2020-2021 SPRING SEMESTER

CS319 - Object Oriented Software Engineering

Iteration 1 Peereview Analysis Report

Group Members

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1 Introduction

Peer grading system is a web-based application where students can create their own project groups and grade their teammates as well as other groups' works. This system will not only provide a grading feature but also allow other actions which can be performed by instructors and graders. Instructors will assign homeworks and graders will be able to track the uploaded assignments and grade them.

The main goal of the application is evaluating teammates and commenting on their contribution on the project. Additionally, every group will post their works on their group's page and students from other groups will be able to see and evaluate their work. Users will be able to message and communicate with each other. Since the application is more than just a grading system, there will be forums where students, instructors and graders can discuss on various topics and share their ideas. Application will contain different courses which a student is supposed to take. Forums, project groups and assignments will be specific for each course.

Project process will start with forming groups. Students will be able to find groups and send requests to join them or create their own group and find members for their groups . Once the groups are formed, each group will have their own group page where they will share information about their projects and upload their works. During the semester students will see other groups' works and at the end of the semester they will grade their teammates.

2 Overview

2.1 Users

2.1.1 Instructor

The instructor user is made for instructors or lecturers of the course. The user can create courses,where they can create projects, add assignments and grade them, add any material related to the course, post in the forum, assign graders, and evaluate students.Instructor users can also create a project where they can add students, add assignments, post announcements, and most importantly give the students the chance to evaluate each other as group mates or other groups. This user will also have the authority to access and see most components of the system from students grades to evaluations to the chemistry of a group. Instructors will also have the ability to limit users who can create posts in courses and projects pages and also kick students.

In short the instructor users will have full control over the course and all components associated with it.

2.1.2 Grader

The grader user is a user assigned by Instructor to grade assignments. This user has limited authority and can only interact with students and in the allowed scope by

Instructor. The user can view and grade assignments in a course or a project. This user can also create posts and comment on them, and view evaluations and grades if given the authority by the instructor.

2.1.3 Student

Student user is on the opposite end of the Instructor user type. This user can join courses created by the Instructor, submit assignments, view the material added by Instructors or graders, if projects exist then Students can join projects, if Instructor lets, Students may create groups, may join groups formed by other Users, and might leave the group they are in. Main purpose of such engagement is to let Students have experience with other groups, hence to have deeper criteria for evaluating themselves as group members.

The main role of this user will be in a project where they can interact with their group mates through posts and messages. They can submit assignments, evaluate their group mates' contributions to each assignment according to some specific criteria and their overall contributions to the project. Students can also evaluate other groups after viewing their assignments. Their authority, however, can be limited by the instructor, so that they cannot post in forums. The user info and her grades and evaluations will be visible on his page to the allowed users assigned by instructors.

2.2 System Components

2.2.1 Course

Course is the main component of the system with it holding all other components like projects and groups. The Instructor user type will be able to create this component and assign a unique code to it. Any Student user type will be able to join the course using that code. Course will have various components, like education materials, assignments, and projects.

In the education materials the instructor will be able to post any form of material related to the course. In assignment the instructor can post any assignment for the students. Instructors will also have the ability to create one or more projects and add students to it. In case the instructor needs help with grading, the user will be able to assign graders to the course for the assignments posted. Course will also have a forum, in which discussions and announcements can be made, and students can post their questions and discussions.

2.2.2 Project

Project is a quite broad term in Bilkent University, in one course Project can be a term project with five students requiring more than one submission, or a one week project with three students requiring one submission. To correctly provide different types of projects, Instructors have the opportunity to set their rules as they wish on the system. Outline of a project consists of its title, its description, its deadline, its final grade and student groups. Basically a project is an assignment that requires a group. Although gathering information about a project is complicated, every project has its

own forum to ease the communication between students, graders, and instructors. Thus, while helping students to inform themselves, and form groups, project forums may ease the burden on the instructors back by enabling them to control the environment that the information is given.

2.2.3 Group

At the very beginning of the semester, students form their project groups. They are able to form their groups by finding groups and sending joint requests or creating groups and then finding members. If there are many students who can not find groups, instructors may assign random groups. If there are a few students who can not find groups, instructors may assign them to random groups. Once students form their groups, they will create their group pages. There will be a link to groups github project and every group will be responsible for sharing their github links. They will also specify their projects' features in a README file. Students will be able to see groups' pages and their submissions as well as their ratings from evaluations.

2.2.4 Assignment

Assignments are given by the instructor and have specific deadlines. Assignments given by the instructors are graded and Graders and Instructors have permission to grade submitted Assignments. Students need to submit the specific assignment before the certain deadline. Grading policy and criteria depend on the instructor. Graders are able to grade submissions in the light of instructor's permission. Instructor gives the description and the deadline of the assignment when assigning the specific assignment. Students are required to drag and drop their submission files before the deadline.

2.2.5 Evaluation

Evaluation is one of the main components of the system. This component represents the evaluations given by Student users to each other, or to other groups. It also represents the evaluations given to students by graders and instructors. These components can also be used to represent evaluations given by students to their graders. Evaluations are available for each assignment for group mates to evaluate each other and for overall evaluations of group mates for the project as a whole. Students will be able to evaluate other groups after looking at their assignments, where this component is useful.

Evaluations will be represented in different ways. During the evaluation process a score out of ten will be assigned according to predetermined criteria and add notes, the average of the scores is calculated and saved. Then when a group or a student page is accessed the average evaluations given by others will be represented by a graph showing the change throughout the project. Evaluations will also be used to calculate Chemistry of a group, by taking the average of the averages of each group mates' evaluation to others. The Chemistry attribute will be used to show how satisfied the students are with their group mates' performance and can be helpful in informing the instructor how useful her way was in assigning groups. The importance of the

Chemistry attribute can also be seen where the instructor can tell if the group had problems cooperating as a whole or whether there were some students with poor performance or communicating skills.

2.2.6 Forum

Forum consists of two parts; posts and comments. Instructors are able to post entries on forums and students and graders should be allowed by the instructor. Instructor has full authority on the forum and gives permission for students and graders either full authority or limited authority. Forums can be used to share information about course related topics or different beneficial information about department related topics by any user as long as the instructor gives permission. Depending on the permission users other than the instructor will be able to some of the rights such as pinning posts and comments, deleting posts and comments, hiding posts and comments, rating posts and comments and editing posts and comments. Each course has its own forum and these forums are controlled by the instructor of the related course.

2.2.7 Post

Posts are main entries on the forum. Instructors may share course related issues as posts. They may pin the important information as they wish. Instructors may limit graders' or students' authority to post an entry on the forum to keep the forum safe from unrelated posts.

2.2.8 Comment

Comments are answers to the given post. Adding a comment, removing a comment, hiding a comment, or editing a comment are possible actions that users may have. Instructors of a course may limit users' capacity to have all of the given actions.

3 Functional Requirements

3.1 Create a course

The Instructors should be able to create their courses where they will create projects and add students and assignments and material.

3.2 Create a Project

The instructor should be able to create projects and assign graders and add students to it.

3.5 Create Groups

The students can create groups and add others to them, they can also submit offers and accept them. The instructor can also assign random groups.

3.6 Find a Group

The students will be able to look for groups and submit offers based on their skills. The students will be able to find groups with vacant places.

3.7 Evaluations

The students will be able to evaluate their group mates after each assignment and at the end of the project. They will also be able to evaluate other groups as well as their TAs performance.

3.8 Grading

The instructors and the graders will be able to grade assignments of the students.

3.9 Upload Assignment

The students will be able to upload assignments as groups or individually.

3.10 Post announcements

The instructor and the graders can post announcements and notify students about important events, like the creation of a new assignment or the additions of a material.

3.11 Create a post

Users will be able to create posts in course and project forums. The posts can be commented on or rated. The instructor will be able to give limited authority to who can post and can hide or delete posts.

3.12 Comment on a post

Users will be able to comment on posts shared on course and project forums. The comments can be rated. The instructor will be able to give limited authority to who can comment and can hide or delete comments.

3.13 Add graders

For every course and project the instructor can assign graders who can grade all the assignments.

3.14 Contact other users

Users will be able to contact graders and instructors using the contacting features.

3.15 Add and Kick Students

The instructor will be able to add students to projects and groups and kick them.

3.16 Notifications

The students will be notified when any important event happens like a creation of a new project or an assignment being posted.

4 Non-Functional Requirements

4.1 User Friendly Interface

The application provides a simple and user friendly interface that helps users to use the application efficiently. Users can easily access the peer evaluation pages which is the main purpose of the application. In addition, by help of the colors, icons and widgets used, an easy-to-use application is offered to the user so the users can easily locate important components and interact with them

4.2 Privacy

In some cases, students may not want their grades to be seen by others. For this reason, in the application, students will only be able to see their own grades. Only instructors and teaching assistants will see all students' grades. Additionally the evaluations will be anonymous. Thus, privacy will be provided for students.

4.3 Availability

The application will be accessible 24/7. In this way, students will be able to post assignments and check announcements and ask questions in the forums and communicate with each other whenever they need.

4.4 Minimalist

The interface is simple and minimalist to make it easy for the user to use and the machine to run.

4.5 Easy to Navigate

The application is very intuitive, and the user can reach any page through simple and logical sequence, so no confusion in how she can access a specific feature. Additionally, it

will have shortcuts to reach important components of the system. Interface is developed keeping in mind familiarity with other such applications like Moode, Slack etc. So the user can navigate around the application easily.

5 System Models

5.1 Use Case Model

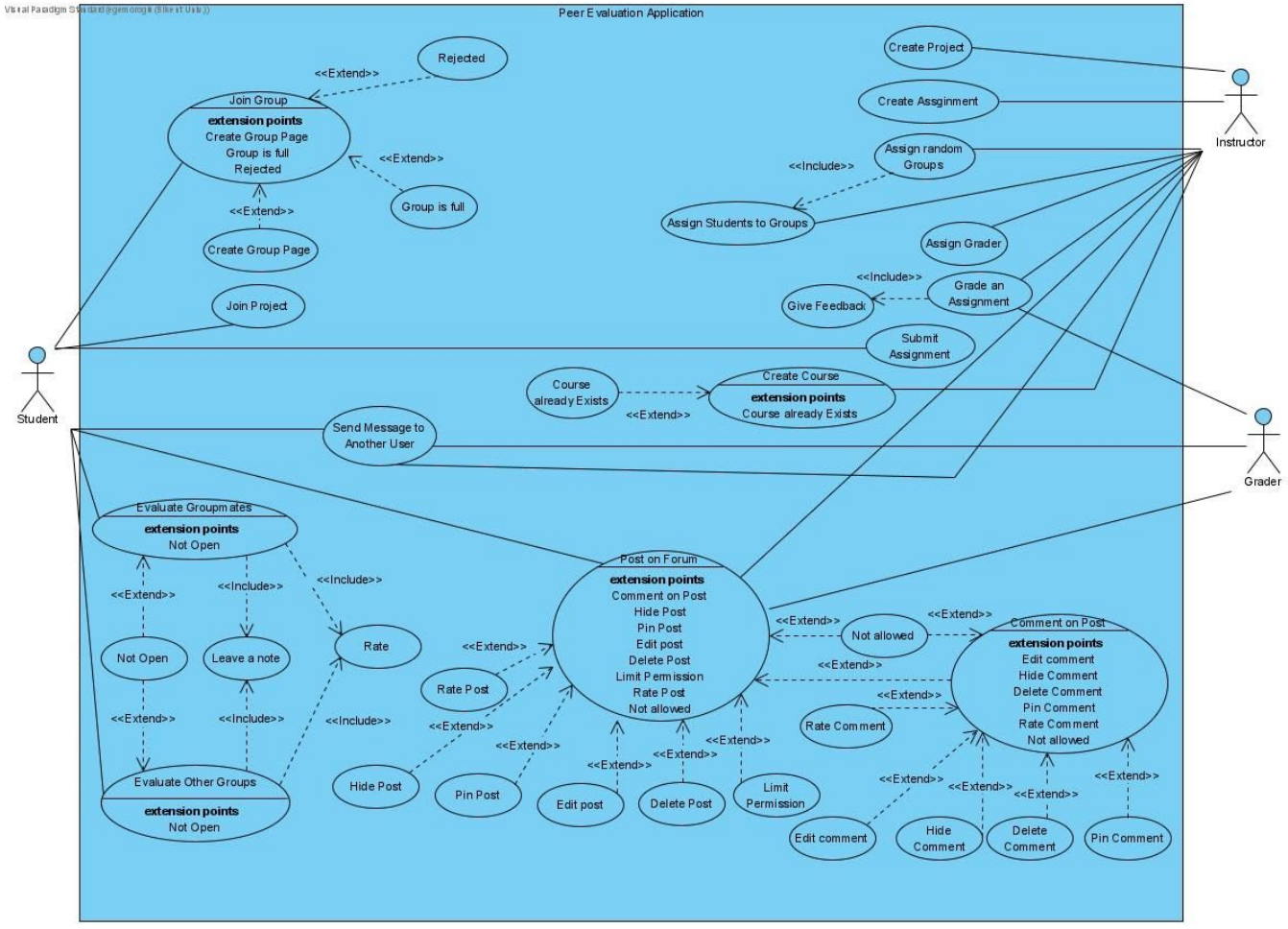


Figure 5.1 - Shows the Use Case model of the Peer Review Application

5.1.1 Use Case Scenarios

5.1.1.1 Use Case: Join Group

Participating actors: Student

Pre-conditions:

- Student should not be in a group

Post-condition:
- Student is a member of a group

Entry condition:
- Student creates a group or finds an available group

Exit condition:
- Student goes to another page

Flow of events:
- Student creates a group and finds members
- If student is not in a group finds a group
- If group is available student request to be a member
- Group accepts the request
- Student joins to the group

Special/Quality requirements:
Joining a group may take a while depending on the group's response.

5.1.1.2 Use Case: Evaluate Groupmates

Participating actors: Student

Pre-conditions:
- Evaluation must be enabled

Post-condition:
- Student's total grade is effected

Entry condition:
- Student must be in the "Evaluate your group members" page

Exit condition:
- Student goes to another page

Flow of events:
- Time for evaluation is reached
- Student goes to "Evaluate your group members" page

- Student rates groupmates out of 10

- Student leaves a note about groupmates

Special/Quality requirements:
Evaluation may take a while. However, submit time should take less than 5 seconds

5.1.1.3 Use Case: Evaluate Other Groups

Participating actors: Student

Pre-conditions:
- Evaluation must be enabled

Post-condition:
- Group’s total grade is effected

Entry condition:
- Student must be in “Evaluate Groups” page

Exit condition:
- Student goes to another page

Flow of events:
- Time for evaluation is reached

- Student goes to “Groups” page and selects a group

- Student checks the submission file of the group

- Student rates the group out of 10

- Student leaves on group’s work

Special/Quality requirements:
Evaluation may take a while. However, submit time should take less than 5 seconds

5.1.1.4 Use Case: Create Group Page

Participating actors: Student

Pre-conditions:
- Student must be in a group

Post-condition:

- No post conditions

Entry condition:
- Student must be in their own group’s page

Exit condition:
- Student goes to another page

Flow of events:
- Student goes to their own group’s page
- Student specifies the github link of the project
- Student explains the project in README part

Special/Quality requirements:

Filling required spaces may take a while. However, submit time should take less than 5 seconds

5.1.1.5 Use Case: Post on Forum

Participating actors: Student, Instructor, Grader

Pre-conditions:
- User must be in the forum page
- User must be allowed to post on the forum

Post-condition:
- No post conditions

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to forum page
- User enters the title of the page
- User enters their post

- User shares their post

5.1.1.6 Use Case: Comment on Post

Participating actors: Student, Grader, Instructor

Pre-conditions:
- A forum post must exist to comment on
- User must be allowed to comment

Post-condition:
- No post conditions

Entry condition:
- User clicks on the from

Exit condition:
- User goes to another page

Flow of events:
- User goes to forum page
- User chooses the desired Post
- User comments on the Post
- User shares their comment

5.1.1.7 Use Case: Rate Post

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A forum post must exist to rate
- User must be allowed to rate the post

Post-condition:
- No post conditions

Entry condition:

- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page
- User chooses the desired forum post
- User rates the forum post

5.1.1.8 Use Case: Hide Post

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A forum post must exist to hide
- User must be allowed to hide the post
- Post must not be hidden

Post-condition:
- Post can not be seen by other users

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page
- User chooses the desired forum post
- User hides the forum post

5.1.1.9 Use Case: Pin Post

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A forum post must exist to pin
- User must be allowed to pin the post
- Post must not be pinned before

Post-condition:
- Post is pinned to forum

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page
- User chooses the desired forum post
- User pins the forum post

5.1.1.10 Use Case: Edit Post

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A forum post must exist to edit
- User must be allowed to edit the post

Post-condition:
- Post is changed

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:

- User goes to the forum page
- User chooses the desired forum post
- User edits the forum post

5.1.1.11 Use Case: Delete Post

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A forum post must exist to delete
- User must be allowed to delete the post

Post-condition:
- Post does not exist anymore

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page
- User chooses the desired forum post
- User deletes the forum post

5.1.1.12 Use Case: Limit Permission

Participating actors: Instructor

Pre-conditions:
- No pre conditions

Post-condition:

- Other Users loose authority while posting on forum

Entry condition:
- Instructor clicks on the forum

Exit condition:
- Instructor goes to another page

Flow of events:
- Instructor goes to the forum page

- Instructor may limit one or more authority of other user's on posting on forum

5.1.1.13 Use Case: Rate Comment

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A comment must exist to

- User must be allowed to rate the comment

Post-condition:
- No post conditions

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page

- User chooses the desired forum comment

- User rates the forum comment

5.1.1.14 Use Case: Edit Comment

Participating actors: Student, Instructor, Grader

Pre-conditions:

- A comment must exist to edit
- User must be allowed to edit the comment

Post-condition:

- Comment is changed

Entry condition:

- User clicks on the forum

Exit condition:

- User goes to another page

Flow of events:

- User goes to the forum page
- User chooses the desired forum comment
- User edits the forum comment

5.1.1.15 Use Case: Hide Comment

Participating actors: Student, Instructor, Grader

Pre-conditions:

- A comment must exist to hide
- User must be allowed to hide the comment
- Comment must not be hidden

Post-condition:

- Comment can not be seen by other users

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page
- User chooses the desired forum comment
- User hides the forum comment

5.1.1.16 Use Case: Delete Comment

Participating actors: Student, Instructor, Grader

Pre-conditions:
- A comment must exist to delete
- User must be allowed to delete the comment

Post-condition:
- Comment does not exist anymore

Entry condition:
- User clicks on the forum

Exit condition:
- User goes to another page

Flow of events:
- User goes to the forum page
- User chooses the desired forum comment
- User deletes the forum comment

5.1.1.17 Use Case: Pin Comment

Participating actors: Student, Instructor, Grader

Pre-conditions:

- A comment must exist to pin
- User must be allowed to pin the comment
- Comment must not be pinned before

Post-condition:

- Comment is pinned on the post

Entry condition:

- User clicks on the forum

Exit condition:

- User goes to another page

Flow of events:

- User goes to the forum page
- User chooses the desired forum comment
- User pins the forum comment

5.1.1.18: Use Case: Create Course

Participating actors: Instructor

Pre-conditions:

- Course must not exist in the system

Post-condition:

- Course with the specific code is created

Entry condition:

- Instructor should be in the “Create Course” page

Exit condition:
- Instructor goes to another page

Flow of events:
- Instructor goes to “Create Course” page
- Instructor specifies the course name
- Instructor enters the course code
- Instructor describes the course
- Instructor specifies an entry code for students to enroll
- Student assigns one or more Graders for the course at will

Special/Quality requirements:
Instructor should be able to complete the events within a minute

5.1.1.19 Use Case: Create Project

Participating actors: Instructor

Pre-conditions:
- Specific project must not exist in the course page

Post-condition:
- Project is created and ready to enroll

Entry condition:
- Instructor should be in the “Create Project” page

Exit condition:
- Instructor goes to another page

Flow of events:
- Instructor selects the course which they want to create a project
- Instructor specifies the name of the project
- Instructor describes the project

- Instructor specifies the programming language of the project at will
- Instructor specifies the tools for the project
- Instructor specifies the group size
- Instructor may create random groups if they want to

Special/Quality requirements:
Instructor should be able to complete the events within a minute

5.1.1.20: Use Case: Assign Students to Groups

Participating actors: Instructor

Pre-conditions:
- There must be students who did not join a group

Post-condition:
- Students are assigned to random groups

Entry condition:
- Instructor should be in the “Groups” page

Exit condition:
- Instructor goes to another page

Flow of events:
- Instructor goes to “Groups” page
- Instructor may add groups manually
- Instructor may create groups randomly
- Instructor may assign students to groups manually

5.1.1.21 Use Case: Create Assignment

Participating actors: Instructor

Pre-conditions:

- The specific assignment must not exist

Post-condition:
- Assignment is created with specific deadline

Entry condition:
- Instructor should be in the “Create Assignment” page

Exit condition:
- Instructor goes to another page

-

Flow of events:
- Instructor specifies the title of the assignment
- Instructor describes the assignment
- Instructor gives a specific deadline for the submission
- Instructor selects the progress of the assignment
- Instructor shares the assignment with students

Special/Quality requirements:
Instructor should be able to complete the events within a minute

5.1.1.22 Use Case: Submit Assignment

Participating actors: Student

Pre-conditions:
- Deadline of for the submission must not be reached

Post-condition:
- Assignment is submitted for grading

Entry condition:

- Student should be in “Assignment” page for students

Exit condition:
- Student goes to another page

Flow of events:
- Student goes to specific assignment page
- Student drags the submission file to proper area before deadline
- Student submits the assignment

5.1.1.23 Use Case: Grade Assignment

Participating actors: Instructor, Grader

Pre-conditions:
- Specific assignment must be submitted by the student
- The assignment must not be graded before

Post-condition:
- Student’s overall grade is effected

Entry condition:
- User must be grading page for assignment

Exit condition:
- User goes to another page

Flow of events:
- User grades each criteria out of 10
- User comments gives feedback as comment at will
- User submits the grade of the assignment

Special/Quality requirements:
Grading process may take a while. However, users should be able to submit grades according to criteria within 5 minutes

5.1.1.24 Use Case: Send Message to Another User

Participating actors: Student, Instructor, Grader

Pre-conditions:

- No Pre conditions

Post-condition:

- The message is sent to specified user
- Receiver gets a notification
- Receiver can see the message in their inbox

Entry condition:

- User must be in the “Message” page

Exit condition:

- User goes to another page

Flow of events:

- User specifies the receiver's name
- User specifies the title of the message
- User enters their message
- User sends the message to the receiver

5.1.1.25 Use Case: Join Project

Participating actors: Student

Pre-conditions:

- Student must not join a project in the same course

Post-condition:

- Student works in a group who works on that project

Entry condition:

- Student sends a request to work on a specific project

Exit condition:

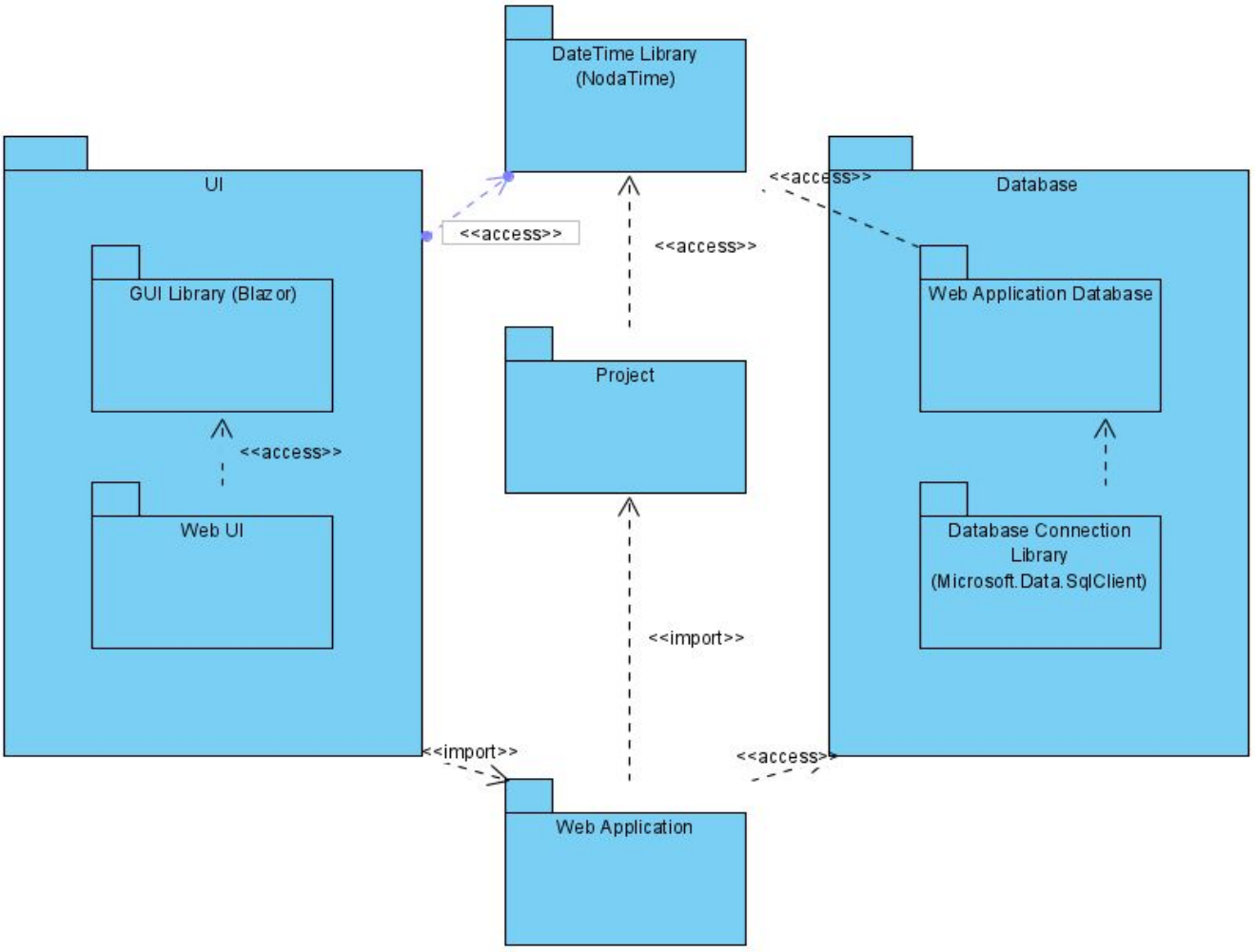
- Student goes to another page

Flow of events:

