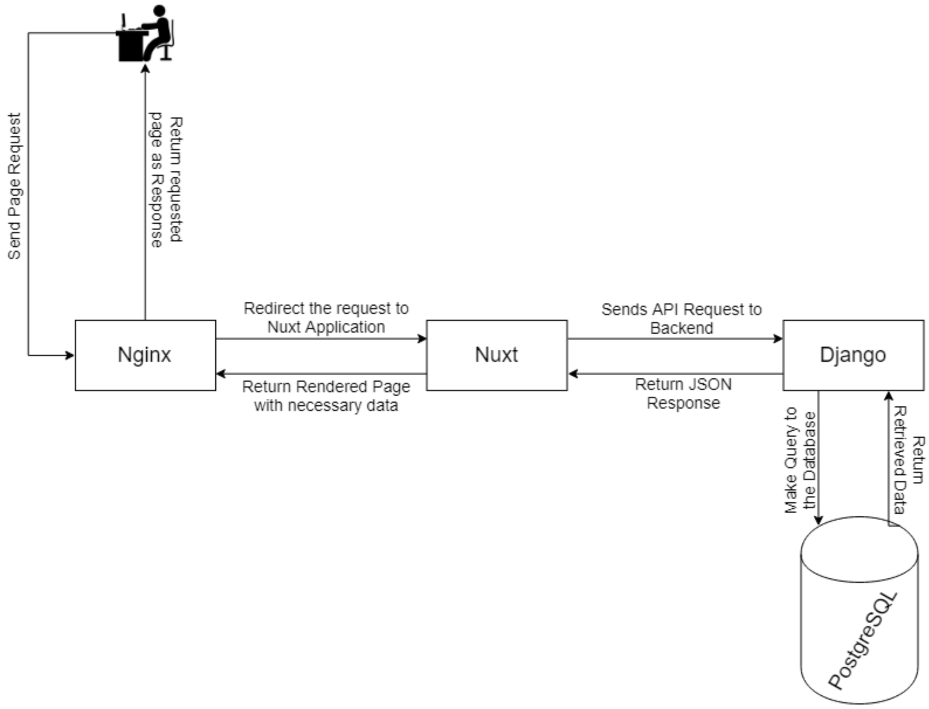

Send Page Request
Return requested page as Response
Redirect the request to Nuxt Application
Return Rendered Page with necessary data
Sends API Request to Backend
Return JSON Response
Nginx
Nuxt
Django
Make Query to the Database
Return Retrieved Data
PostgreSQL

Figure 4.2.1: Request and Response flow-diagram of the application

Nuxt

Nuxt is used as the front-end application as it is officially recommended Server-Side Rendering framework based on Vue.js. Server-side rendering increases more interaction results in better user experience and helps in Search Engine Optimization (SEO). Nuxt comes with pre-built Node server which is used to serve our front-end application. We are using Vuex (Centralized State Manager) and Axios (HTTP client to handle API Request) along with our Nuxt application.

Django

Django is a python web framework that makes building of powerful web application easy, efficient, organized and fun. We are using Django for serving our API endpoints that is responsible for handling logical part and data management with the database. Another module Django Rest Framework has been added to make the development flow easier. Django follows Model-View-Template(MTV) patterns. Views are used to handle all the logic, Models are used to work with databases and Template are the design of HTML pages that are returned to the user. As we are building API endpoints, we don't need any template for our case, just the Views and Models.

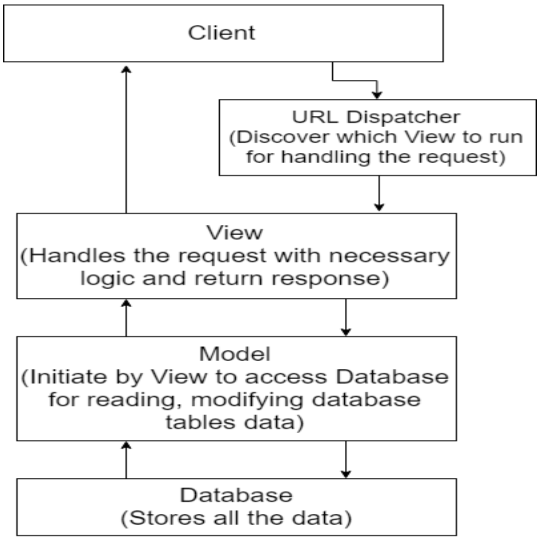

Client
URL Dispatcher
(Discover which View to run for handling the request)
View
(Handles the request with necessary logic and return response)
Model
(Initiate by View to access Database for reading, modifying database tables data)
Database
(Stores all the data)

Figure 4.2.2 Django Design Pattern

Authentication Best Practices

Primary caution has been taken to ensure that leaking of information does not harm user authentication credentials. With that in mind, we have used the best available encryption algorithm named Argon2 to encrypt user's password. Argon2 was selected as the winner of Password Hashing Competition in July 2015. Hence, we chose Argon2 over another famous and secure password encrypted algorithm Blowfish.

Universal app cannot use traditional authentication system like session storage because there are two parts of the application where front-end communicate with user and backend handles the logic to fetch and put data. Among the practices used in these scenarios, JSON Web Token (JWT) based authentication is considered the best to use. In this mechanism, front-end sends a POST request with user credentials to the backend, the backend evaluate the credentials and creates a special token with user's information signed by a secret key and return it back to the frontend. This token is known as JSON Web Token or JWT. JWT uses a standard algorithm to generate this token, so the mechanism is same around all the platform. With further request, frontend will send this JWT token with each request and backend will recognize the authenticate user from this token.

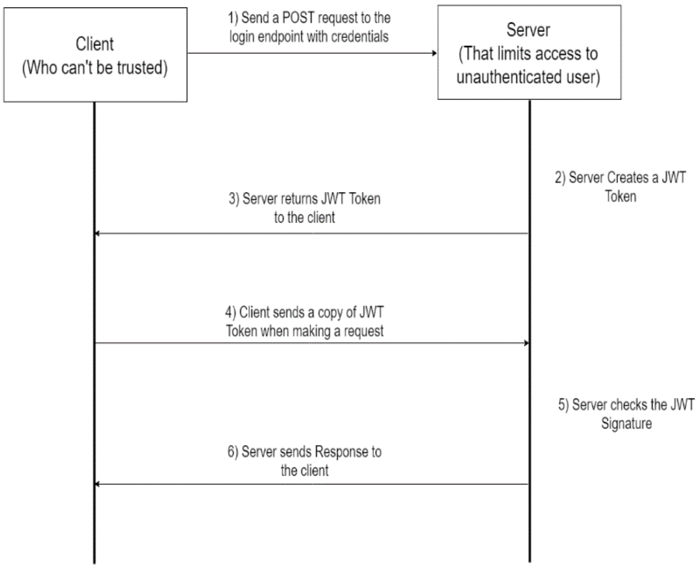

Client
(Who can't be trusted)
1) Send a POST request to the login endpoint with credentials
Server
(That limits access to unauthenticated user)
2) Server Creates a JWT Token
3) Server returns JWT Token to the client
4) Client sends a copy of JWT Token when making a request
5) Server checks the JWT Signature
6) Server sends Response to the client

Figure 4.2.3 JWT Authentication Flow Diagram

4.3 Interaction Design and UX

Course Tracking Management System have simple & most attractive interaction design. The user can find it very much easy to operate & use. The design is trendy fresh flat UI. A user can easily find what they need with simple some clicks. User can view & do the work for the institute with great experience.

The User Interface is minimalistic. The User Experience is built with some criteria. The usability, accessibility, and pleasure provided in the interaction with the user is totally satisfactory. There is no such bug or abominable task or interaction found while using or interaction with the system. The system interaction design, visual design, information architecture, user research, and other disciplines, and is concerned with all facts of the overall experience delivered to users.

The most convenient feature of our developed system is responsiveness. The user interface is fixable with all type of display resolution even with appel's retina display. The system is mobile ready on android or iphone based web browser.

4.4 Implementation Requirements

Technical Specification Requirements

The system will be developed using the following technology:

a. **Web Development Technology**:

Operating System: Ubuntu 16.04 (Server Minimal Version)

Web Server: Nginx

Application Architecture: Universal Application (UA)

Language Platform: Python 3.6+, JavaScript

Backend Framework: Django 2.0+

Frontend Framework: Nuxt.js (Server Side Rendering layer based on Vue.js)

UI Component: Vuetify

Database Server: PostgreSQL 9.6+

Cache Server: Memcached

Queue Server: RabbitMQ

IDE: PyCharm Professional by JetBrains

b. **Web Server Configuration (VPS):**

Processor: 2 VCPU (virtual central processing unit)

RAM: 4 GB RAM (For better management)

Storage: 5~10 GB SSD (to upload the web application & its source files)

Transfer Rate: 2TB Transfer/Month (Bandwidth for better transfer of the files for the user, Upload & Download the assessment files are not limited (as per course), so more teacher/ user more traffic on the server. So that more bandwidth transfer needed)

c. **Domain Name Server**:

One registered Domain with SSL Enabled. SSL (Secure Sockets Layer) is the standard security technology for establishing an encrypted link between a web server and a browser. This link ensures that all data passed between the web server and browsers remain private and integral.)

d. **Others:**

Version Management: Git

Remote Login to VPS: SSH

Media Hosting: (This storage is needed for managing the media files of course files, assessment files like: 1st, middle & last (person based on number in an exam) files for accreditation)

SMTP Server: Simple Mail Transfer Protocol for our mailing, & user management.

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

For our developed system we follow the schema and build up an Entity Relationship diagram for implementation of the database.

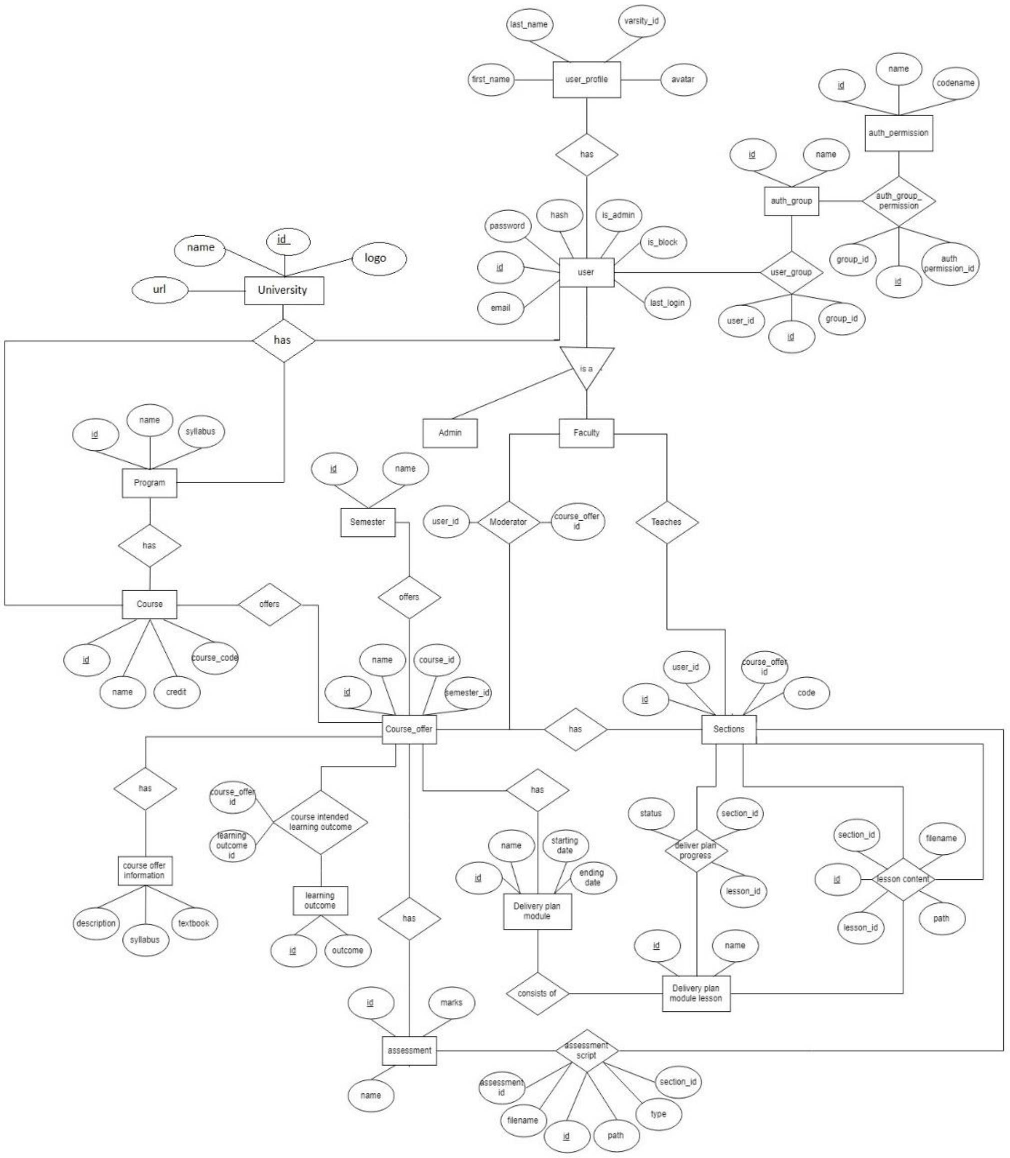


Figure 5.1.1: Entity Relationship Diagram | Implementation of Database

5.2 Implementation of Front-end Design

The Developed system have met a minimalistic flat design & ultimate easy user understandable design solution. So the UI & UX is too much easy for use & interaction with. But we also do not compromise the Design for the optimization. The system have a great look to incorporate with. The figures, given bellow are Front-end Design of Implementation of the developed system.

