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OPUS Open Portal to University Scholarship

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eLearning

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eLearning

By

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GRADUATE CAPSTONE SEMINAR PROJECT

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For the Degree of Master of Science,

With a Major in Computer Science

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ABSTRACT

The e-Learning website will be on technology course concepts and will help the users learn the technical information to improve their knowledge. With that knowledge and information, they can implement the concepts in real-time to develop the applications and websites by using different technologies.

This e-Learning website on technology will reduce users' study time concerning finding different technological concepts in one platform. Nowadays, reading a complete book on one technology is taking more time than reading the same book concepts from the e-learning platform. This application will be a new application and provide the technical information concept-wise. This application will be released on December 1st, 2021, and no other future releases are planned.

Table of Content

1   Project Description

eLearning platform is a great source for learners and instructors to post on technology concepts. The main aim is to share the knowledge and gain knowledge through a web platform(eLearning) instead of physical hard books. Both learners and Instructors have the flexibility to learn technology courses. For instance, If the learner wants to learn some technical information on java, the learner can just come on to the eLearning platform and can read if it is available. If the same learner knows some more information related to java he can also post the content as an instructor. Once the instructor posts the content, the admin will verify the content to publish or unpublish. If the posted content is valid admin will approve to publish and if it is not relevant to the course then the admin will unpublish the content. In this eLearning platform, instructors have the flexibility to conduct the live lectures and schedule the future meeting for lectures through Zoom and share it with the users through an email or any medium of sharing the meeting information. It has the feature of recording the lecture through a third-party website and it is an instructor option to record. The instructor can also upload the lecture videos to other websites such as YouTube, and Instagram, etc., and publish that lecture link through the eLearning platform.

1.1   Competitive Information

There are competitors in this platform like Udemy, Tutorials point and W3schools. etc. These platforms provide the lecture contents or information on different topics. But they don't offer live lectures or future lecture schedule meetings on technology. Once we go to their home page it shows confusion initially that what is provided in the platform. On the eLearning home page, it will show all courses that are available on the platform, and to search for a course, just in the content, select the name of the course then that course content only appears on the page. Competitors are not providing an option of a live lecture by the instructor on a particular course. Conducting live sessions on technical topics can easily show interest to attend the meeting and learn the technology concept. Accessing the course information is an open source but to post content users need to sign up. For other competitors are using registration and charging the fee to see the content. Instructors don't need to approach the eLearning platform to register as an instructor to post the content. Other platforms are not giving flexibility to the users as read the content and post the content for free. The reach of the eLearning platform is more than other competitors.

Identify competitor products, applications, or services that this project will directly compete against and whether your team has the potential to be the first to market this new project application or capability.

1.2   Relationship to Other Applications/Projects

- eLearning platform is common in sharing the content, but the way eLearning is the one that provides friendliness in providing the content and learning from the content.
- There are a lot of platforms that provide the content like Udemy, W3schools, Tutorials Point but they don't do live sessions through Zoom to the audience in a unique way and do not provide the feature of screen recording through external sources.

1.3   Assumptions and Dependencies

- Giving user-friendly to the users(Learner and Instructor) In terms of learning technology topics and providing the technology concept and making it available to the user.
- Here instructor has unrestricted access to provide the content but to make it available to the public Admin need to validate the content as to whether it is valid content or unwanted content.
- Admin can also register the same as other users, but the admin role needs to be enabled at the time of registration.
- For live Zoom meetings configured through zoom API into eLearning.
- For the screen recording is through the screen recording website externally.
- It will not send any forgotten password to the registered email, but it can reset over the eLearning platform.

1.4   Future Enhancements

This platform has more scope to add more content on the pages and different courses not only from technology like accounts, Chemistry, Math's, and English, etc. To add more features to the platform, need to plan before they can be implemented with the .Net Core MVC framework and C#. This eLearning platform has the flexibility to add more features conveniently.

1.5   Definitions and Acronyms

C# is Programing language, SQL: Structured Query Language
HTML: Hypertext Markup Language

2   Project Technical Description

Dr. Xin Chen is our stakeholder to build this eLearning website. This platform is somewhat like other content-providing sites such as Udemy, w3schools and tutorial point, etc. This website is for any user like registered and unregistered users to access available courses to learn. There is only restricted to the instructor that he needs to create an account to perform the operations which belong to the instructor. Leaner needs only content to read and learn but it can only get it from an instructor. For that purpose, the instructor needs proper accountability and security to the content what the instructor post which belongs to the specific technological course. To monitor the instructor posted content, we have an admin role. The admin will validate the posted content and make it available to every user if it is valid content otherwise will unpublish or won't publish them so that it will not be available to all the users. Admin can register once the role is enabled in the backend. Admin can also sign up with his details and immediately disable the role in the backend so that other users can not register as an admin. Therefore, we are also storing admin details in the back end to control website content. This admin control will be done by the business owner. The instructor can have access to posted content with status as published or unpublished. The instructor can also have a track of all posted content. In the same way, the admin will also have a track of all contents posted by the instructor. There is a big feature was configured for the instructor role which is conducting live and future lecture sessions through Zoom API and sharing the meeting information through email and chat conversion. There is another feature provided for the screen recording of the lecture by the instructor through the Screen recording website with an online version.

This application was built with help of .Net Core MVC Framework, an SQL server for the database, and C# for backend programing. We have imported the package SQL server to get connect the database, collections, Json, Tokens, etc. We have used, JavaScript, jQuery, CSS, and HTML for the frontend. This website is also mobile compatible.

2.1   Application Architecture

HTTPS Protocol: is used to generate the session key for the long term and short term to encrypt the data flow between client and server.

Web Client: Basically, a web browser that connects or has access to the website.

Web Server: This server processes the client requests over the web and incoming networks request over the HTTP.

Server-Side Script: This website processor interprets the client request which comes from the web client and web server and applies logic based on the user role access authentication verification.

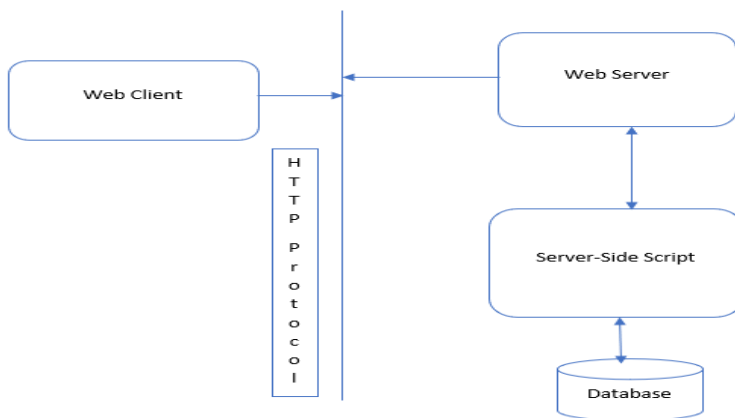**Database:** It receives the request from the server and gives the response to the same server to present it to the client.

Image1: Application Architecture
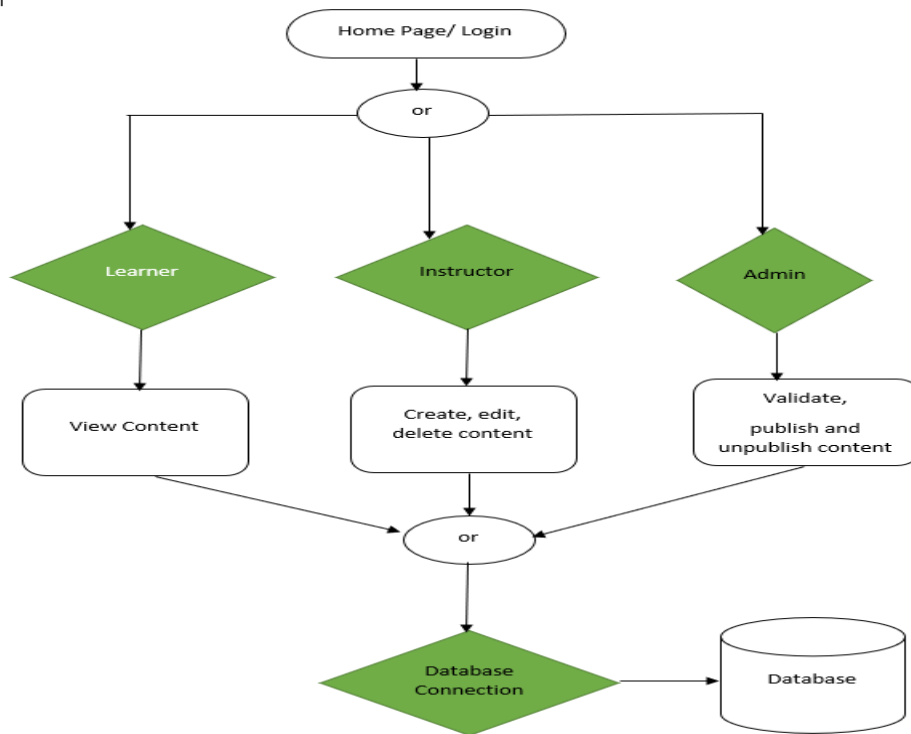
2.2   Application Information flows

Image 2: Flow Chart of the application

2.2.1. Home Page:
This is the home page that is common for any user. On this page, there is a content item to view the web development list of courses. By default, all lists of courses will appear on the page once scroll down. But if any user wants to see the courses then Go to contents, web development, courses find the name of the course to see or learn. On the home page, there are other pages are attached which are Registration and Login.

2.2.2. Registration Page:
This page gives access to the user to enter the personal information for registration signup along with role, password, and confirm password. Once the registration is done a successful message will appear on the page to the user.

2.2.3. Login Page:
This page gives users to enter their username and password.

2.2.4. Forgot password page:
This page takes the email id of the user and resets the password.

2.2.5. Forgot Password confirmation page:
It will direct to the reset password page to take email and password and confirm password to reset the password for registered email.

2.2.6. Add content page:
This page contains the Content Management System to post content of the post particular course contents in different forms such as text, images, videos, and provide the links to publish.

2.2.7. Courses page:
It will show the posted content of an instructor.

2.2.8. Create Meeting Page:
This page creates a live or future meeting with a certain time frame, date, and duration with the topic name. Once the meeting schedule is created meeting ID and password will be generated.

2.2.9. Start Meeting Page: This page will help to start the meeting by the instructor once the instructor enters the hostname, meeting ID number, and password then click to join. Once join Zoom API will run our host to start the meeting.

2.3   Interactions with other Applications

- This eLearning is configured with the zoom API to conduct the meeting by the instructor.
- To record the instructor content communicating through screen recorder website online version.
- Uploading the instructor video content through YouTube, Instagram, Vine, Vimeo, or Yoku and providing these uploaded file links in the eLearning platform.
- Interacting with MS Visual Studio IDE for code development
- Interacting with SQL Server Management Studio for the database.

2.4   Capabilities

- This website can be able to store all courses information which is the main source for the website in addition to that it can store all users' information.
- In the Content Management System, it can be able to provide different types of content (text, images, audio, and video) including links from third-party media domains such as YouTube, Instagram, etc.
- It can also schedule meetings through Zoom to conduct lecture sessions with audiences.