- Student chooses an assigned project
- Student sends a request to work on the project
- Instructor assigns the student to an available group who works on that project

5.2 Object and Class Models

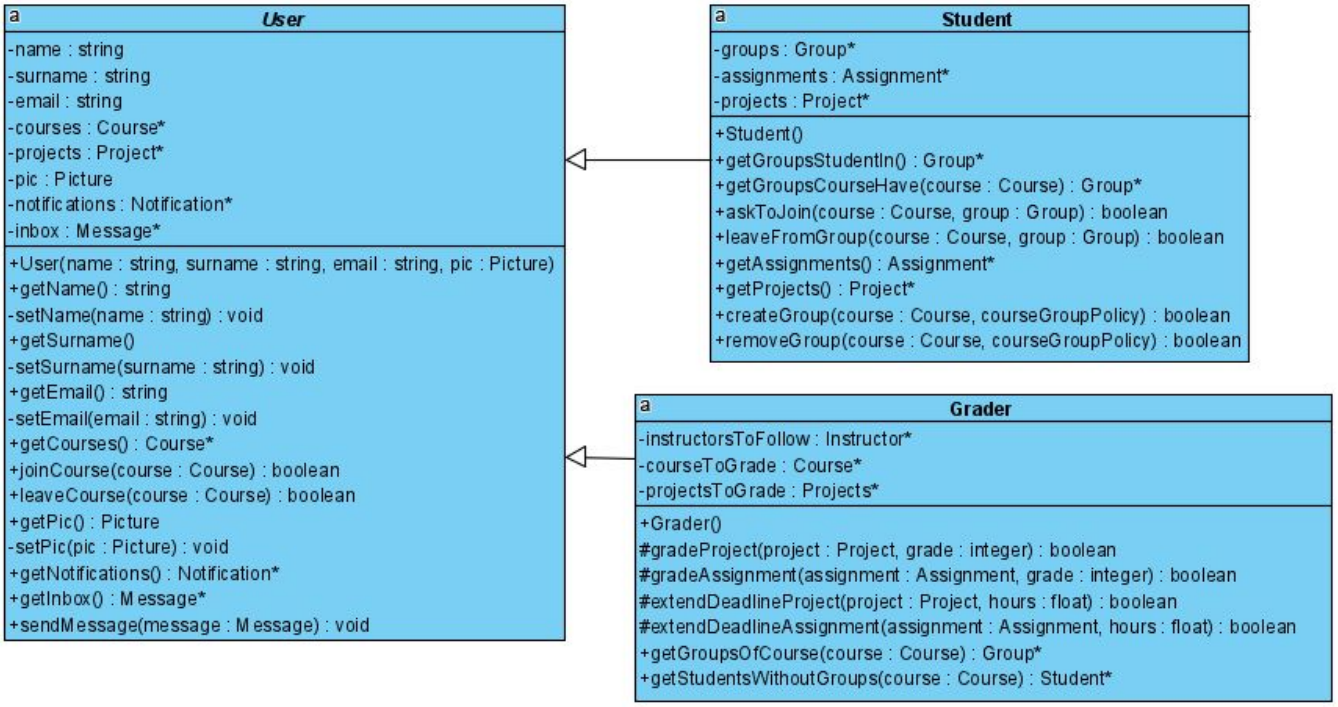
5.2.1 Package Diagram



5.2.1 Package Diagram

For user interface it is thought that a library for gui might be beneficial especially to make eye appealing service. Thus, we might access some of Blazor Library functions to handle our ideas better in our web ui package. For data handling we thought that a database might ease the process. Hence, we might call from Microsoft.Data.SqlClient library. For time management we have our date service. In case of a better solution NodaTime library might help us. Project has the forthcoming capabilities, and the web application is where our ideas become alive.

5.2.2.1 User Student Grader Diagram

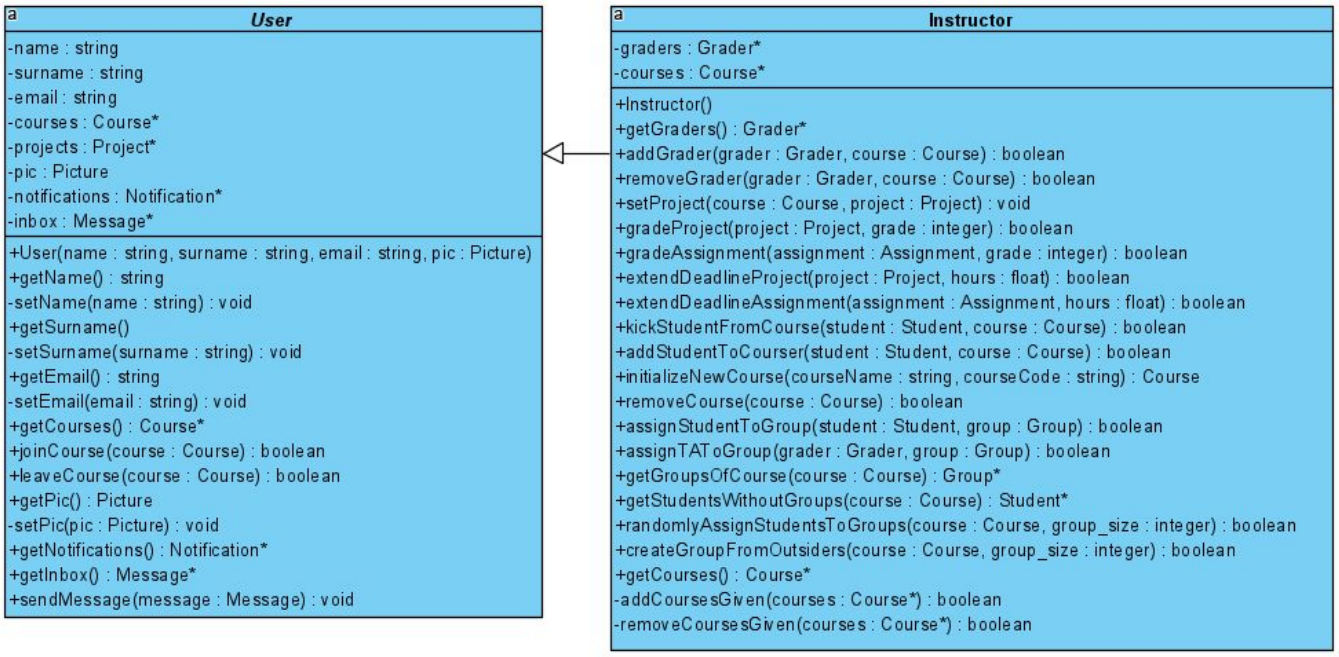


5.2.2.1 User Student Grader Diagram

In the system we have an abstract class called User which is basically any user. That has a name, surname, email address, set of courses, set of projects, profile picture, notifications, and a set of messages. From the user, we have the student class which has a set of groups to keep track of students distinct groups from other courses, a set of assignments to help students get their grades easily, and a set of projects to help them to keep track of what is going on in each project.

Grader is the instructor assigned masters or phd students having some capacity to grade students while not having the unrestricted instructor capabilities.

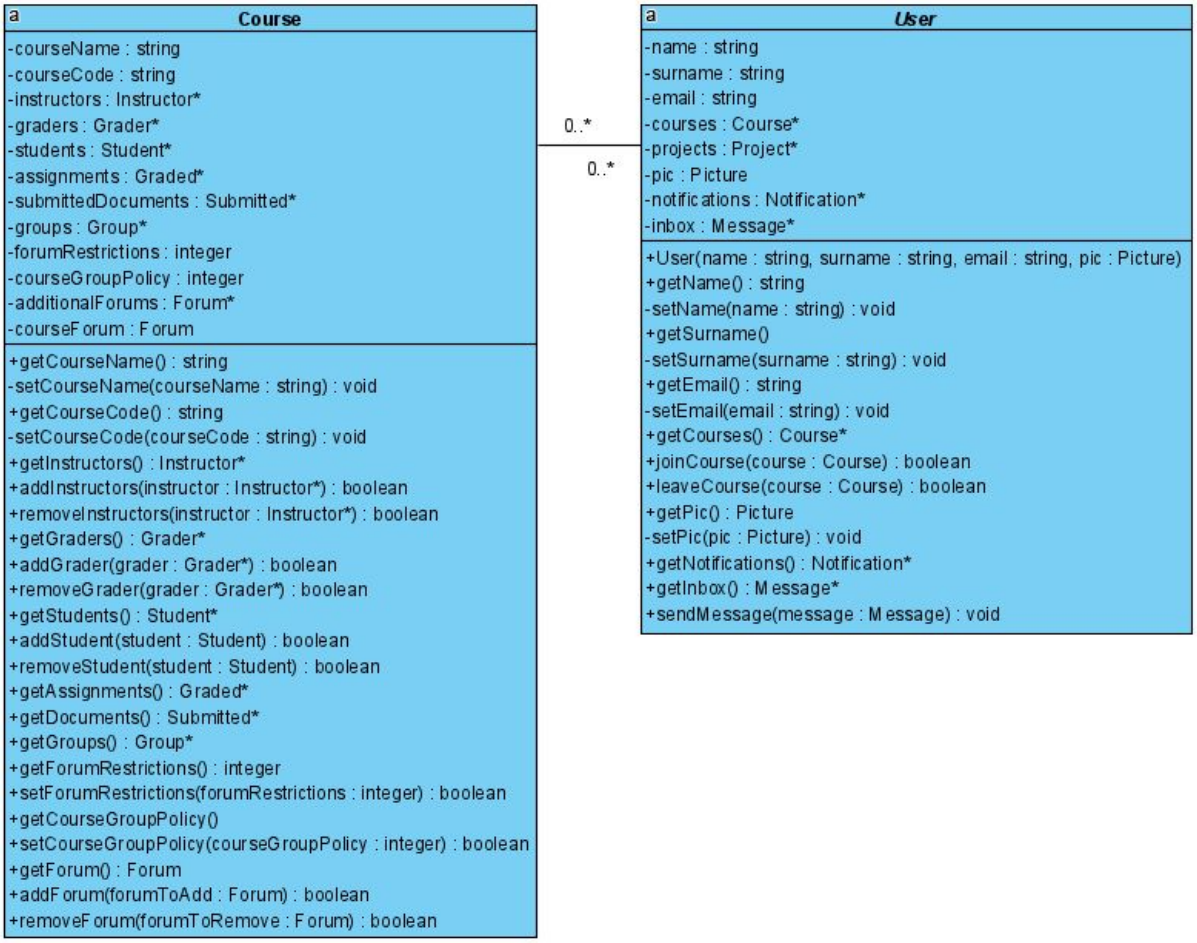
5.2.2.2 User Instructor Relationship



5.2.2.2 User Instructor Relationship

Instructor has a set of graders that are assigned by them, and the given course list. Nearly everything that is related to them is under their control. Assigning homework, extending deadlines, randomly assigning students to groups are examples of what instructors can do within seconds.

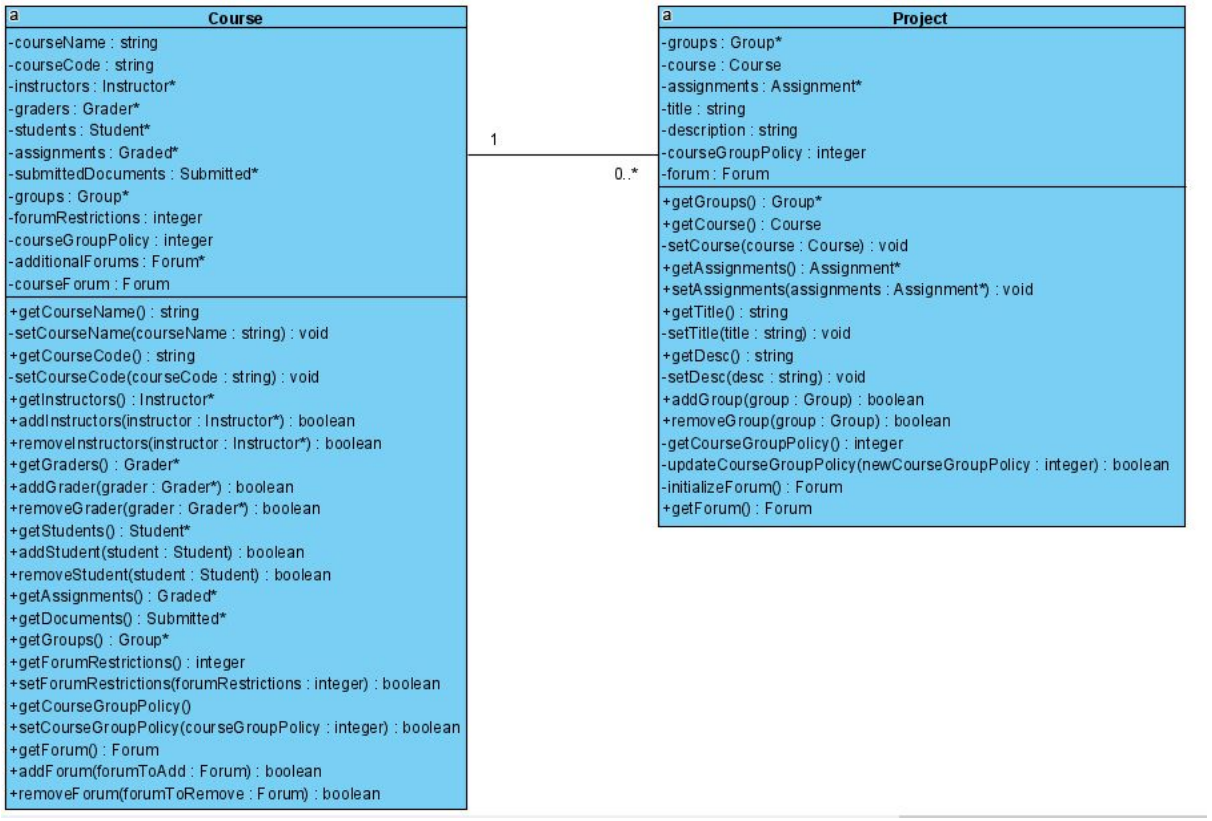
5.2.2.3 User Course Relationship



5.2.2.3 User Course Relationship

User and course relationship is a multiplication, if all users removed from the course then there is at least zero users in, and there might exist a user with zero courses. Course has a course name, course code, a set of instructors, graders and students as well as assignments, submitted documents, groups formed for projects, and forums. Forum restriction can be set while creating the course, or changed afterwards by the instructor, used to limit the actions that one can take in the course forums.

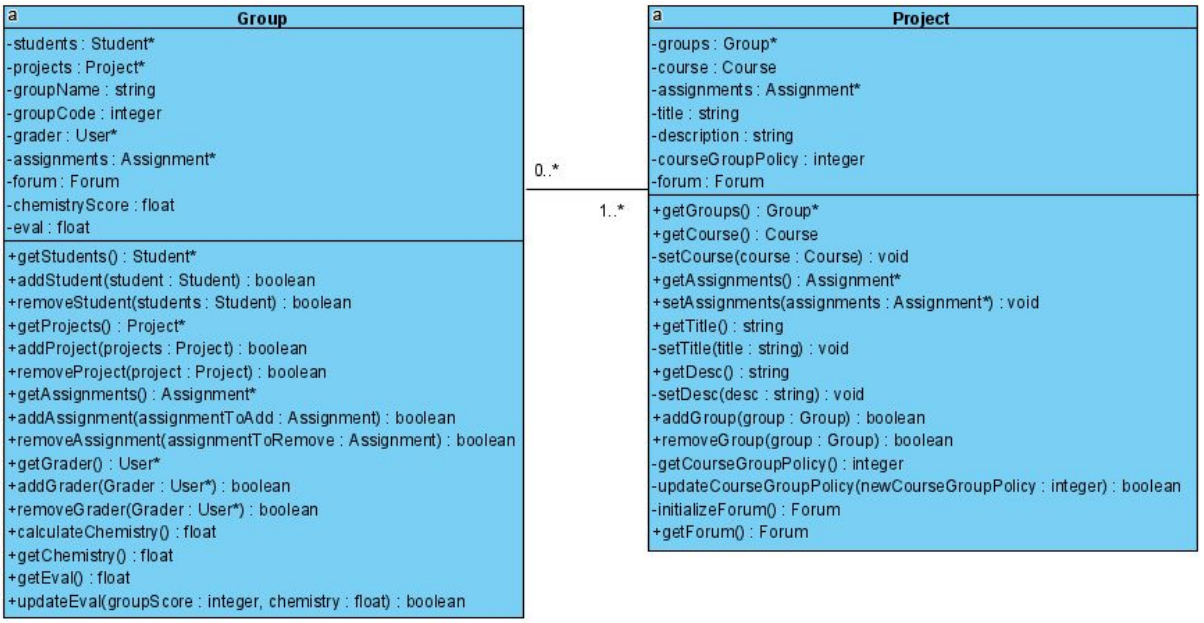
5.2.2.4 Course Project Relationship



5.2.2.4 Course Project Relationship

Course has a name, course code, and a set of instructors, graders, students, assıgnments, submıtted documents, and groups. Forum restriction is set by the instructor while creatıng the course, or changed afterwards to limit, or delimit the users. Course group policy is to limit the group related issues, additional forums may be created by the instructor to separate the students into their specific sections, if the instructor does not create any additional forums then it is an empty set, and the main forum is where the user shares information. Some functions are private to make the course more secure and the relationship between a course and a project is thought to be a multiplication where a project requires a course while the course has zero or more projects.

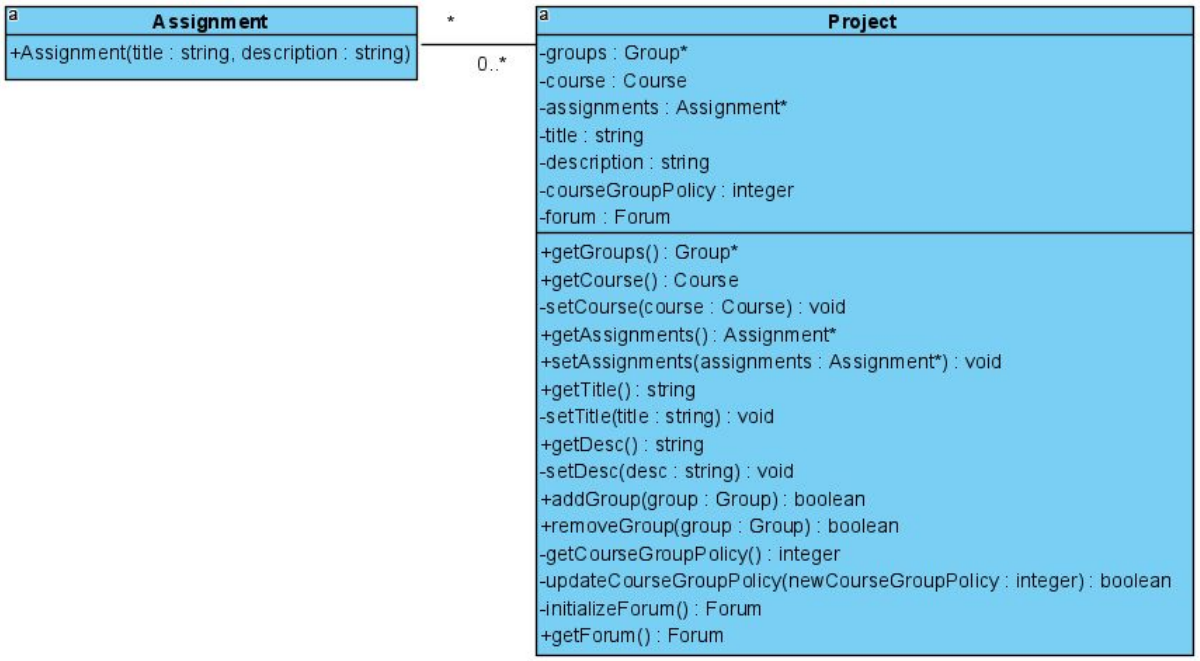
5.2.2.5 Group Project Relationship



5.2.2.5 Group Project Relationship

Group is a very distinct set of students that are in the same course. Set of students, and set of projects that the same group of students done can be accessible within the group. Group name and code is what makes them distinguishable from the groups. Grader is who is supposed to grade, or mentor that group, and the assignments are the set of assignments that are done by that group. Distinction between set of projects and set of assignments is, for example CS 315 requires two projects that should be done by the same group while CS 461 requires six assignments and one project that should be done by the same group. CS 315 projects are kept in the projects and the CS 461 assignments are kept in the assignments. Forum is where group members have conversations and talk about the projects. Chemistry score is a number in an interval which may be used to get the information about how well the members of the other group fit in each other. That is distinct from the evaluation by its working principles, for example we thought that if students from the same group answer posts on the course forum regularly, then they might have the same instinct to help others thus, they might have higher chemistry scores, as if they act similarly. Evaluations of the groups are kept. It is thought that an instructor may want to get evaluations after every group activity, or just at the end of the semester, that is what we aimed to provide. Evaluations are just as close as a function call.

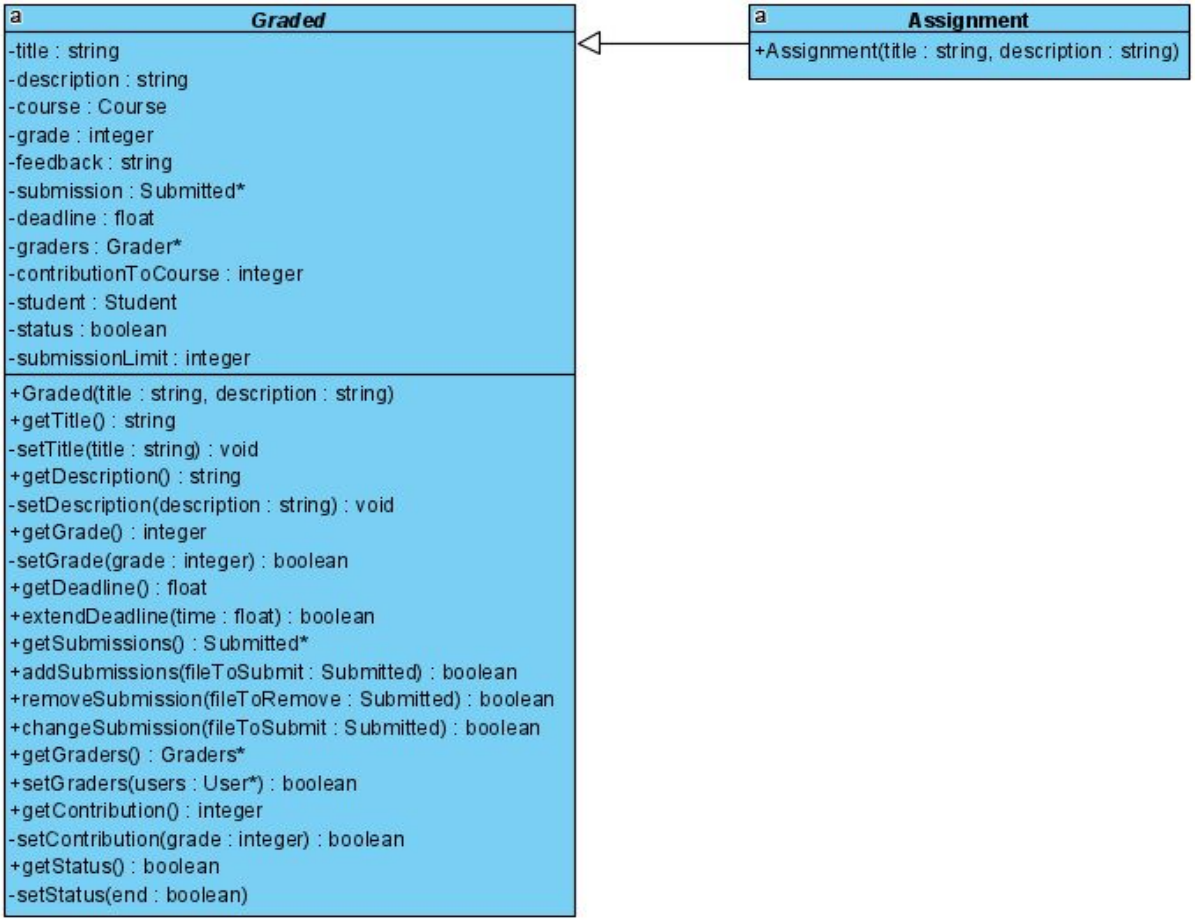
5.2.2.6 Assignment Project Relationship



5.2.2.6 Assignment Project Relationship

Assignment can be a part of the project in case of CS 461, students are given small tasks that will build up to a project.