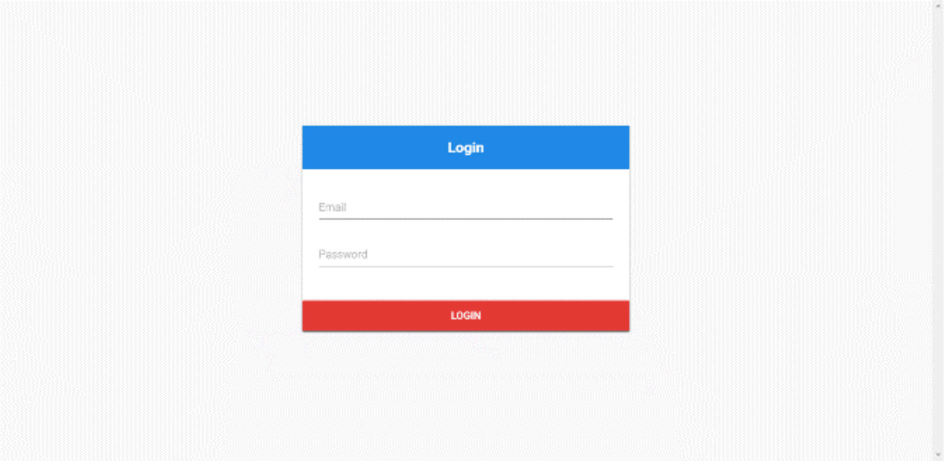
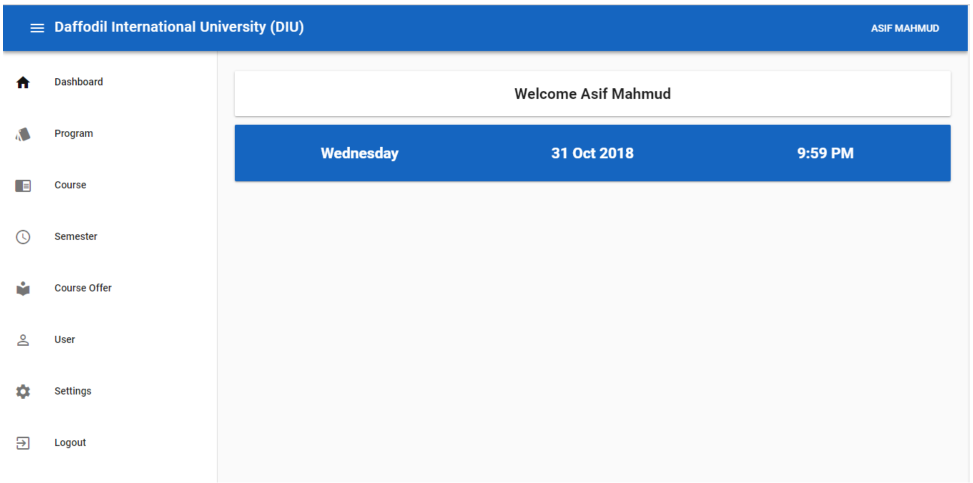


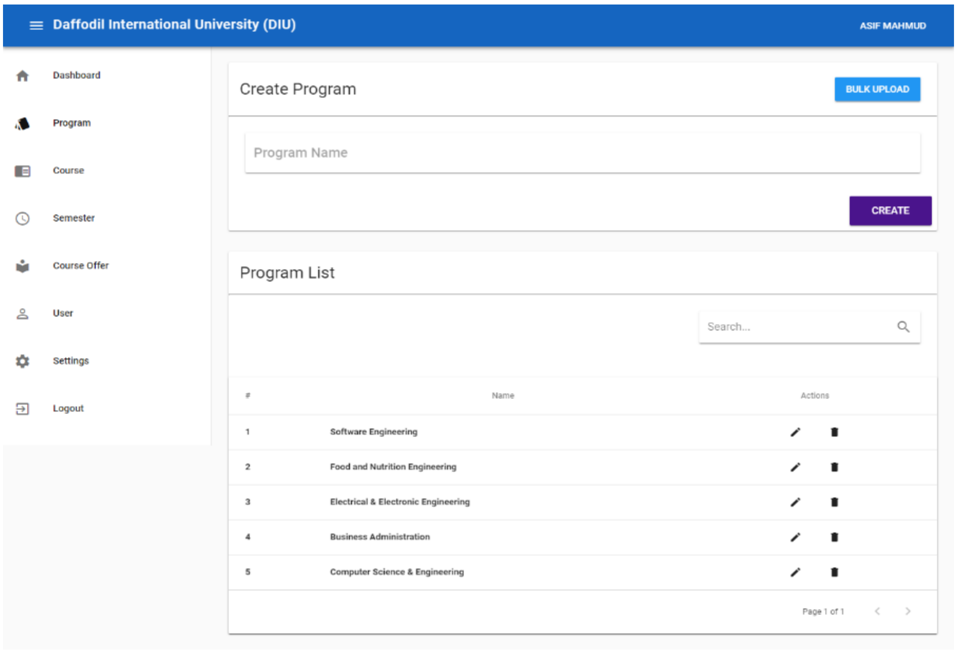
Figure 5.2.1: Log in



Welcome Asif Mahmud

Wednesday 31 Oct 2018 9:59 PM

Figure 5.2.2: Admin Dashboard



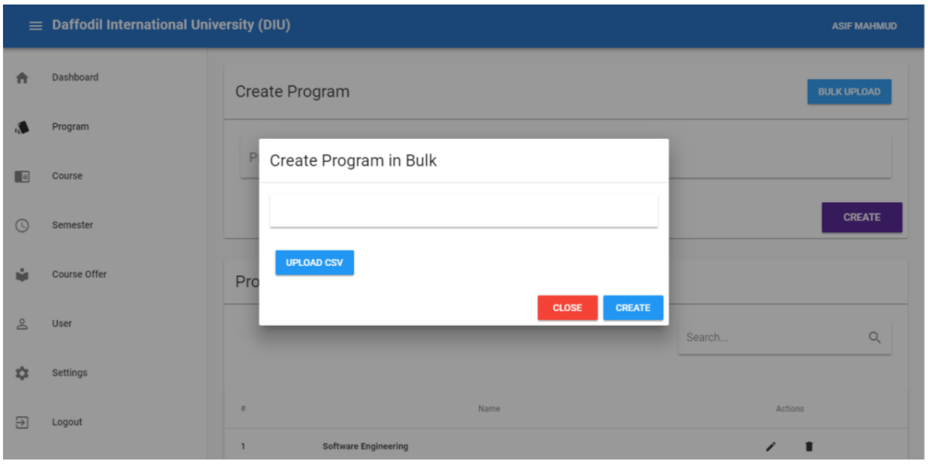
Create Program

Program List

#	Name	Actions
1	Software Engineering	✎ 🗑
2	Food and Nutrition Engineering	✎ 🗑
3	Electrical & Electronic Engineering	✎ 🗑
4	Business Administration	✎ 🗑
5	Computer Science & Engineering	✎ 🗑

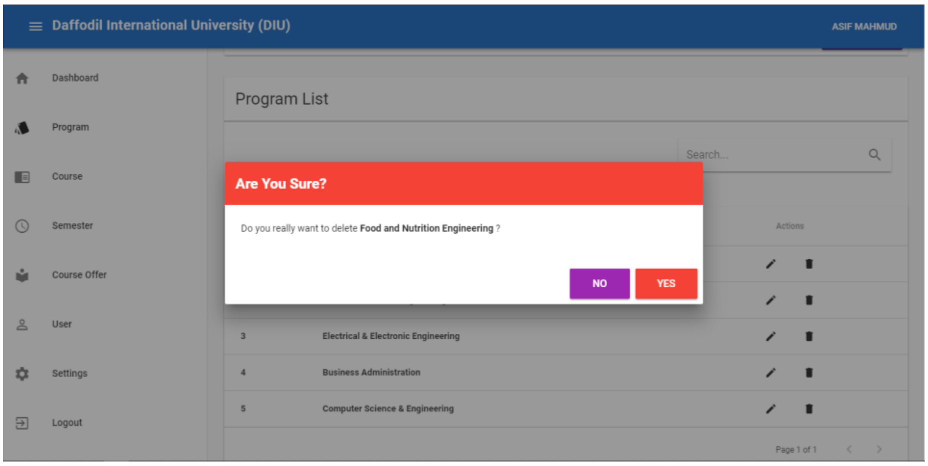
Page 1 of 1

Figure 5.2.3: Program Section



#	Name	Actions
1	Software Engineering	

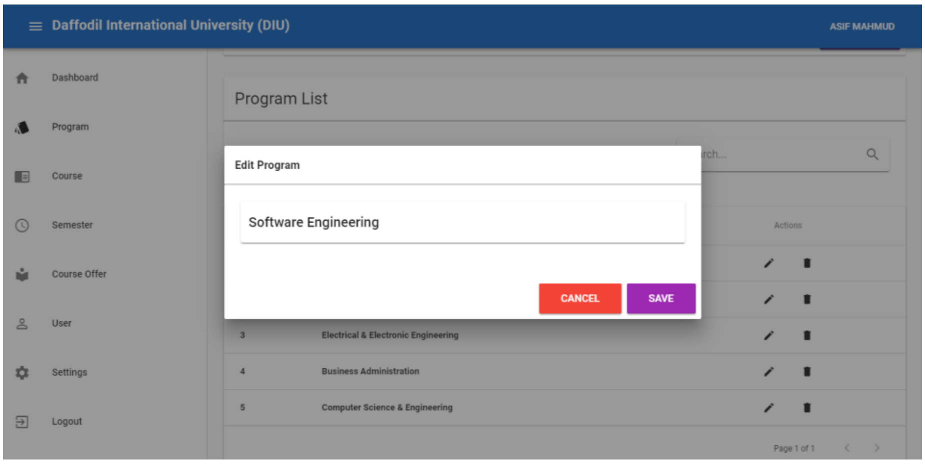
Figure 5.2.4: Create Program



Do you really want to delete **Food and Nutrition Engineering** ?

#	Name	Actions
3	Electrical & Electronic Engineering	
4	Business Administration	
5	Computer Science & Engineering	

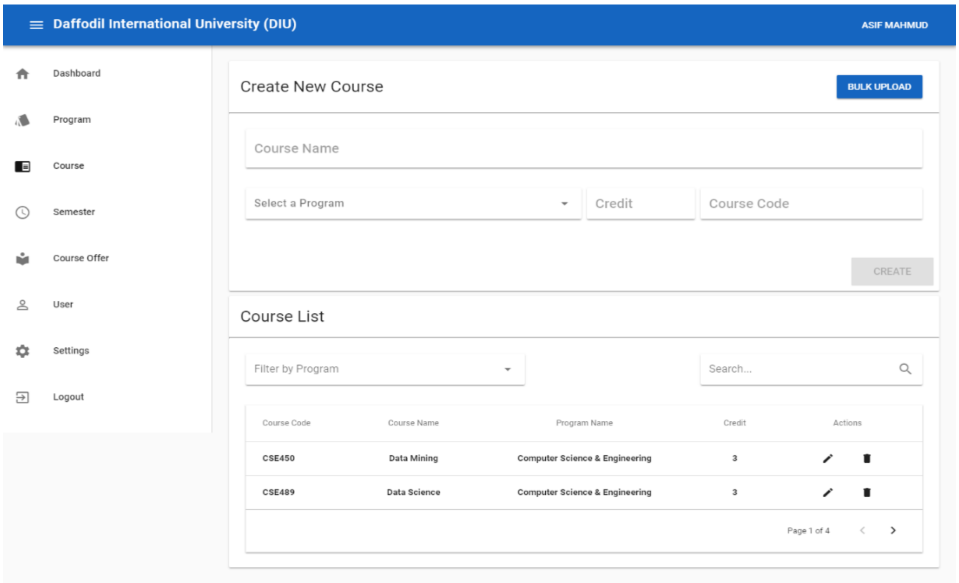
Figure 5.2.5: Delete Program



Software Engineering

#	Name	Actions
3	Electrical & Electronic Engineering	
4	Business Administration	
5	Computer Science & Engineering	

Figure 5.2.6: Update Program



Create New Course

Course Name

Select a Program | Credit | Course Code

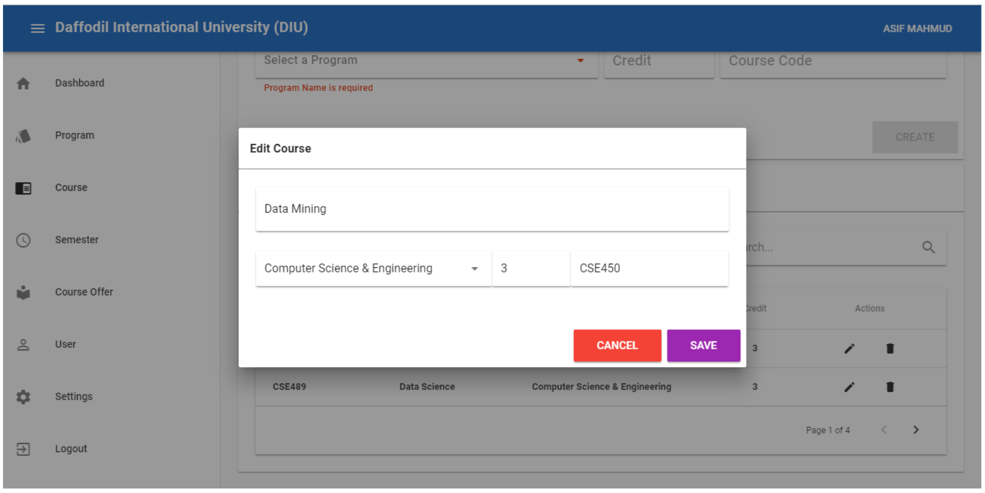
Course List

Filter by Program | Search...

Course Code	Course Name	Program Name	Credit	Actions
CSE450	Data Mining	Computer Science & Engineering	3	
CSE489	Data Science	Computer Science & Engineering	3	

Page 1 of 4

Figure 5.2.7: Course Section



Select a Program | Credit | Course Code

Program Name is required

Edit Course

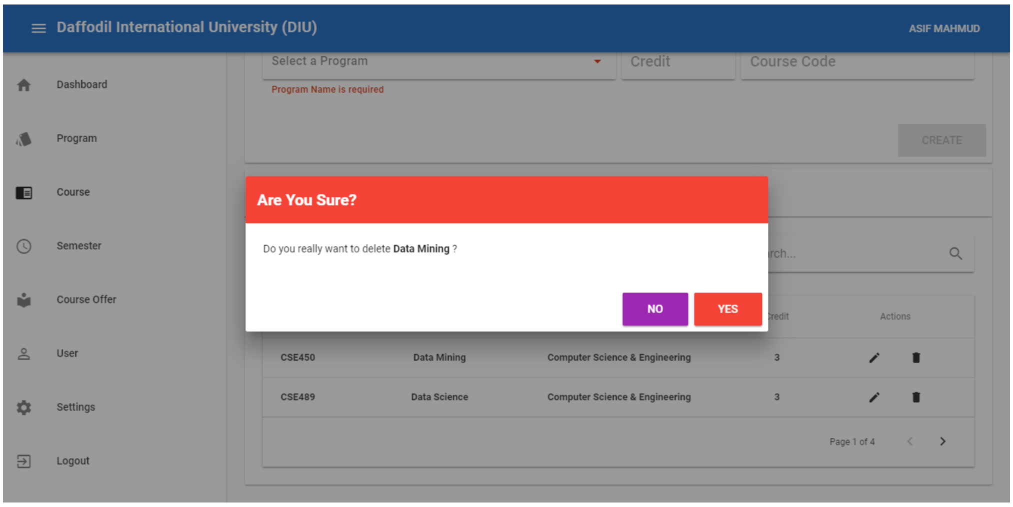
Data Mining

Computer Science & Engineering | 3 | CSE450

			Credit	Actions
			3	
CSE489	Data Science	Computer Science & Engineering	3	

Page 1 of 4

Figure 5.2.8: Update Course



Select a Program | Credit | Course Code

Program Name is required

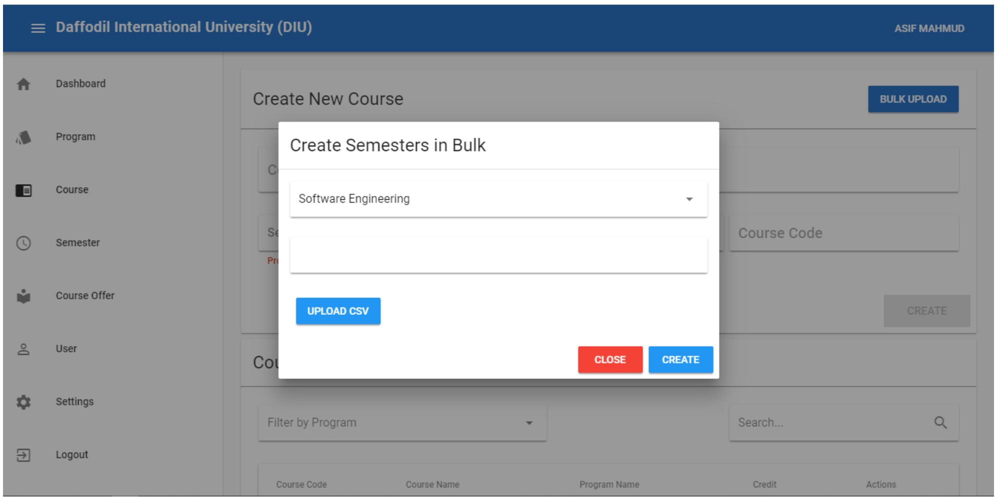
Are You Sure?