2.5   Risk Assessment and Management

- Currently it is running on the local machine with 500 GB Space available so that it can handle a thousand requests per second and to handle more requests, need to increase the space so that it can handle the more requests by the server.
- To load balance always recommends additional servers to handle huge traffic.
- To reduce unauthorized access please add more two-way secure authentication processes to login.
- Always maintains space the store the data, do not get overloaded when the instructor posts content.
- Admin signup must be done at a specific time means when the traffic is very low to control unauthorized admin registration. Once signup is done then need to disable the admin sign-up access.
- Admin always should check the content posted by the instructor for content integrity.

3   Project Requirements

3.1   Identification of Requirements

3.1.1. eLearning-1 User Registration/Login-000001

eLearning has three roles of registration which are learner, Instructor, and Admin.

For each signup by each user need to provide the first name, last name, email, select the role, password, and confirm the password.

For login need to provide an email and password.

3.1.2. eLearning-1 Home page Contents-000002

Contents on the home page have the same access to every registered or unregistered user to view the content of the course.

3.1.3. eLearning-1 Instructor add content- 000003

In the added content, the instructor needs to enter the title of the content, available course title from the drop-down menu, option item to record the lecture from the screen recording website online version, and description for the content(text, images, audio, and video files through YouTube link, etc.).

3.1.4. eLearning-1 Create Meeting -000004

Creating live and scheduling future meetings through zoom and sharing meeting information through an email to the audience or chat.

Instructors can create a meeting with the topic names on the available courses and on specific days and times with the duration period.

3.1.5. eLearning-1 Start Meeting -000005

The instructor can be able to start the meeting.

The instructor can start the meeting by entering the name of the host, meeting ID and password then join the meeting.

3.1.6. eLearning-1 Posted Content -000006

To view and modify any posted content before it is published by the admin.

Once the instructor posts the content then they can see a list of contents they posted from their account in posted content. The instructor will have an option to edit before it is published by admin to all users.

3.1.7. eLearning-1 admin/posted content -000007

Admin can see all contents which are posted by all registered instructors in posted content of admin account.

Here admin needs to validate the content as to whether it is valid or unwanted content based on that admin will publish or unpublish the content.

3.2   Operations, Administration, Maintenance and Provisioning (OAM&P)

Once the admin is registered, will get full access rights to maintain the eLearning platform to control all the operations of the website from front end to back end. He will be responsible to transfer rights to another user when he is moving out by enabling the admin role from code. Admin will maintain the website once the release is done. For instance, the admin will also monitor traffic and provide the available resources to the users in terms of space to store the data and balance with servers to process requests over the web. To provide the additional course admin will take care of it from the database.

3.3   Security and Fraud Prevention

While enabling the admin role back end, admin will take the responsibility to get registered with assigned to a user, but any user gets registered as an admin who is not authorized, admin will delete the account from the database. Admin is the person who makes the content visible to all the users once it's posted by the instructor.

3.4   Release and Transition Plan

We have this website in our local and at present, it is running in the local. The delivery of the project is up to date as planned and will be transferred to stakeholders over email at present. No other versions are planned. Stakeholders will download and run it on their local machine/server.

4   Project Design Description
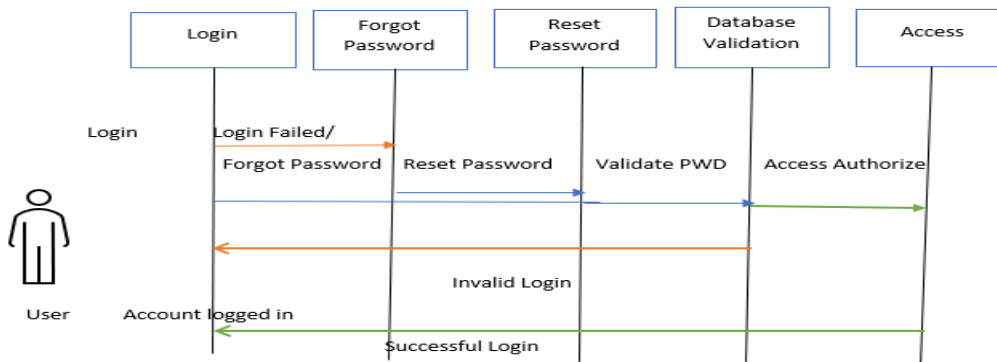
4.1   Sequence Diagram:

Image 3: Sequence Diagram

Sequence diagram for the user login as when a user tries to log in, the database will validate the username and password. If it is failed then the user needs to enter the correct password or select forgot password to reset the password of the user account. Once reset is done then the user will try to log in to access. The database will validate the changed password then provides the access to get the login.

4.2 Database ER diagram:

In this eLearning app database, there are different tables that connect with each other to process the data as user requests. Course names, user details, course content, user roles, roles, users, users' logins, and user tokens tables will hold data. Each table is related to primary key and foreign key relation.
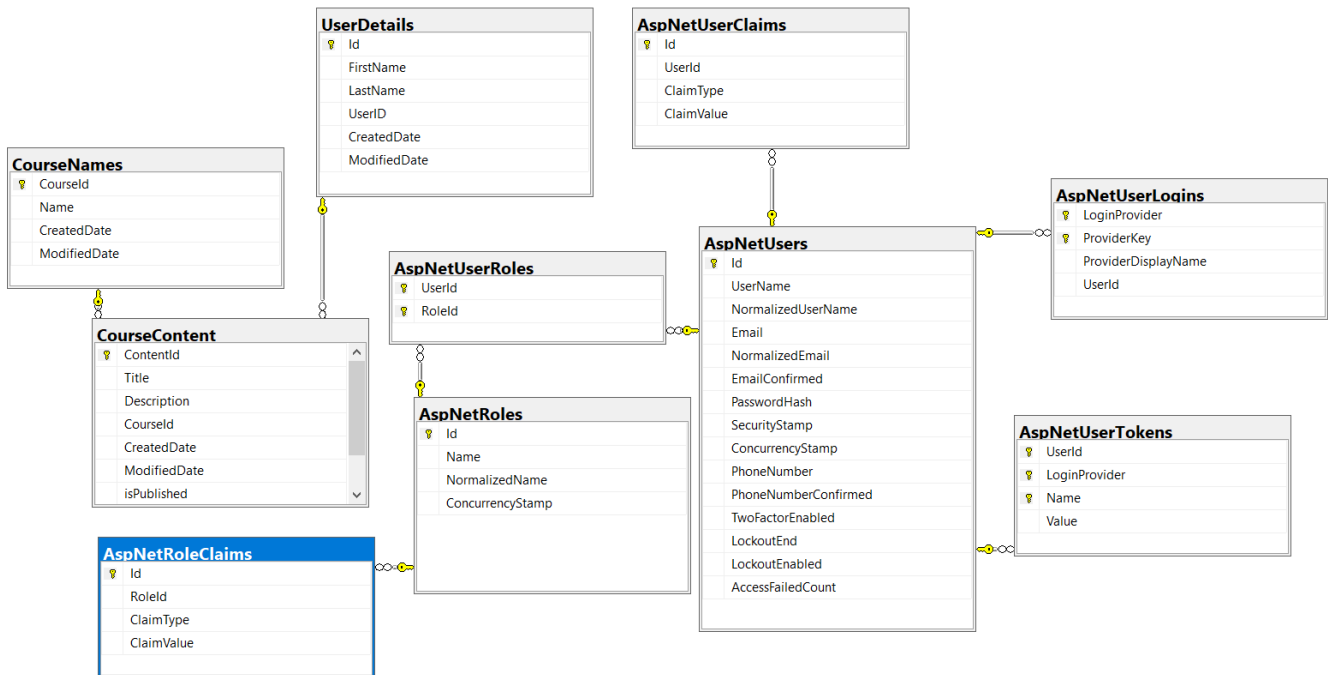
Image 4: Database ER diagram

5 Internal/external Interface Impacts and Specification

5.1 Internal: Back end

For the back end used C# programing language, .Net core framework and there are different packages like Entity framework core, UI, SQL server package for the database is used in the home and course controller to process the request.

5.2 External: Front end

For the front end of the eLearning is developed with JavaScript, HTML5, CSS, jQuery and used forms, different classes like wrapper, container classes for the layout.

6 Design Units Impacts

6.1 Functional Area A/Design Unit A

6.1.1 Functional Overview

eLearning website contains 3 user roles which are Learner, Instructor and Admin.
Learner registration is an option on the website even if the leaner registered whatever the access that person gets same level of access other non-registered learners will het it. So, it is an option for the learner.
Admin is the main role on the platform where this user makes sure the valid content and make it available based on the instructor posted content.

The instructor is the main person to provide the content and conducts the lecture meetings either live or future on the technology topic through zoom. Without Instructor's role in the eLearning content will not get generated.

6.1.2   Impacts

There is the advanced search option to see the same course name content by the different instructors by selecting course name from contents.

6.1.3   Requirements

6.1.3.1 Functional Requirements
- It can be able to create an account for different users
- Admin can be role enabled and disabled at the time of registration by existing admin.
- Learner can be able to log in and view the content of the course from the available list of courses.
- Instructor can be able to create different types of lecture content i.e., text, images, audio, and video format.
- User can be able to reset the password
- Instructor can be able to create the meeting through zoom.
- Instructor can be able to start the meeting with the meeting information and can share the meeting information through email.
- Instructor can be able to see posted content on the topics
- Instructor can upload the video content file over the third-party domains such YouTube, Instagram, etc.
- Instructor can be able to use a screen recording website to record the lecture.
- Admin can be able to see posted content of all instructors
- Admin can be able to add a list of courses
- Admin can control all operations of the eLearning website and its database.

6.1.3.2 Non-Functional Requirements

Security: account creation will be done through a secured method and getting connected with the database will be secured authentication.

Data Storage: data related to the eLearning website through relation database through SQL server queries
.
Compatibility: It has compatibility with Windows and mobile devices.

Performance: it provides the best performance when processing user requests.

Reliability: Currently it is running in the local and once deployed into the server based on the server capacity it can handle the requests.