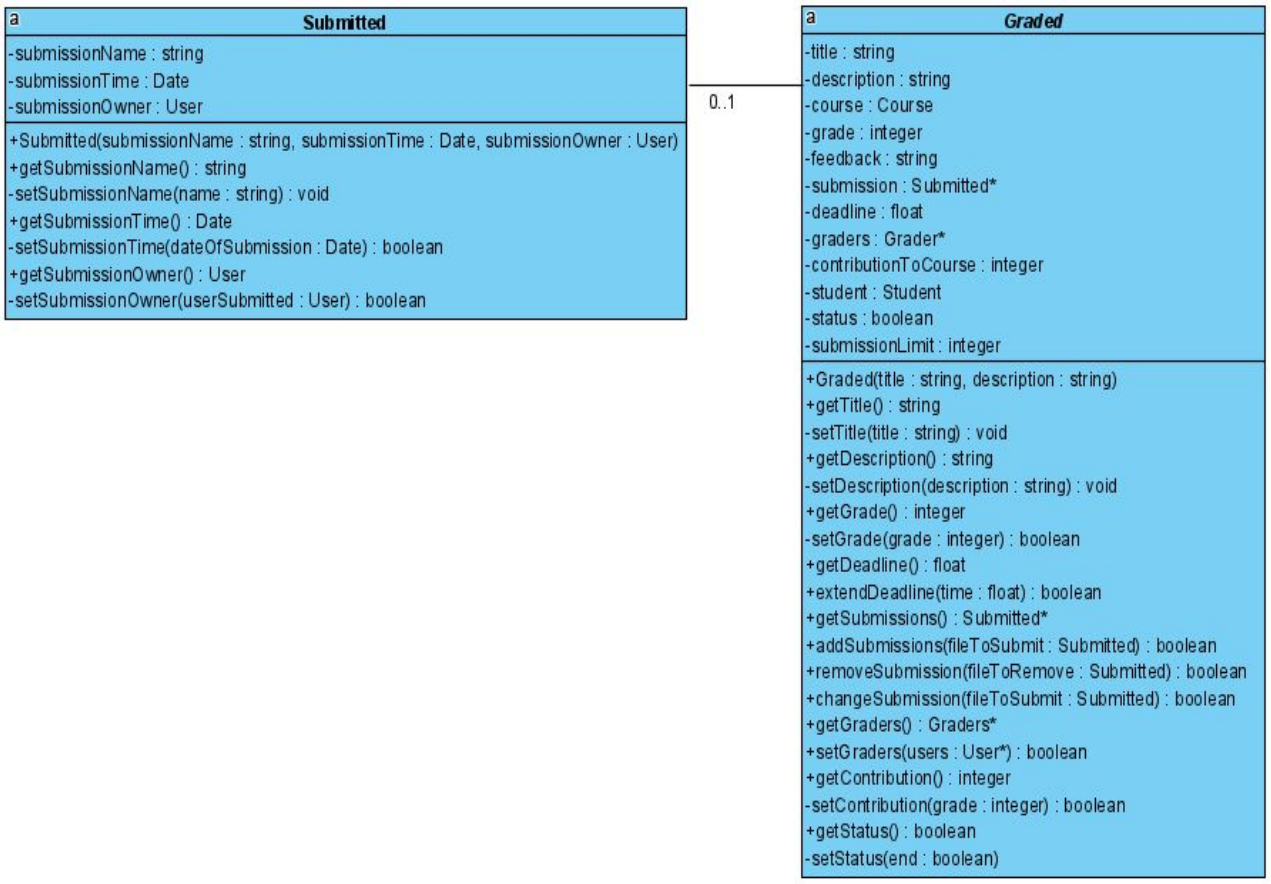
5.2.2.7 Graded Assignment Relationship



5.2.2.7 Graded Assignment Relationship

Graded is an abstract class of any graded work.

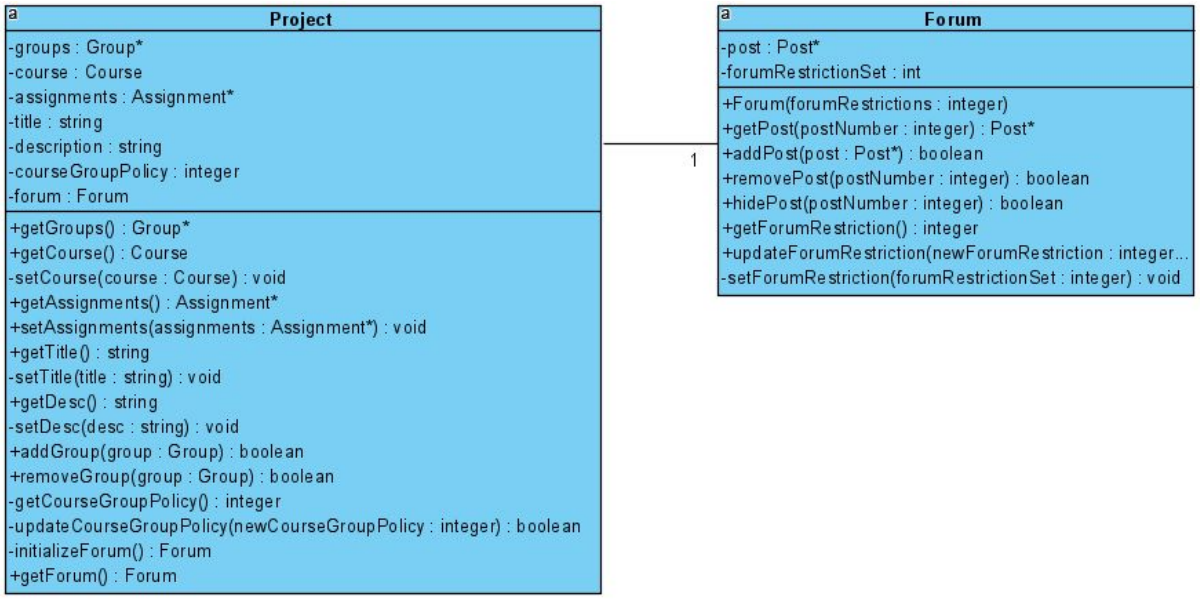
5.2.2.8 Submitted Graded Relationship



5.2.2.8 Submitted Graded Relationship

Submitted is a document that is sent to the system to grade, or to share, and to keep track of what is uploaded it has submission name, name of the file, submission date, when it is submitted, submission owner, who submits.

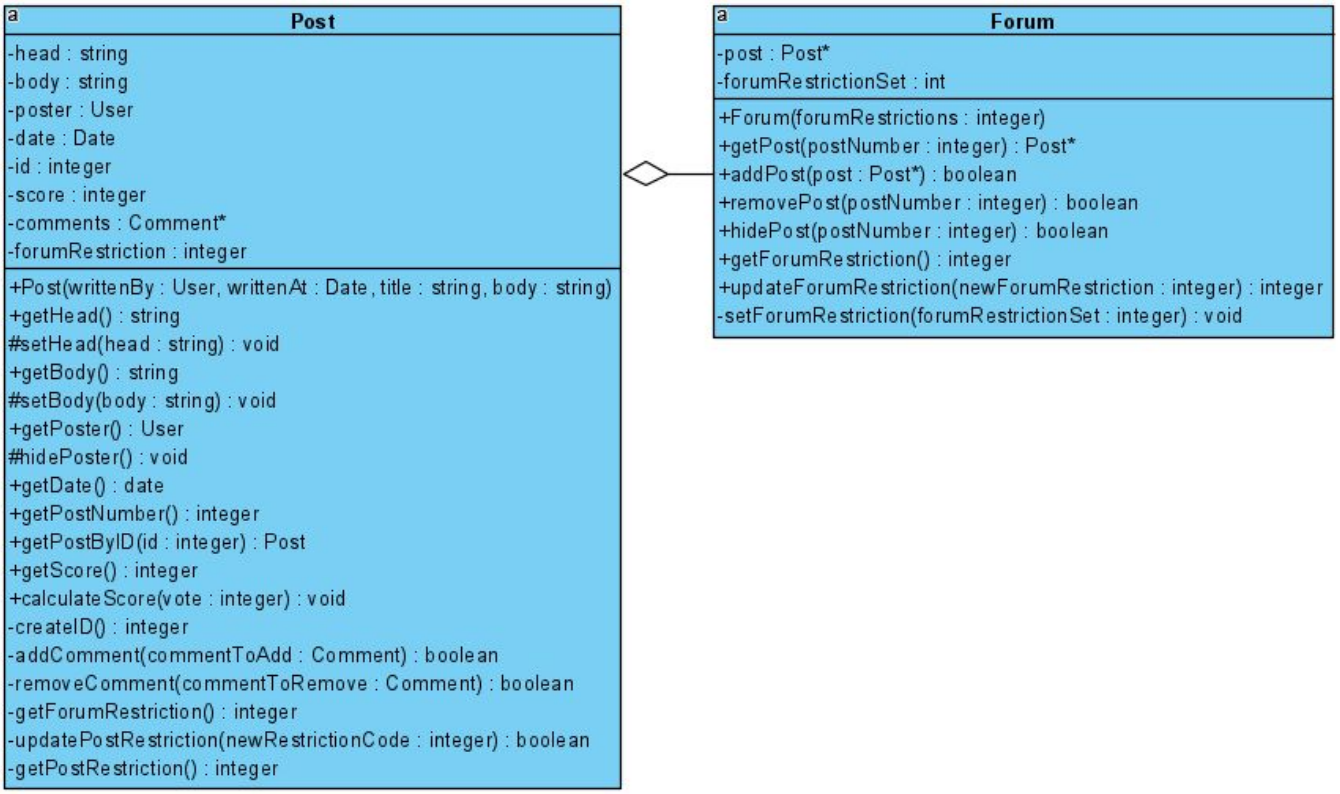
5.2.2.9 Project Forum Diagram



5.2.2.9 Project Forum Diagram

A project is thought as a group assignment, that requires a group of people to work on the given assignment, thus a project may have different groups that are working on them, and to bring them together, and easily reach them from the backend project keeps all the groups that are working on it. Course is the course information about the project, and assignments is a set of assignments that can be graded throughout the project. Title and description are the information about the project that instructors gave. Course group policy is like the restriction code in the forum, instructors can set it while creating the project or changing it afterwards. It is thought to restrict the project forums. It is thought that, if a student wants to chat about the project, then by just going to the projects forum they can access their needs, as long as it is not restricted by the instructor. Forum has the same capability as a forum. Users can add, remove, edit, hide posts, if they are not restricted, and the comments have the previous capabilities as the instructor lets.

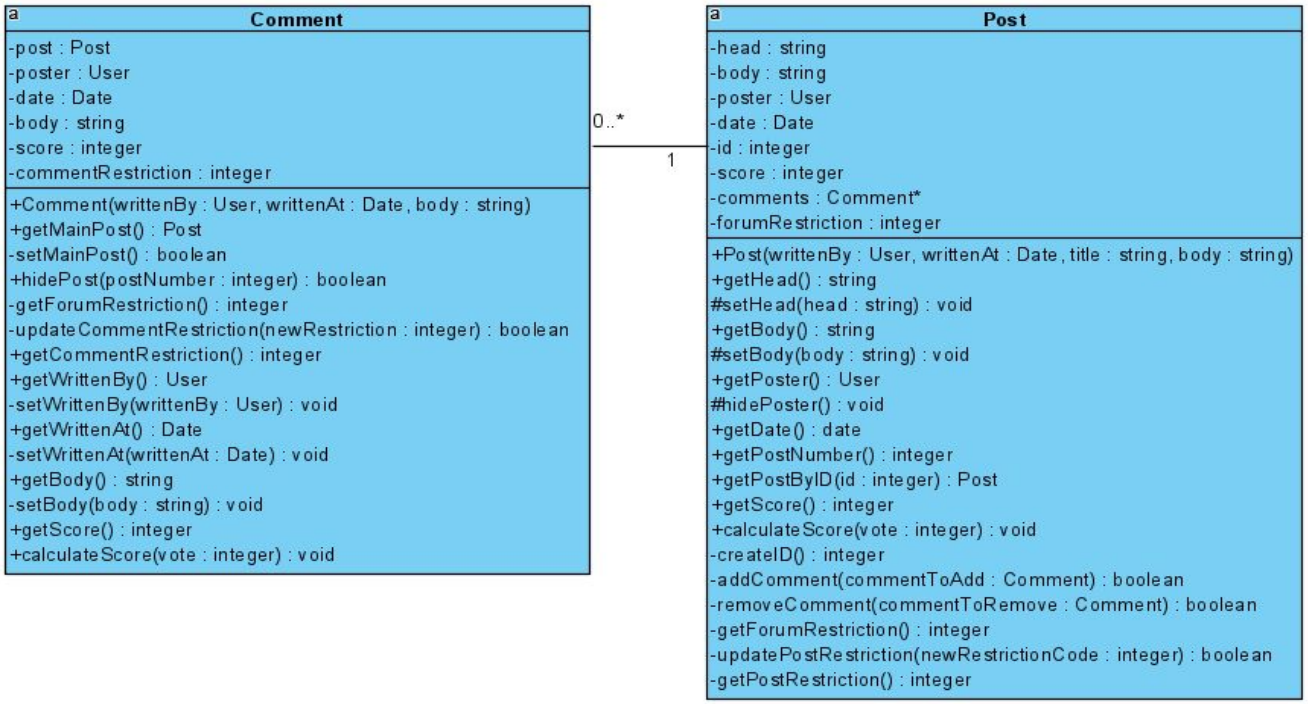
5.2.2.10 Forum Post Diagram



5.2.2.10 Forum Post Diagram

Forum is a storage for the posts. Every distinct forum has its own post set. Thus Forums are more maintainable. Attributes of Forum consists of a set of posts and a restriction code. Initially, when the forum has no posts, its set is empty, and it gets crowded as any user, if allowed, adds new posts. Forum restriction code is thought as an integer value in between an interval. Instructors of the course may set value while creating the course, or afterwards when they want to limit, or delimit forum. Constructor of the forum is thought to get a restriction value since at initial state of the forum there does not exist any pre opened posts. Forum functions are set with the consideration of changes. That is posts can be removed, hiden, edited after the addition, if the restriction code lets users.Post is the initial message that users want to say, if not limited. The most common forum - post relation is aimed at during the analysis stage. Thus, post has a head, that is what user can see without entering actual post, has a body, the message of the user, a poster, who made that post, date, when the poster added the post, id number to keep track of each post, and to ease accessing them throughout the backend, score, a is beneficial question to make system more interactive for the user, a comment set, basically every reply to that specific post and comments will be explained deeply forthcoming image, and last but not least the forum restriction number, which is enabling the user interaction within the desired limitations of the instructor, for example if the restriction code is a high value within its defined limit than the students may not edit, or even add any comment to a post. Within this structure the forum and posts have an aggregation among them.

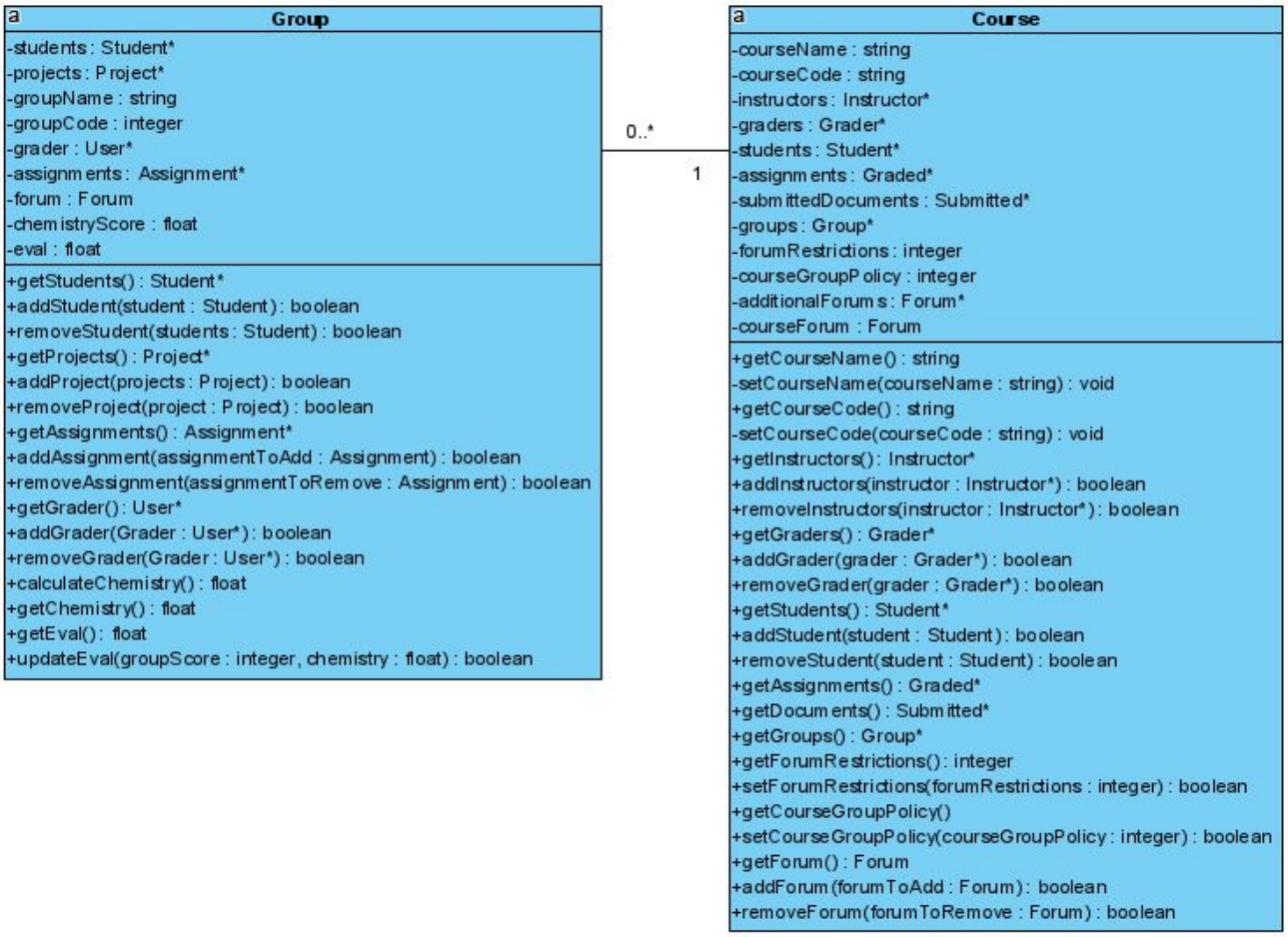
5.2.2.11 Comment Post Diagram



5.2.2.11 Comment Post Diagram

Post is created when a user wants to discuss something on the forum, if not limited. Comments are the replies to that specific post. That is every post have its set of comments added by other users. Hence, every comment has its post to ease the access needs. The poster is who adds that comment, date is the date of the addition, body has what the poster wanted to share, score ıs to see how beneficial that comment was, comment restriction is calculated by looking at the forum restriction code, if forum is set to be quite limited one then this implies that the comments might needed to be set restrictive. Within this structure between comment and a post, a post might not have any comments while a comment requires at least a post.

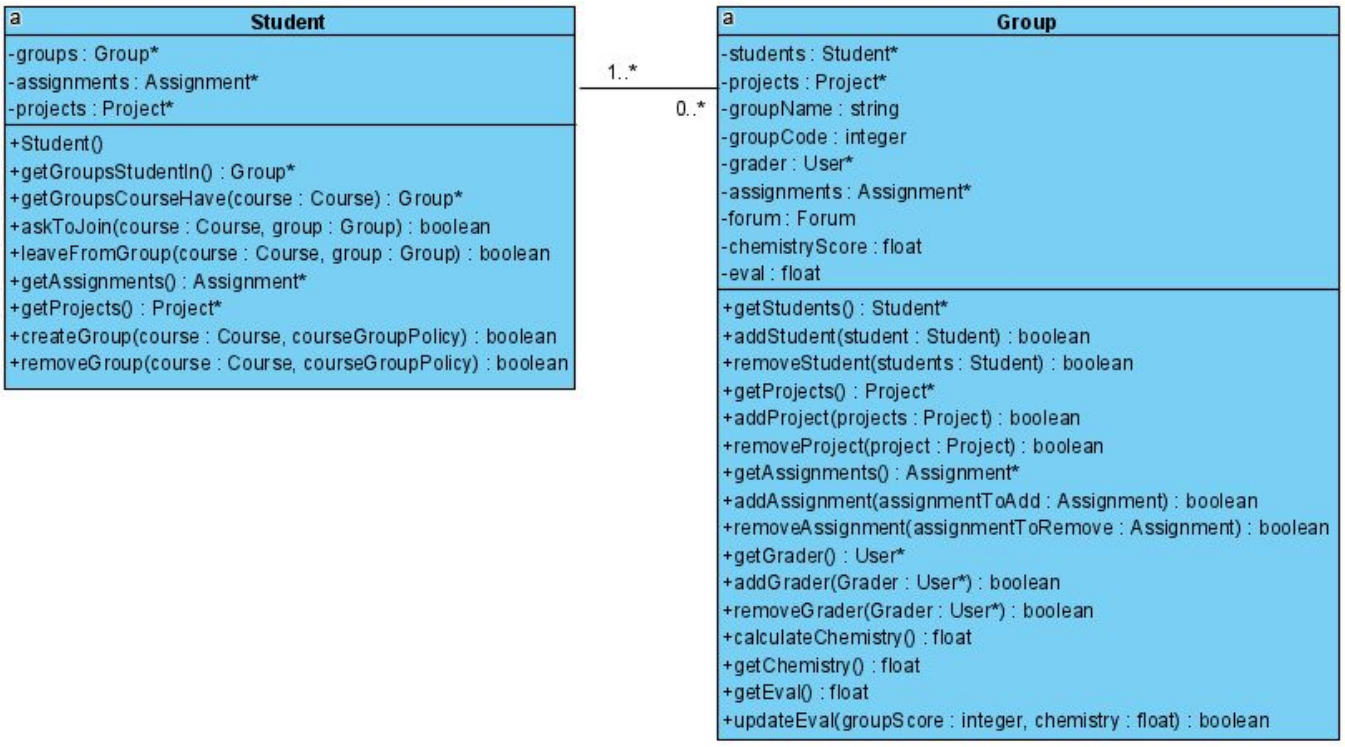
5.2.2.12 Group Course Diagram



5.2.2.12 Group Course Diagram

Courses and groups in that course have their multiplication as a course may have zero or more groups while a group should have only one course.

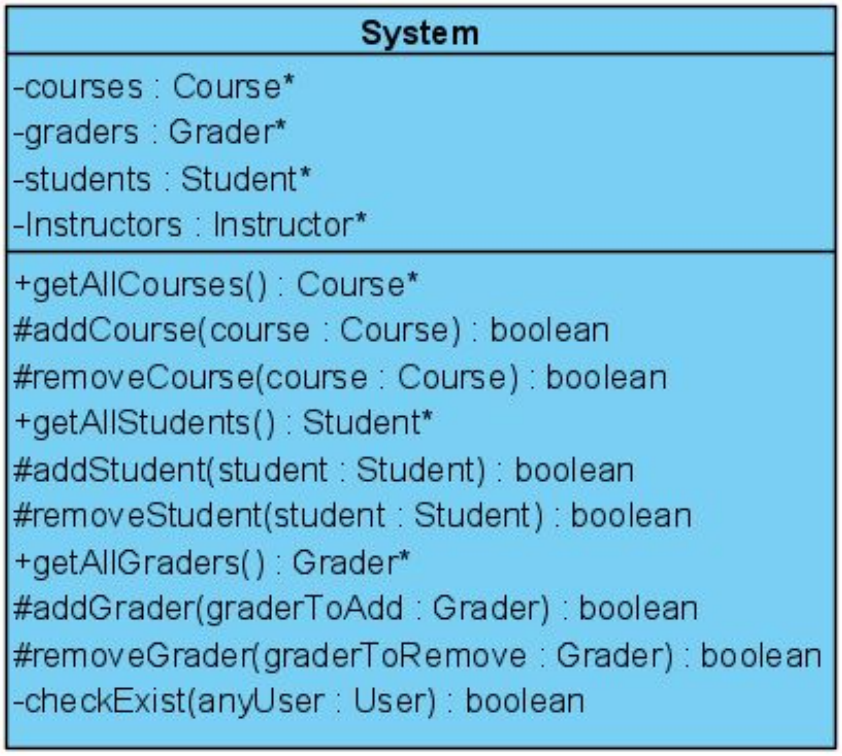
5.2.2.13 Student Group Diagram



5.2.2.13 Student Group Diagram

Students can form a group as long as they obey the limitations of the instructor.

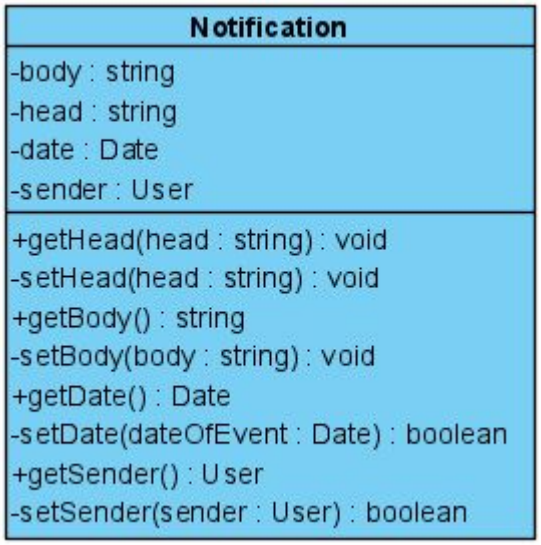
5.2.2.14 System Class



5.2.2.14 System Class

The system contains all the courses and users. It has methods to add or remove courses, student and grader and also a method to get all courses for a specific user and check for an existing user.