Do you really want to delete **Data Mining** ?

			Credit	Actions
CSE450	Data Mining	Computer Science & Engineering	3	
CSE489	Data Science	Computer Science & Engineering	3	

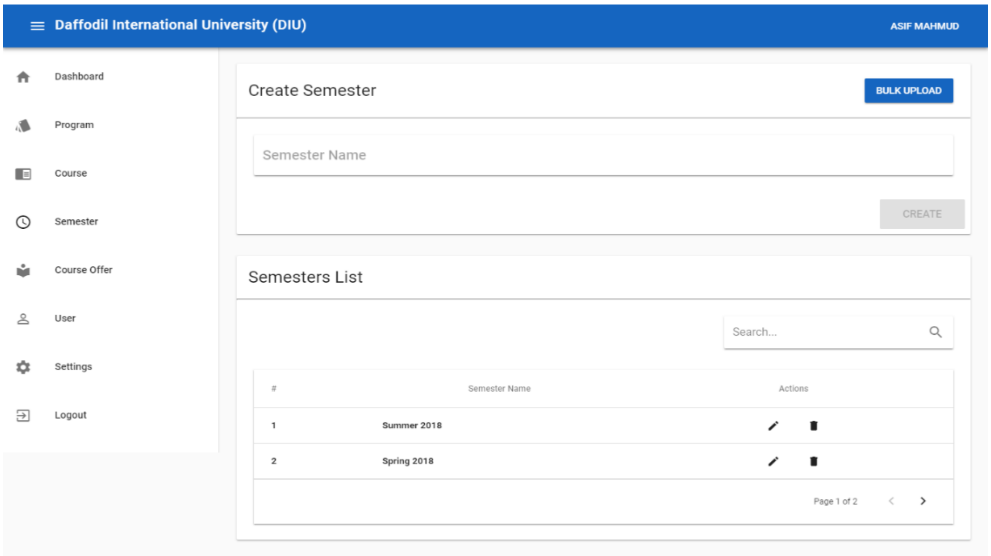
Page 1 of 4

Figure 5.2.9: Delete Course



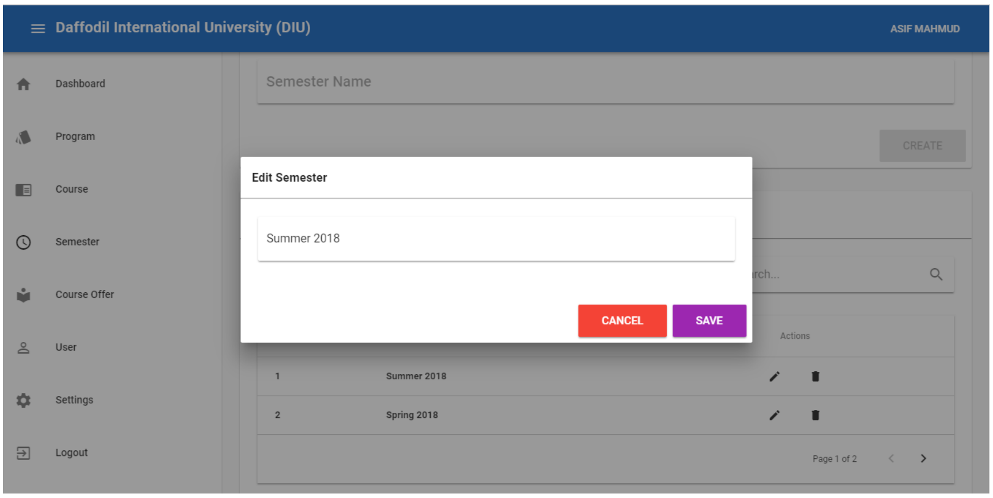
Software Engineering

Figure 5.2.10: Create Semester



#	Semester Name	Actions
1	Summer 2018	✎ 🗑
2	Spring 2018	✎ 🗑

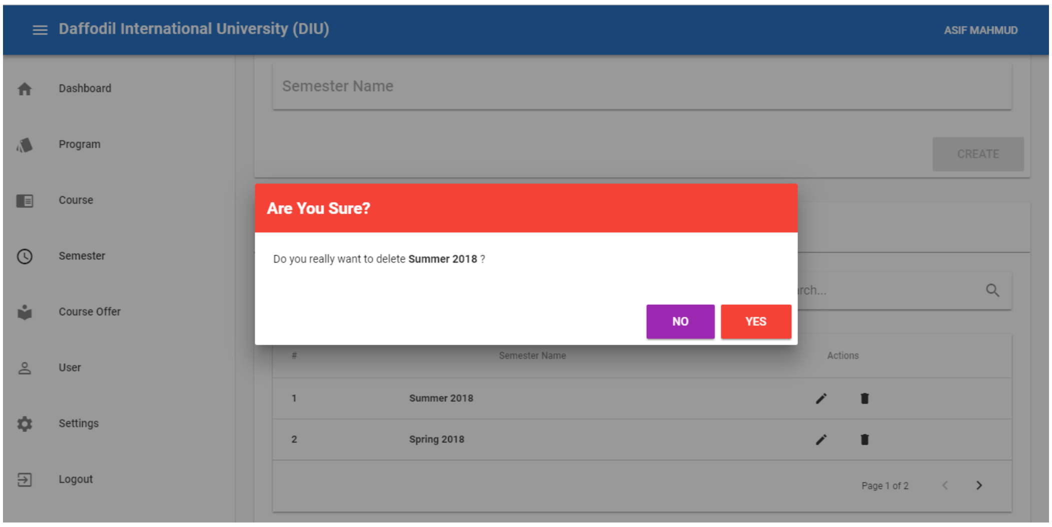
Figure 5.2.11: Semester Section



Summer 2018

1	Summer 2018
2	Spring 2018

Figure 5.2.12: Edit Semester

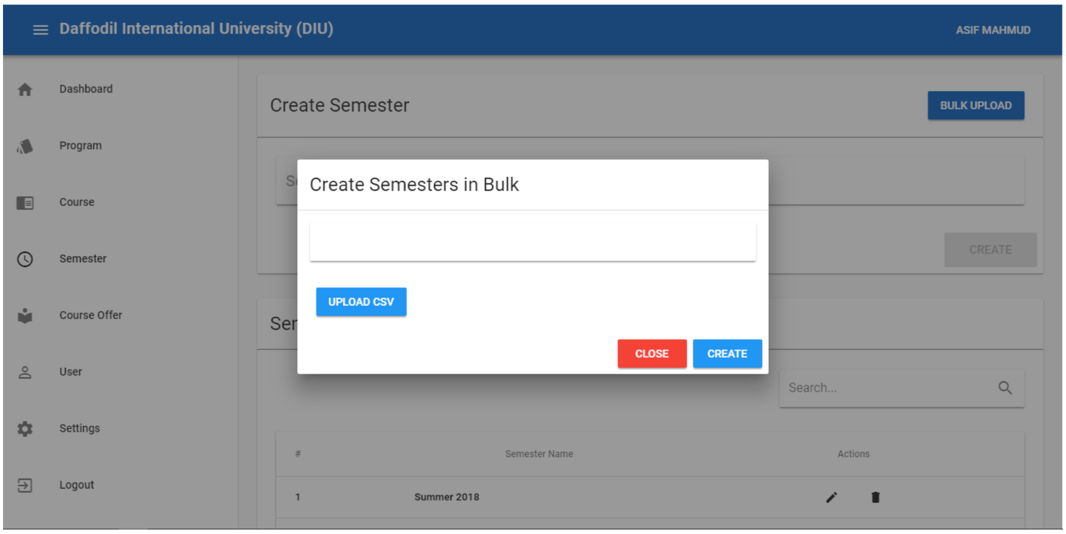


Are You Sure?

Do you really want to delete **Summer 2018** ?

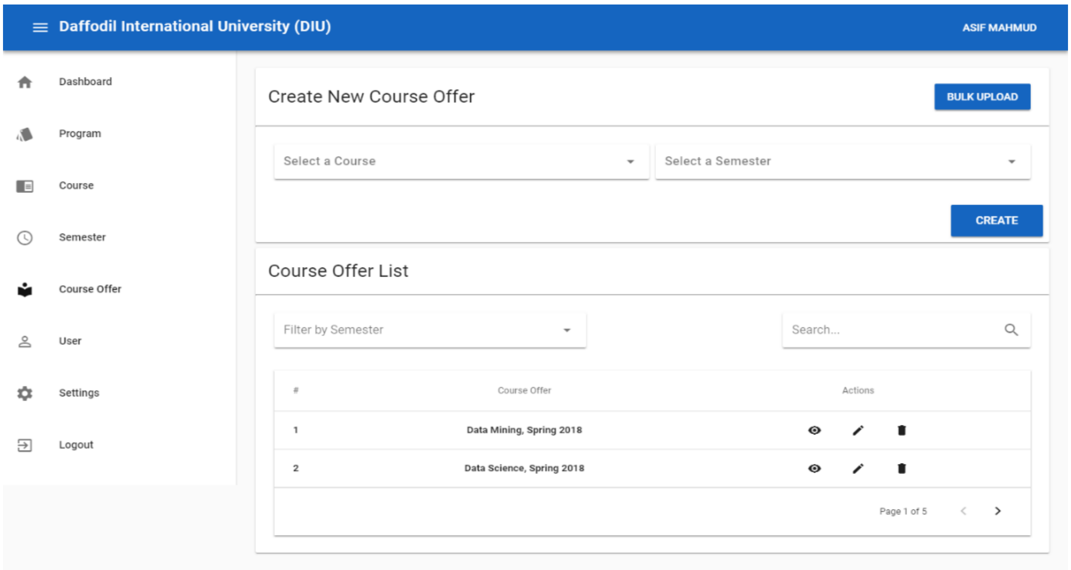
#	Semester Name	Actions
1	Summer 2018	
2	Spring 2018	