7   References

C# Tutorial. (n.d.). Retrieved from https://www.w3schools.com/cs/index.php

C# Tutorial. (n.d.). Retrieved from https://www.tutorialspoint.com/csharp/index.htm

ASP.NET Tutorial. (n.d.). Retrieved from https://www.javatpoint.com/asp-net-tutorial

8   Appendices
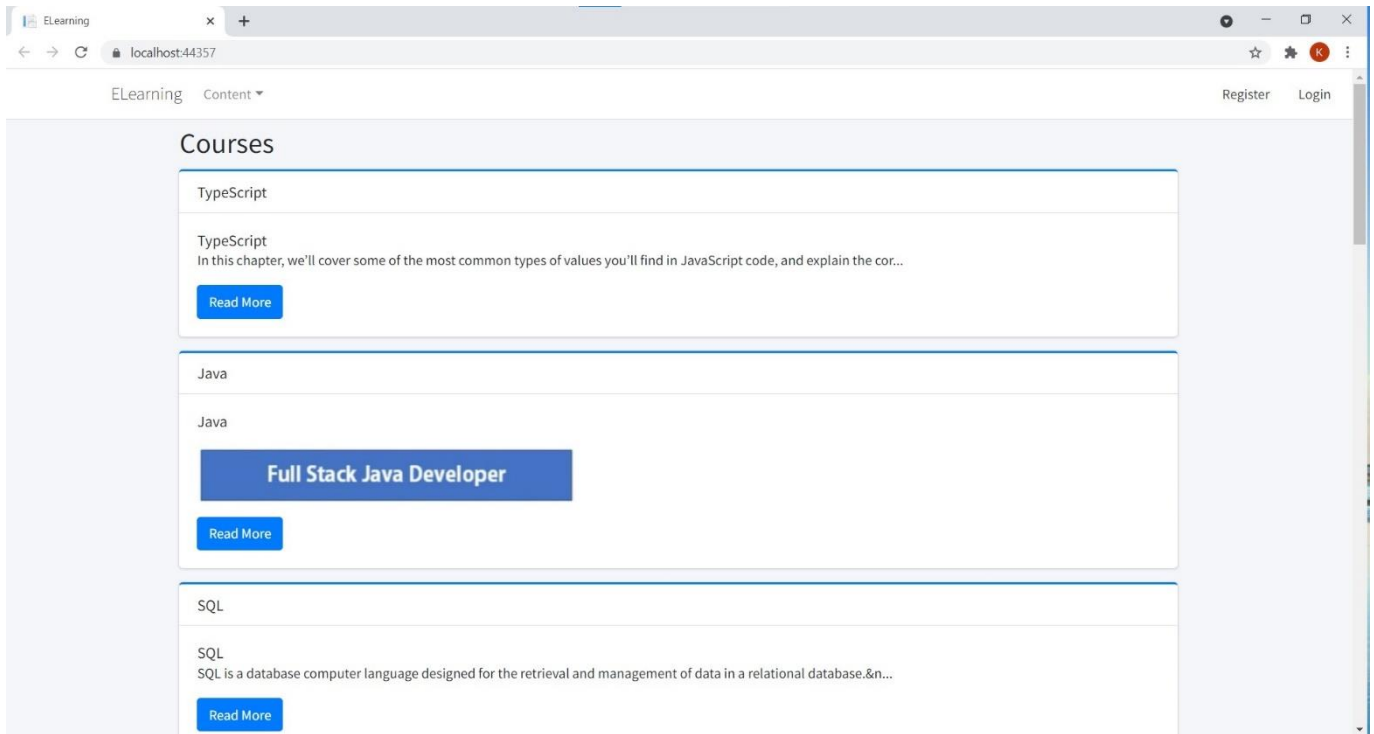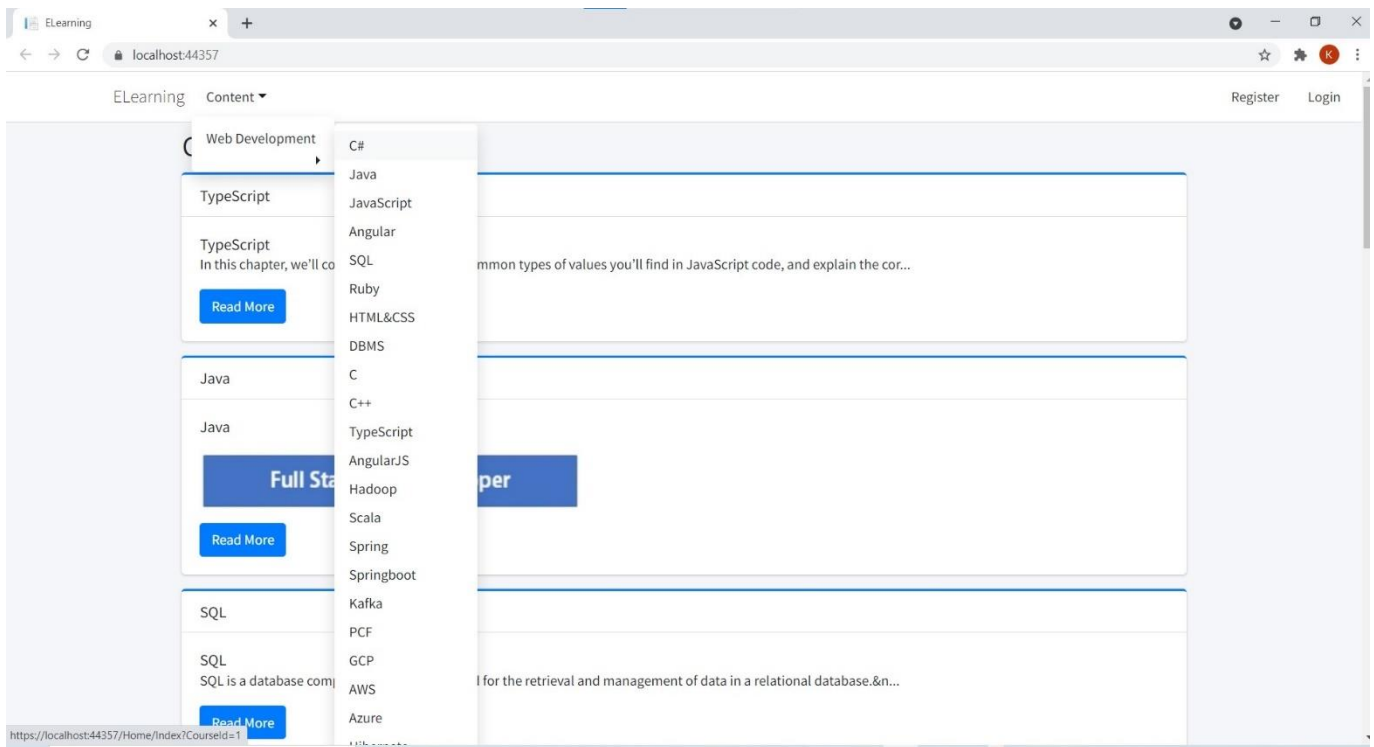