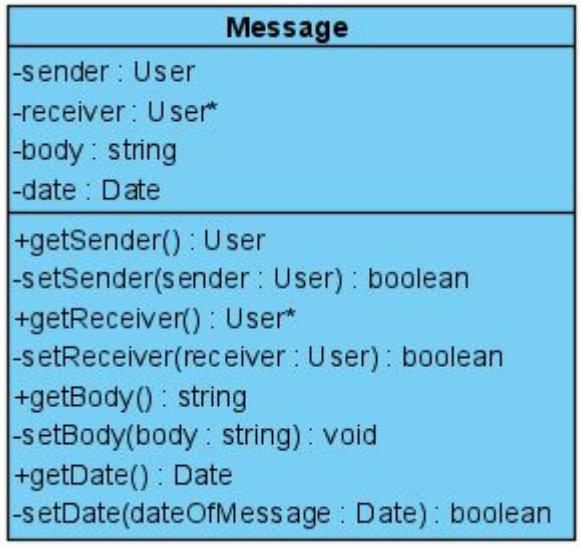
5.2.2.15 Notification Class



5.2.2.15 Notification Class

The notifications have a sender, date and content and get and set methods for all attributes

5.2.2.16 Message Class



5.2.2.16 Message Class

The messages have a sender, receiver, date and content and get and set methods for all attributes

5.2.2.17 Date Class

5.2.2.17 Date Class

The date is in the normally used format with get and set methods for every attribute.

5.3 Sequence Diagram

5.3.1 Instructor

In this diagram we show the sequence of the interactions between the instructor and the system. As explained before the Instructor user has the authority to create a course, we check if the course does not already exist, before creating it. Instructor can also add students, materialism projects, assignments and graders to the course. When Instructor decides to create a project the call is sent to the course where the project is created and added to it. Afterwards, Instructor interacts directly with the project objects created where

she can add materials, assignments, and graders special to the project. Instructor can also assign students to random groups and remove graders from projects if needed.

We can also see how Instructors interact with groups through grading and contacting them. Also Instructors can add and remove graders form projects and courses. Additionally, Assignment objects are created as a result of Instructor actions but their creations are called through course or project objects, depending on the destination.

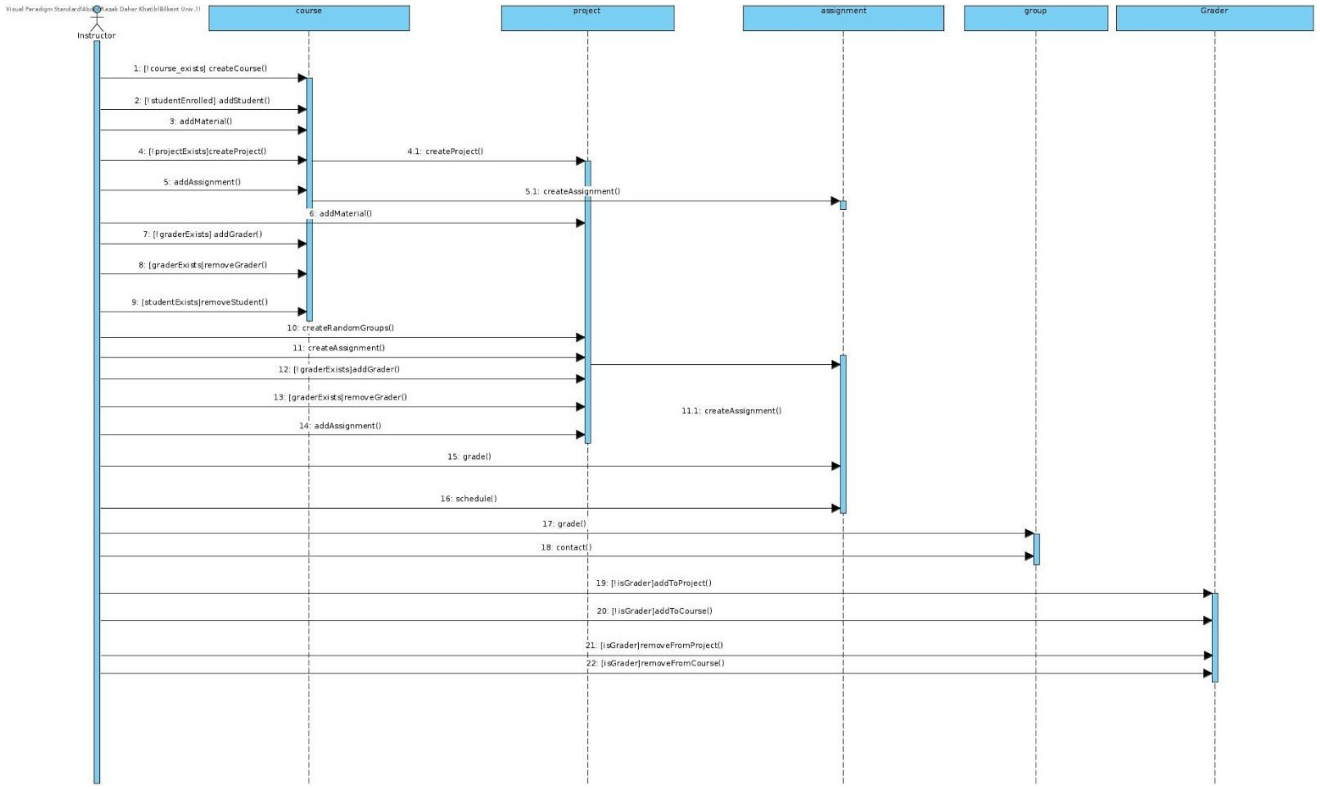


Figure 5.3.1: Instructor sequence diagram

5.3.2 Grader

This diagram shows the brief interactions of Grader users with the system. Graders can grade an assignment and grade or contact a group. No other authority is given to the Grader objects.

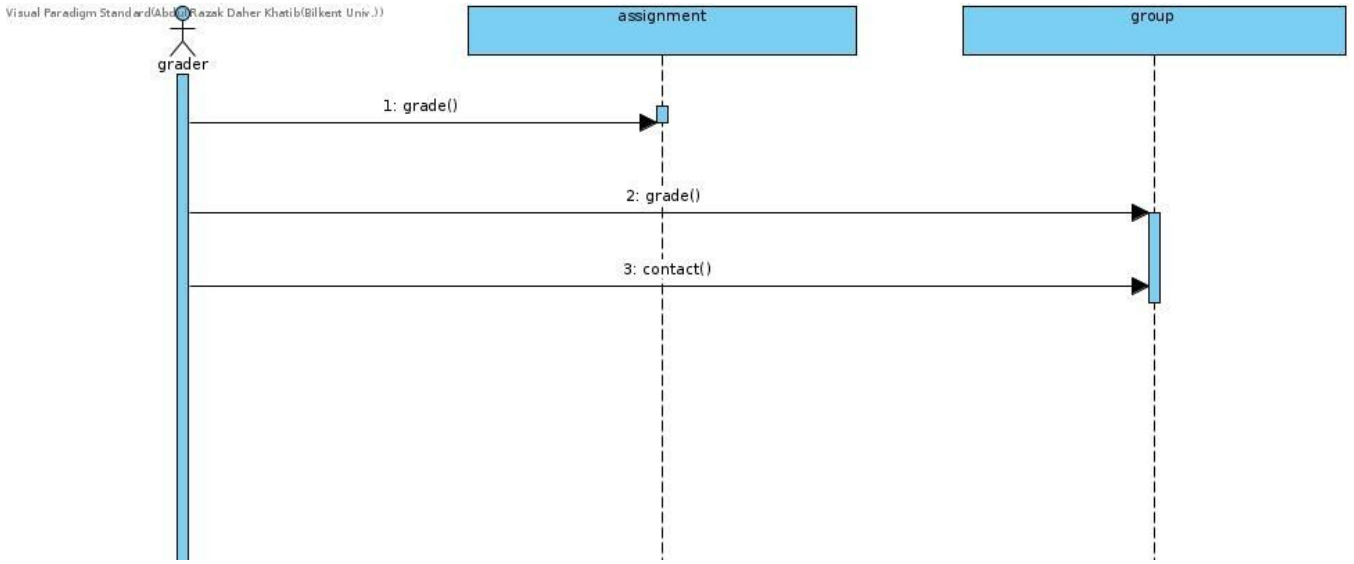


Figure 5.3.2: grader sequence diagram

5.3.3 Student

In this diagram we show the interactions of students of the system. Student objects can join a course, given that it exists, then their direct interaction with Course objects is done. Student interactions will be mostly with their groups, where they can create a group, be added to it if Instructor chooses students to be randomly assigned, submit an offer if the offers are open by groups, then either added or rejected by the group. Finally, they can also send a message to their group. Student objects can also submit an assignment, join an existing group, view other groups assignments and evaluate them according to some criteria, and evaluate and contact their group mates and graders once the evaluations are open.

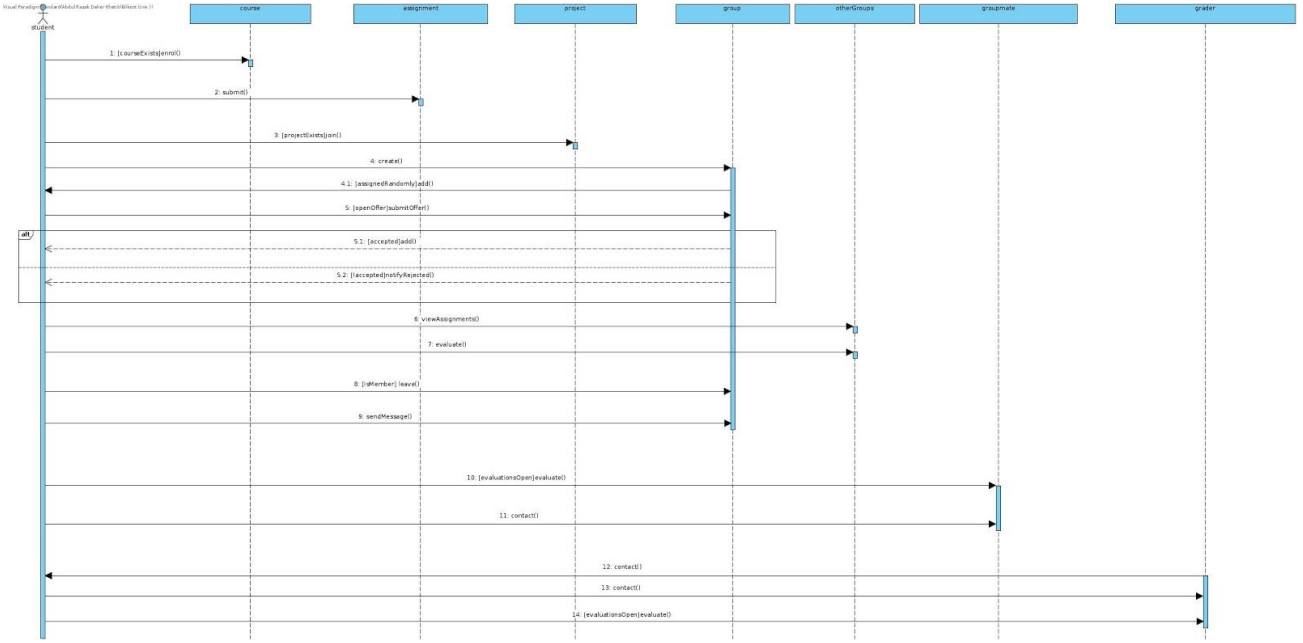


Figure 5.3.3: student sequence diagram

5.3.4 Poster

This diagram shows the interactions of every user allowed to post in the forum, this authority will be given by the Instructor objects, so in case no one was allowed this will represent only Instructor users, and in case there are no restrictions all users are represented by the Poster actor. A Poster actor can create a post through the Forum object in the course or group, then Poster's interactions will be directly with the post itself where she can rate the post or comment on it. The poster can edit their posts or delete them. A comment can be added by the poster even if she is not the owner of the post. The comment will be added through the post then the editing, deleting or hiding actions will be taken directly from the Poster object.

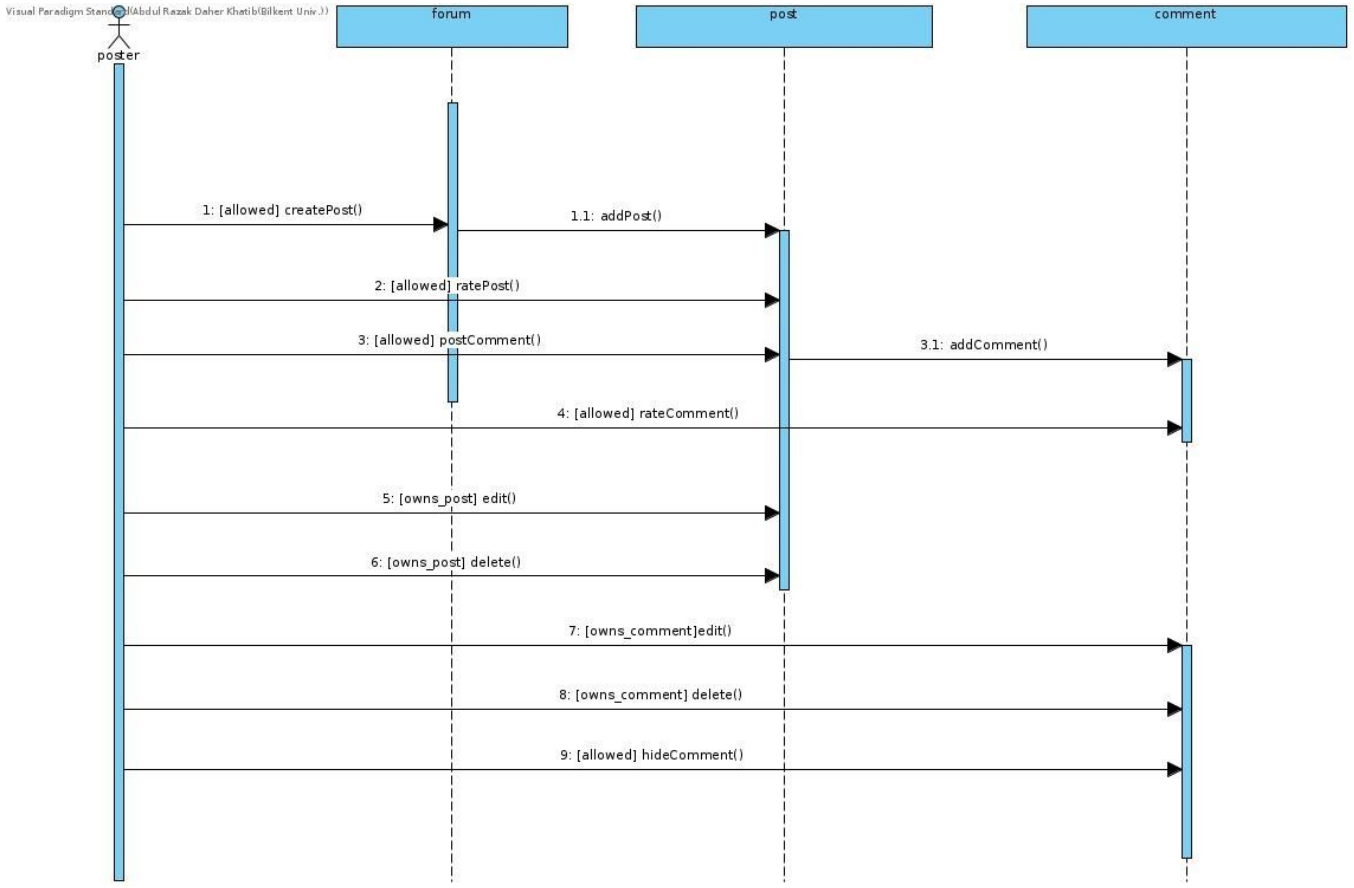
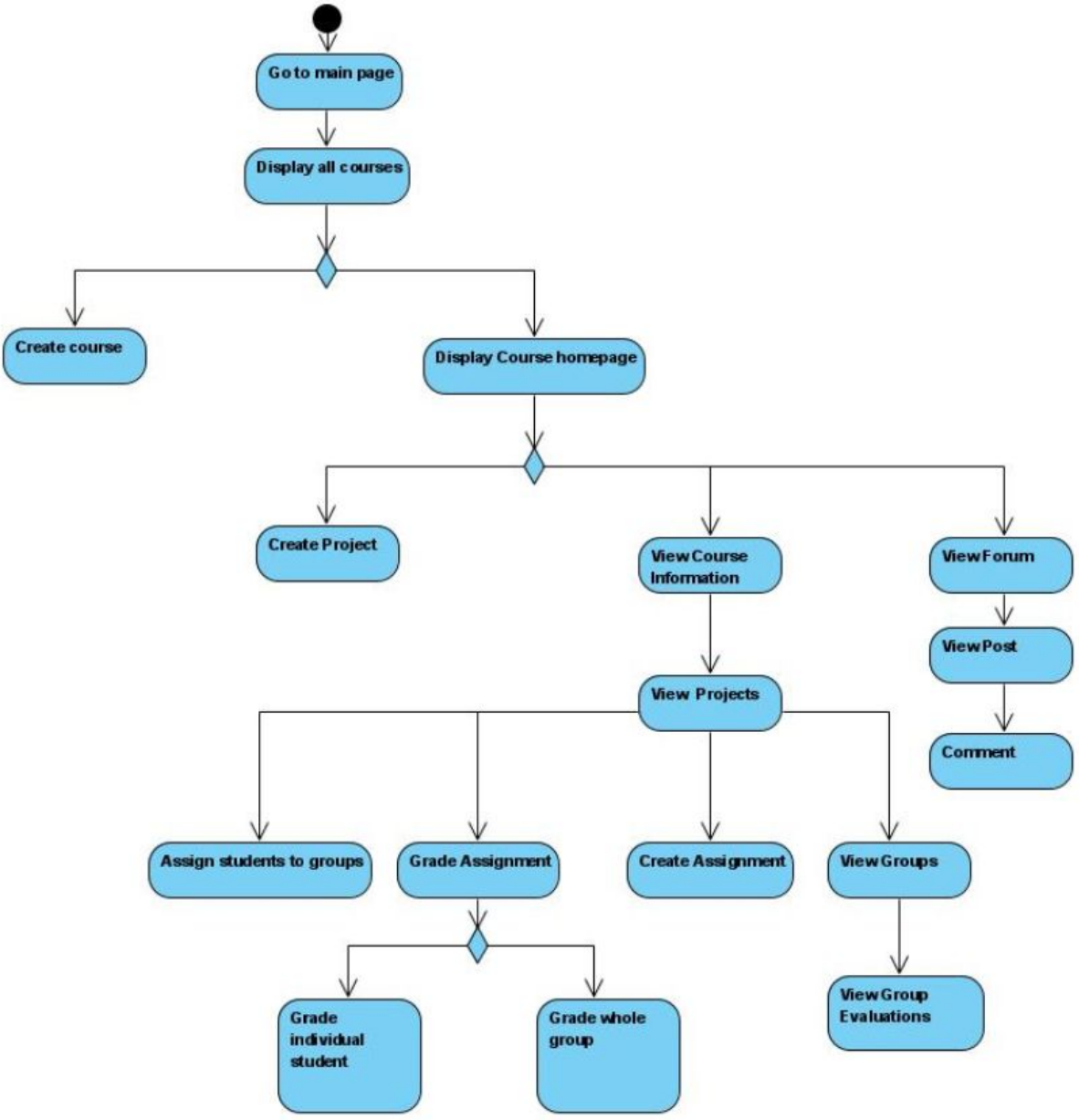


Figure 5.3.4: Poster sequence diagram

5.4 Activity Diagram

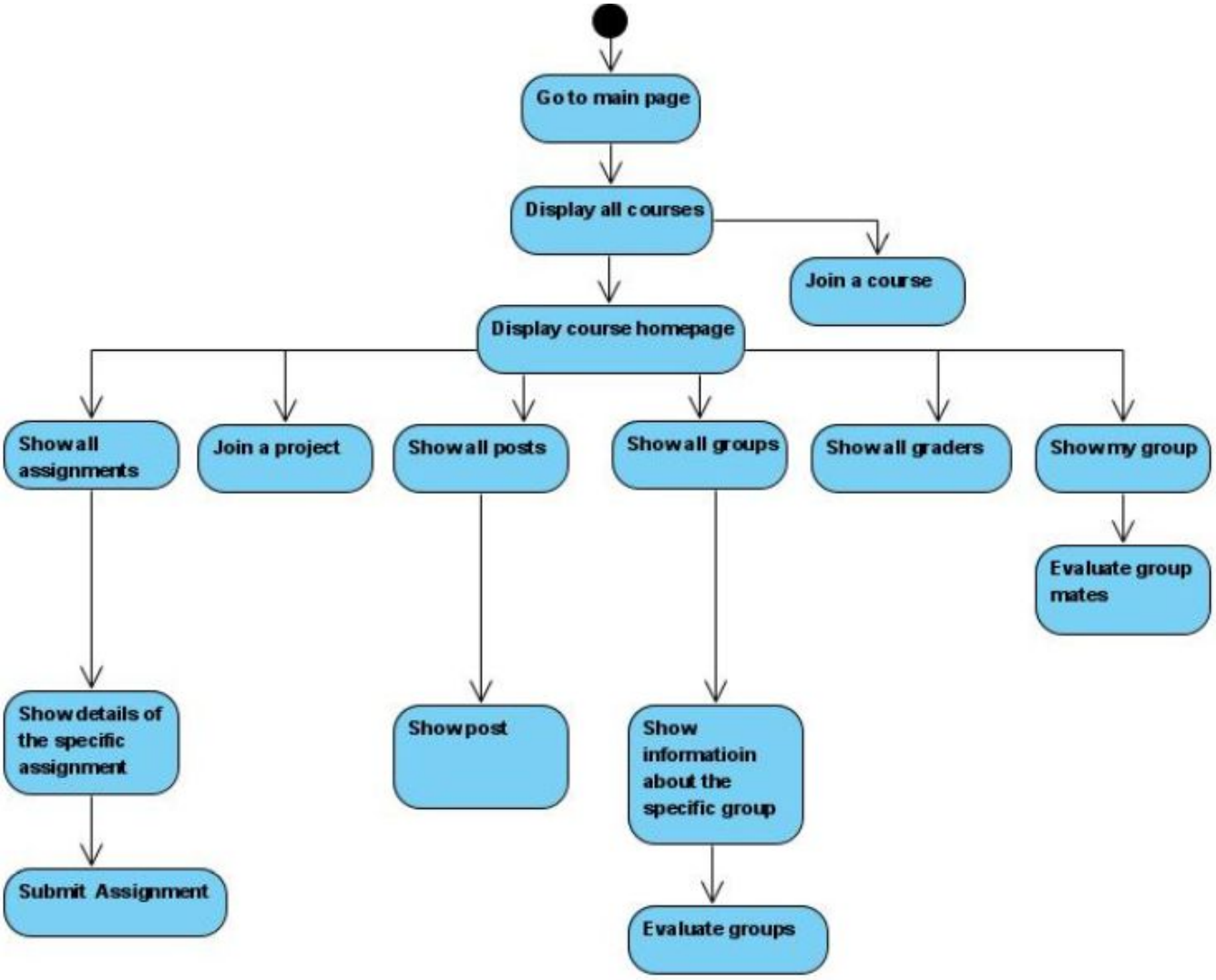
5.4.1 Instructor

The instructor has admin privileges as she can create a new course and assign students to the course. While on the course homepage, she can both view and edit all information such as projects,assignments, groups, and posts, as well as assign new assignments and create new projects.In the course homepage, new projects can be created and the course info and forums can be viewed. If the forums are opened, all the posts are displayed along with the comments and the instructor can also interact on the posts. Projects can be viewed from the “course information” page where assignments can be created and graded and groups can be viewed and assigned.