Figure 5.2.13: Delete Semester



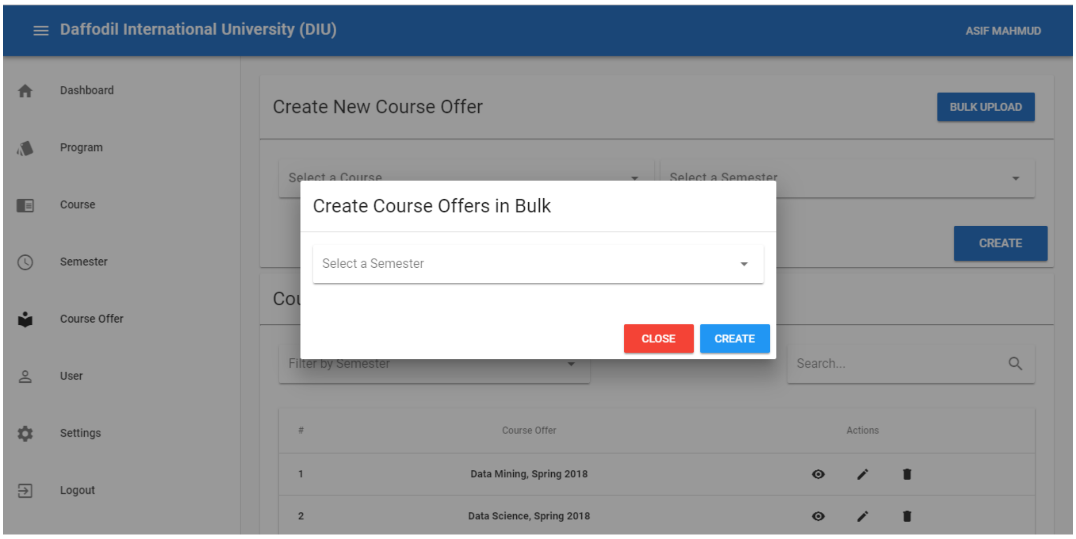
#	Semester Name	Actions
1	Summer 2018	

Figure 5.2.14: Create Semester



#	Course Offer	Actions
1	Data Mining, Spring 2018	
2	Data Science, Spring 2018	

Figure 5.2.15: Course Offer Section



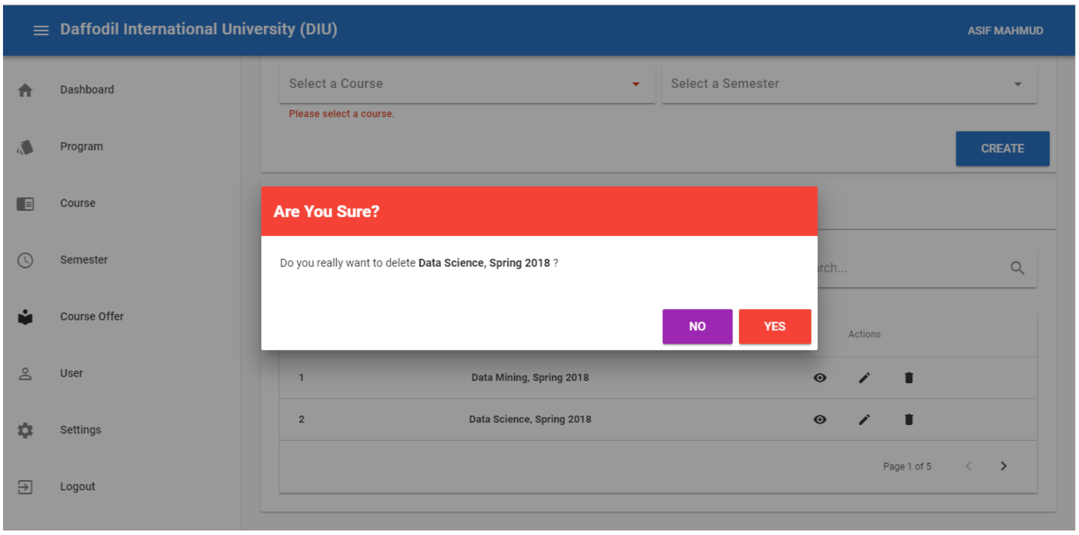
Create New Course Offer

Create Course Offers in Bulk

Select a Semester

#	Course Offer	Actions
1	Data Mining, Spring 2018	
2	Data Science, Spring 2018	

Figure 5.2.17: Create Course Offers



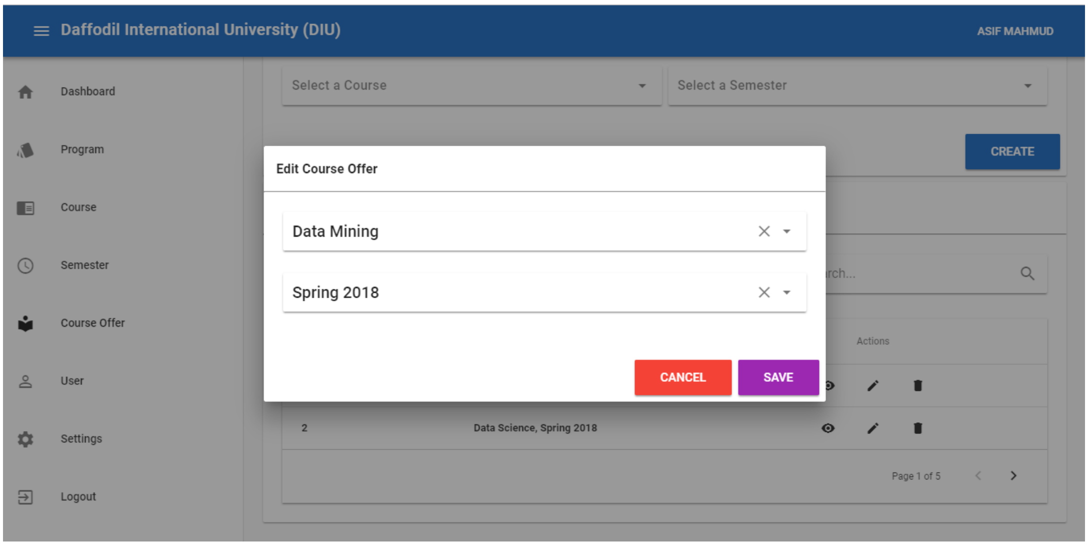
Please select a course.

Are You Sure?

Do you really want to delete **Data Science, Spring 2018** ?

		Actions
1	Data Mining, Spring 2018	
2	Data Science, Spring 2018	

Figure 5.2.18: Delete Course



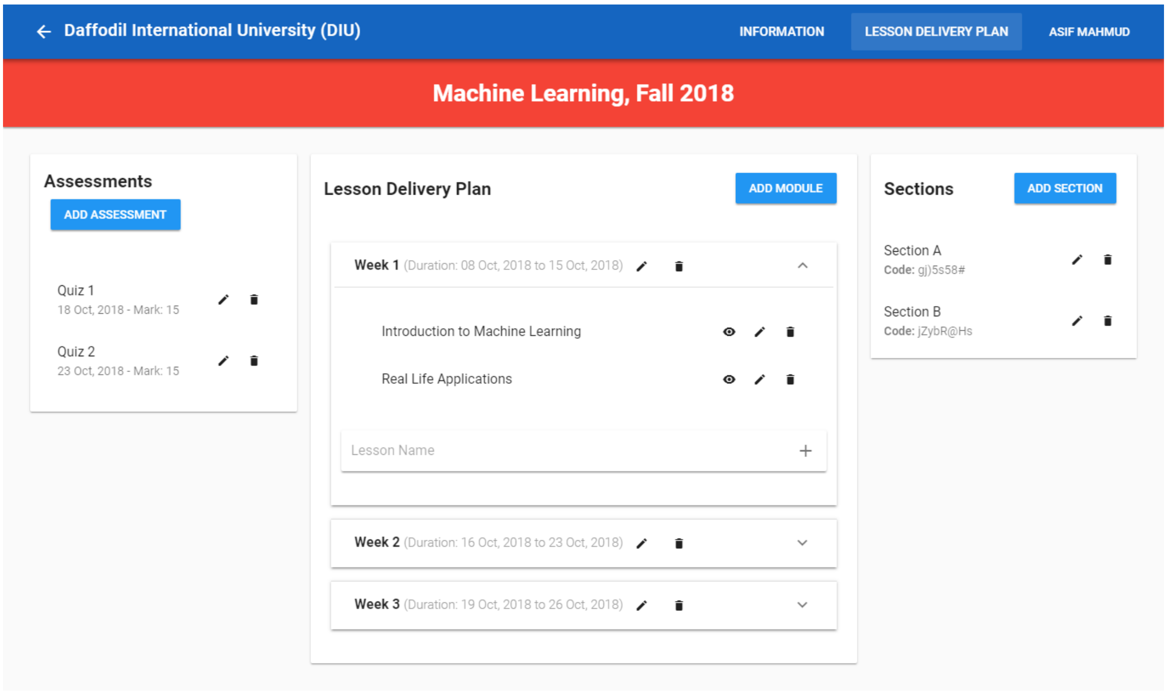
Edit Course Offer

Data Mining

Spring 2018

2	Data Science, Spring 2018	

Figure 5.2.19: Edit Course Offer



Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Week 1 (Duration: 08 Oct, 2018 to 15 Oct, 2018)

Introduction to Machine Learning

Real Life Applications

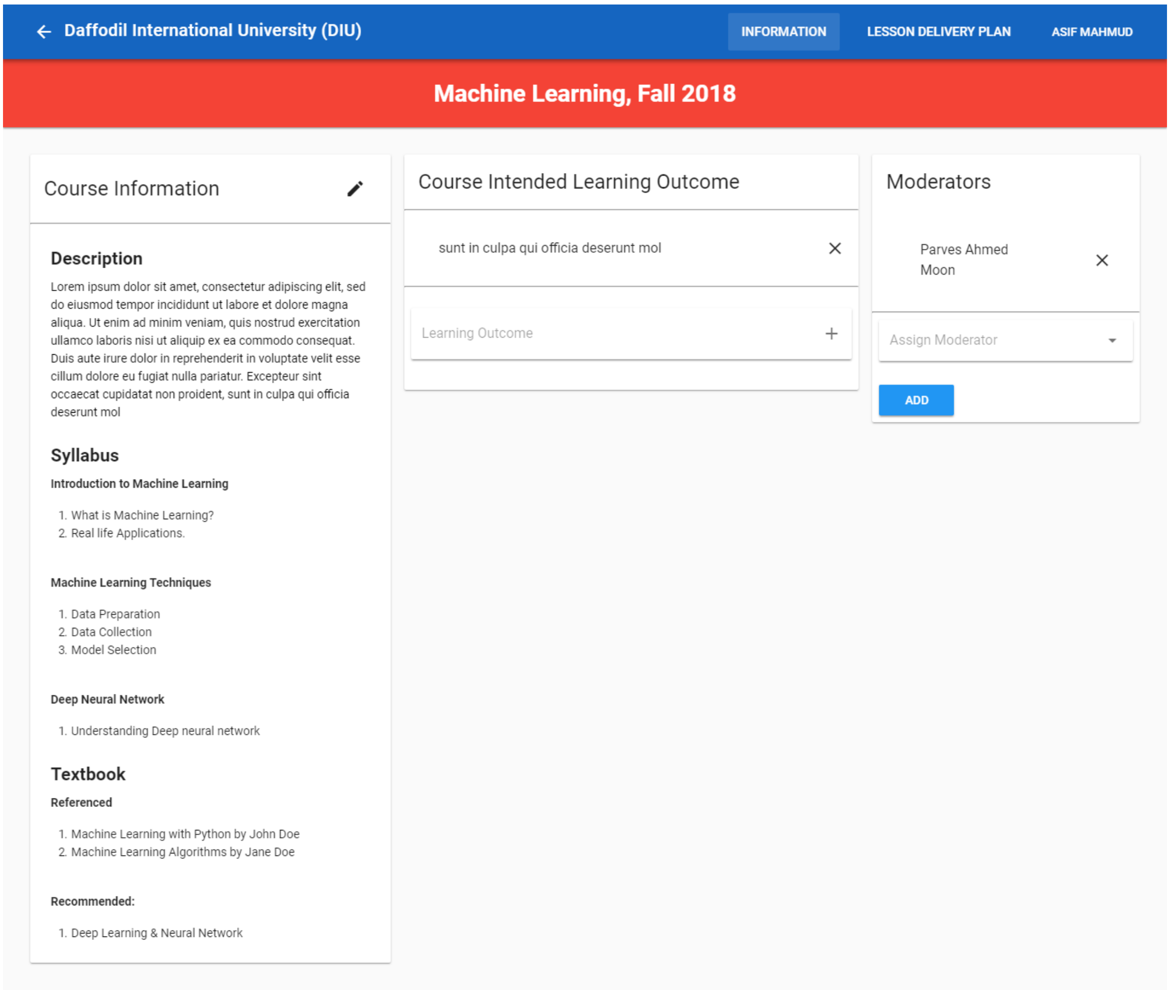
Week 2 (Duration: 16 Oct, 2018 to 23 Oct, 2018)

Week 3 (Duration: 19 Oct, 2018 to 26 Oct, 2018)

Section A
Code: gj)5s58#

Section B
Code: jZybR@Hs

Figure 5.2.20: Course Information



Description

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mol

Syllabus

Introduction to Machine Learning

1. What is Machine Learning?
2. Real life Applications.

Machine Learning Techniques

1. Data Preparation
2. Data Collection
3. Model Selection

Deep Neural Network

1. Understanding Deep neural network

Textbook

Referenced

1. Machine Learning with Python by John Doe
2. Machine Learning Algorithms by Jane Doe

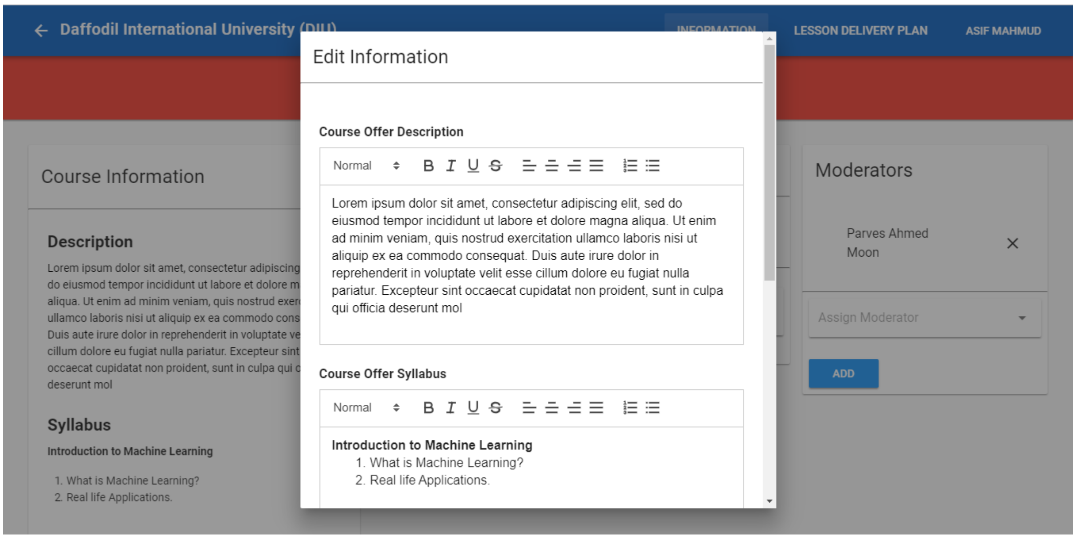
Recommended:

1. Deep Learning & Neural Network

sunt in culpa qui officia deserunt mol

Parves Ahmed Moon

Figure 5.2.21: Course Intended Learning Outcome



Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mol

Introduction to Machine Learning

1. What is Machine Learning?
2. Real life Applications.

Figure 5.2.22: Course Details

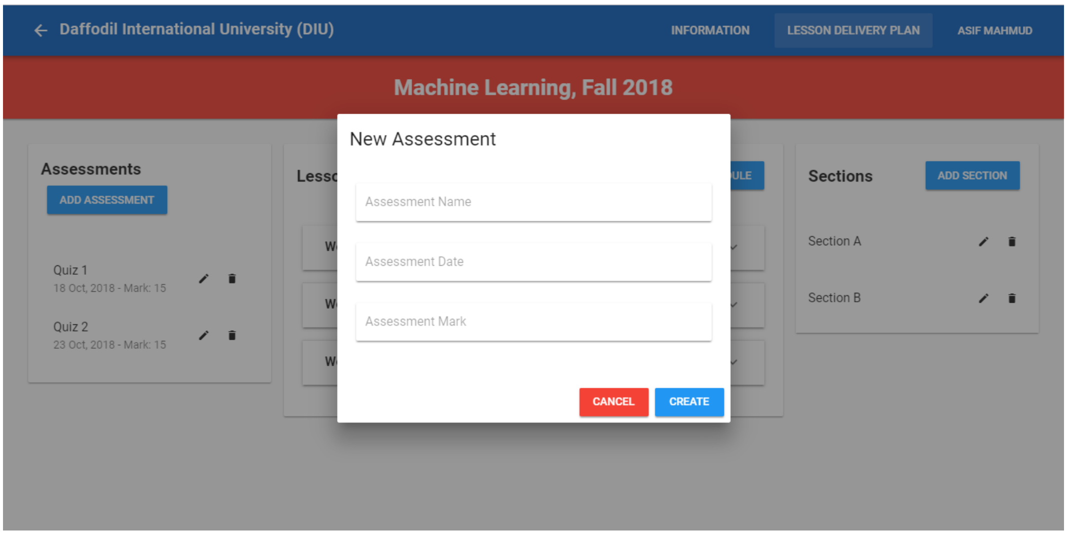
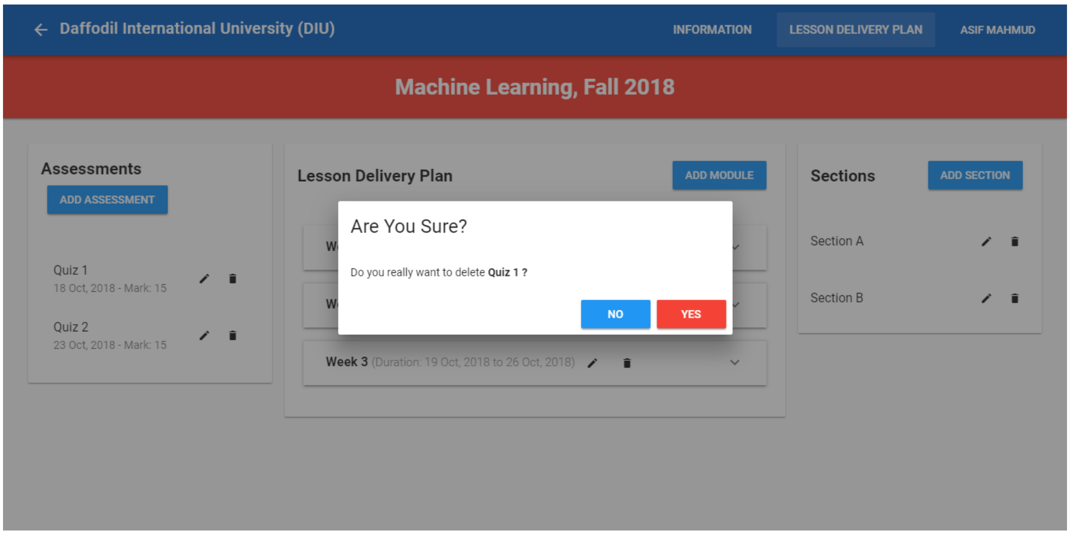
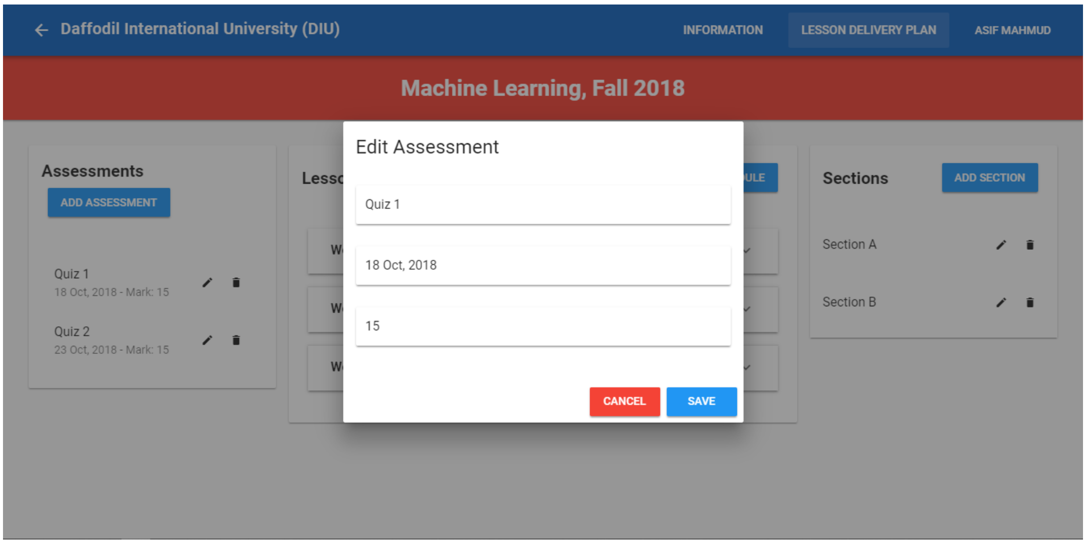


Figure 5.2.23: Create Assessment



Do you really want to delete **Quiz 1** ?

Figure 5.2.24: Delete quiz



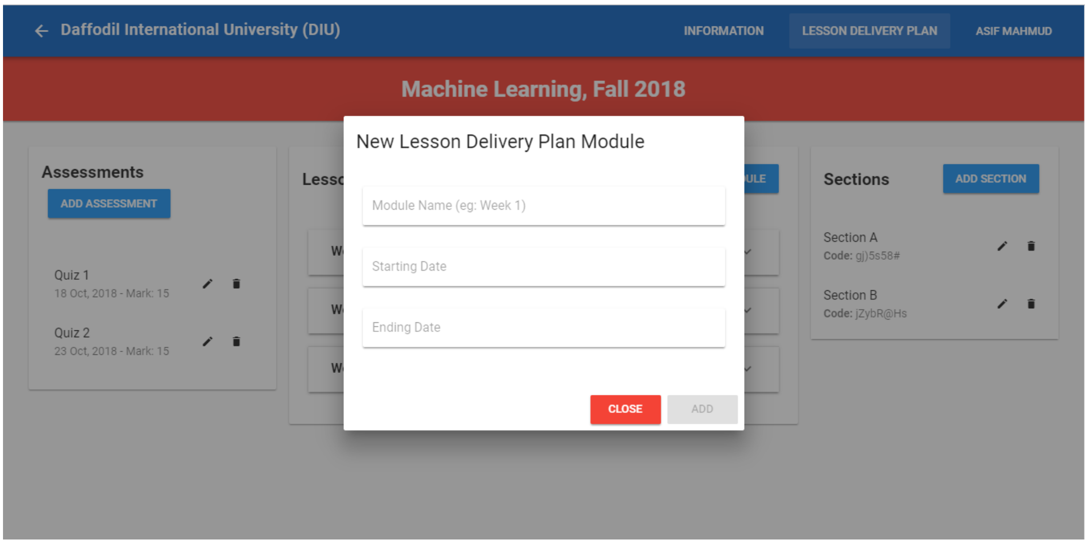
Edit Assessment

Quiz 1

18 Oct, 2018

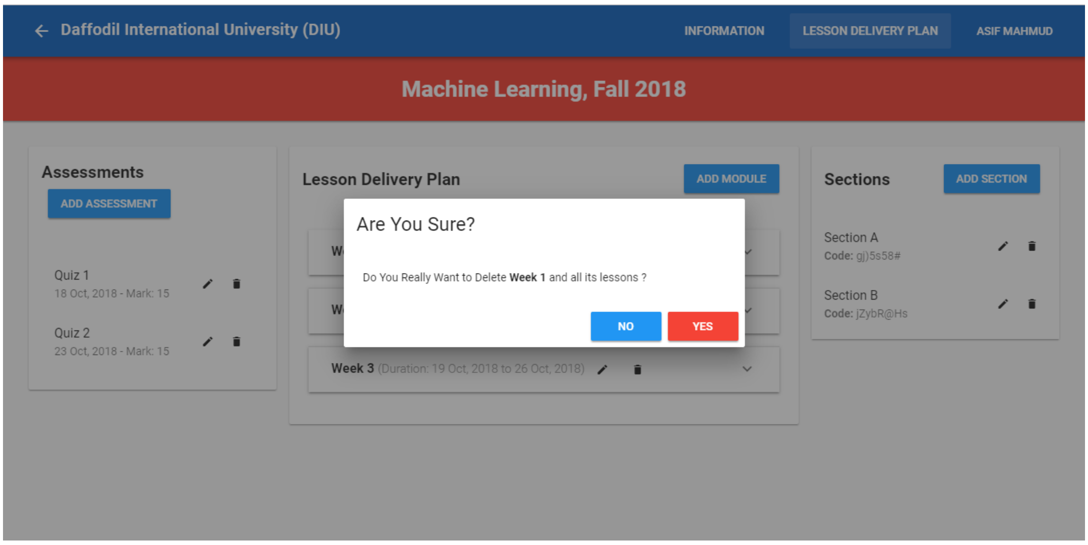
15

Figure 5.2.25: Update Assessment



New Lesson Delivery Plan Module

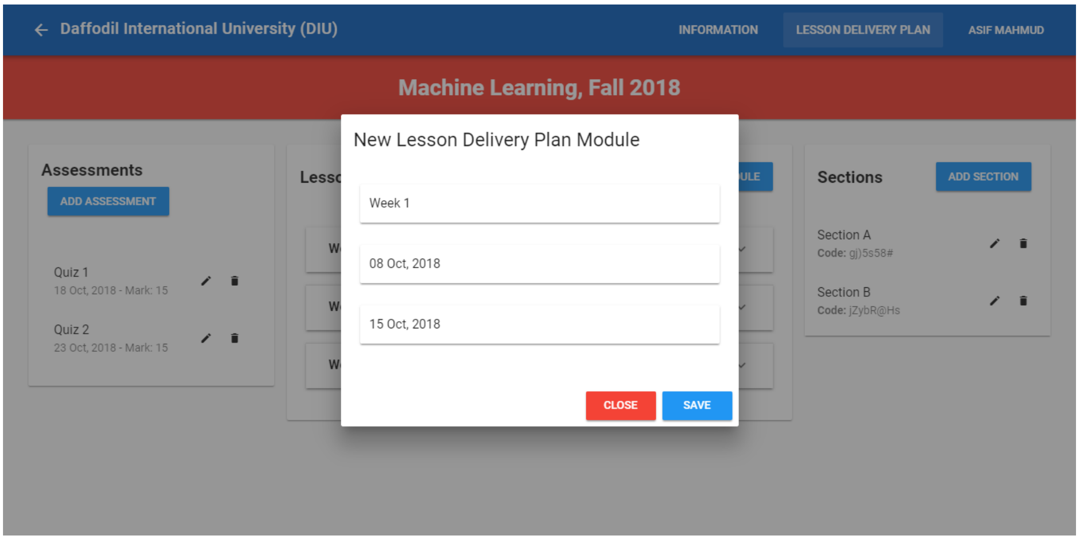
Figure 5.2.26: Update Lesson Delivery Plans



Are You Sure?

Do You Really Want to Delete **Week 1** and all its lessons ?

Figure 5.2.27: Delete Lessons



New Lesson Delivery Plan Module

Week 1

08 Oct, 2018

15 Oct, 2018

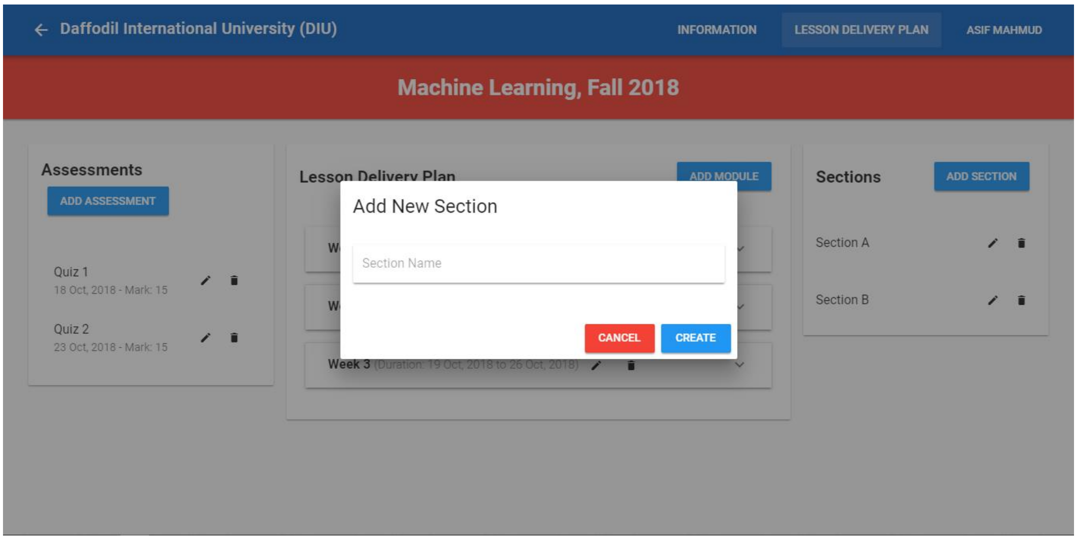
Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Section A
Code: gj)5s58#

Section B
Code: jZybR@Hs

Figure 5.2.28: Create Lesson Delivery Plan



Add New Section

Section Name

Quiz 1
18 Oct, 2018 - Mark: 15

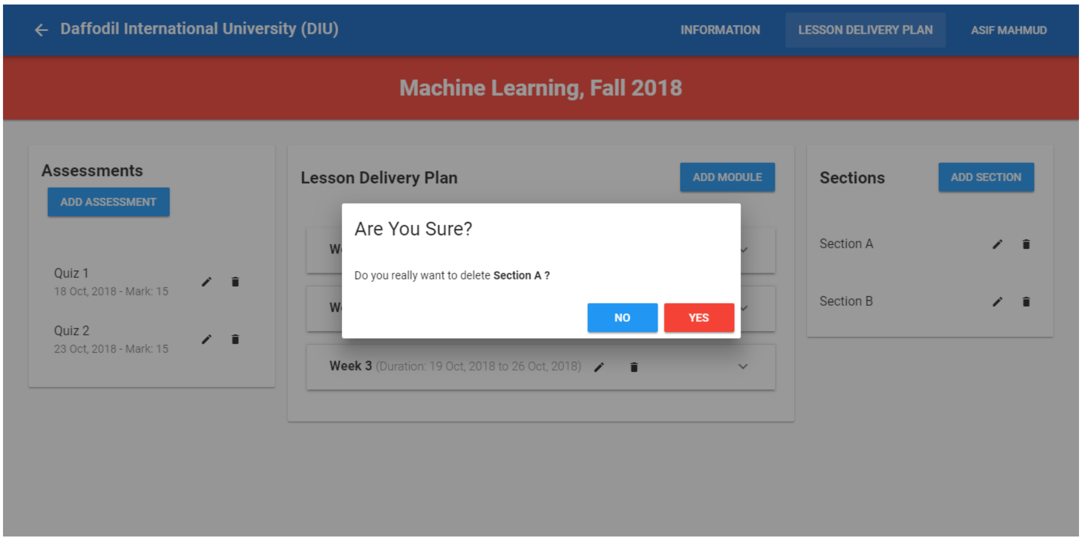
Quiz 2
23 Oct, 2018 - Mark: 15

Week 3 (Duration: 19 Oct, 2018 to 26 Oct, 2018)

Section A

Section B

Figure 5.2.29: Create Section



Are You Sure?