Image 5: Home Page
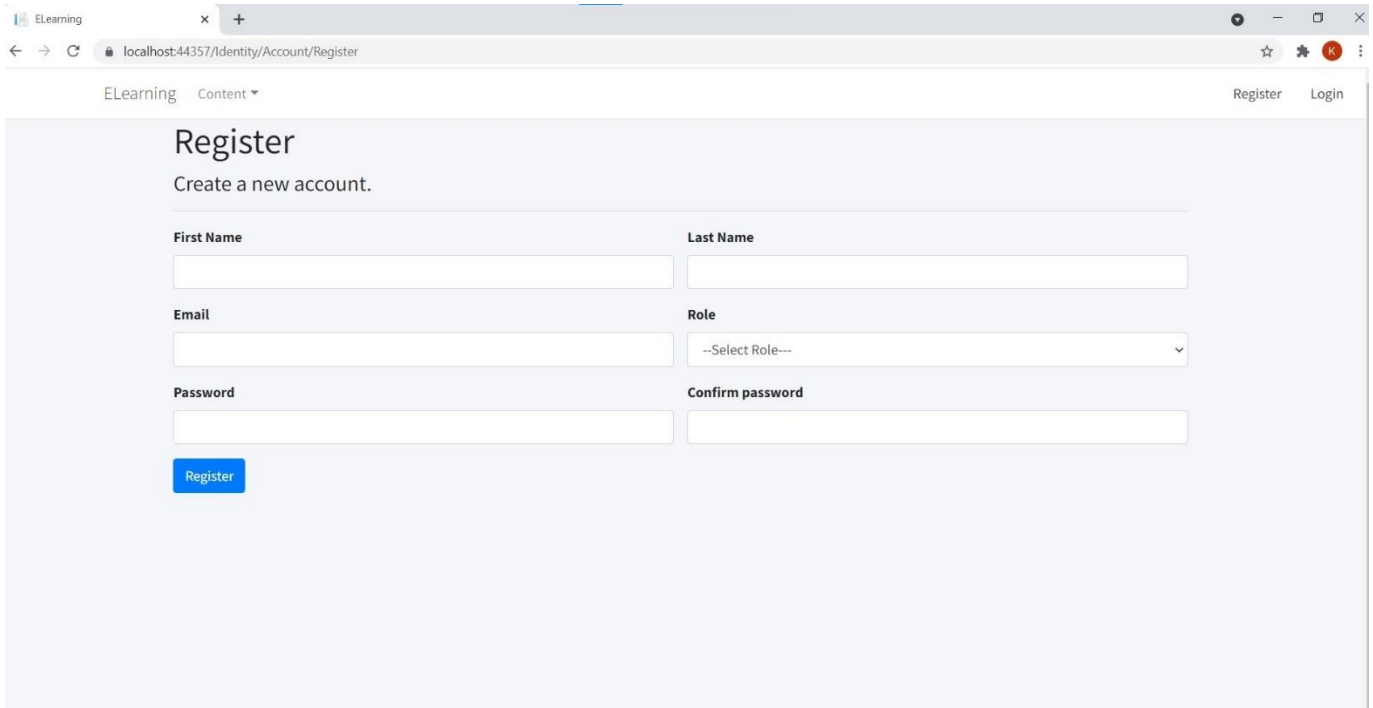

Image 6: Course list on the home page
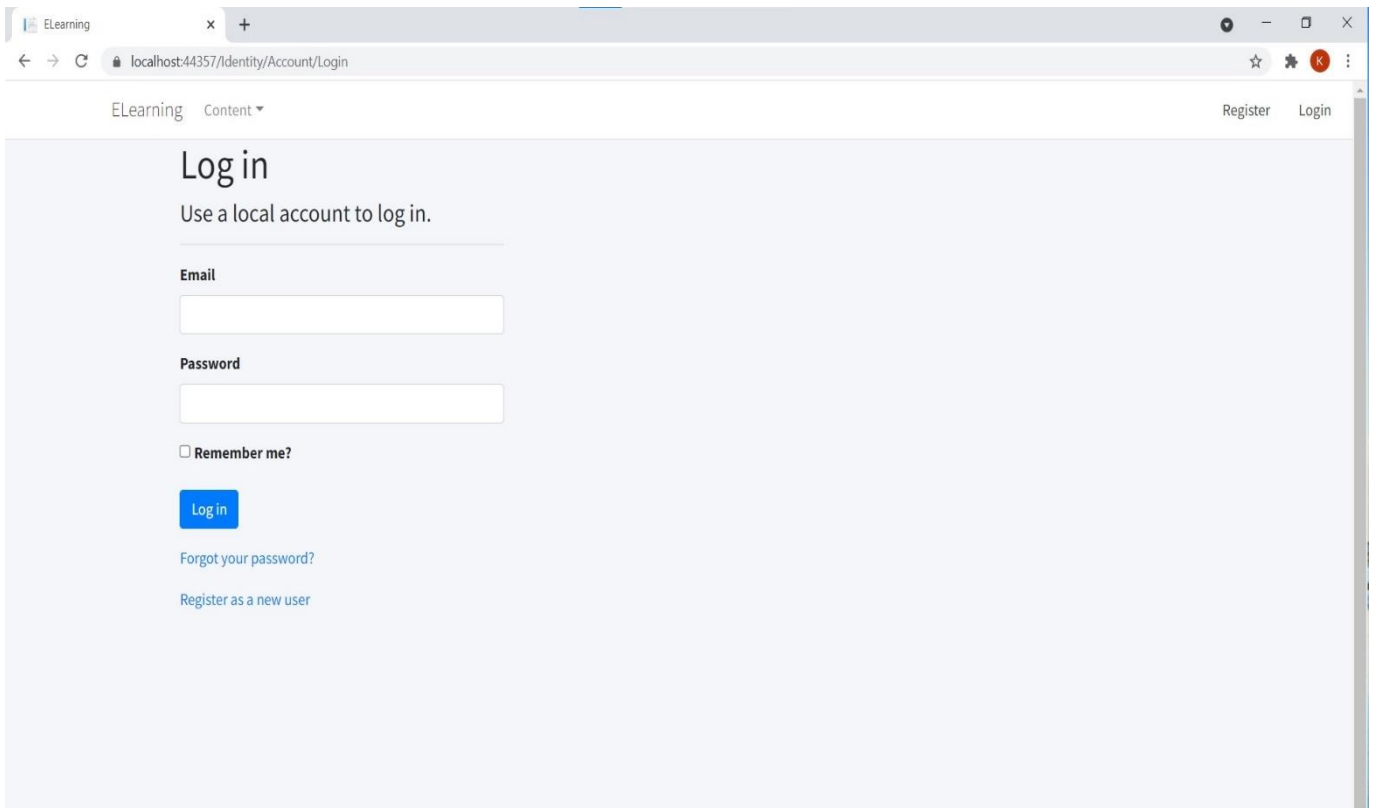
Image 7: Registration Page
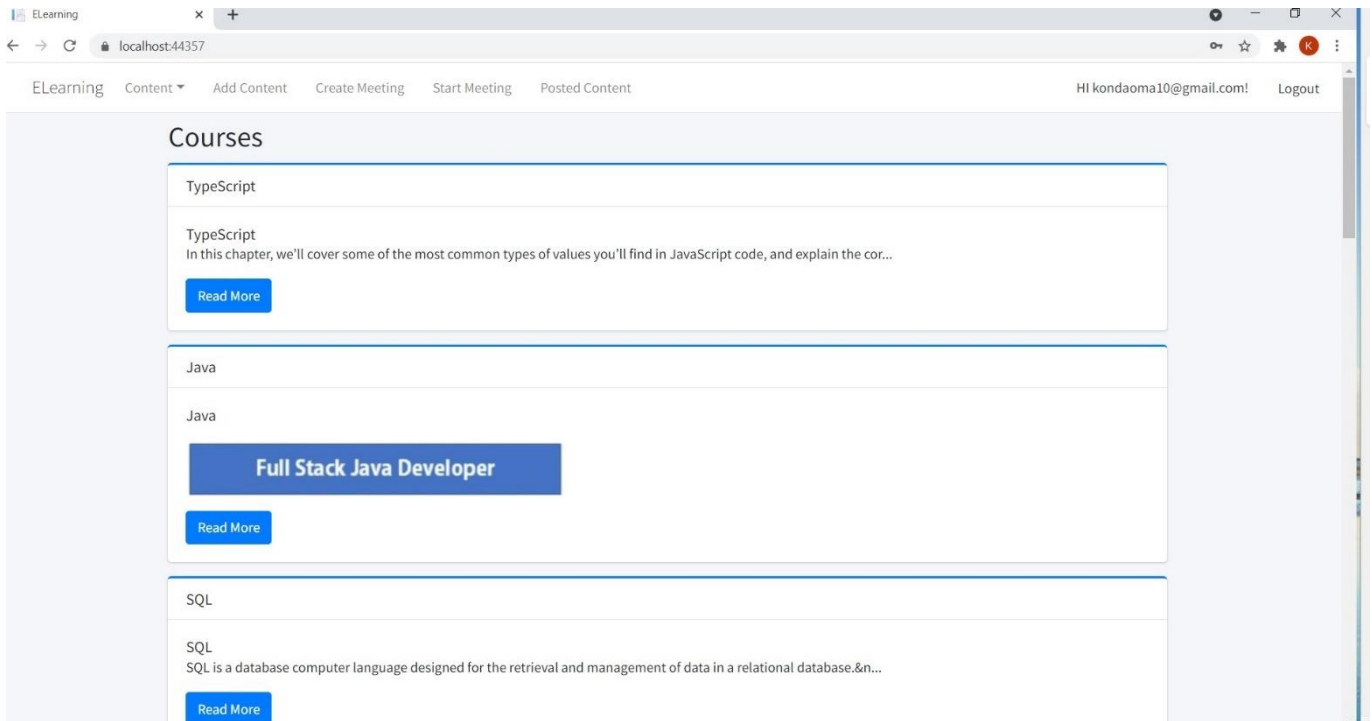

Image 8: Login Page
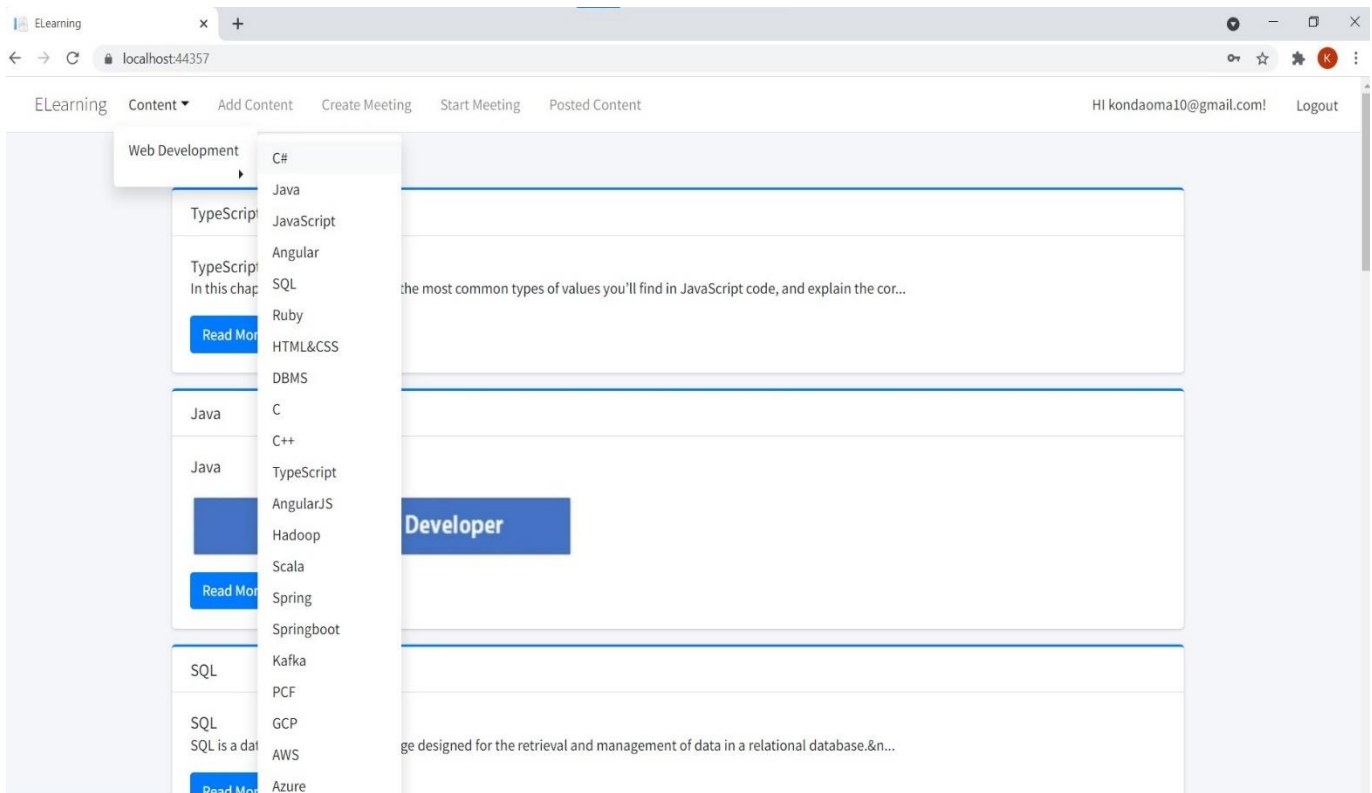
Image 9: Instructor account page