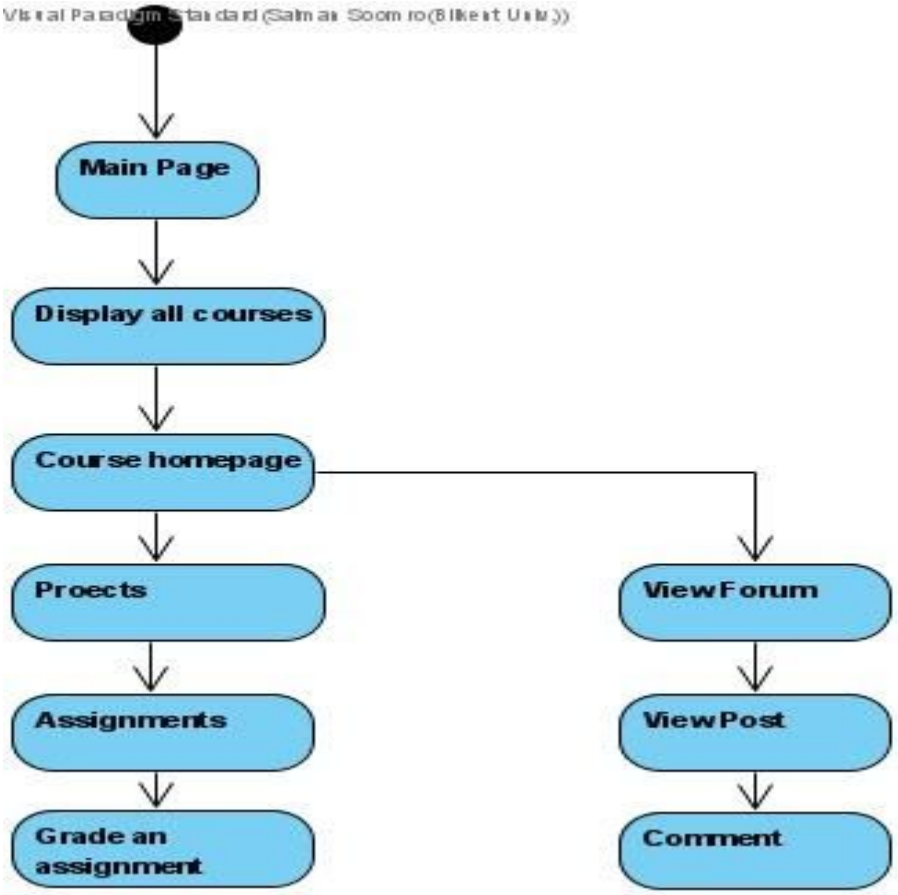
5.4.2 Student

The student can view all the enrolled courses and can enroll in a new course from the main page.After proceeding to a specific course's homepage, all of the details, like the project, assignments,groups, and posts, can be accessed. Moreover, the student can also join a project from thehomepage, submit an assignment in the assignments section,
and evaluate group mates in the groups section.



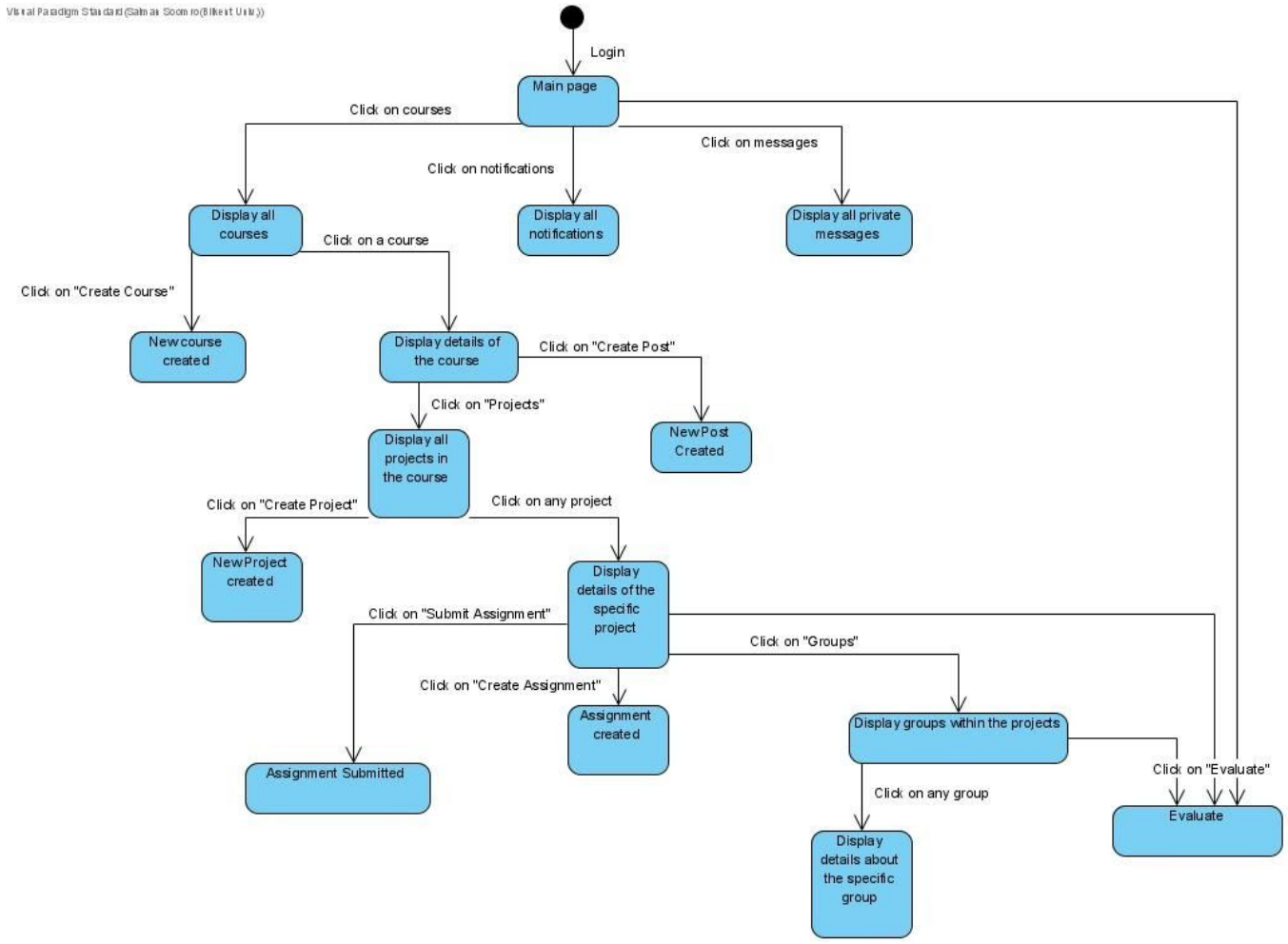
5.4.3 Grader

The grader is there to only help out the instructor with grading so she can only access the assignments, projects, and groups in a course and can assign grades to submitted assignments.The grader can view all the projects in the course homepage and view all the assignments in the project section where they can be graded. Also the grader can view forums from the course homepage and see the posts and interact on them.



5.5 State Diagram

The state diagram gives all the different states our peer review system would be in, depending on the action of the user. The user starts from the main page from where she can access the notifications, messages, evaluations and the courses. Once the user gets into the “courses” section, he can create a new course only if she is an instructor or just view the course. Furthermore in the course homepage, all the details of the specific course can be accessed like projects, groups, assignments and depending on the type of user, the course information can be viewed or manipulated.The course homepage provides links to access the details of every course which constitute of “Posts” and “Projects”. Under the projects section, a new project can be created or the details of an existing one can be accessed which includes assignments and the groups with the projects. From the assignments section, new assignments can be created or existing ones can be viewed and submitted while in the groups section, group members can be evaluated and characteristics of the groups such as the members and their chemistry can be viewed.



5.6 Screen Mockups

5.6.1 Login As Page

Figure 5.6.1: Login As Page

On the "Login as" page,the user is asked whether she is an instructor, a student or a teaching assistant. After that, the user is directed to the "Sign Up" page accordingly.

5.6.2 Sign Up Page

5.6.2.1 Sign Up Page For Students

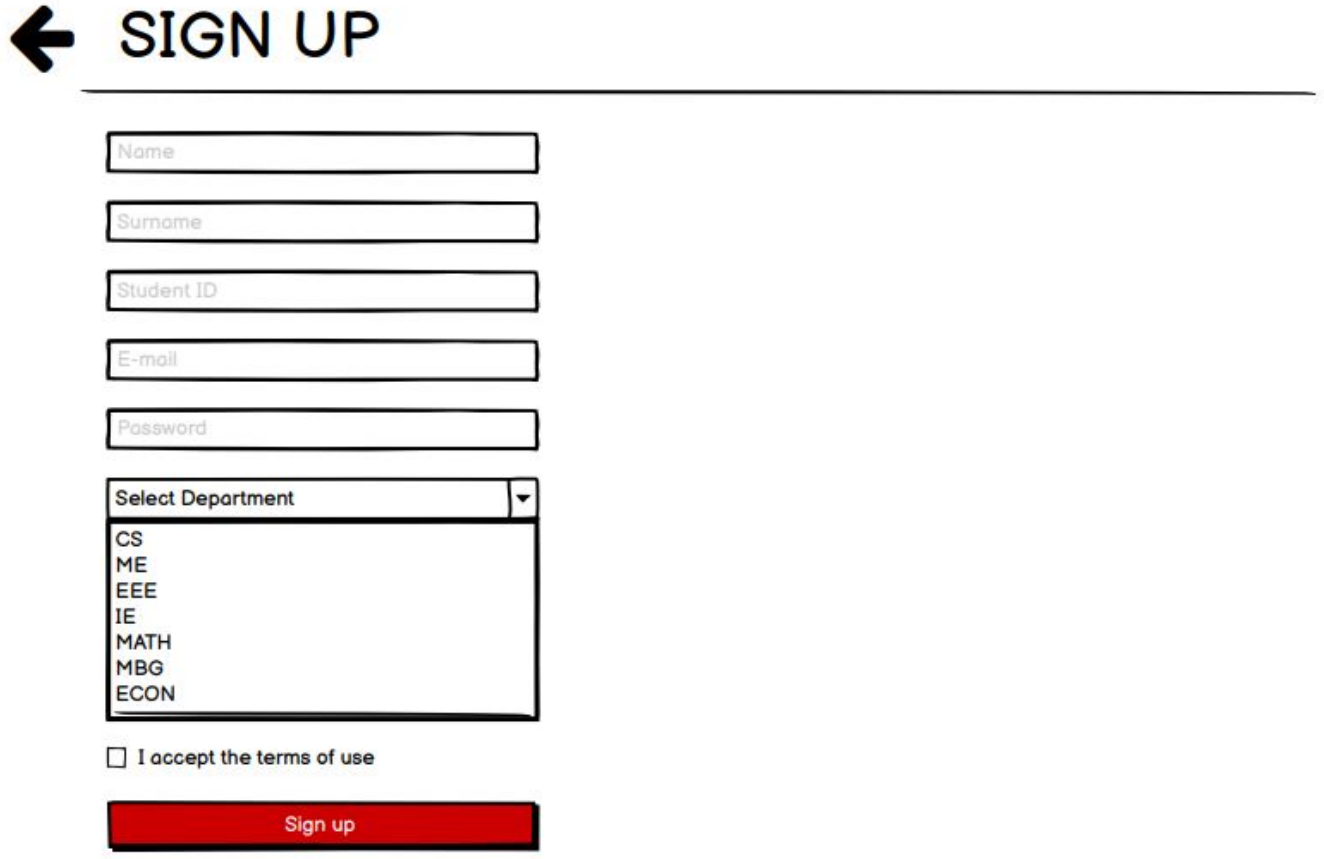


Figure 5.6.2.1: Sign Up Page For Students

In "Sign up Page for Students", the student is asked to enter her name, surname, student ID, E-mail, password and department. After clicking on the "Sign up" button, an account is created using that info and the student will see the main page.

5.6.2.2 Sign Up Page For Instructor and Grader

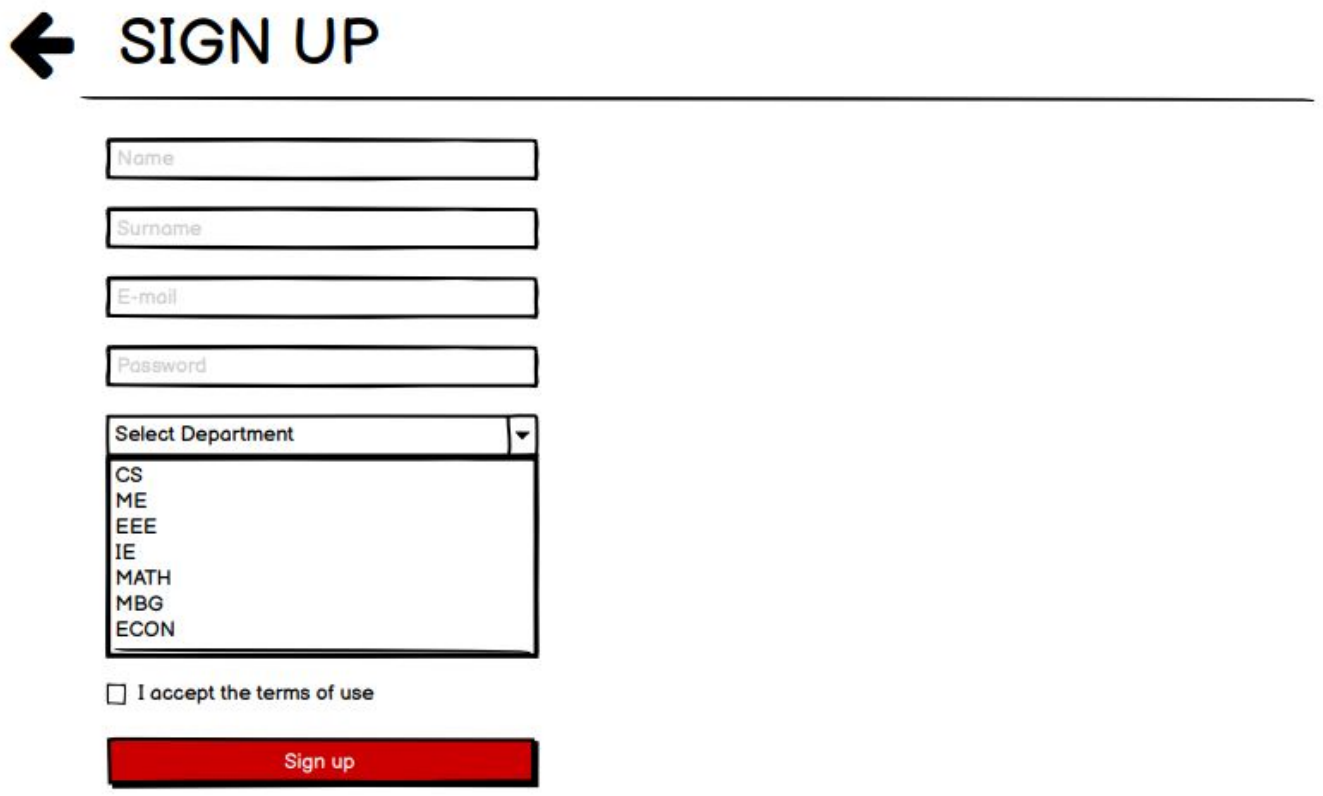


Figure 5.6.2.2: Sign Up Page For Instructor and Grader

In the "Sign up Page for Instructors and TA" page, the instructor is asked to enter her name, surname, e-mail, password and department. After clicking on the "Sign up" button, an account is created using that info and the student will see the main page. The only difference from the "Sign up Page for Students" page is that no student ID information is received from the user.

5.6.3 Login Page

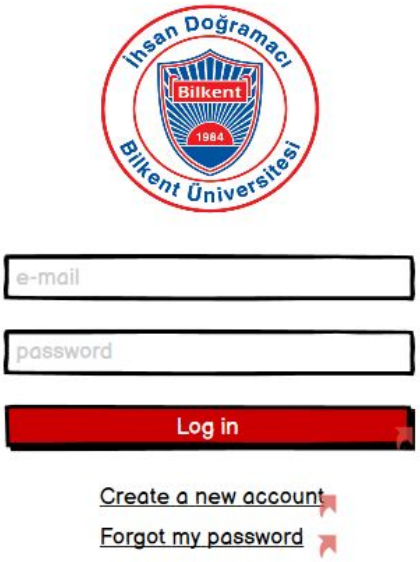


Figure 5.6.3: Login Page

On the "Log in" page, users log in to the application by entering their email and password. They can also choose the option of creating a new account or changing the passwords of their existing accounts in case they forgot it.

5.6.4 Main Page

5.6.4.1 Main Page For Students

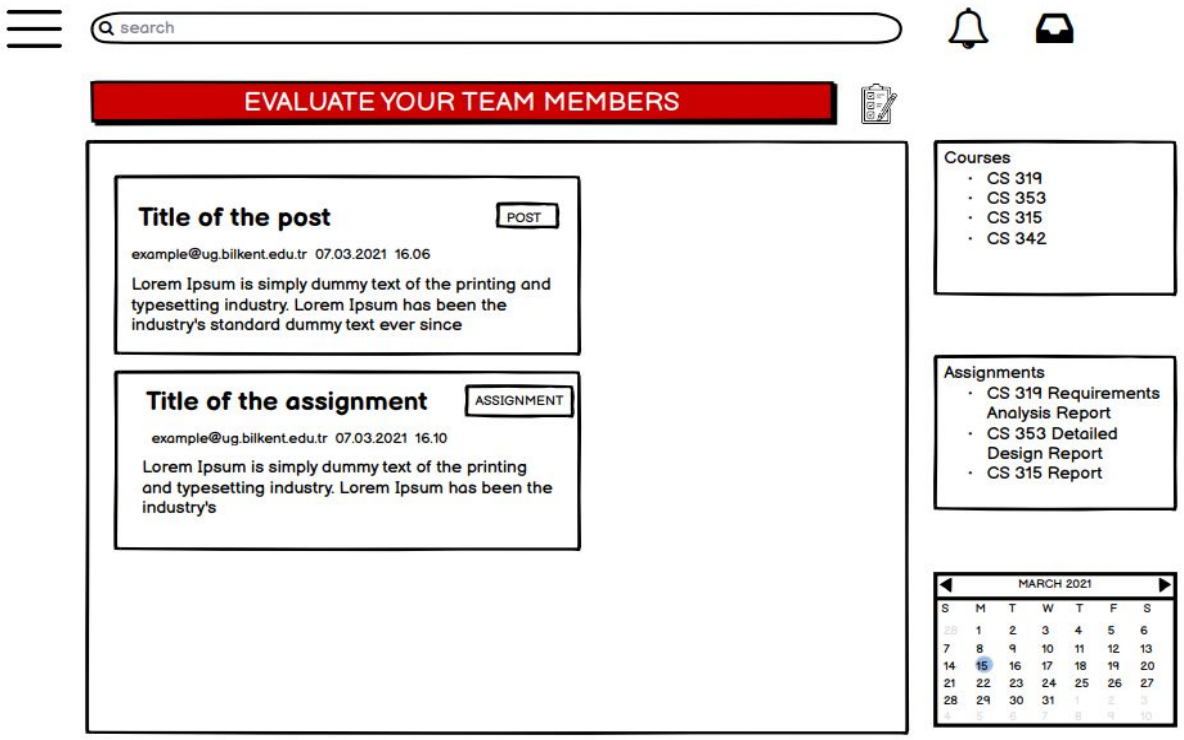


Figure 5.6.4.1: Main Page For Students

In the "Main Page for Students" page, users can evaluate the group members by clicking on the "Evaluate your team members" button when it is time to evaluate the assignments or the group near the end of the project. In addition, users can view their notifications and message boxes by clicking on the notification and inbox icons, view their courses and tasks by clicking on the courses and assignments labels, view the posts and assignments of the courses they are enrolled in, and finally click on the drop menu icon in the upper left corner to view options menu.

5.6.4.1.1 Drop Menu For Students

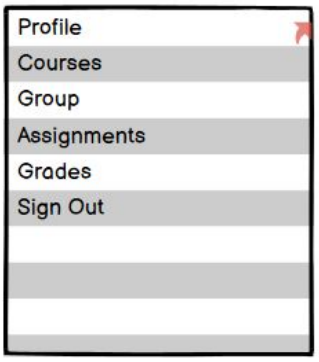


Figure 5.6.4.1.1: Drop Menu For Students

In this drop menu, the user can go to the related pages by pressing the profile, course, group and assignments tags. She can also sign out from the application.

5.6.4.2 Main Page For Instructor and Grader

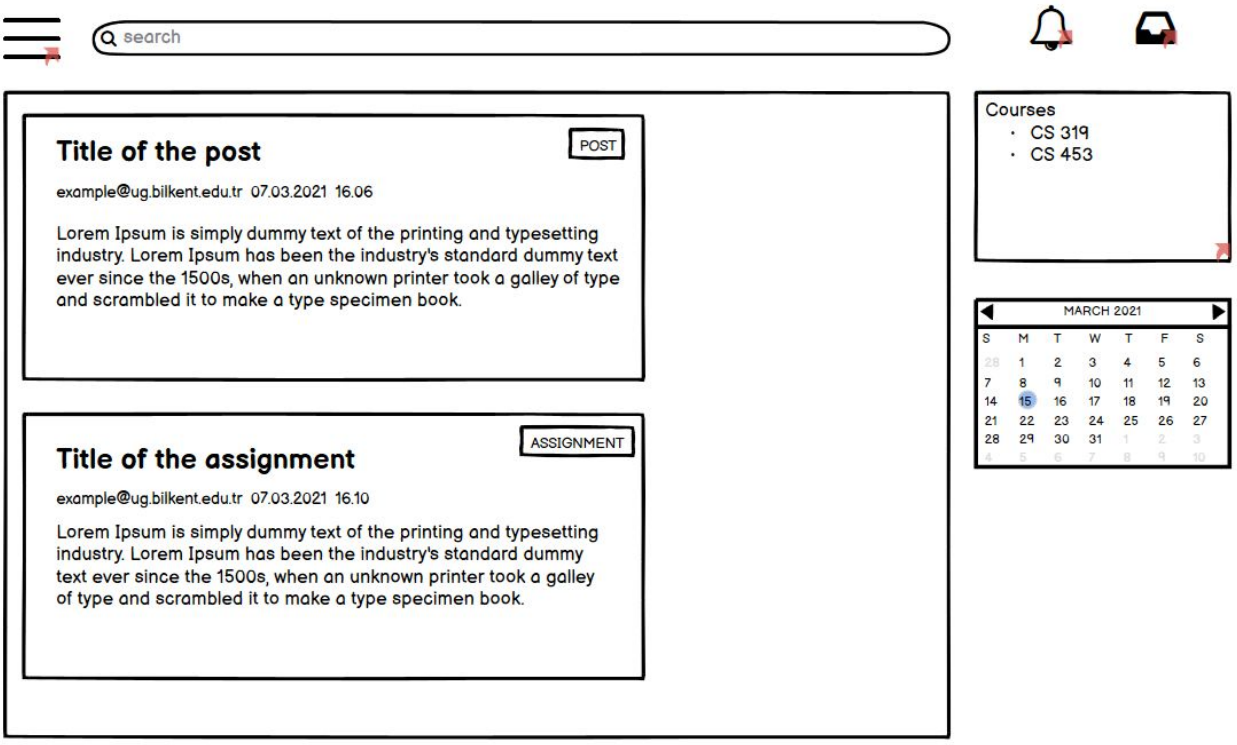


Figure 5.6.4.2: Main Page For Instructor and Grader

The "Main Page for Instructors and TA" is the home page for instructors and teaching assistants. There are 2 differences between this page and the "Main Page for Students" page. There is no "Evaluate your Team Member" button on this page and no assignments' label. Also, the drop menus are different for each user type.

5.6.4.2.1 Drop Menu For Instructor and Grader

In this drop menu, the user can go to the related pages by pressing the profile, courses and assignments tags. She can also sign out from the application.

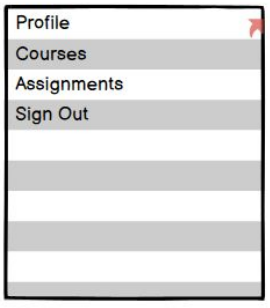


Figure 5.6.4.2.1: Drop Menu For Instructor and Grader

5.6.5 Profile Pages

5.6.5.1 Profile Page For User

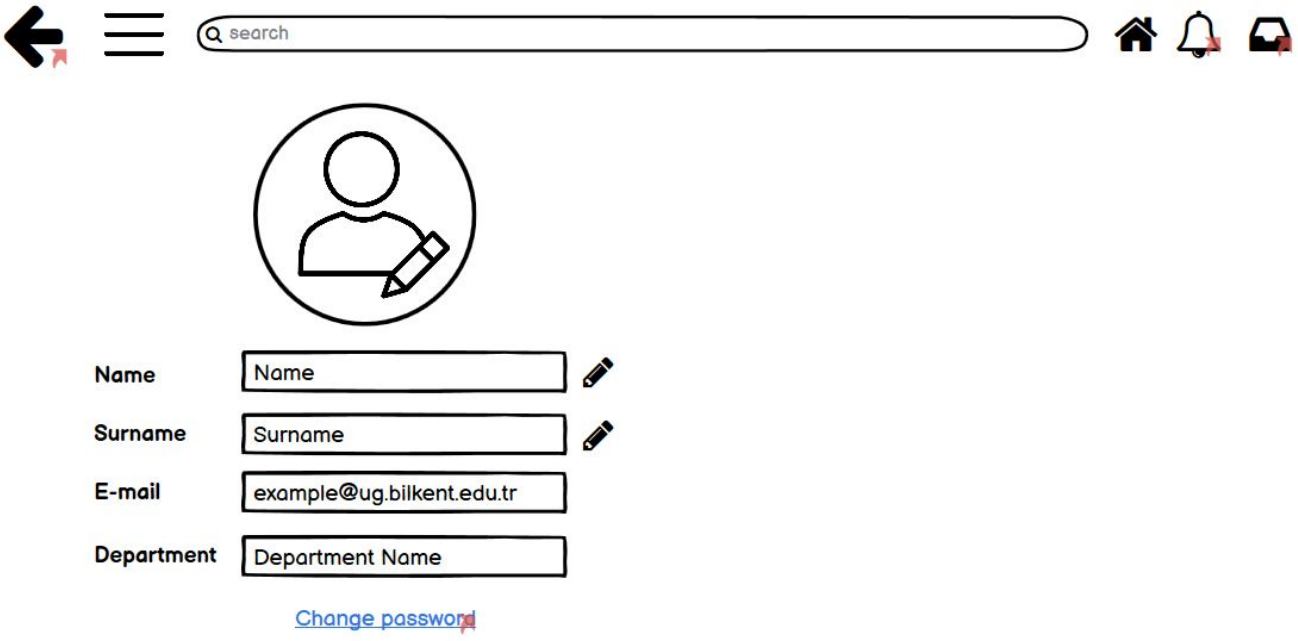


Figure 5.6.5.1: Profile Page For User

In "Profile Page", users can view their profile information and edit them.