Do you really want to delete **Section A ?**

Quiz 1
18 Oct, 2018 - Mark: 15

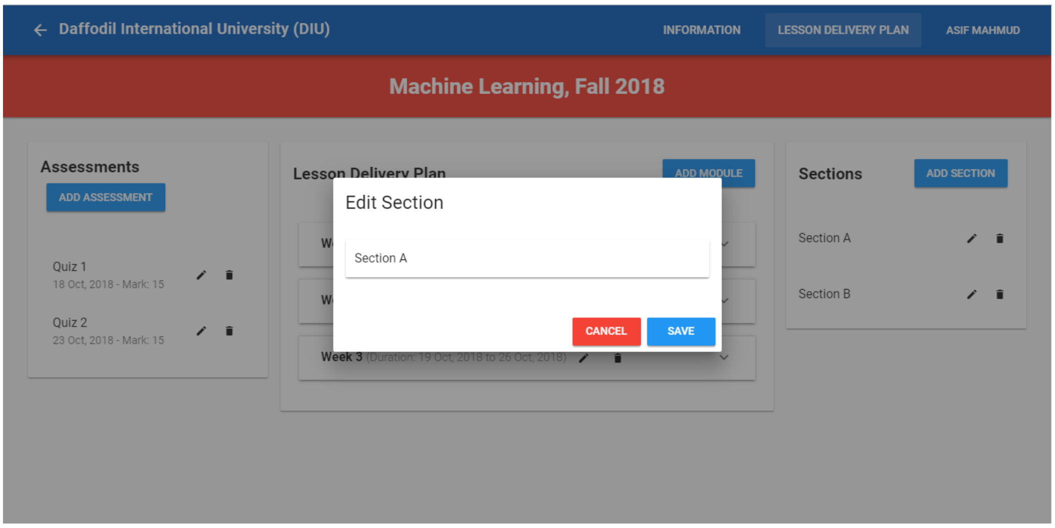
Quiz 2
23 Oct, 2018 - Mark: 15

Week 3 (Duration: 19 Oct, 2018 to 26 Oct, 2018)

Section A

Section B

Figure 5.2.30: Delete Section



Machine Learning, Fall 2018

Assessments

Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Lesson Delivery Plan

Edit Section

Section A

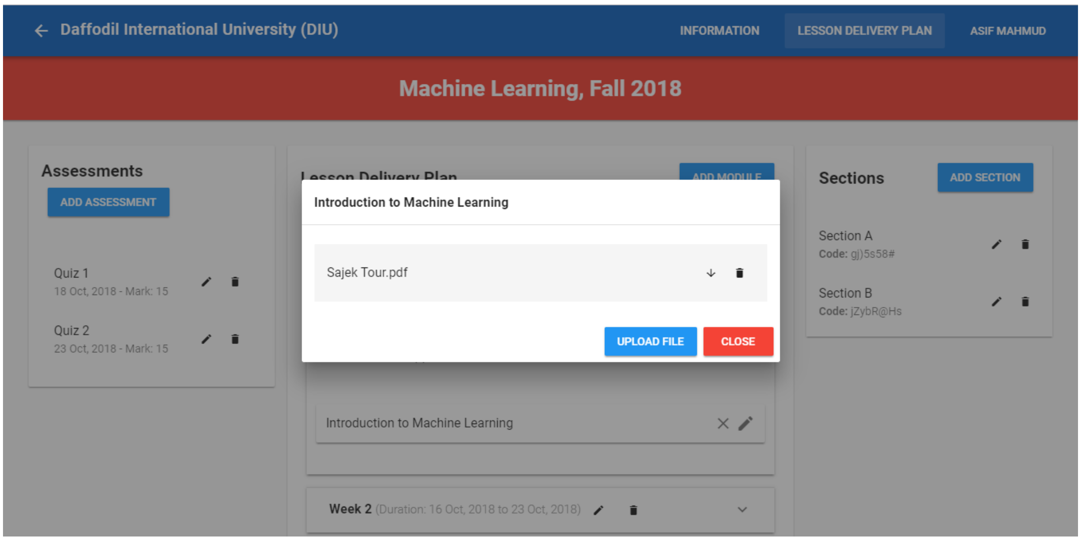
Week 3 (Duration: 19 Oct, 2018 to 26 Oct, 2018)

Sections

Section A

Section B

Figure 5.2.31: Section



Machine Learning, Fall 2018

Assessments

Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Lesson Delivery Plan

Introduction to Machine Learning

Sajek Tour.pdf

Introduction to Machine Learning

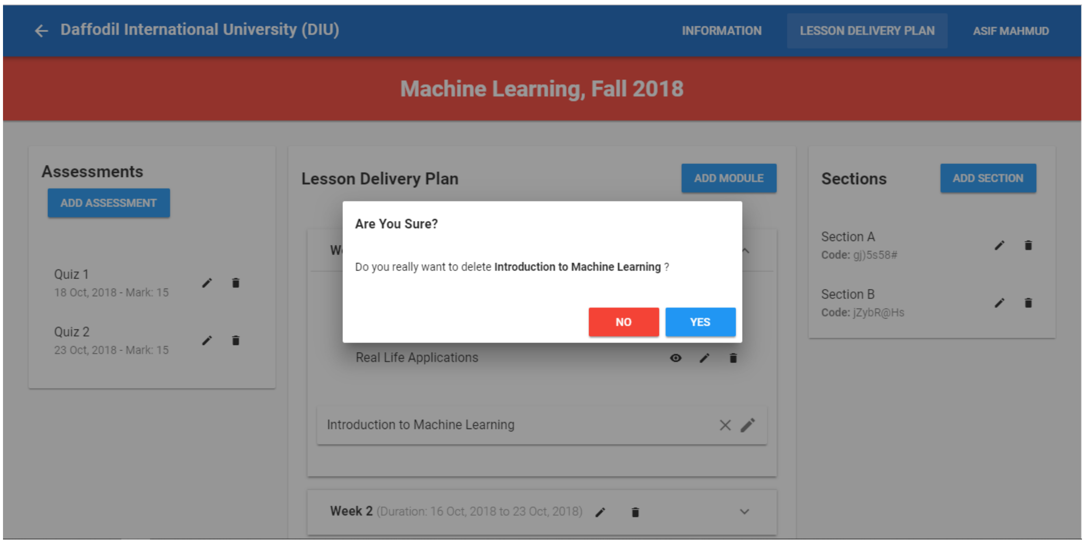
Week 2 (Duration: 16 Oct, 2018 to 23 Oct, 2018)

Sections

Section A
Code: gj)5s58#

Section B
Code: jZybR@Hs

Figure 5.2.32: Course Details



Machine Learning, Fall 2018

Assessments

Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Lesson Delivery Plan

Are You Sure?

Do you really want to delete **Introduction to Machine Learning** ?

Real Life Applications

Introduction to Machine Learning

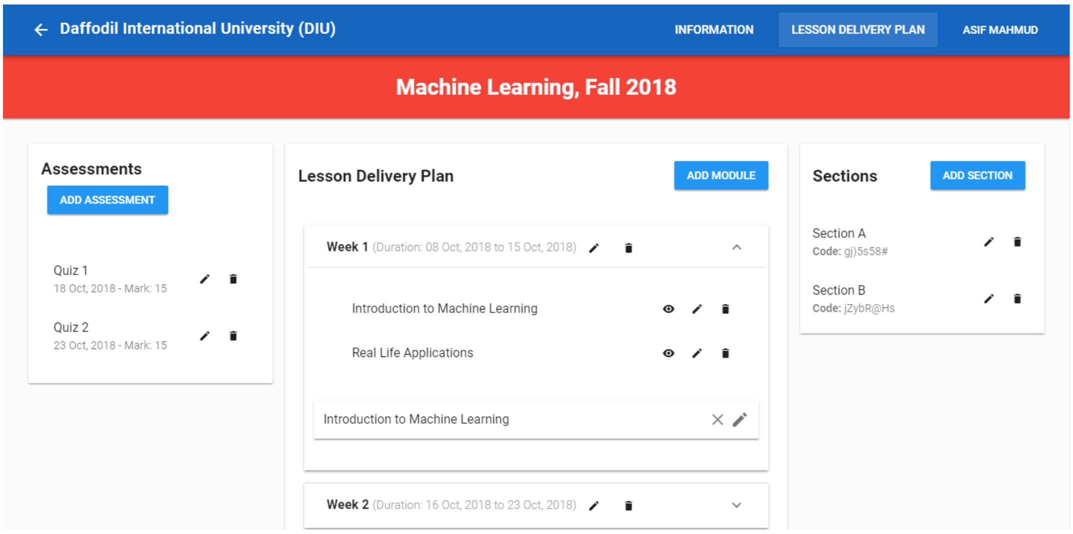
Week 2 (Duration: 16 Oct, 2018 to 23 Oct, 2018)

Sections

Section A
Code: gj)5s58#

Section B
Code: jZybR@Hs

Figure 5.2.33: Delete Course



Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Week 1 (Duration: 08 Oct, 2018 to 15 Oct, 2018)

Introduction to Machine Learning

Real Life Applications

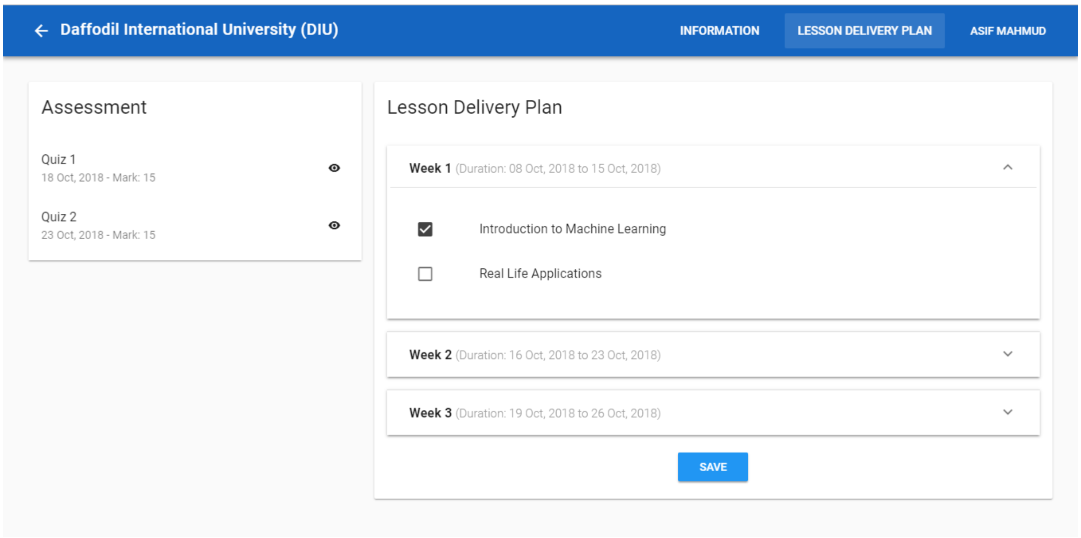
Introduction to Machine Learning

Week 2 (Duration: 16 Oct, 2018 to 23 Oct, 2018)

Section A
Code: gj)5s58#

Section B
Code: jZybR@Hs

Figure 5.2.34: Course



Quiz 1
18 Oct, 2018 - Mark: 15

Quiz 2
23 Oct, 2018 - Mark: 15

Week 1 (Duration: 08 Oct, 2018 to 15 Oct, 2018)

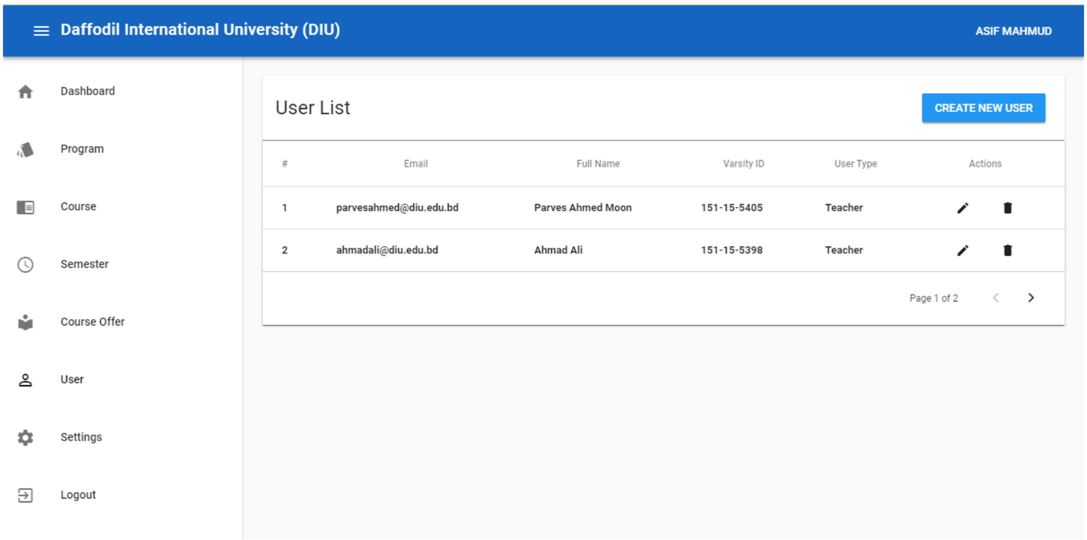
☑ Introduction to Machine Learning

☐ Real Life Applications

Week 2 (Duration: 16 Oct, 2018 to 23 Oct, 2018)

Week 3 (Duration: 19 Oct, 2018 to 26 Oct, 2018)

Figure 5.2.35: Lesson Delivery Plan



#	Email	Full Name	Varsity ID	User Type	Actions
1	parvesahmed@diu.edu.bd	Parves Ahmed Moon	151-15-5405	Teacher	
2	ahmadali@diu.edu.bd	Ahmad Ali	151-15-5398	Teacher	