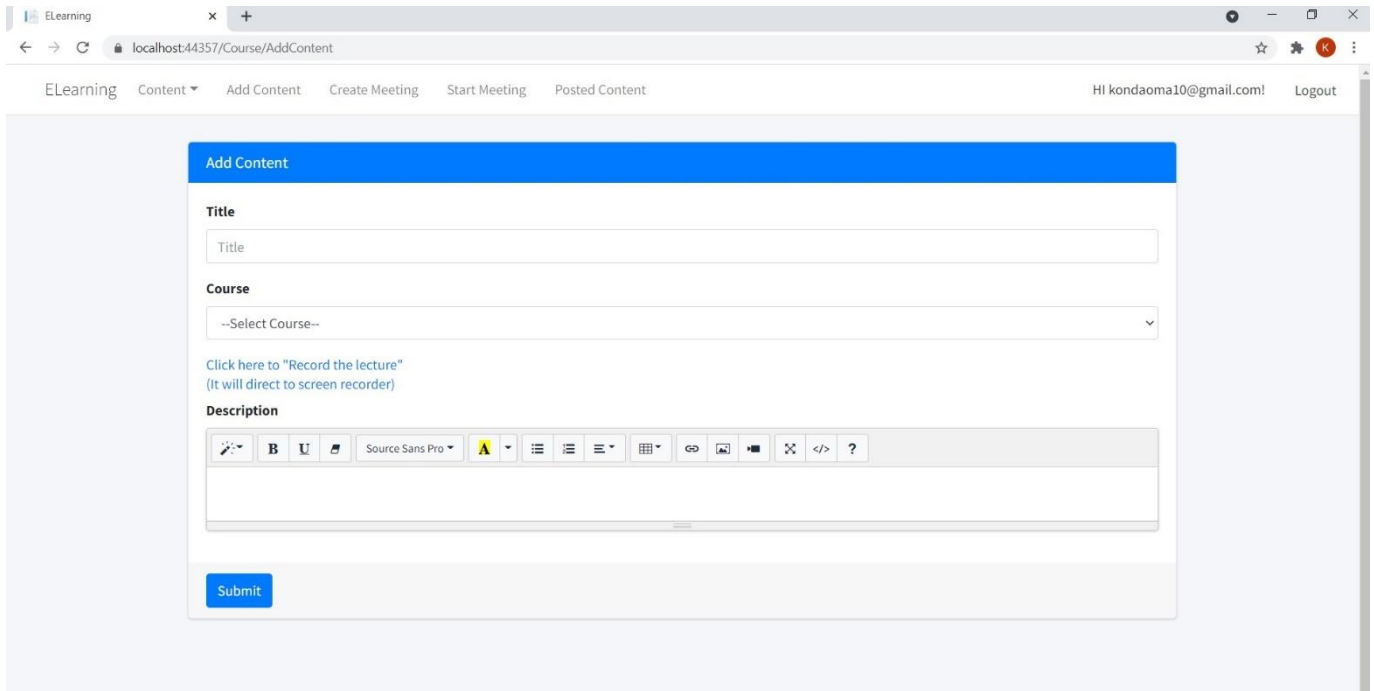*Image 10: Instructor account page list of courses*
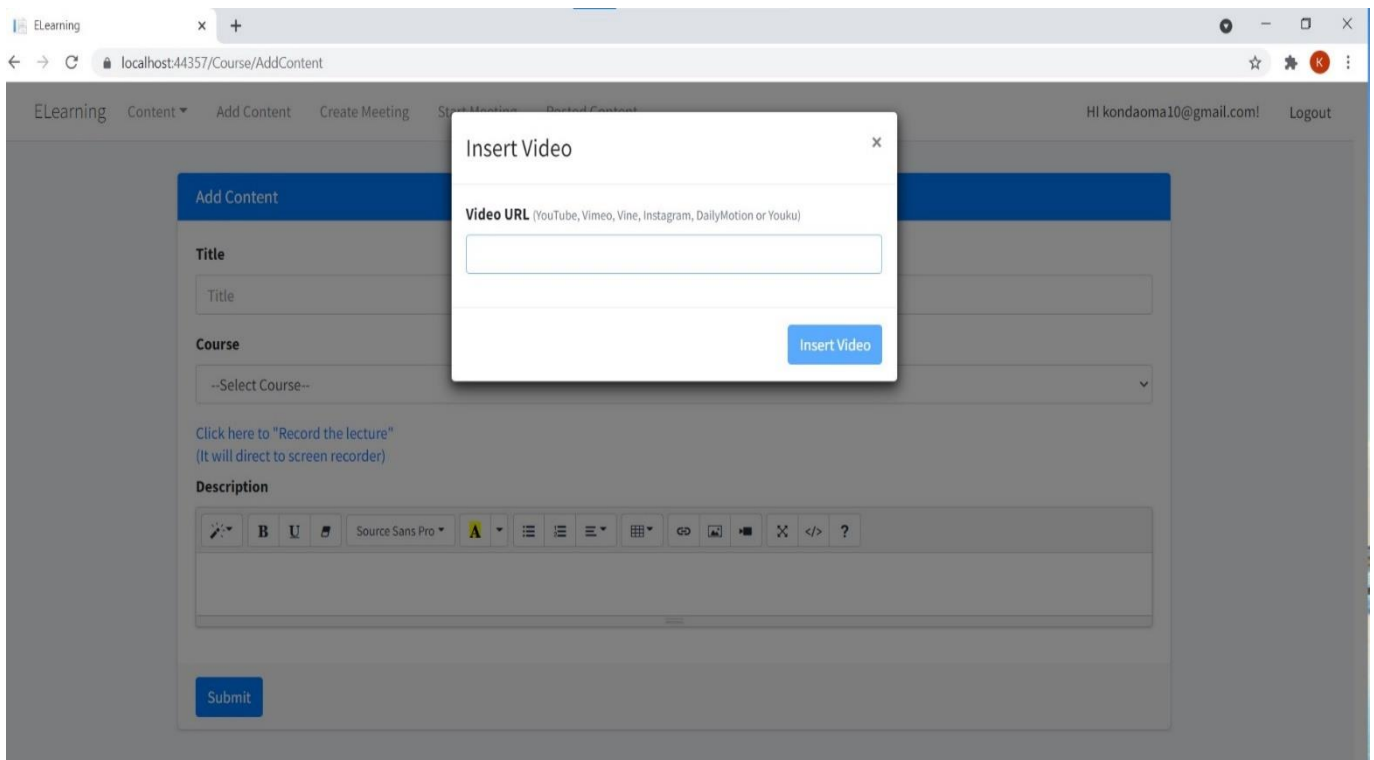
Image 11: Instructor account add content page

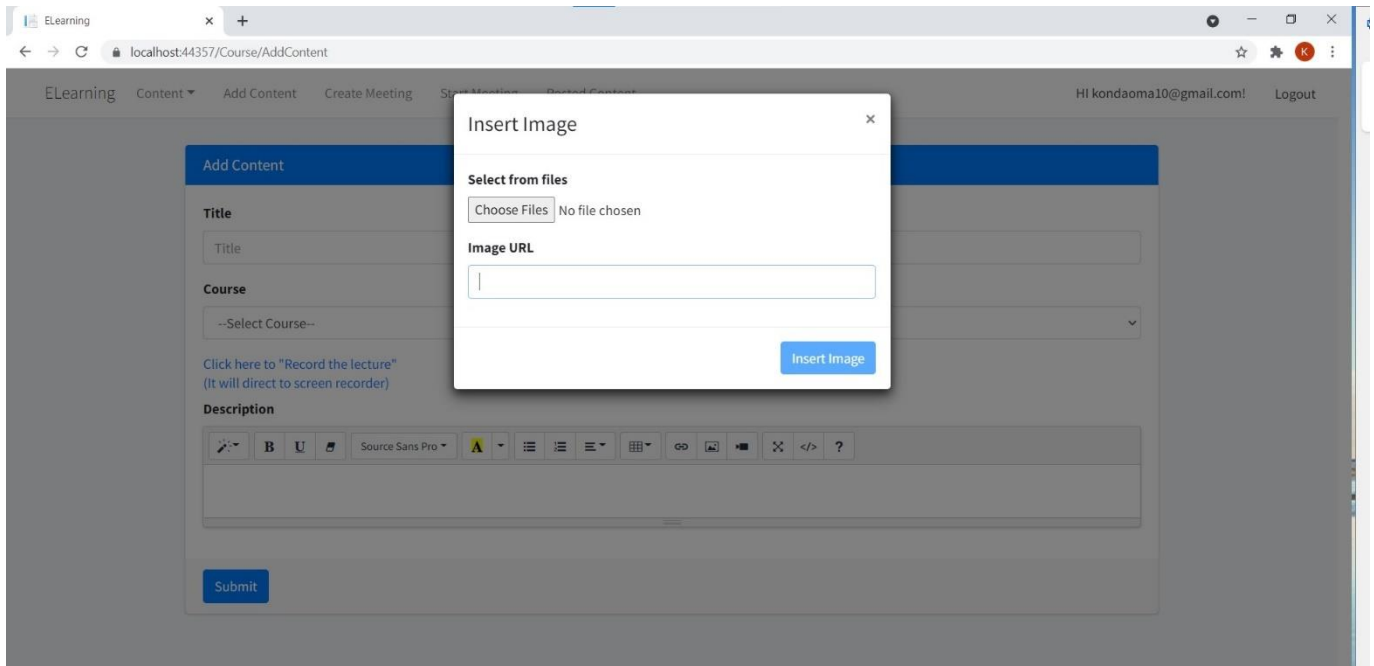*Image 12: Instructor account add content page/insert video URL page in CMS*

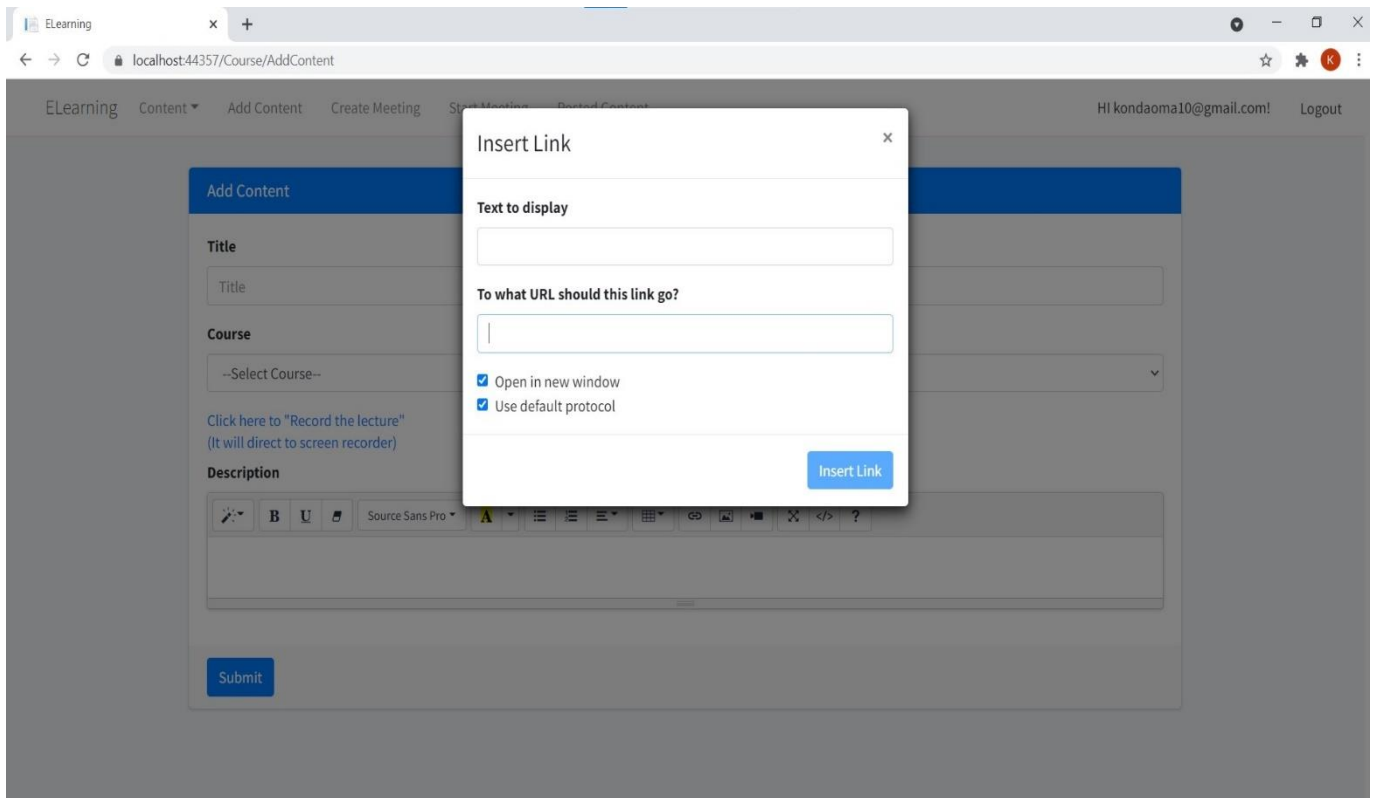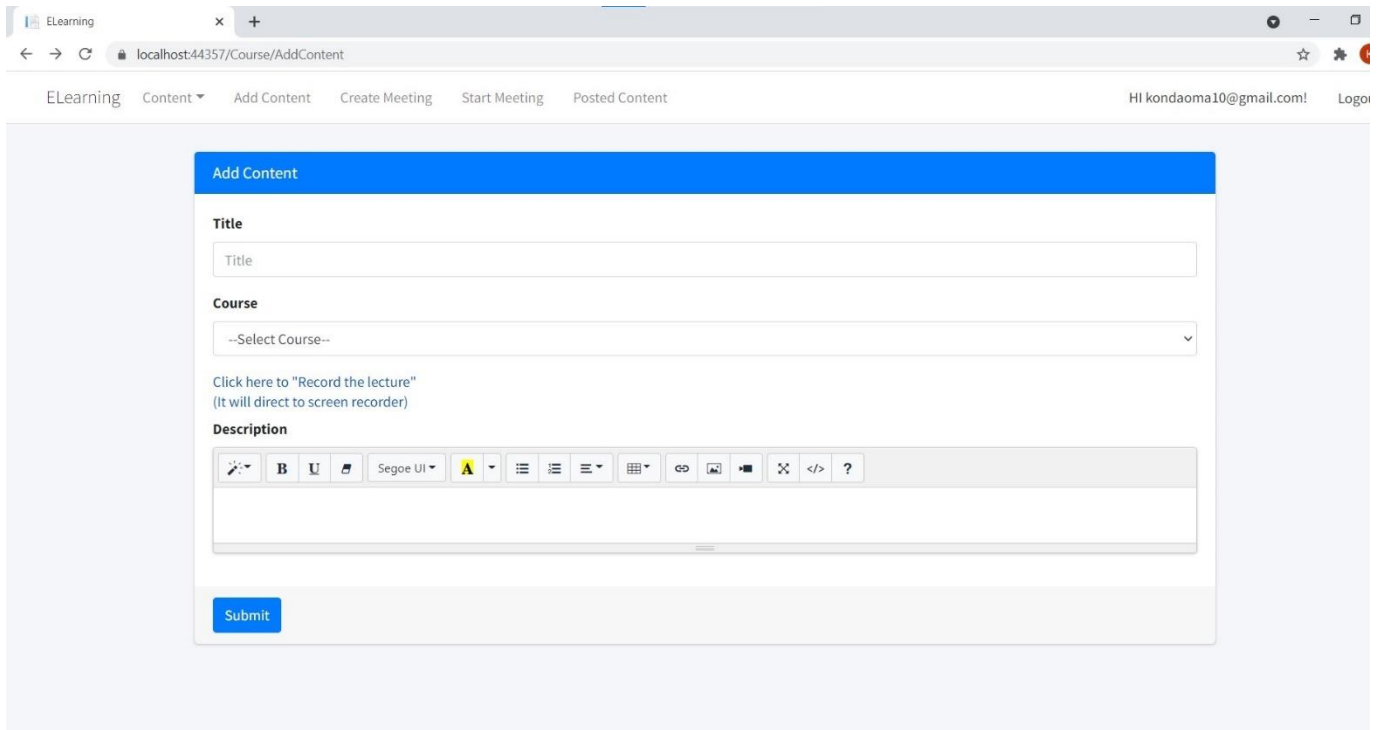*Image 13: Instructor account add content page/insert Image URL page in CMS*