5.6.5.2 Profile Page For Other User

Figure 5.6.5.2 Profile Page For Other User

On this page, users can view other users' profile information, courses, projects, assignments, grades, and evaluations, although the last two elements are optional and enabled by the instructor. Also, users can send a message to other users by clicking on the "Send Message" label. To access this page, users should click on person names under the “Members” tab on the group pages.

5.6.6 Courses Pages

5.6.6.1 Courses Page For Students

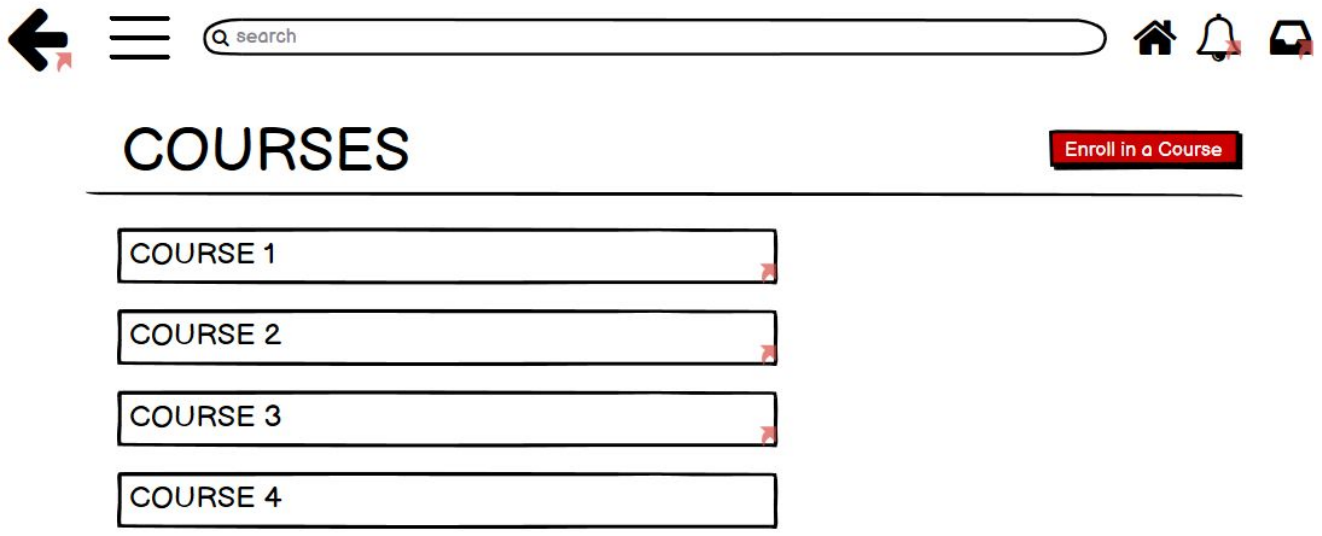
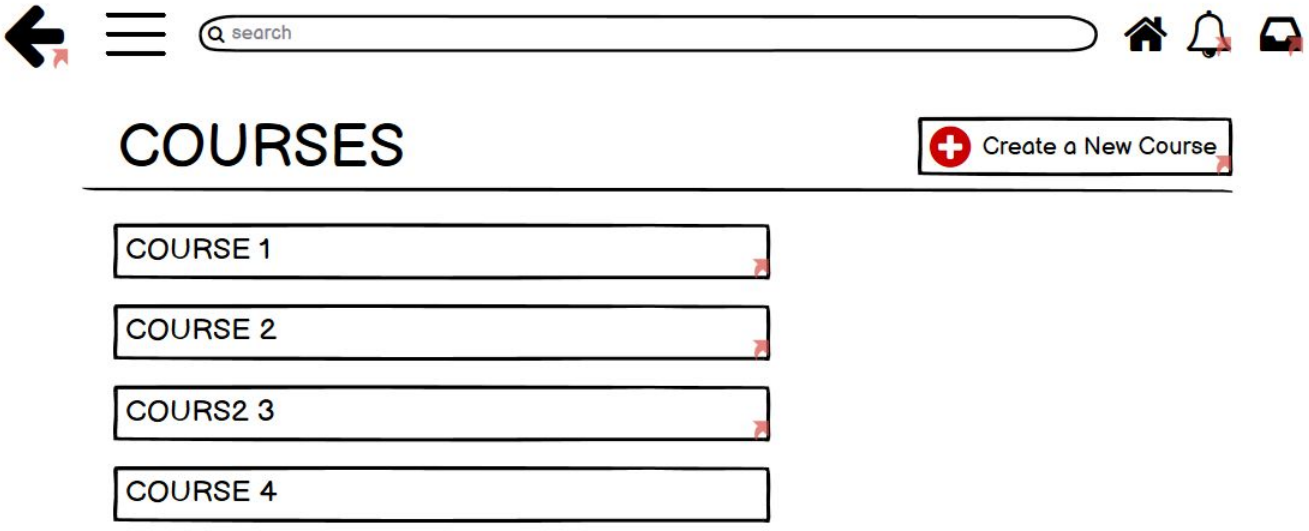


Figure 5.6.6.1 Courses Page For Students

In the "Courses Page for Students" page, students can view the courses they have enrolled in and go to the relevant course's page by clicking on its label. Also they can go to the relevant page to enroll in a new course by clicking on the "Enroll in a Course" button.



5.6.6.2 Courses Page For Instructor

Figure 5.6.6.2 Courses Page For Instructor

In the "Courses Page for Instructors" page, instructors can view the courses they have and go to the relevant course’s page by clicking on its label. Also, they can go to the relevant page to create a course by clicking on the "Create a New Course" button.

5.6.6.3 Courses Page For Grader

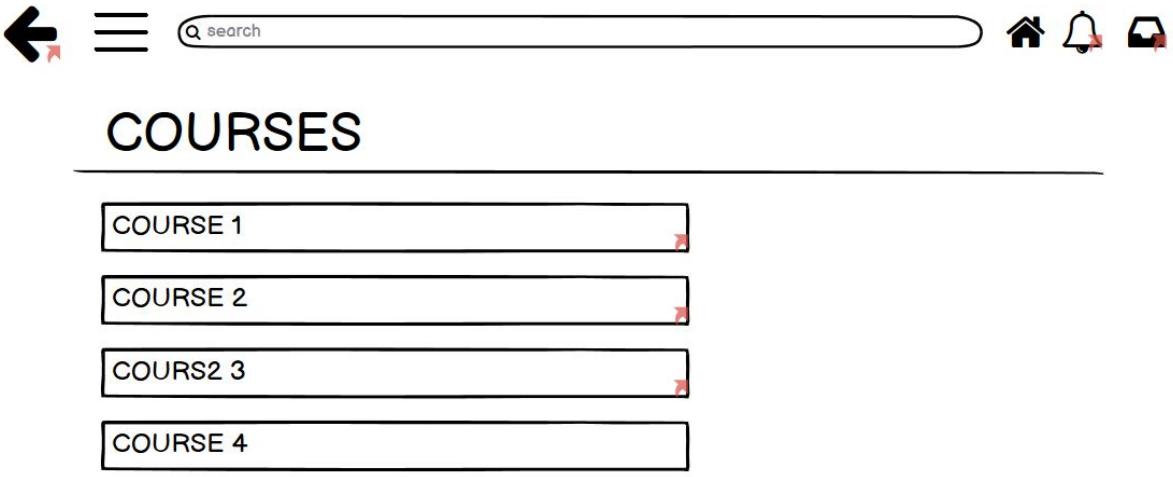


Figure 5.6.6.3 Courses Page For Grader

In the "Courses Page for TA" page, a grader can view the courses they grade. Also, they can go to the relevant course page by clicking on its label.

5.6.7 Detailed Course Pages

5.6.7.1 Detailed Course Page For Student

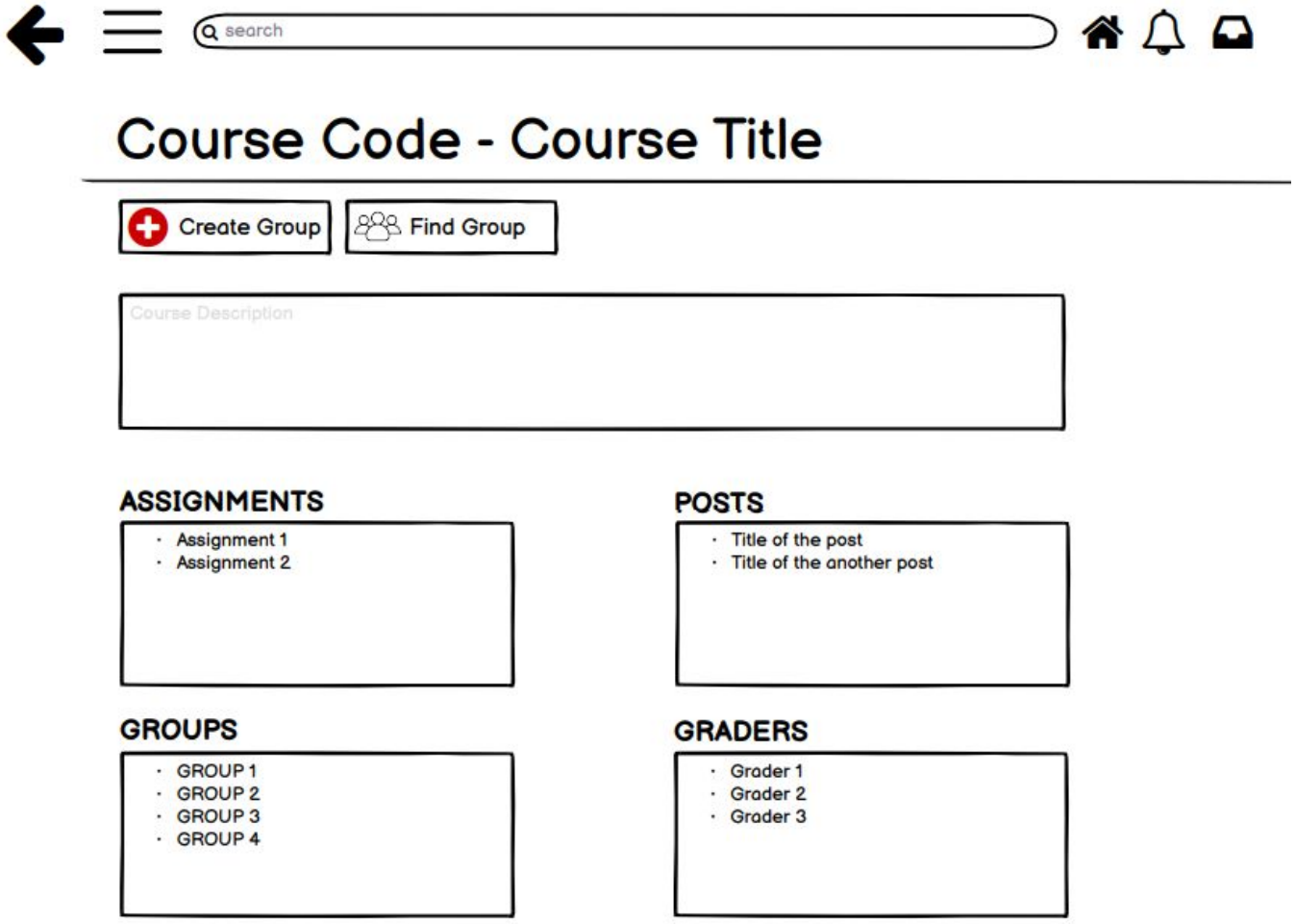


Figure 5.6.7.1 Detailed Course Page For Student

On this page, a student can view the course's description, assignments, posts, groups and graders. If the student clicks on assignments, posts or groups labels, she is directed to the pages where she will see the clicked label’s page. Also, if she is not in a group, she can create a new group by clicking on the "Create Group" button or find a group by clicking on the "Find Group" button.

5.6.7.2 Detailed Course Page For Instructor

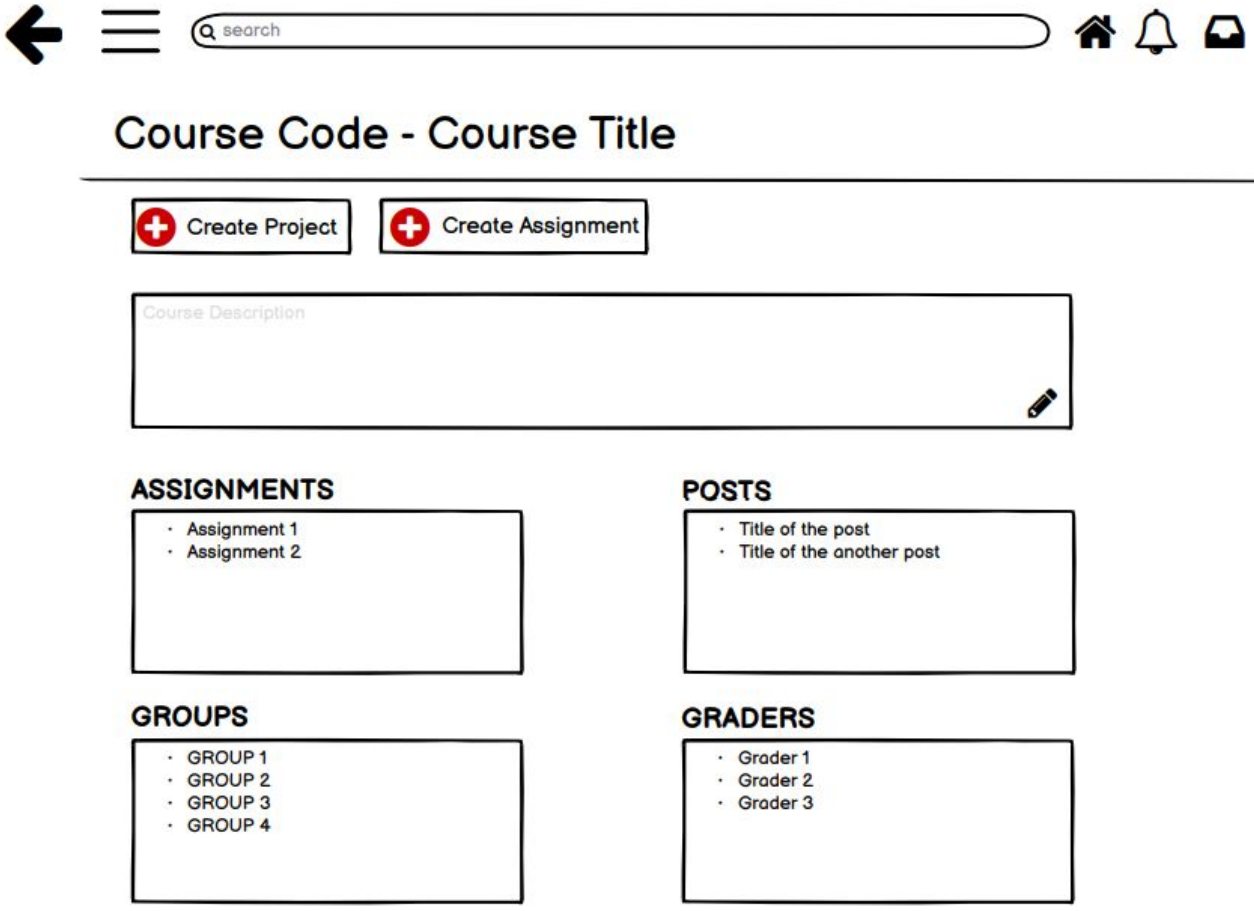


Figure 5.6.7.2 Detailed Course Page For Instructor

On this page, an instructor can edit the course's description and see the assignments, posts, groups and graders. If the instructor clicks on assignments, posts or groups labels, she is directed to the pages where she will see the clicked label’s page. Also, the instructor can create projects and assignments for the course by clicking on the "Create Project" and "Create Assignment" buttons.

5.6.7.3 Detailed Course Page For Grader

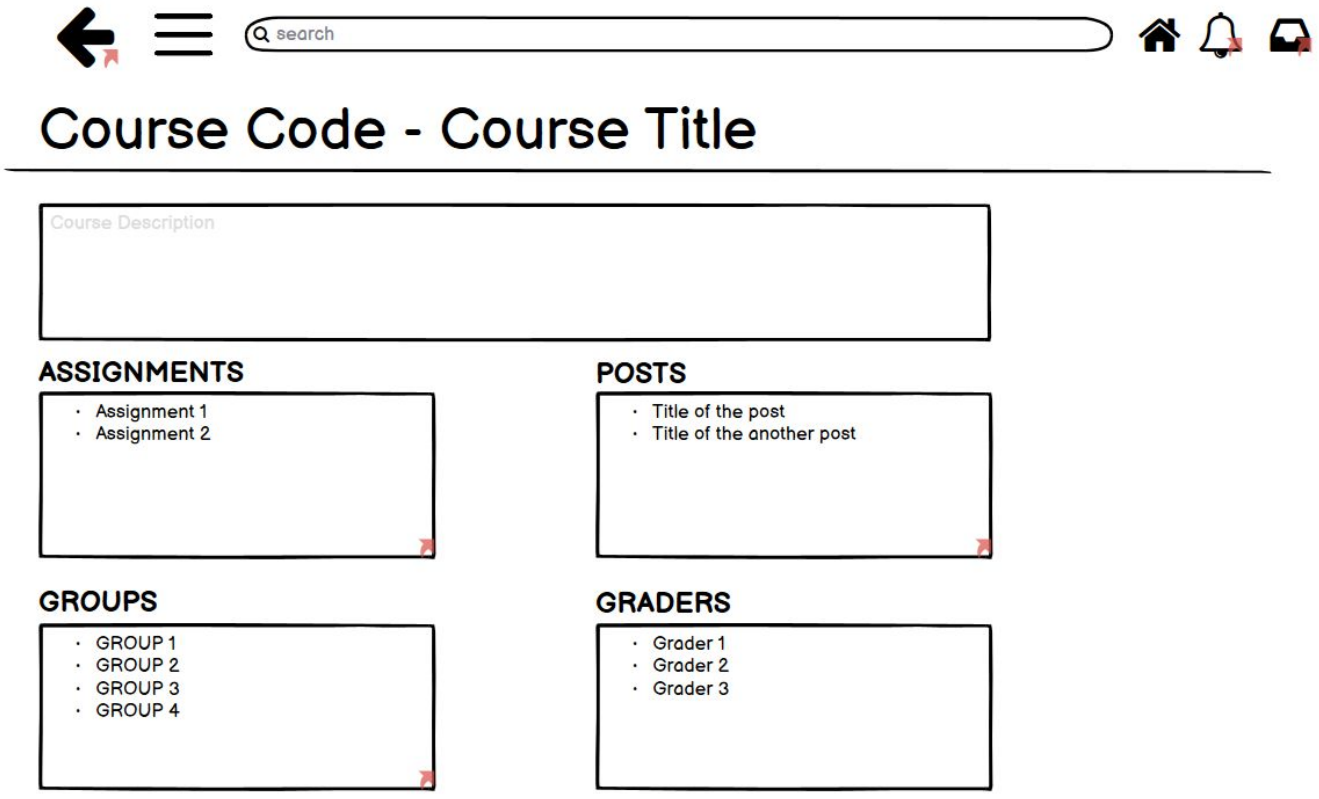


Figure 5.6.7.3 Detailed Course Page For Grader

On this page, a teaching assistant can see the course's description, assignments, posts, groups and graders. If the teaching assistant clicks on assignments, posts or groups labels, she is directed to the pages where she will see the clicked label’s page.

5.6.8 Assignments Page

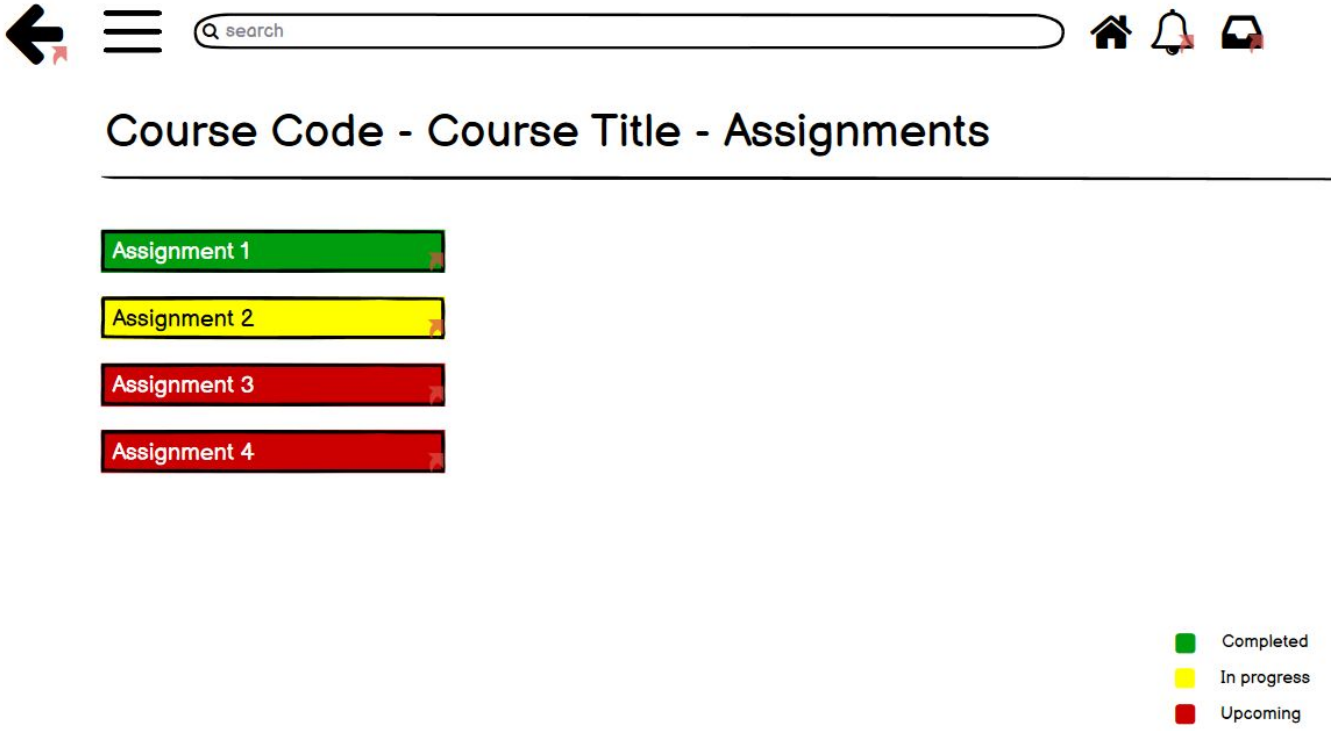


Figure 5.6.8 Assignments Page

The "Assignments Page" page is the same for all users. By clicking on the assignments' labels, users can access the page where they can view the details of the assignments. The green color indicates that the assignment is completed, the yellow color indicates that it is in progress, and the red color indicates that it is an upcoming one.

5.6.9 Detailed Assignment Pages

5.6.9.1 Detailed Assignment Page For Students

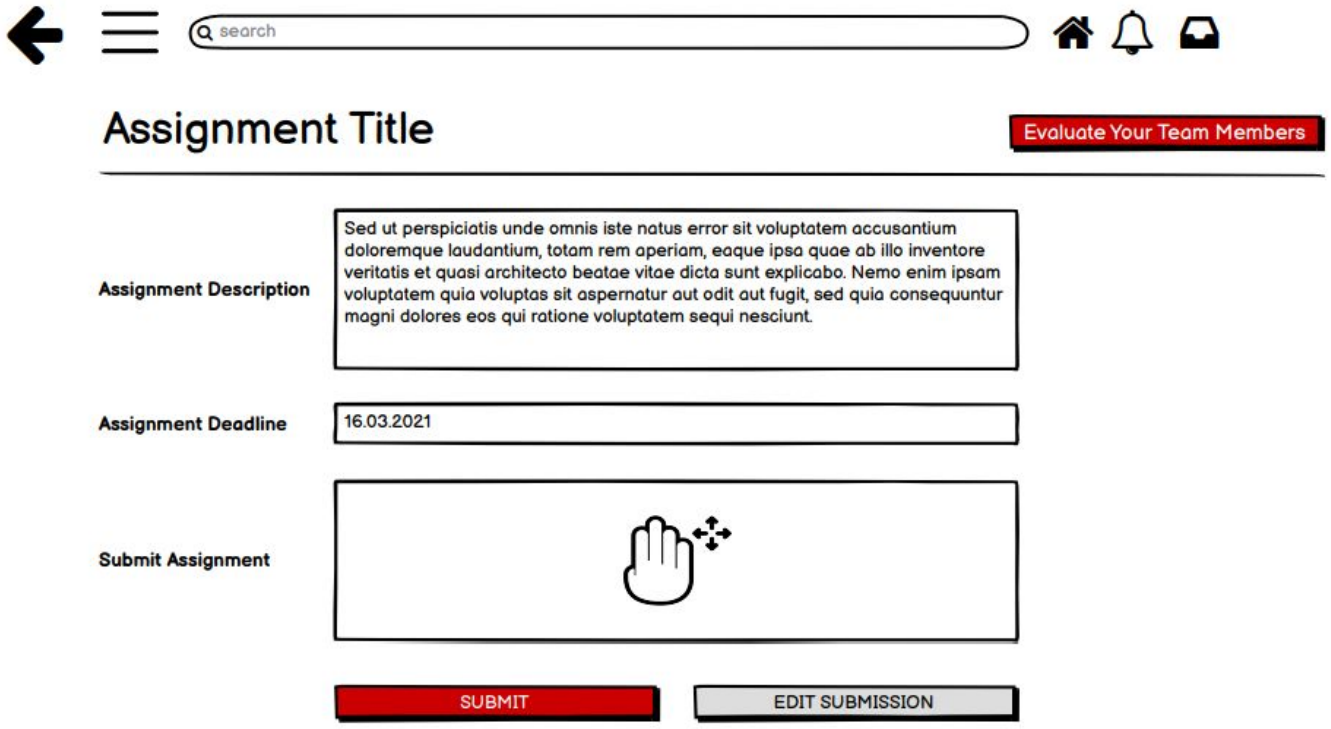


Figure 5.6.9.1 Detailed Assignment Pages

On this page, students can view the description and deadline of the assignment. They can also submit the assignment by dragging and dropping the assignment file or by uploading the file and editing the assignment they submitted. Finally, if it's time to evaluate, they can evaluate their teammates' contributions by clicking the "Evaluate Your Team Members" button.