Page 1 of 2

Figure 5.2.36: User List

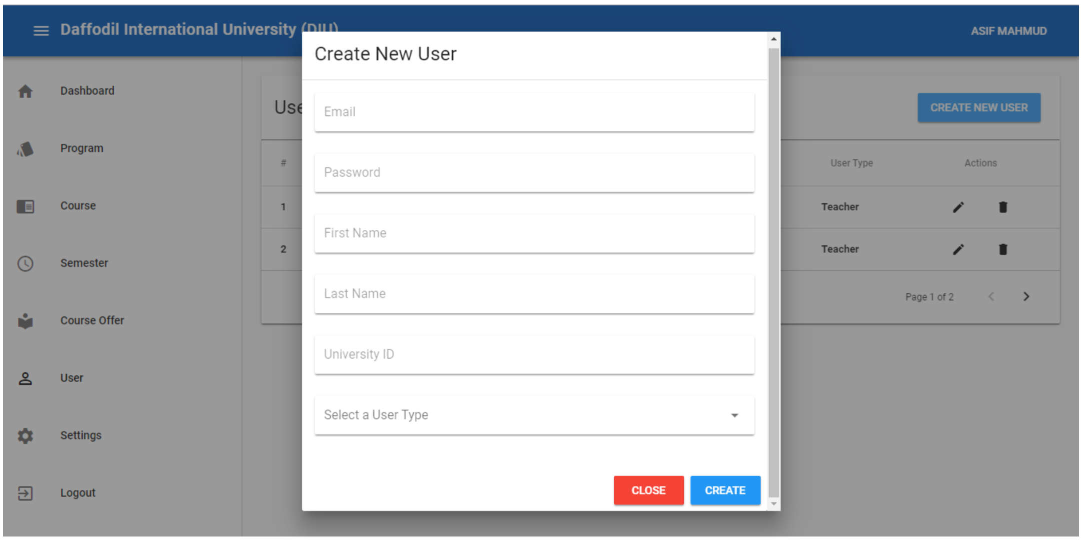
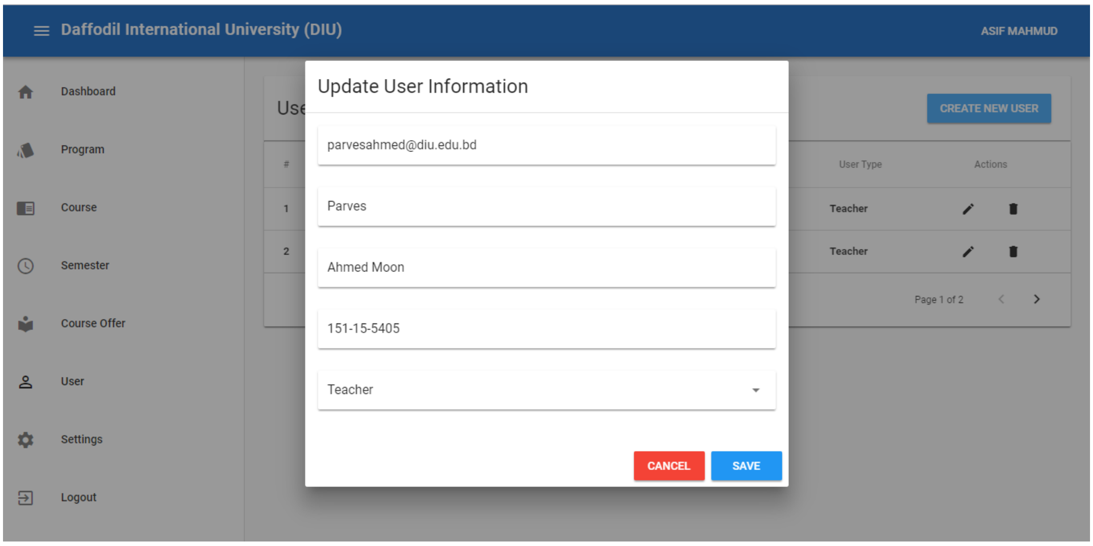


Figure 5.2.37: Create User



Update User Information

parvesahmed@diu.edu.bd

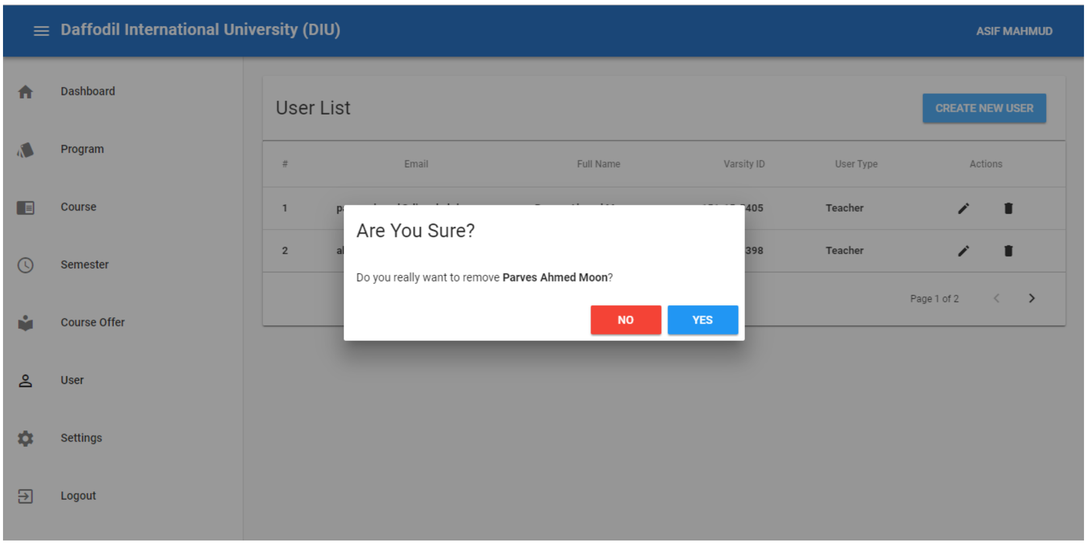
Parves

Ahmed Moon

151-15-5405

Teacher

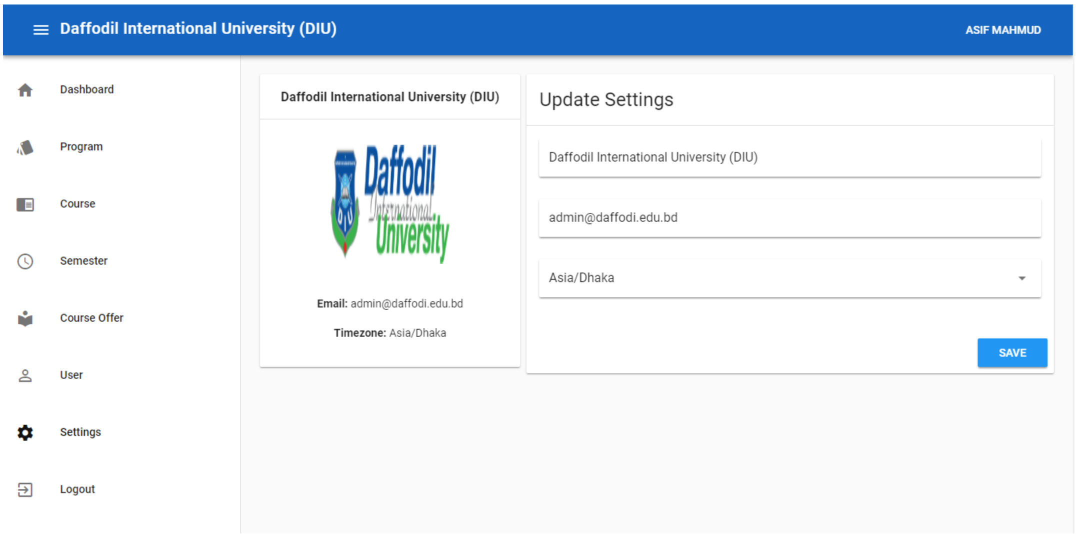
Figure 5.2.38: Update User Information



Are You Sure?

Do you really want to remove **Parves Ahmed Moon**?

Figure 5.2.39: User (Delete)



Daffodil International University (DIU)

Email: admin@daffodi.edu.bd

Timezone: Asia/Dhaka

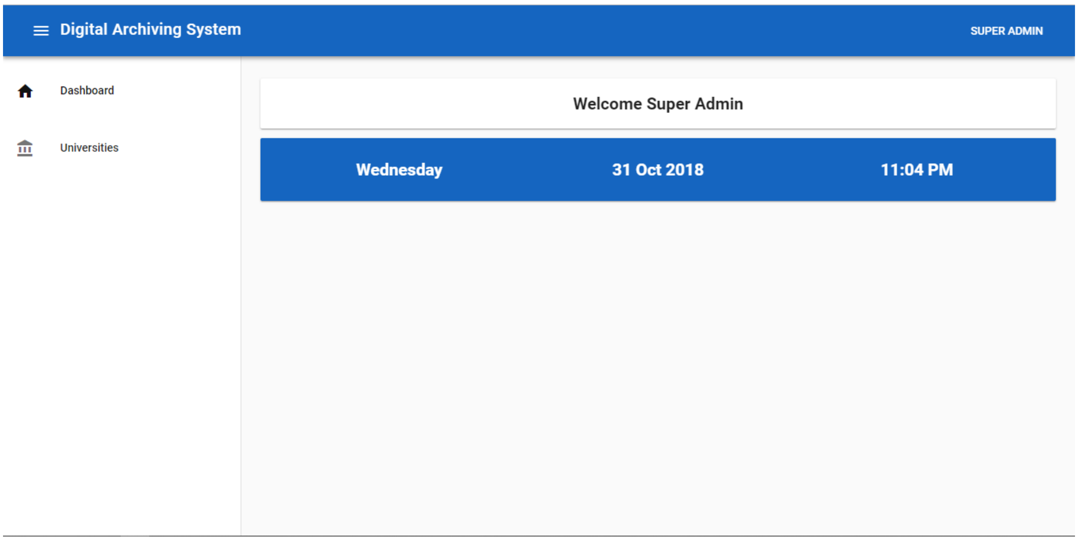
Update Settings

Daffodil International University (DIU)

admin@daffodi.edu.bd

Asia/Dhaka

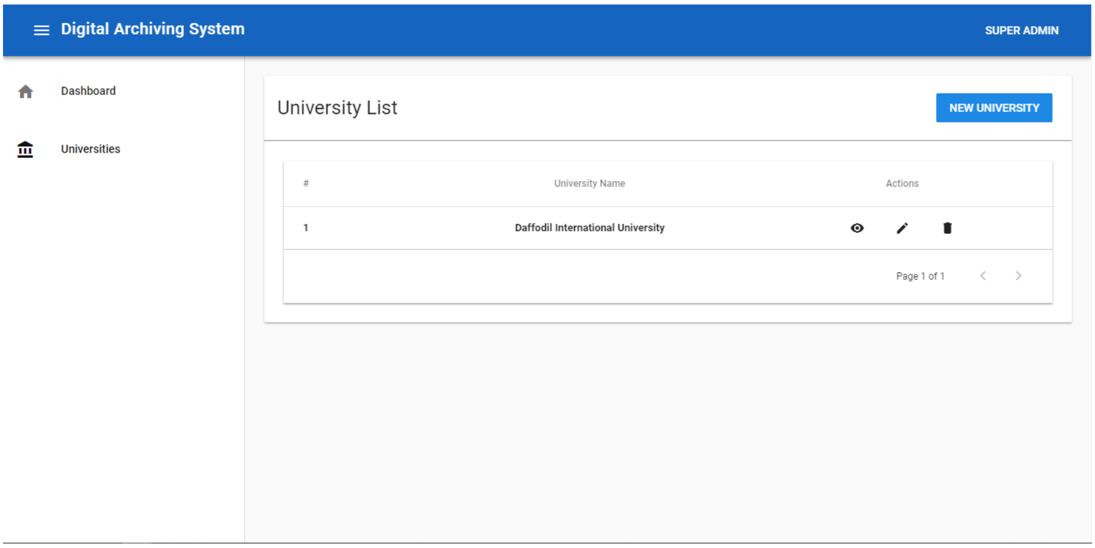
Figure 5.2.40: University Settings



Welcome Super Admin

Wednesday	31 Oct 2018	11:04 PM

Figure 5.2.41: Super Admin Dashboard



University List

#	University Name	Actions
1	Daffodil International University	👁 ✎ 🗑

Page 1 of 1

Figure 5.2.42: Super Admin : University Section Page

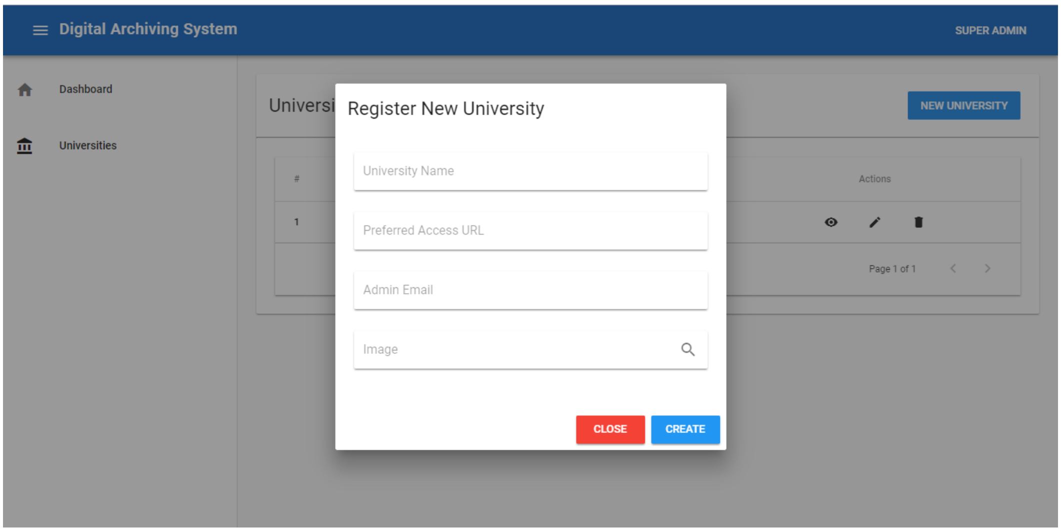
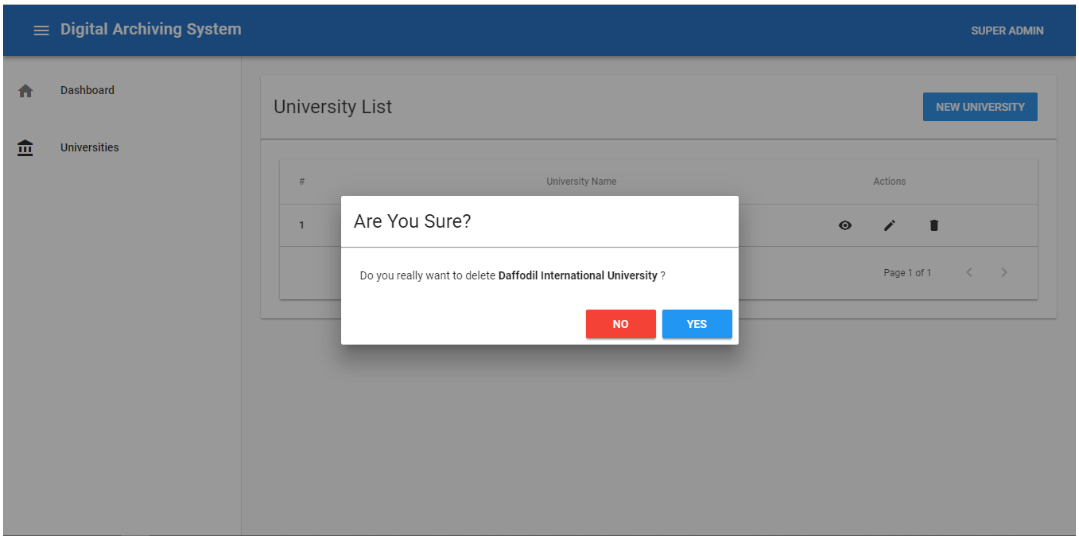
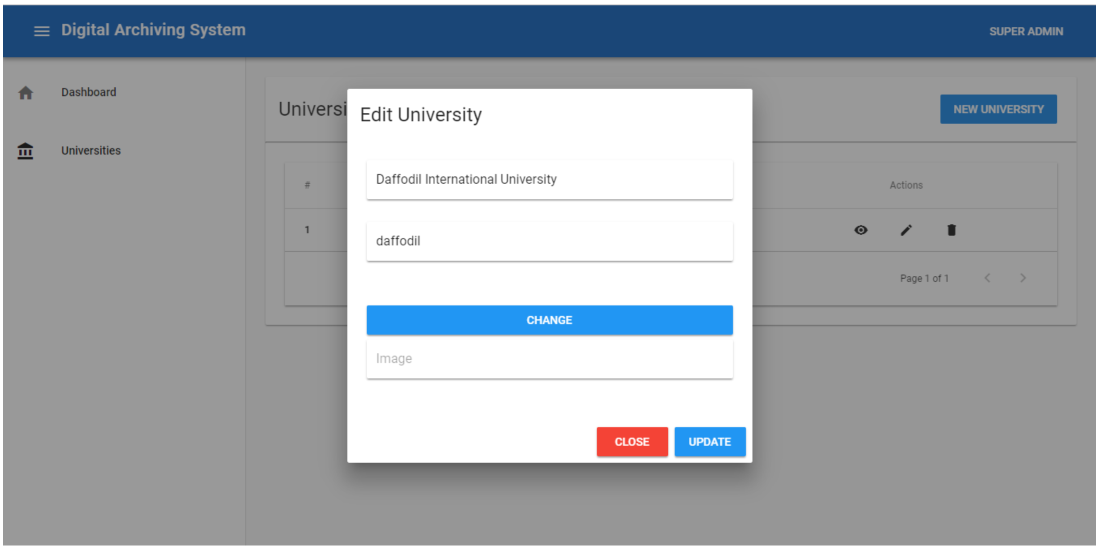


Figure 5.2.44: Register New University



Do you really want to delete **Daffodil International University** ?