Image 14: Instructor account add content page/insert reference page URL in CMS

Image 15: Instructor account add content page/ record the lecture link
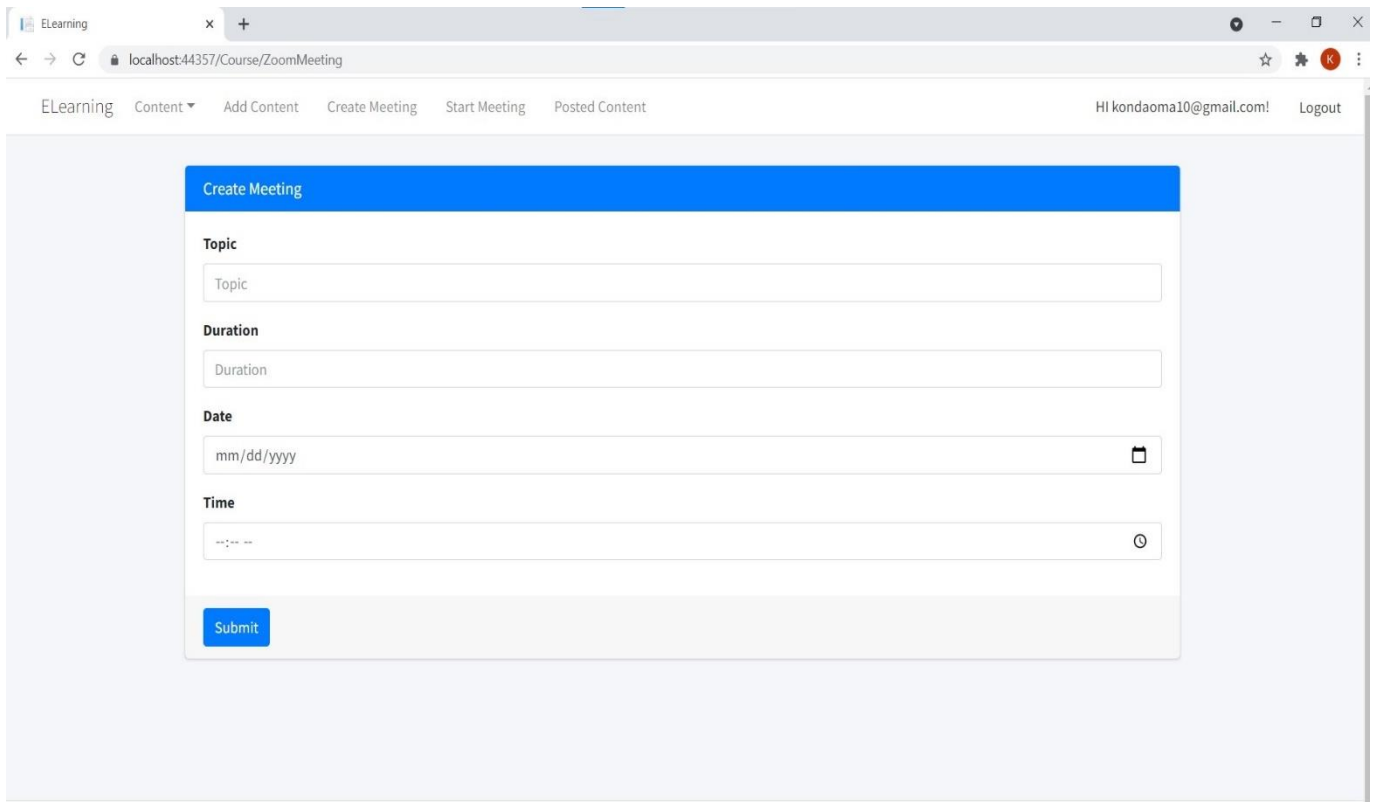
Image 16: Instructor account create meeting page
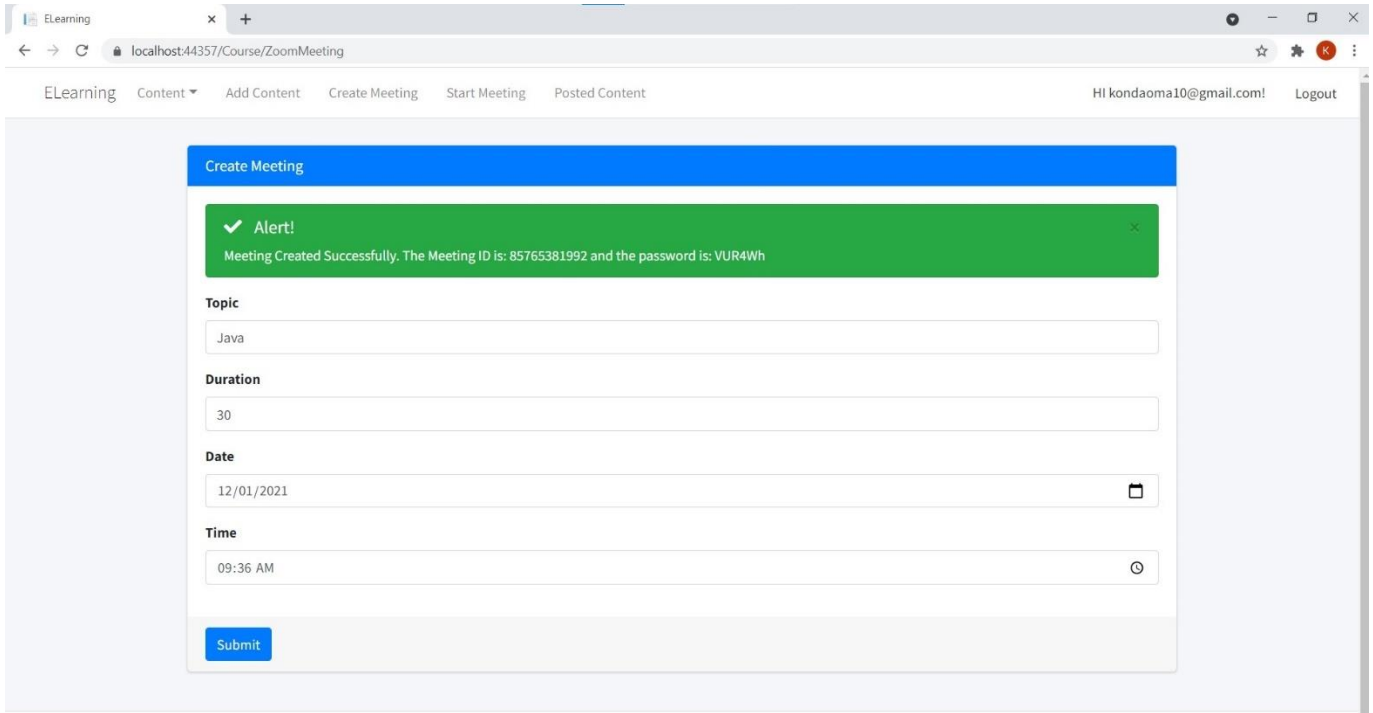
Image 17: Instructor account meeting is created
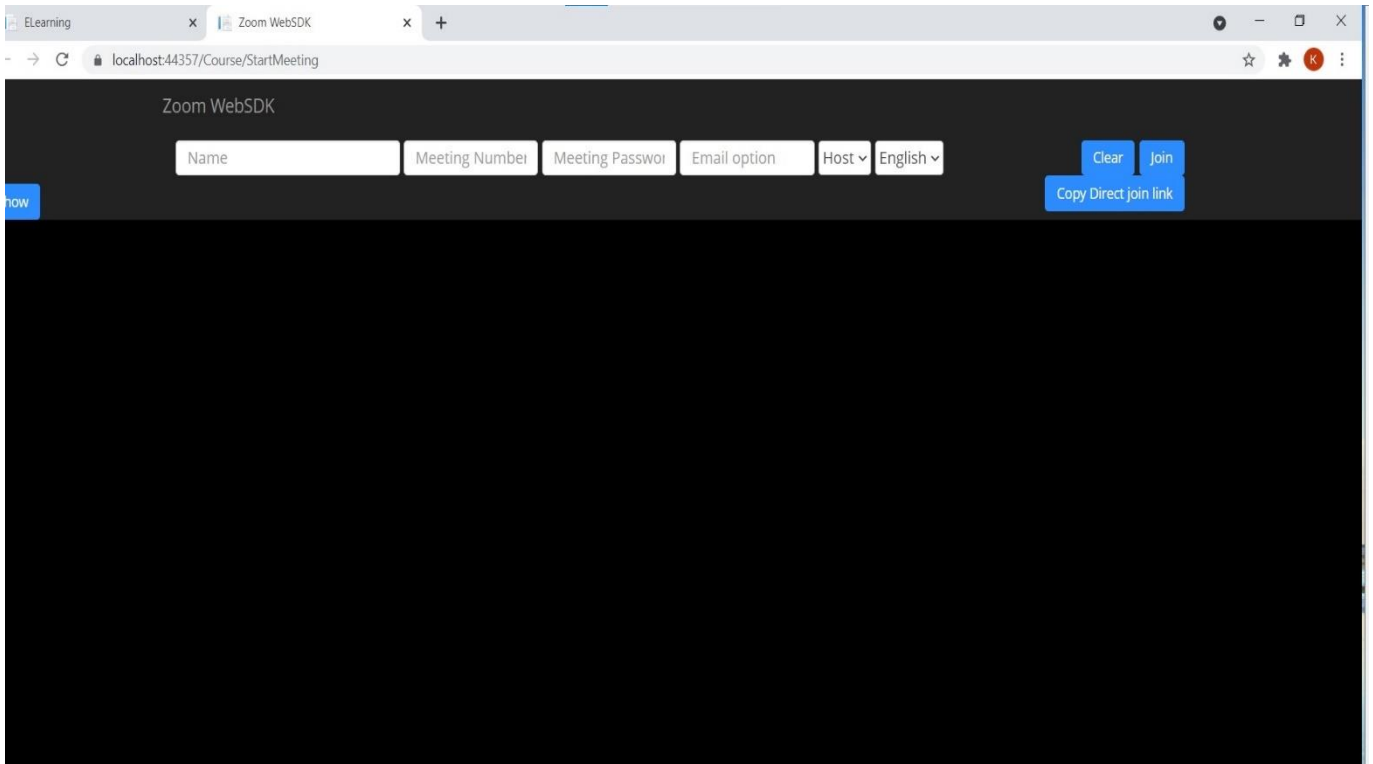