5.6.9.2 Detailed Assignment Page For Instructors

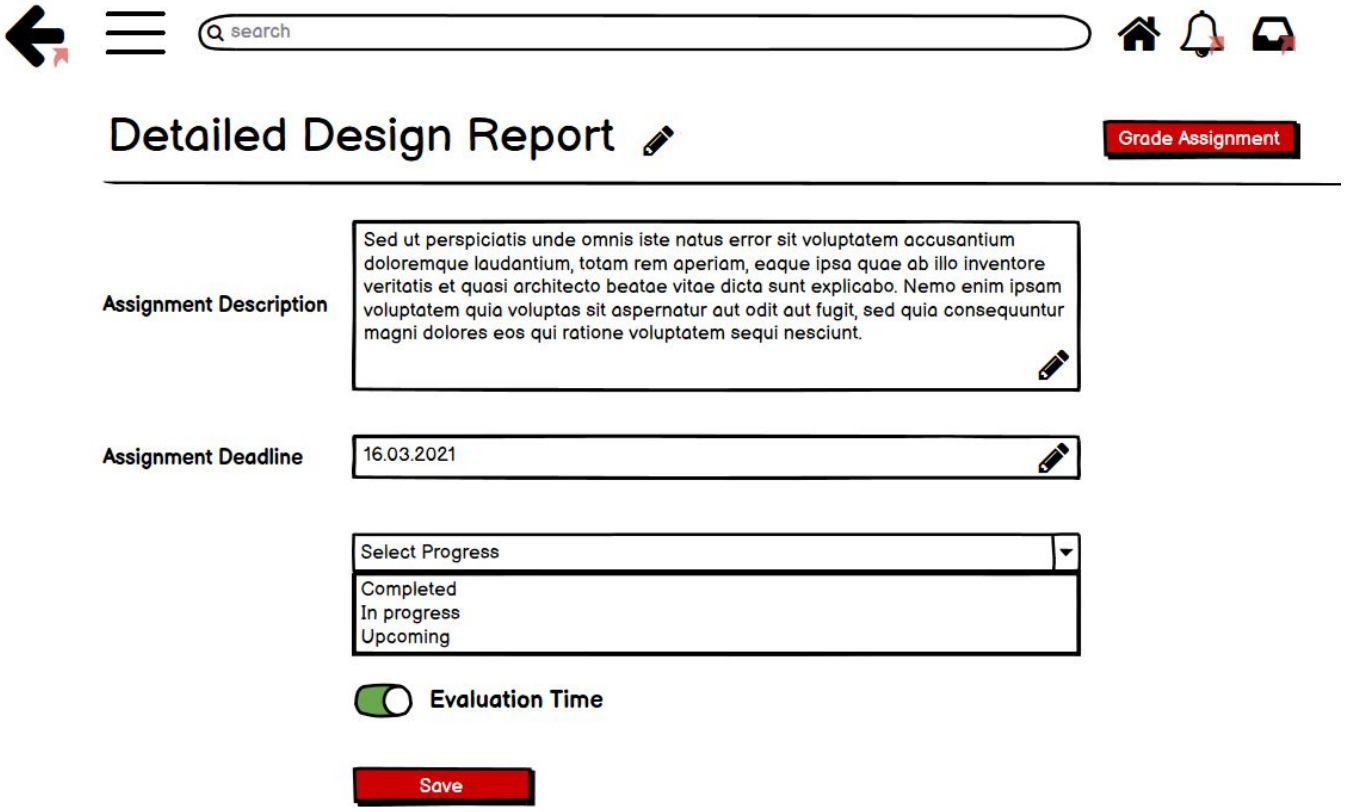


Figure 5.6.9.2 Detailed Assignment Page For Instructors

On this page, instructors can edit the name, description and deadline of the assignment. They can also select the progress for the assignment and determine if it is time to evaluate or not. Finally, if the assignment's deadline has passed, they can click on the "Grade Assignment" button to reach the page where they will grade the assignment.

5.6.9.3 Detailed Assignment Page For Grader

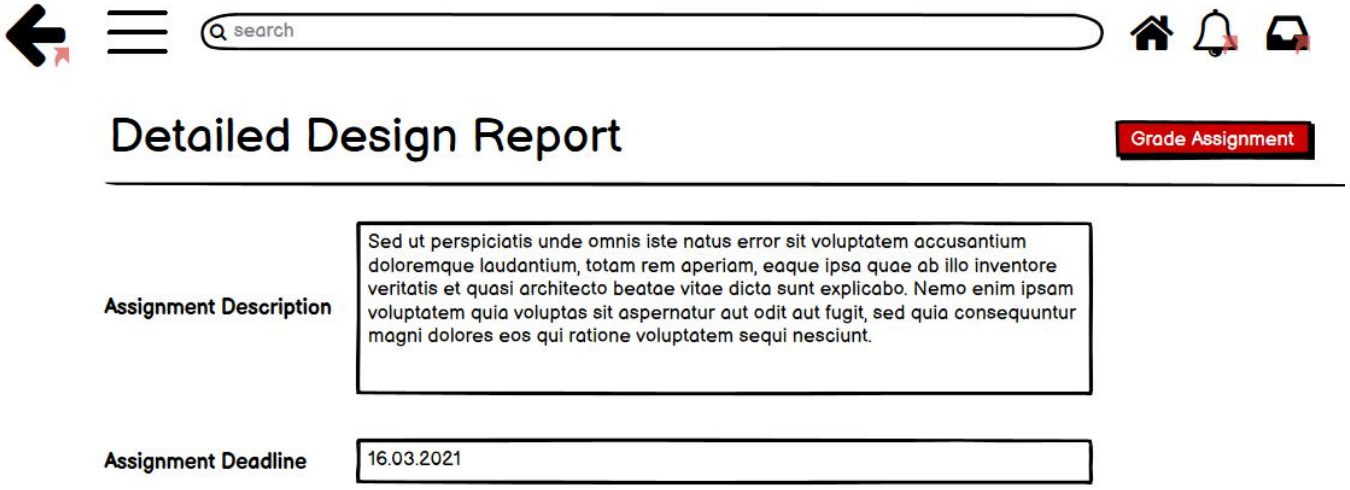


Figure 5.6.9.3 Detailed Assignment Page For Grader

On this page, teaching assistants can see the name, description and deadline of the assignment. They can also reach the page where they will grade the assignment by clicking the "Grade Assignment" button.

5.6.10 Posts Pages

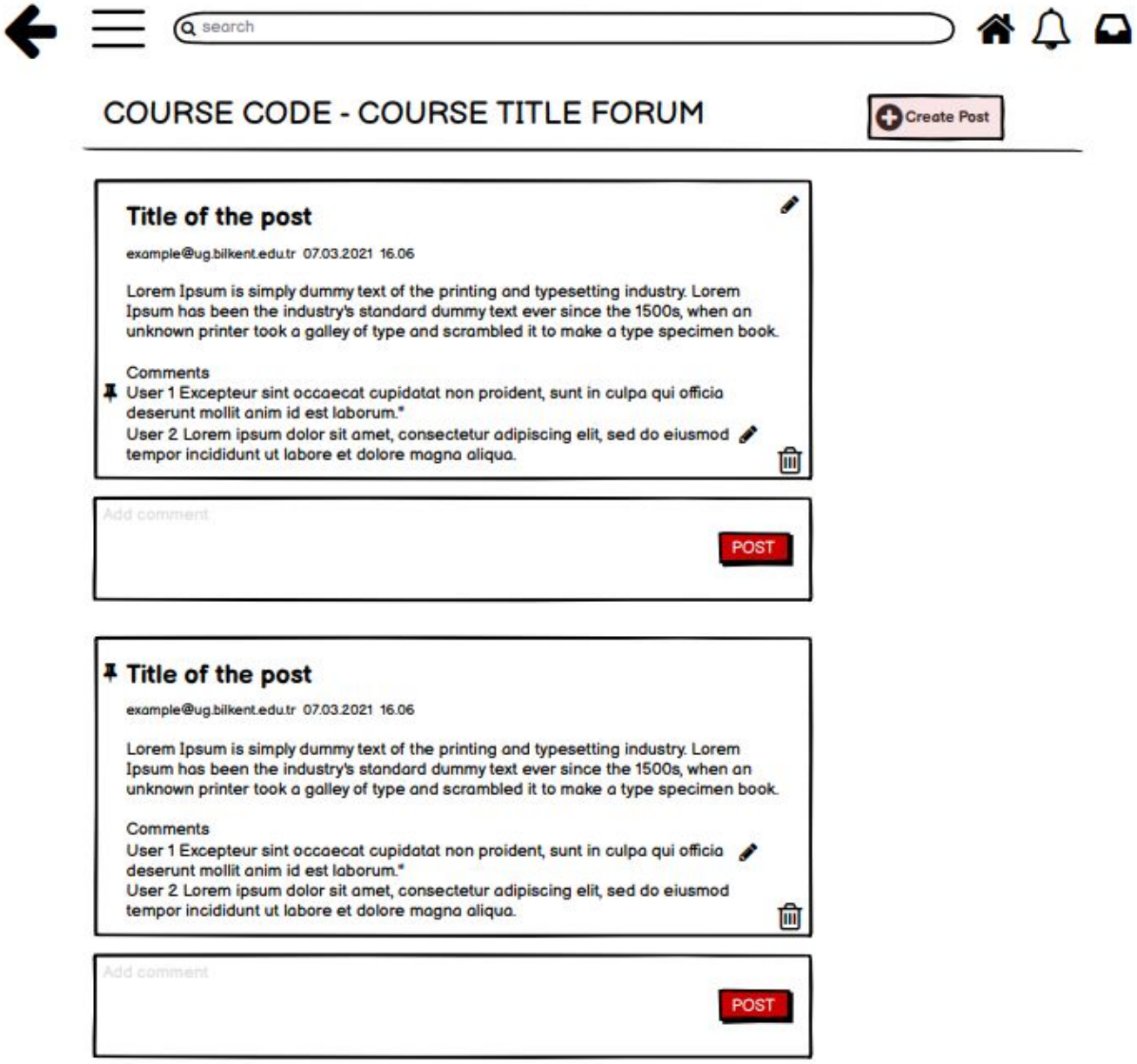


Figure 5.6.10 Posts Pages

This page is the same for all users. Users can view shared posts, comment on posts, delete, change and pin the comments if they have authority. They can also delete the posts they have posted. Finally, they can create a new post by clicking on the "Create Post" button.

5.6.11 Groups Pages

5.6.11.1 Groups Page For Students

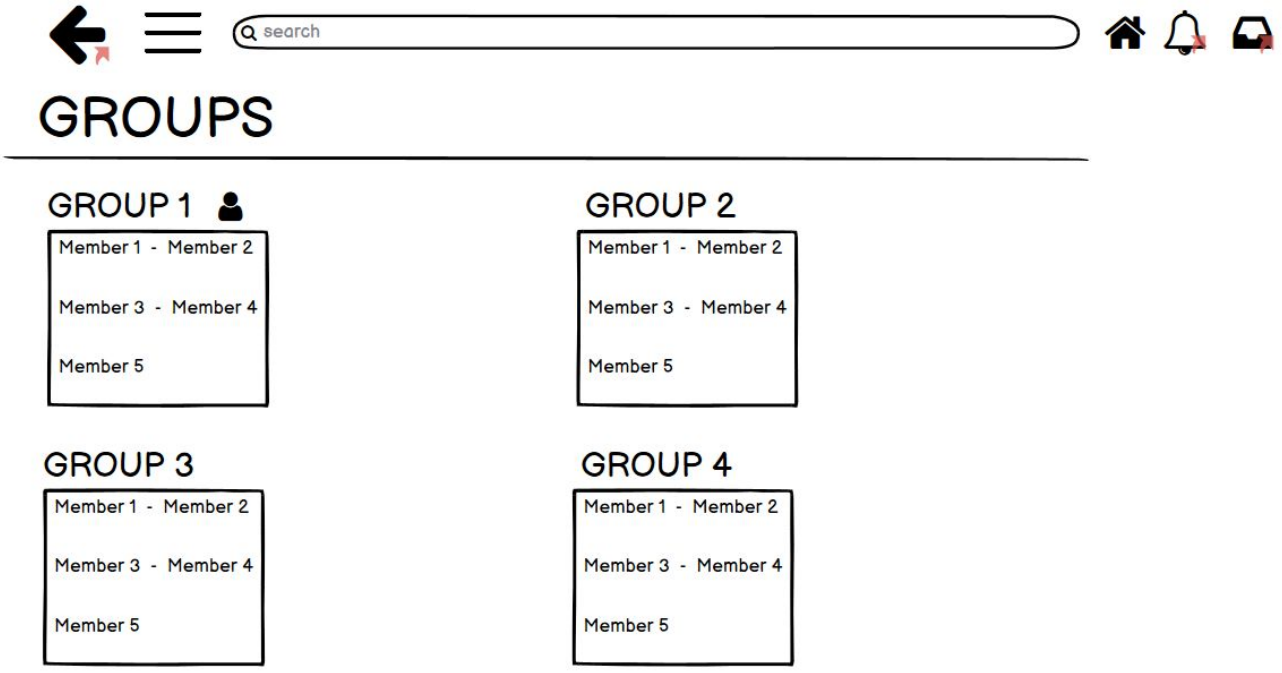


Figure 5.6.11.1 Detailed Assignment Pages

On this page, students can see the groups and members of the relevant course. If they click on their own group's label, they are directed to their own group's page, if they click on another group's label, they are directed to the pages of the said group.

5.6.11.2 Groups Page For Instructor And Graders

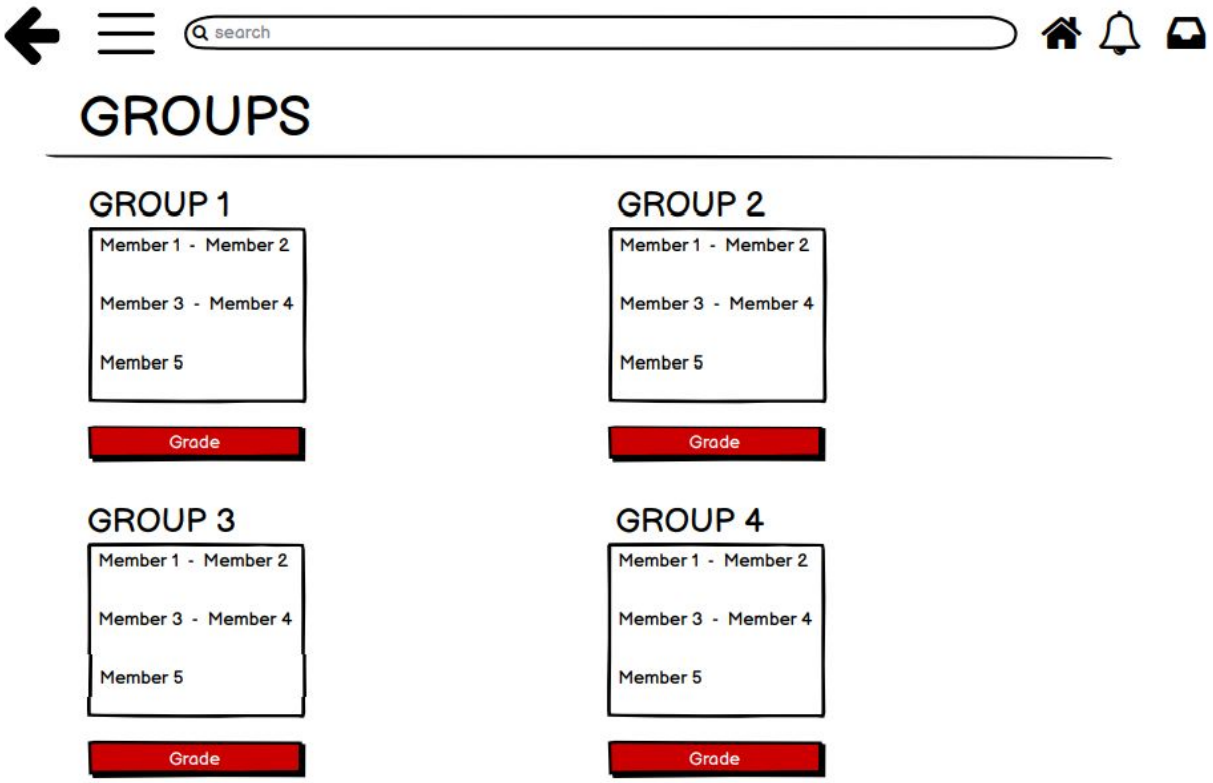


Figure 5.6.11.2 Groups Page For Instructor And Graders

On this page, instructors and teaching assistants can see the groups and members of the relevant course. If they click on a group's label, they are directed to the clicked group's page. Also, they can reach the page where they will choose all assignments of a group by clicking on the "Grade" button.

5.6.12 Groups Assignments Page For Students Instructor and Graders

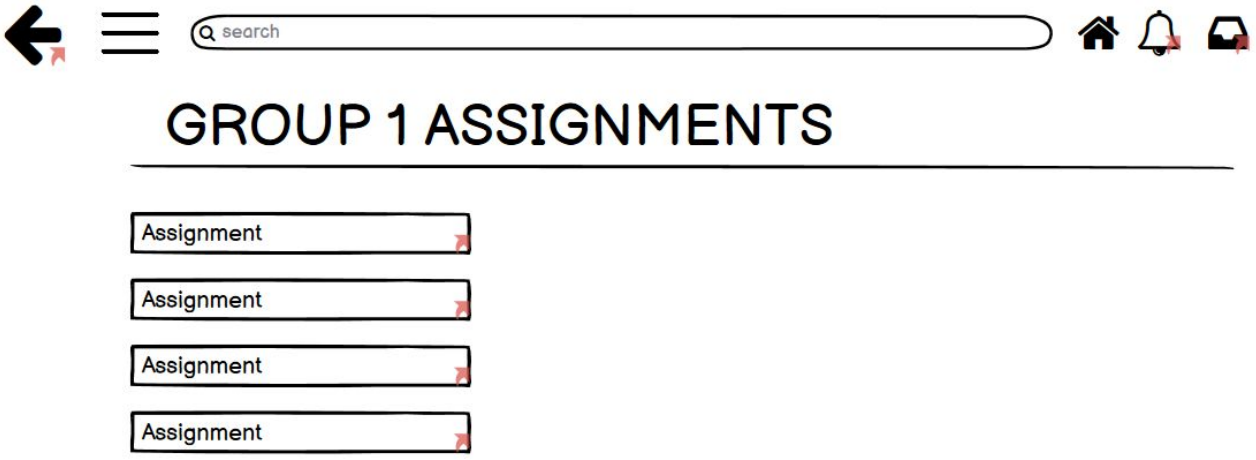


Figure 5.6.12 Groups Assignments Page For Students Instructor and Graders

On this page, students, instructors, and teaching assistants can see the assignments of the clicked group. Students can reach this page by clicking on the "Evaluate" button in the “Detailed Other Groups Page”. If they click on assignment labels, they are directed to the clicked evaluation page. Also, instructors and teaching assistants can reach this page by clicking the “Grade” button in the “Groups Page for Instructors and TA”. If they click on an assignment’s label, they are directed to the clicked evaluation’s page.

5.6.13 Grading Page For Instructors and Graders

5.6.13.1 Grade Group Page For Instructors and Graders

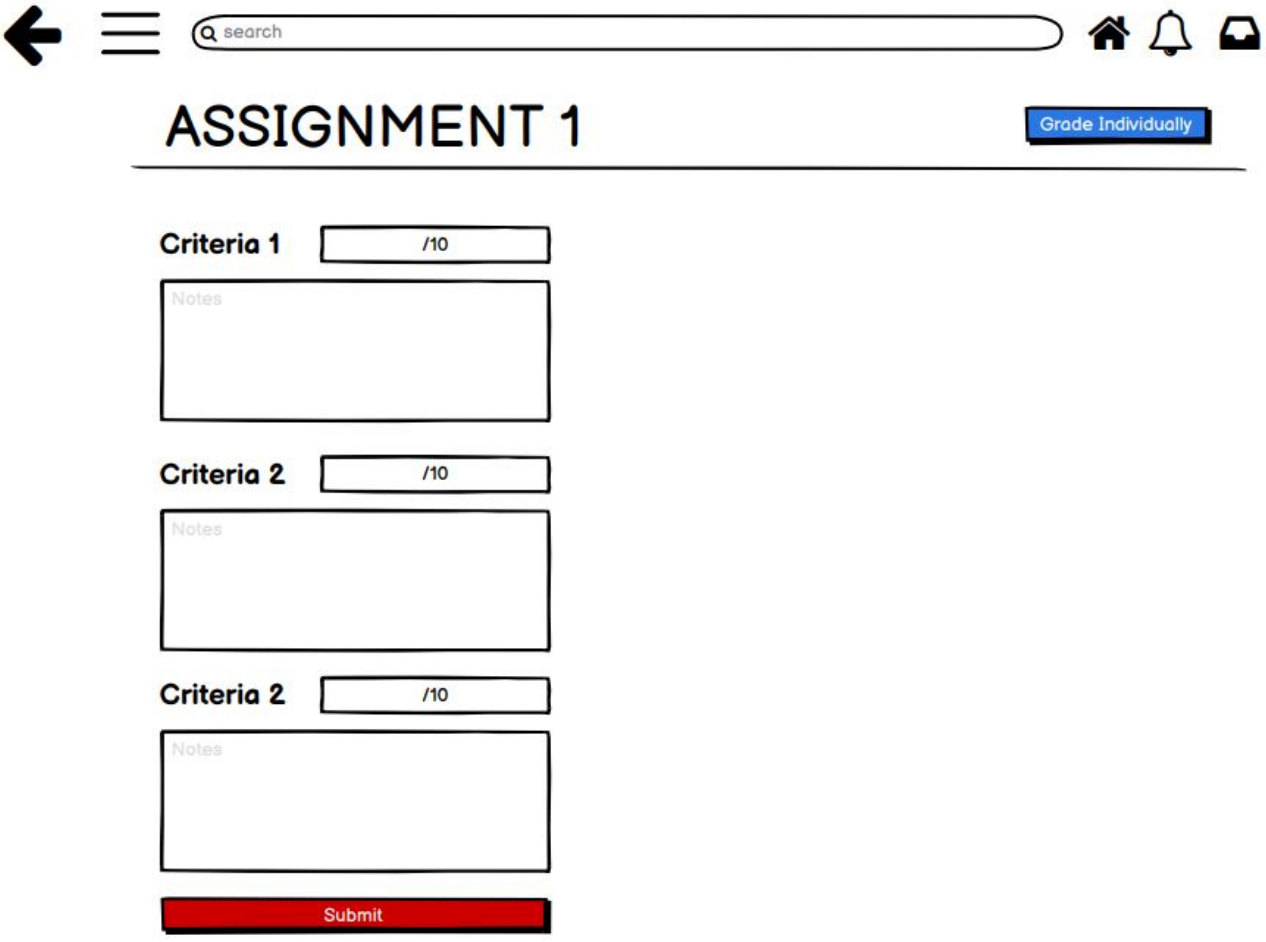


Figure 5.6.13.1 Grade Group Page For Instructors and Graders

On this page, instructors and teaching assistants can grade and give feedback for one of the assignments of the group. They can reach this page by clicking one of the assignments' labels in the group assignments page. In addition, they can evaluate the members of this group individually by clicking on the "Grade Individually" button.