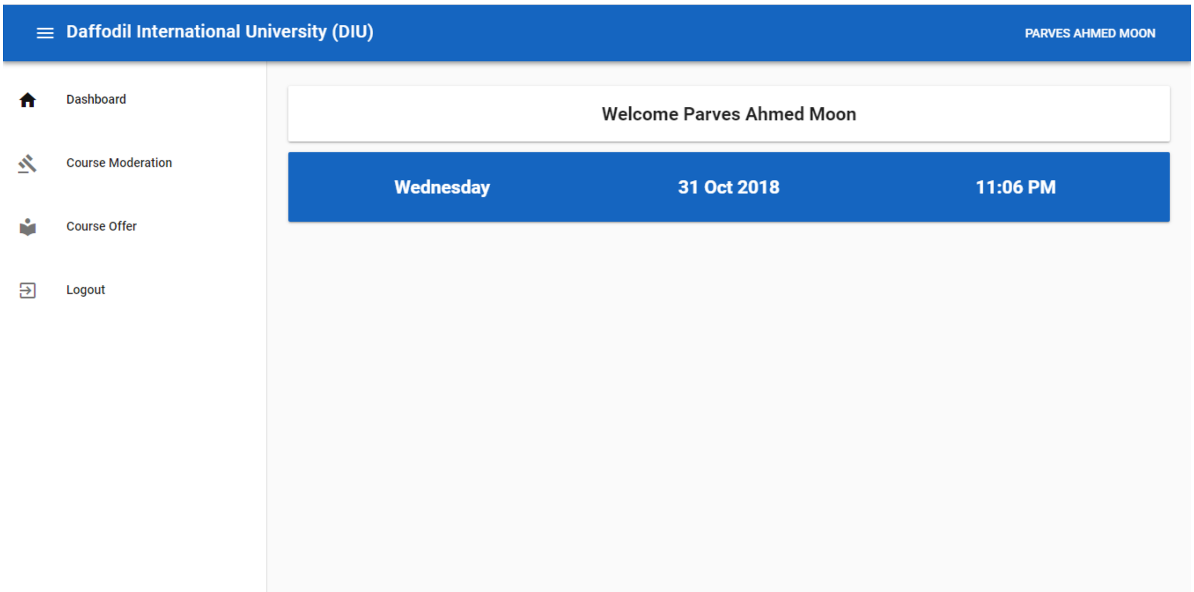
Figure 5.2.45: Delete University



Daffodil International University

daffodil

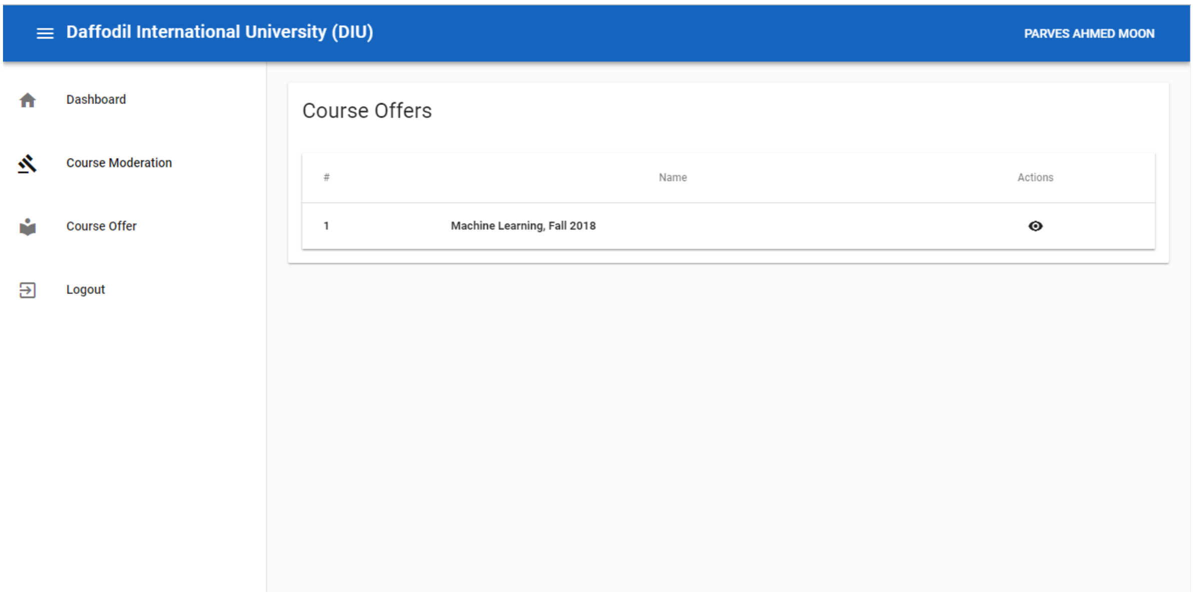
Figure 5.2.46: Edit University Details



Welcome Parves Ahmed Moon

Wednesday 31 Oct 2018 11:06 PM

Figure 5.2.47: Teacher Dashboard



Course Offers

#	Name	Actions
1	Machine Learning, Fall 2018	👁

Figure 5.2.48: Course Moderation

5.3 Implementation of Interactions

With the system, from the very beginning the process of interactions are well planned.

At the beginning, when the project is more conceptual we do some workings: Ethnographic research, Surveying, Focus group administration, Contextual Interview, Mental modeling, Flow charts, Mood boards, Card sorting, Competitive analysis, Contextual Inquiry was done.

While the project is n development phase: Wireframing, Heuristic analysis, Expert evaluation, Personas, Scenario, Prototypes of two stage: Alpha & Beta version, , System mapping, Experience mapping & User testing/usability testing has been also done.

When we have completed the Beta version & user acceptance testing we do some minor user interaction changes, patch some wireframing & fine-tuning.

Thus the system Course Tracking Management System met the proper & valid visual design, user experience & human computer interaction, usability and accessibility.

5.4 Testing Implementation

Testing is a simple terms in checking web application for potential bugs before its made live or before code is moved into the production environment.

During this stage; our developed system issues such as that of web application security, the functioning of the site, its access to handicapped as well as regular users and its ability to handle traffic is checked. We tested the functions, security, interface, database & other requirements as below:

- Functionality Testing:
  We tested Outgoing links, Internal links, Anchor Links, MailTo Links & others to check the systems functionality. We also check Forms, Cookies, Front-end functions.
- Usability Testing:
  Uses of our functions, features, contents, location of images & others in position is checked in this stage. We did test of navigation & site pages redirecting.
- Interface Testing:
  Our system response time is good when the connection between of three layers (Application, Web and Database). Test requests are sent correctly to the Database and output at the client side is displayed correctly. Our system Web server is handling all application requests without any service denial. And last but not the least queries sent to the database give expected results.
- Database Testing:
  We mentioned about expected result in the previous section. The systems data Integrity is maintained while creating, updating or deleting data in database. It is dynamic & the queries are optimized in response timing.
- Compatibility testing:

This system have no compatibility issues in modern web browsers. Mozilla Firefox, Google Chrome, Opera, UC Browser, IE are tested for Windows, Mac, Linux Operating System. Apples Safari & Retina display issues are checked in Mac OS. We did test on Tab, iPhone, iPad, Windows Touch, Android phone & various version of OS. And all the result passes.

- Performance Testing:
  Website loading response time is short, cached memory & cookies is reusable. The overall performance is satisfactory for a user.
- Security testing:
  Data passes through user and server end point is well secured. We are using encryption based data passing for ensuring higher security for the system. So we divided the system backend in two parts. Also the admin & super admin have secure login options.

5.5 Test Results and Reports

We have completed our project & the project meets all the requirements. The final version of Course Tracking Management System have no bugs & interaction problems. The testing of the web application is successful & have found no error. The results of the CTMS is giver bellow.

- **Completion of Percentage**
  We have completed our project 100%. We have met all the functional requirements that we discussed in the requirement section.
- **Percentage of Accuracy**
  Our project is working 100% accurate. It fulfills all the functional and non-functional requirements as we mentioned in the previous chapter earlier.
- **Percentage of Correctness**
  As we have tested all the requirements and made their test cases mentioned and clear all the mistakes so now our project is 100% correct.

CHAPTER 6

Conclusion and Future Scope

6.1 Discussion and Conclusion

The present manual system is too much time consuming, costly management system with in need of big storage for preserving or archiving the course files. We can easily digitalize the whole system with course tracking management system. This system is not complex to use, have fully human computer interaction and enough storage for archiving the files. There is no need an offline big storage or person to manage the whole system. The cost of management & storage is saved. The time for finding or sorting out of the course files are saved. So, when the time of quality checking, rechecking or at the time of accreditation this developed system will be blessing. And not only for our manual system in university also for a digitalization of education system in Bangladesh.

6.2 Scope for Further Developments

Though our requirements meets the full thought of our objectives & motivation there are some scope to improve the system & easier for the user. The further scope of developments are our future developments for this project.

Scope for further developments:

- Mobile Application: For extending portability, flexibility and more time saving the development of an application for mobile phones is matter of time. Everyone wants a system in their hands for easy usability. This Mobile Application will met the desire.
- Adding some tweak: For easy view of the whole process there can be added some features like Matrix system [21] for the developed system. In this way viewer & user can find the progress & a view of Course Intended Learning Outcome.
- Marking Method: Though all of our universities does not have the same marking system, so there is a need that the marking system has to be dynamic for the system. Admin or varsity authority can add their marking system and grade for the system & the whole system is converted to that marking system only for that particular university. There is a process & system named Rubric [22] for this solution.

Appendix

Appendix A: Course Files & Manual Management

After some research of Bangladeshi University Course Management System, almost same picture is showed up. Most of the universities doing or tracking some data in their own portal, but most of the course files are maintain by the authority & manual system.

A research & calculation showed the following result of the current situation: The current system for a course file management is entirely paper based and completely manual. These paper-based files are maintained manually which presents a variety of disadvantages that include physical storage, retrieval issues, management of papers and recurring paper and printing costs. Moreover, the extensive paper uses required to maintain cost, storage cost and complex system for further checking for the accreditation.

It is interesting to explore that the storage space and cost for a course file in terms of money and man-hours. The size of the course file that is presently used to maintain one paper-based course file is 9cm x 29cm x 32cm (8352 cubic cm) and it may contain between 200-300 pages. According to our estimate a medium range university which passed minimum four years in a varsity and offers 500 courses per academic year would require a storage space of approximately 15 cubic meters. This space would be required to house 18 files cabinets. In addition, roughly around 30,00,000 BDT would be needed to cover the paper & printing cost of 500 courses files. The estimated number of man-hours spent to prepare paper-based courses files will be around 1000. For the accreditation and assessment purposes of an undergrad degree program, the institutions generally maintain a complete record of all course files for a period of four years. Therefore, maintaining the course files of the entire program for a period of four years becomes a challenging task (see Appendix A).

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[2] About IEB: The Institute of Engineers, Bangladesh, available at <<http://www.iebbd.org/>>.

[3] Swan, K., Matthews, D., Boles, E. and Day, S., “Linking online course design and implementation to learning outcomes: A design experiment.”, The Internet and Higher Education, 15(2). 81–88.

[4] Learn about DIU Student Portal, available at <<http://studentportal.diu.edu.bd/>>.

[5] Learn about DIU Teacher Portal, available at <<http://attendance.daffodilvarsity.edu.bd/#/login>> & <<http://forum.daffodilvarsity.edu.bd/index.php/topic,36528.0.html?fbclid=IwAR1NY3LSOV-Y6HrBz_17glruinMvk_Kjsns--7tbcTxGIYMvALf_QxTNKHw>>.

[6] Learn more about ‘Portal of the Student’ NSU, available at <<https://rds3.northsouth.edu/>>

[7] Learn more about “NSU Faculty Login & Online”, available at <<http://www.northsouth.edu/nsu-announcements/oscas.html>>

[8] Learn about Udemy Online course system, available at <<https://www.udemy.com/>>

[9] Learn about Udacity Online learning system, available at <<https://www.udacity.com/>>

[10] Learn about CS, Cornell University, NY, available at <<https://www.cs.cornell.edu/>>

[11] Learn more about University of Tabuk, Saudi Arabia at <<https://www.ut.edu.sa/web/university>>

[12] Learn more about Howard University, Washington at <<https://www2.howard.edu/>>

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[17] Zyad Shaaban, “Course File Management System”, Volume 3, Issue 5, October 2014

[18] Chaoyun Peng,Jie Ren,Jianping Zhang, “Development of a General-Purpose Online Course Platform based-on Asp.Net”, July 2010 from 2010 2nd International Conference on Education Technology and Computer of IEEE.

[19] Harry N. Keeling, Ph.D., “Using A Learning Management System to Facilitate Program Accreditation”, worldcomp-procedding, Vol. FECS Paper-3643, pp. 01-03, January 2010

[20] Learn more about CILO, available at << http://tll.mit.edu/help/intended-learning-outcomes>>

[21] Sahar A. El_Rahman, Sahar S. Shabanah, “Course and Student Management System Based on ABET Computing Criteria”, Published Online May 2016 in MECS (http://www.mecs-press.org/).