Image 18: Instructor account start meeting
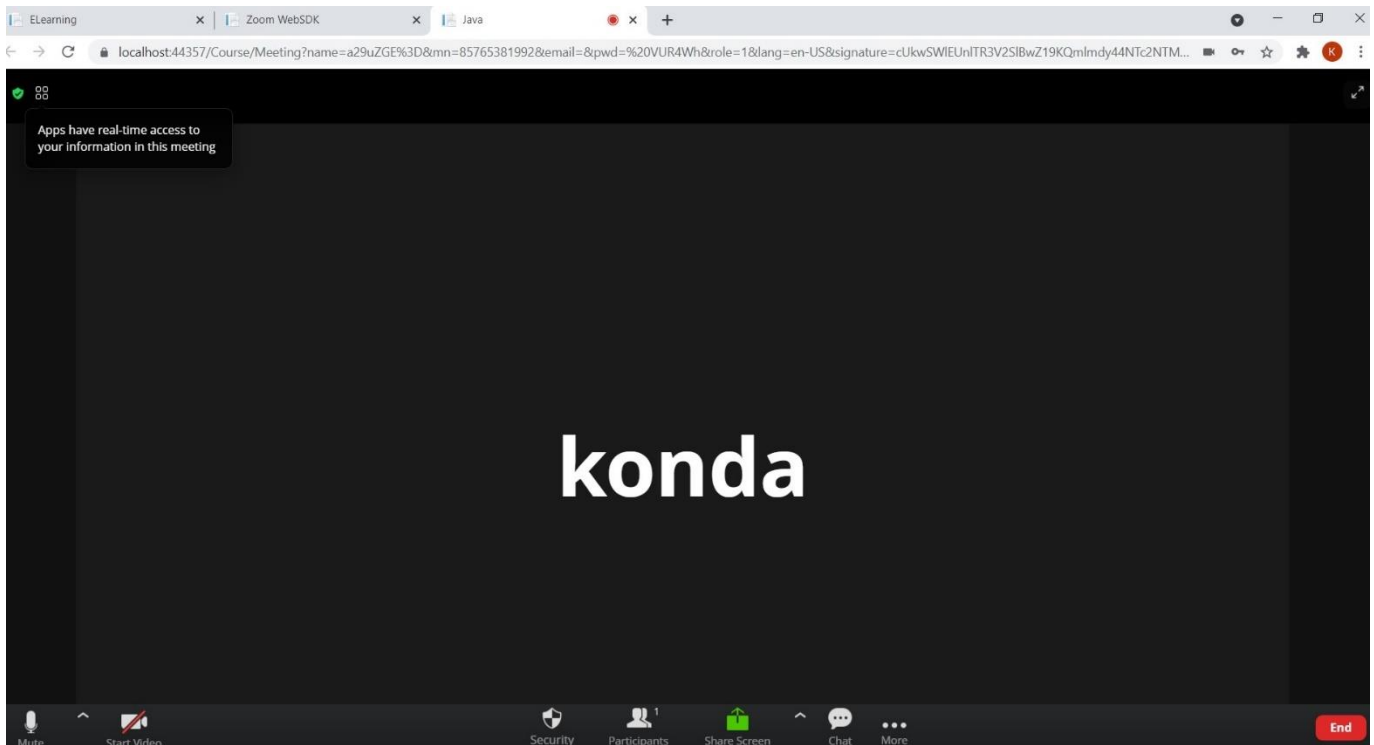
Image 19: Instructor account meeting started
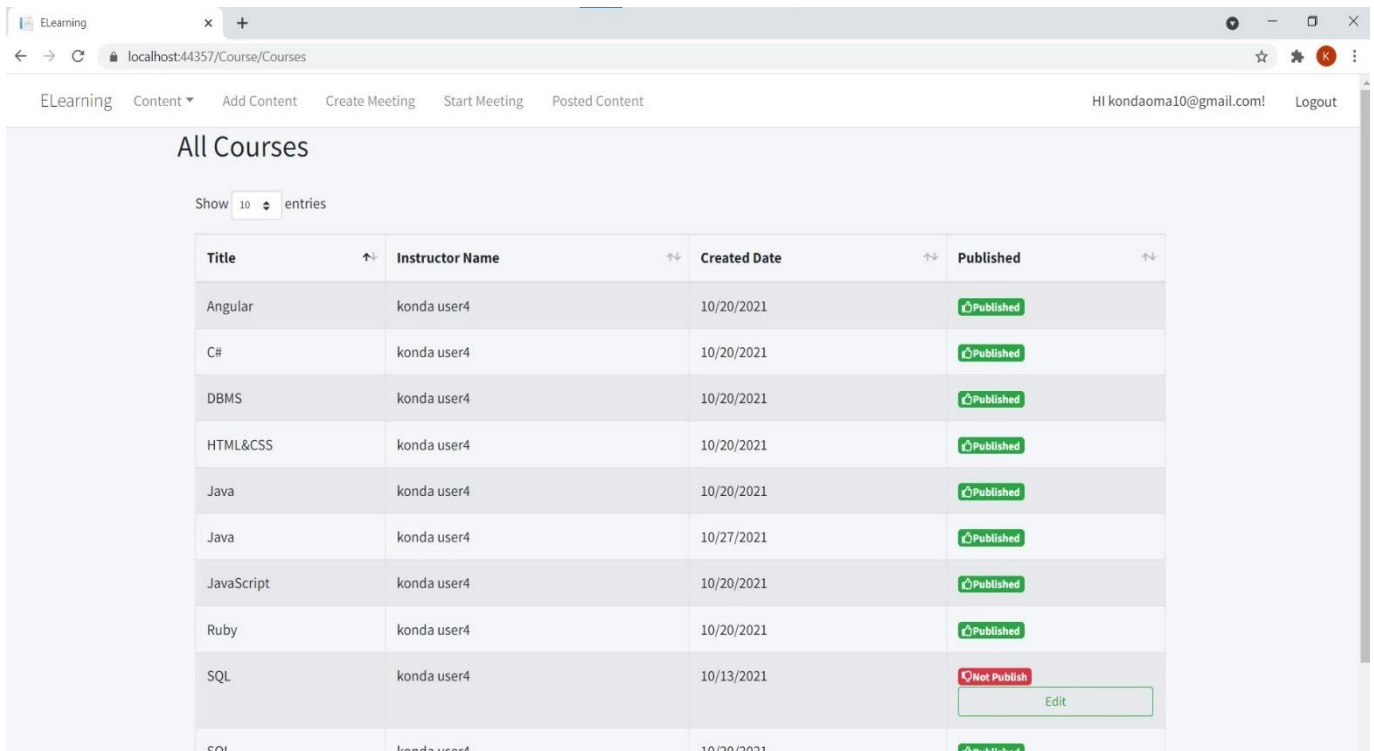
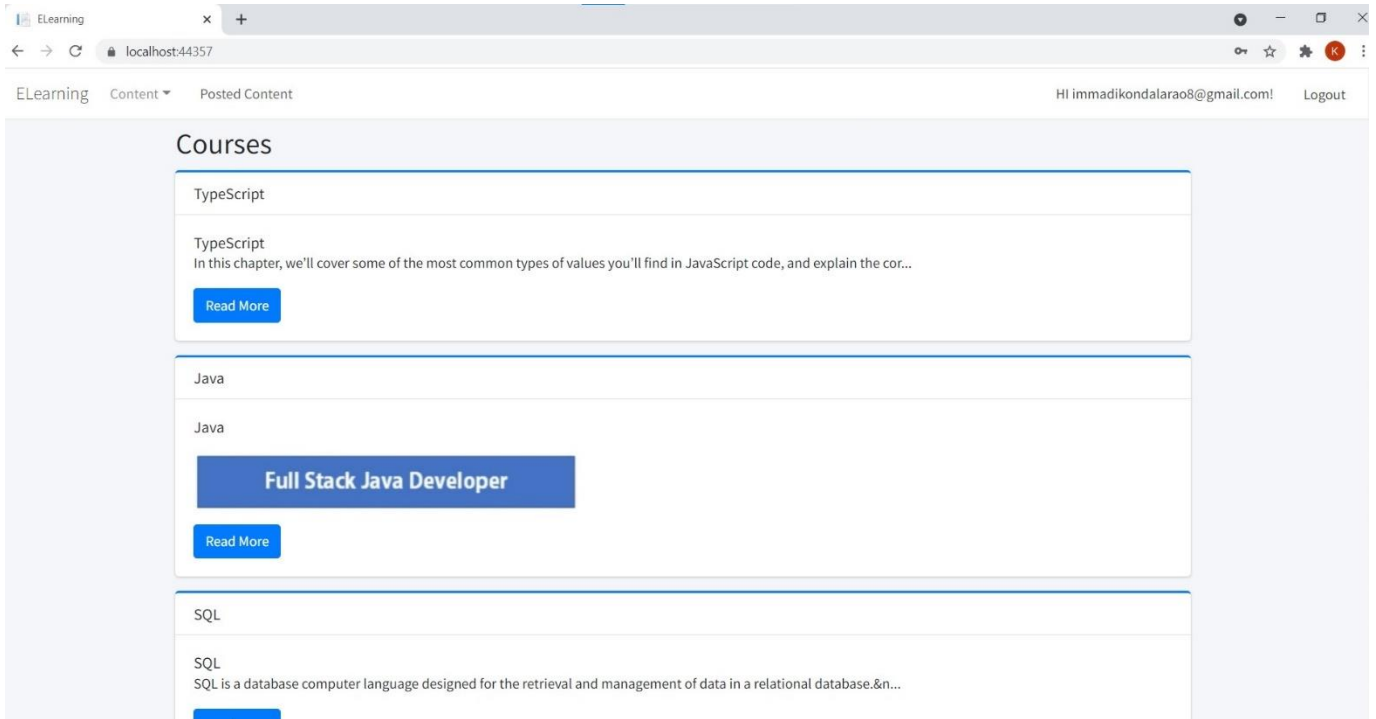
Image 20: Instructor account posted content page
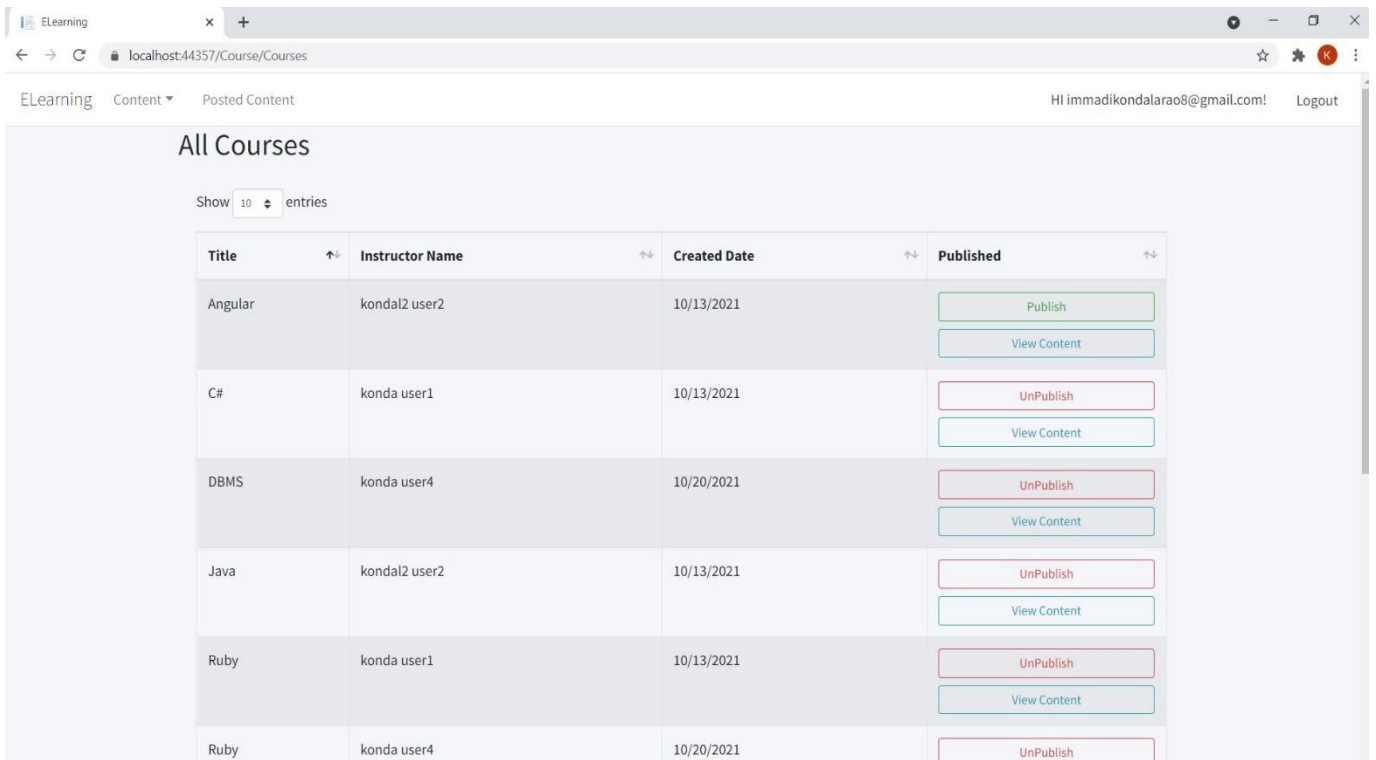
Image 21: Admin account page

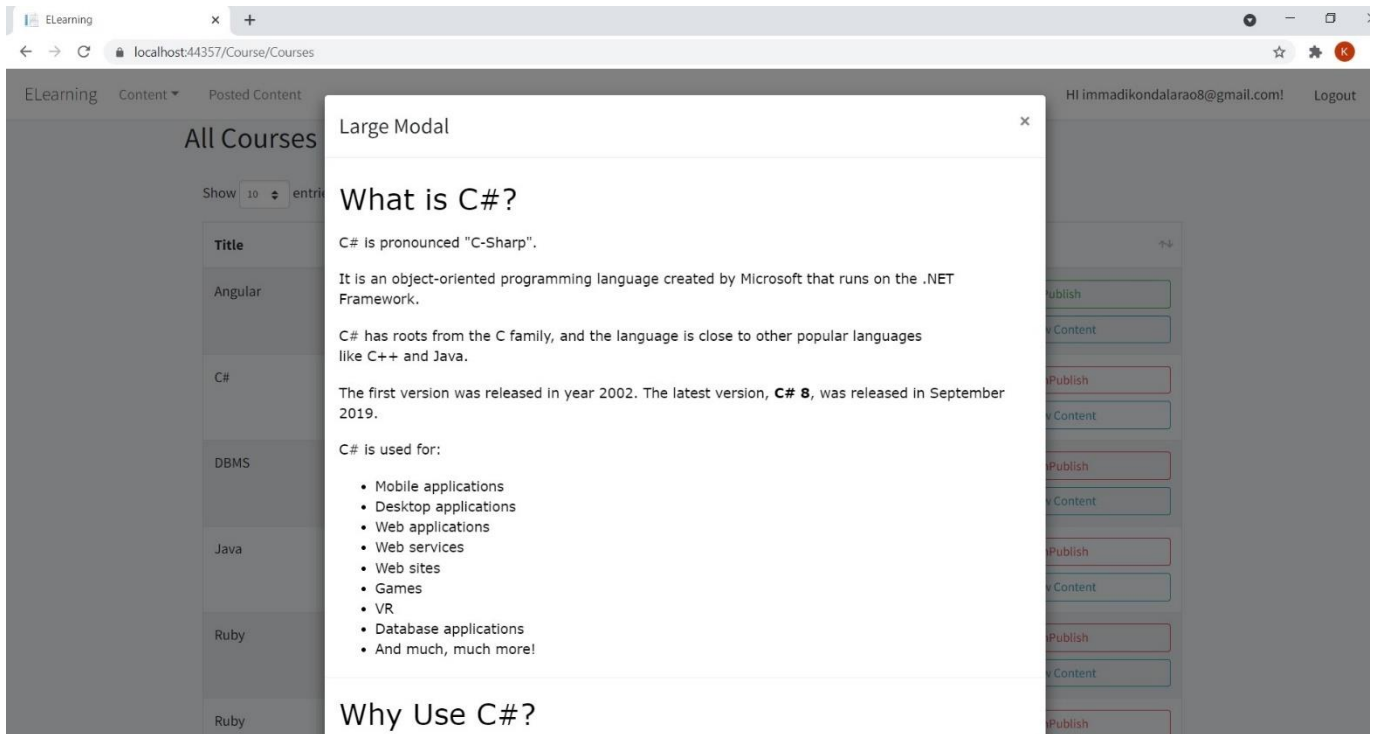*Image 22: Admin account page/posted content of all instructors*
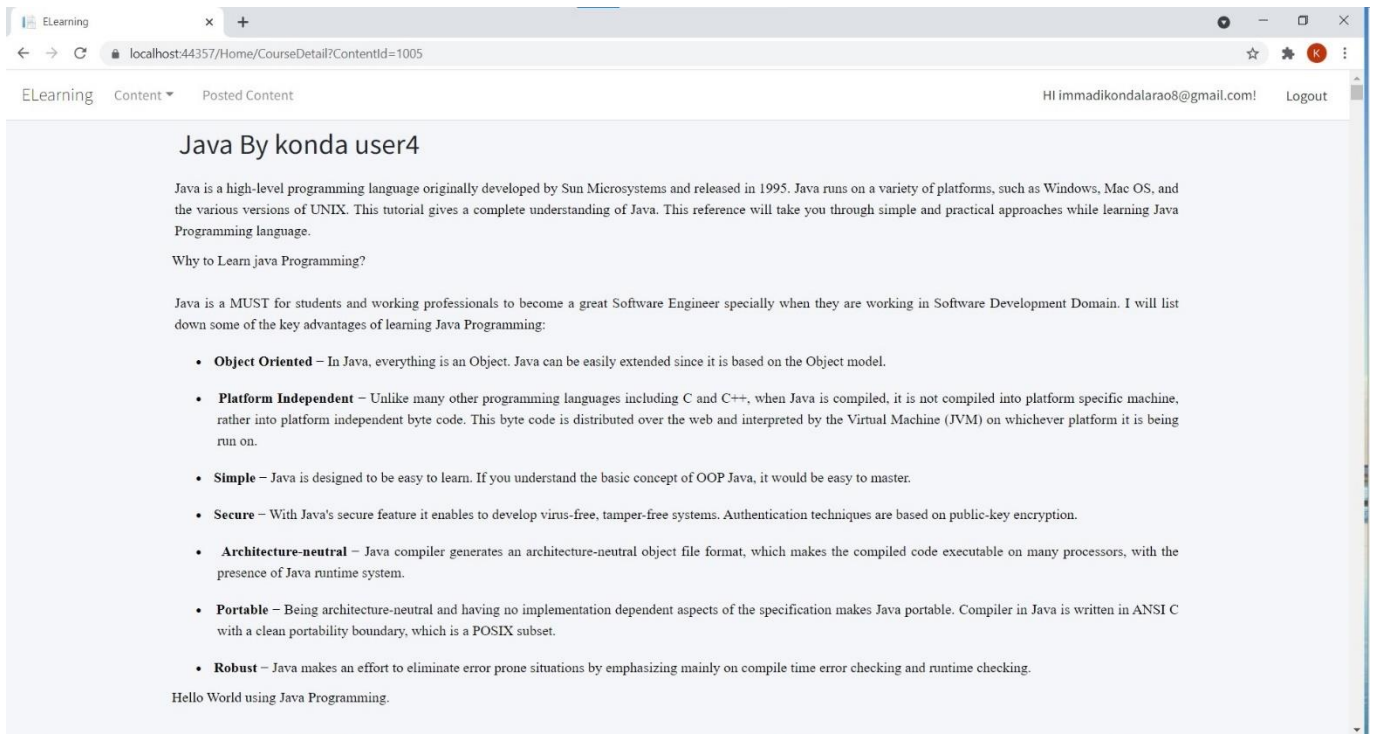
Image 23: admin account/ view content

Image 24: Admin account/ specific course with instructor name page

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