5.6.13.2 Grade Individually Page For Instructor and Graders

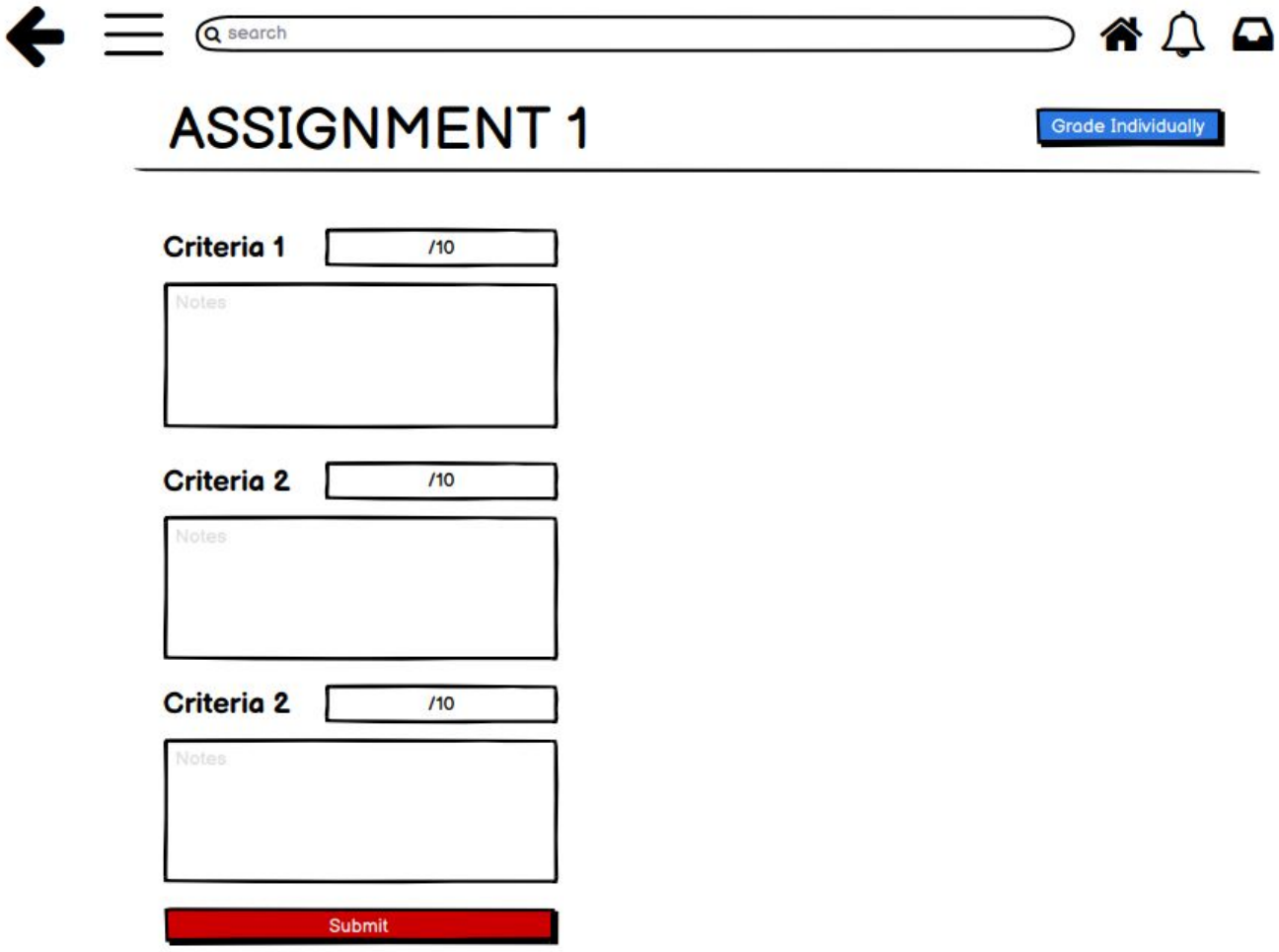


Figure 5.6.13.2 Grade Individually Page For Instructor and Graders

On this page, instructors and teaching assistants can grade and give feedback for an assignment for a student.

5.6.14 Detailed Group Page

5.6.14.1 Detailed Your Group Page For Students

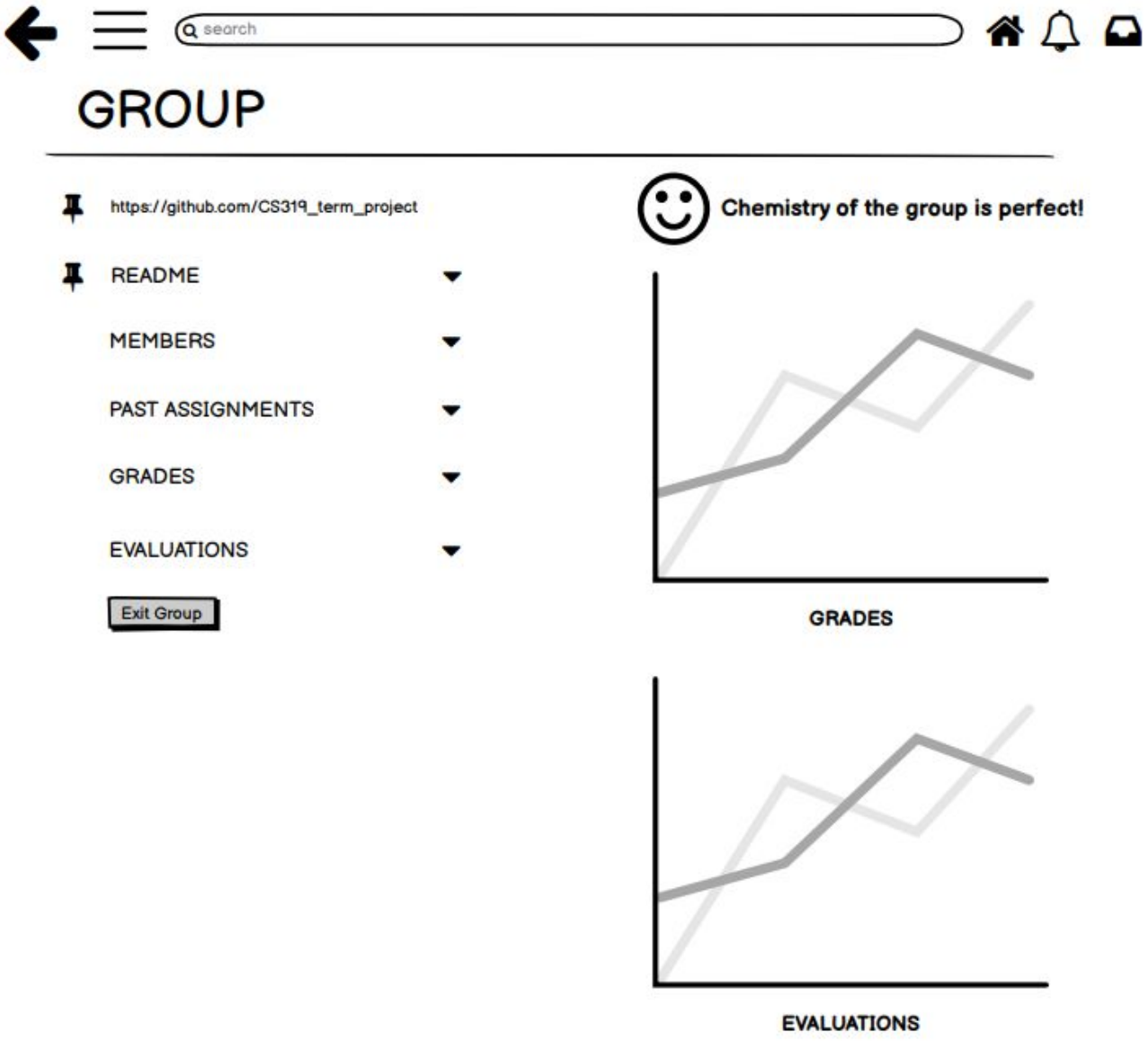


Figure 5.6.14.1 Detailed Your Group Page For Students

On this page, students can see their group's members, assignments, grades, evaluations, chemistry and related graphs. Also, if the group formation phase is not over, they can exit the group by clicking the "Exit Group" button.

5.6.14.2 Detailed Other Groups Page For Students

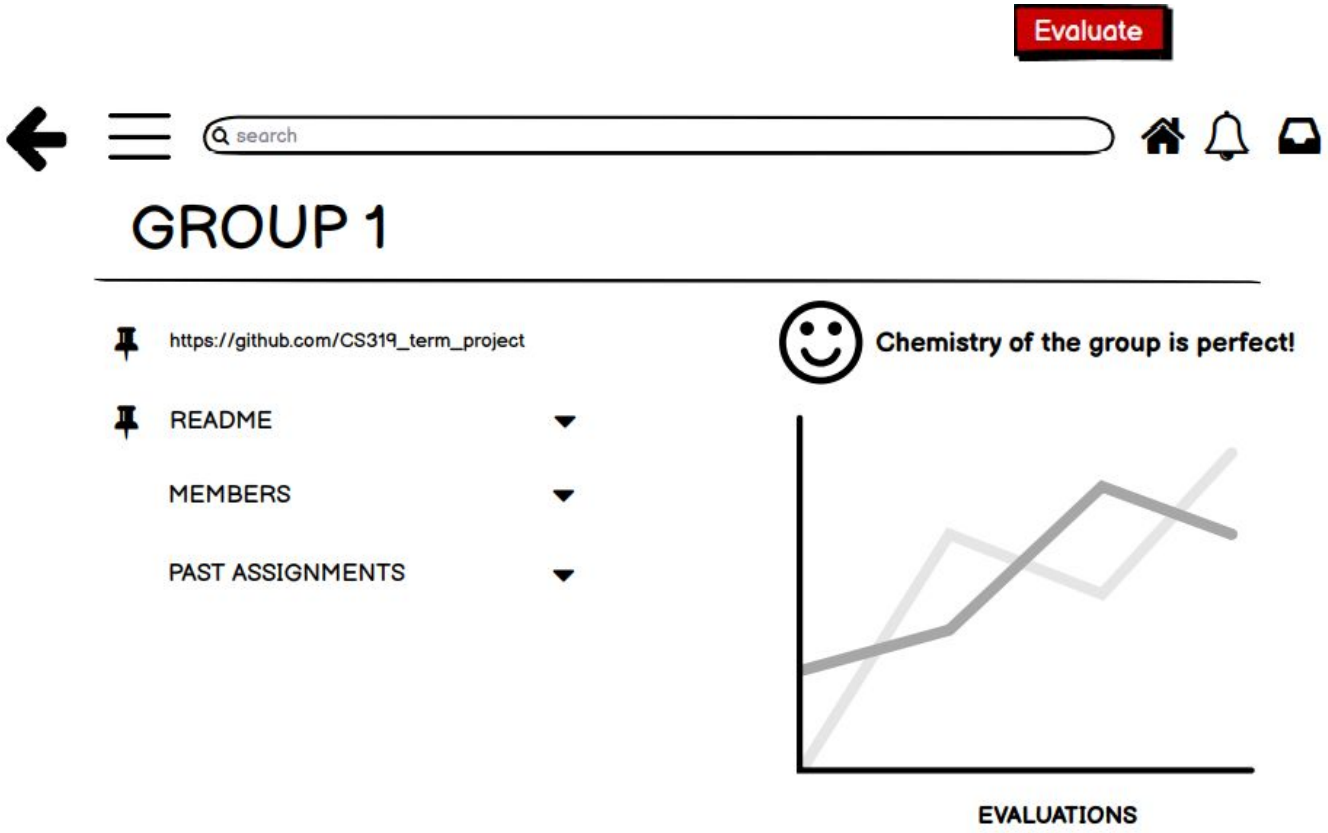


Figure 5.6.14.2 Detailed Other Groups Page For Students

On this page, students can see other groups' members, assignments, chemistry and related graphics. They can also evaluate other groups by clicking the “Evaluate” button.

5.6.14.3 Detailed Other Groups Page For Instructor and Grader

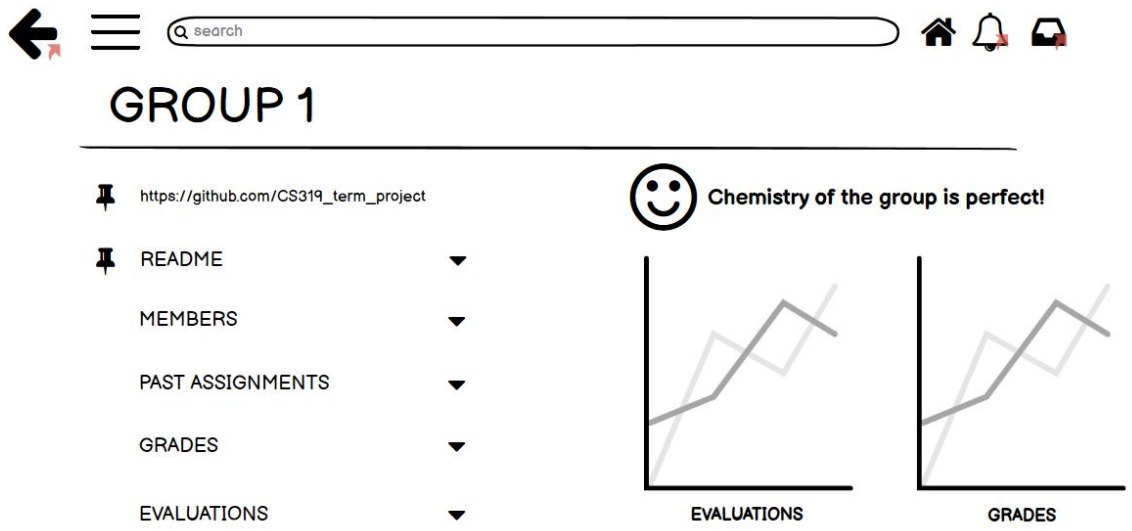


Figure 5.6.14.3 Detailed Other Groups Page For Instructor and Grader

On this page, instructors and teaching assistants can see the group's members, assignments, grades, evaluations, chemistry and related graphs.

5.6.15 Evaluatiın Pages

5.6.15.1 Evaluate Your Group Member Page

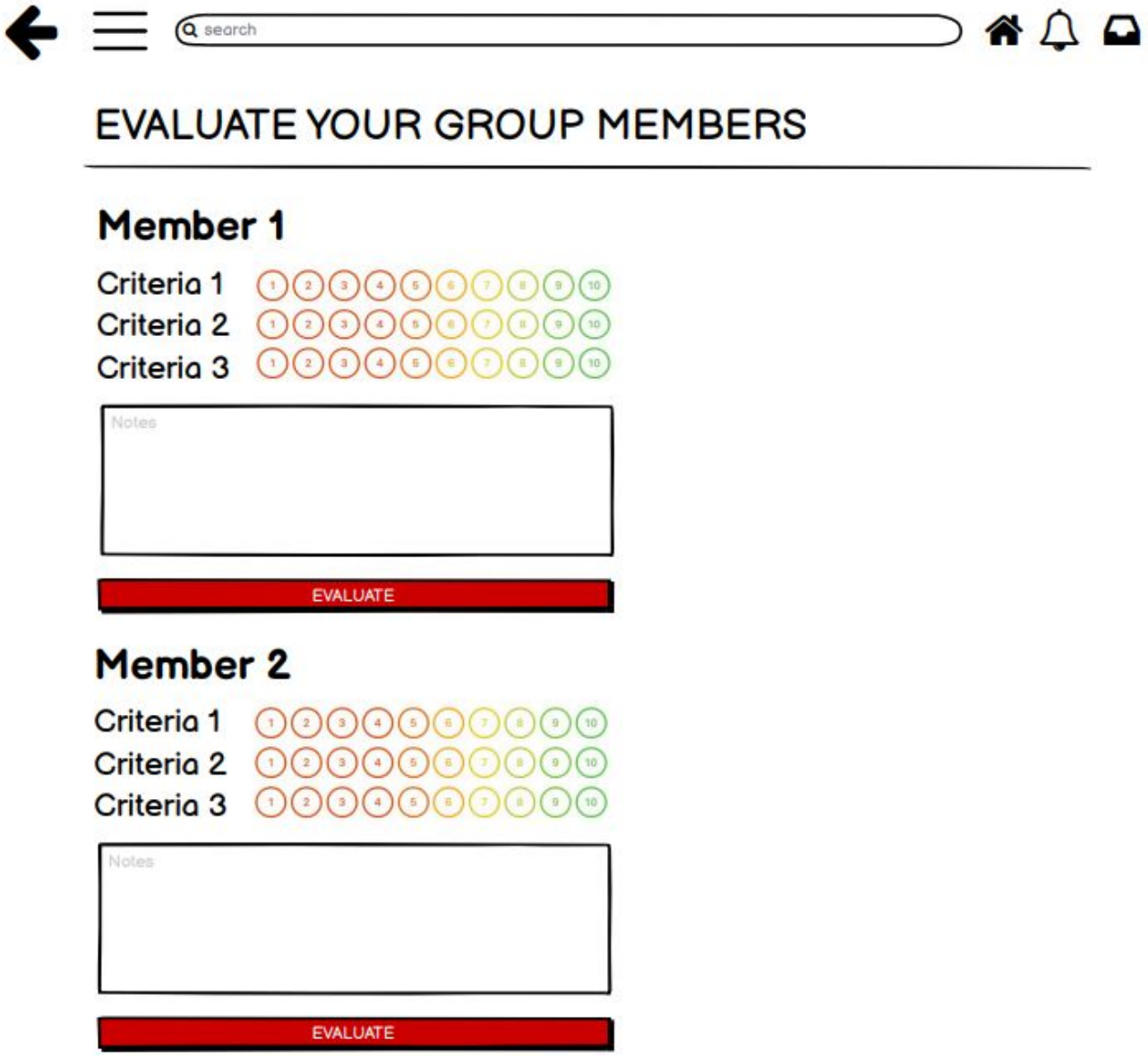


Figure 5.6.15.1 Evaluate Other Member Page

On this page, students can evaluate their group members according to given criteria. To go to this page, click on the "Evaluate Your Team Members" button on the "Detailed Assignment Page for Students" page or select the assignment after clicking the "Evaluate Your Team Members" button that will appear when the time comes on the "Main Page for Students" page.

5.6.15.2 Evaluate Other Groups Page

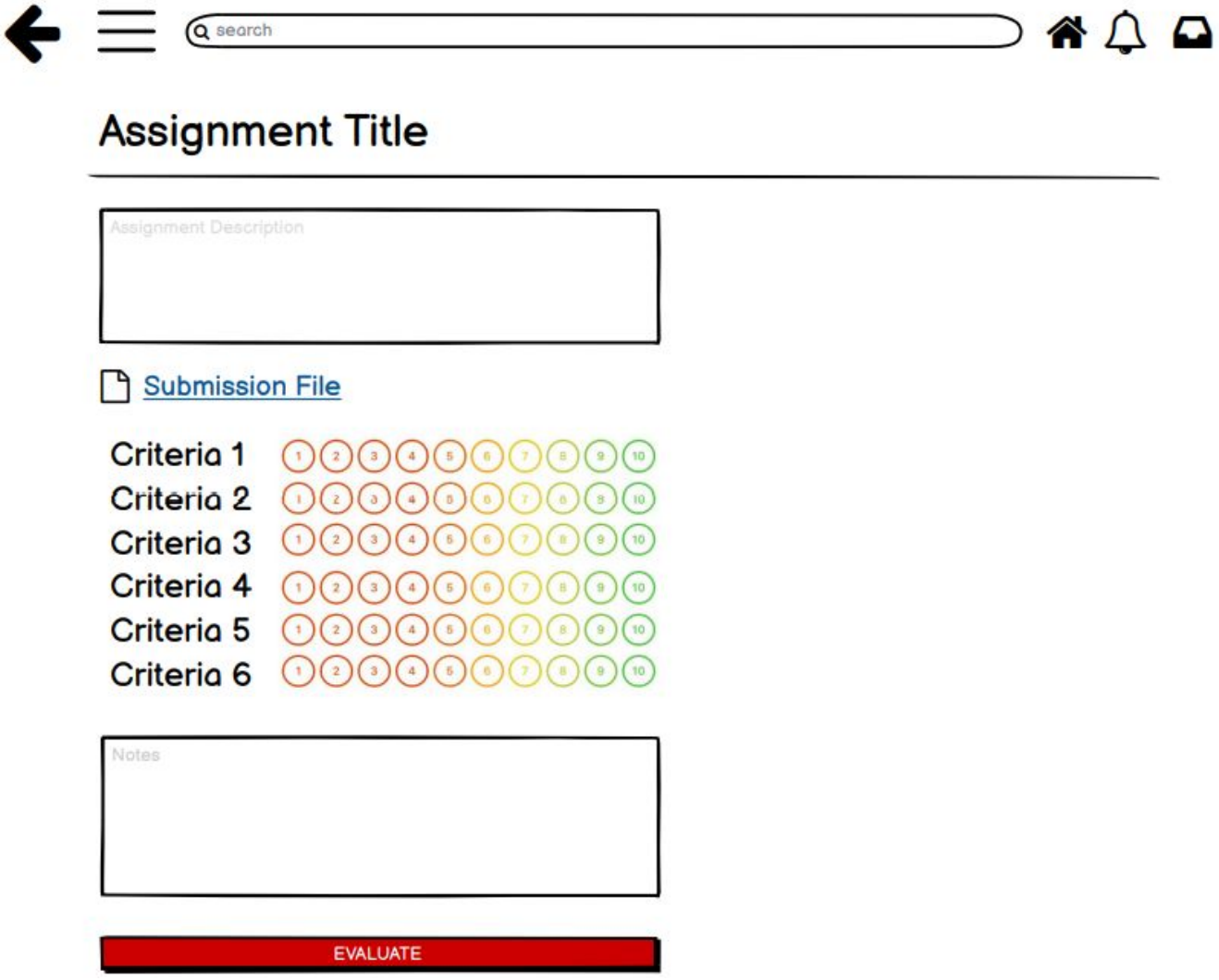


Figure 5.6.15.2 Evaluate Other Groups Page

On this page, students can access other groups' assignment files and evaluate groups according to given criteria. Students can access this page by clicking on the "Evaluate" button on the "Detailed Other Groups Page for Students" page, and selecting the assignment they want to evaluate from the "Group Assignments Page for Students, Instructors and TA" page.

5.6.16 Create Course Page For Instructors

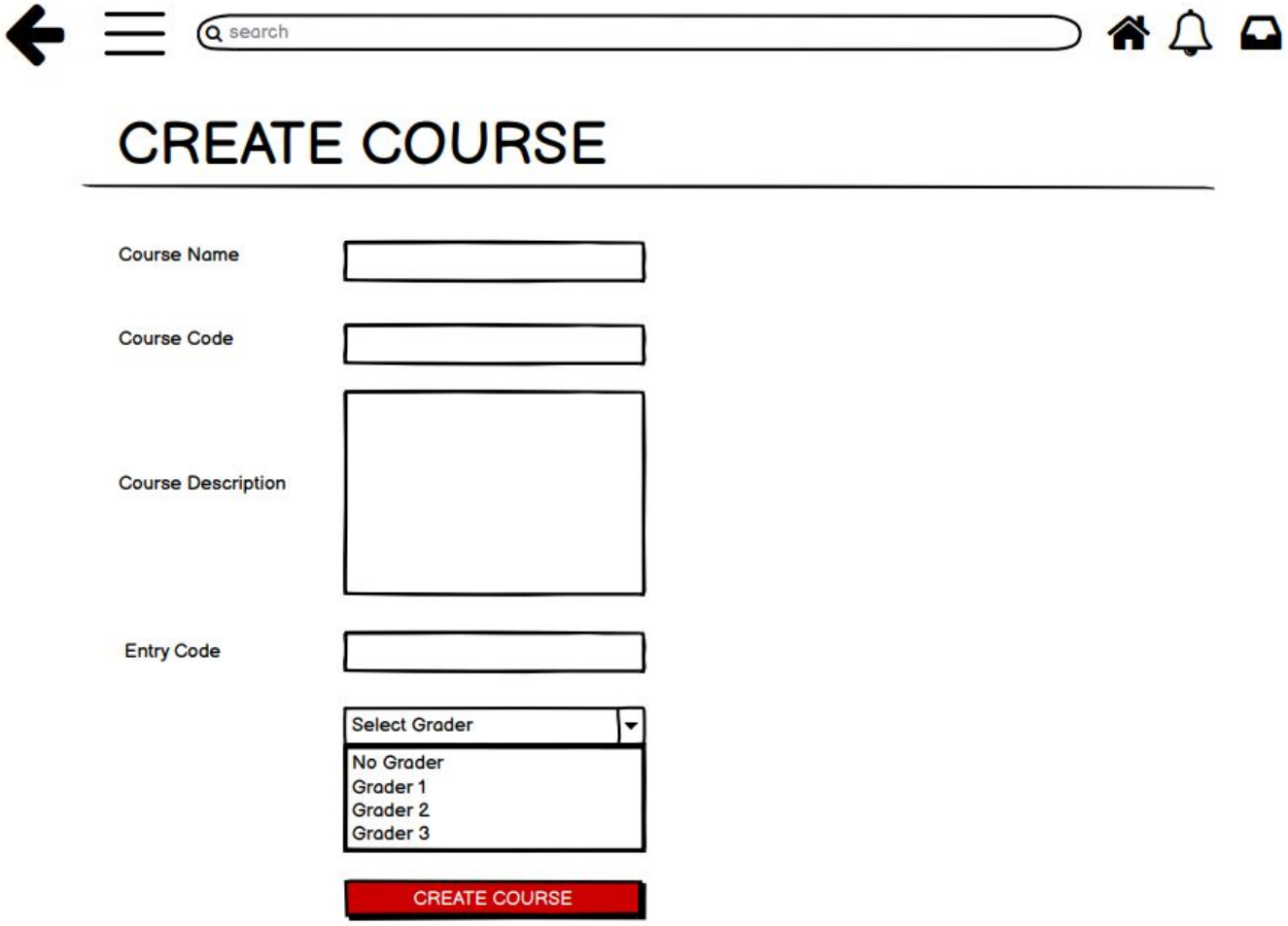


Figure 5.6.16 Create Course Page For Instructors

On this page, instructors can create a course by entering the required information for the course. "Entry Code" is a unique code that will be created for students to enroll in the course.

5.6.17 Create Project Page For Instructor

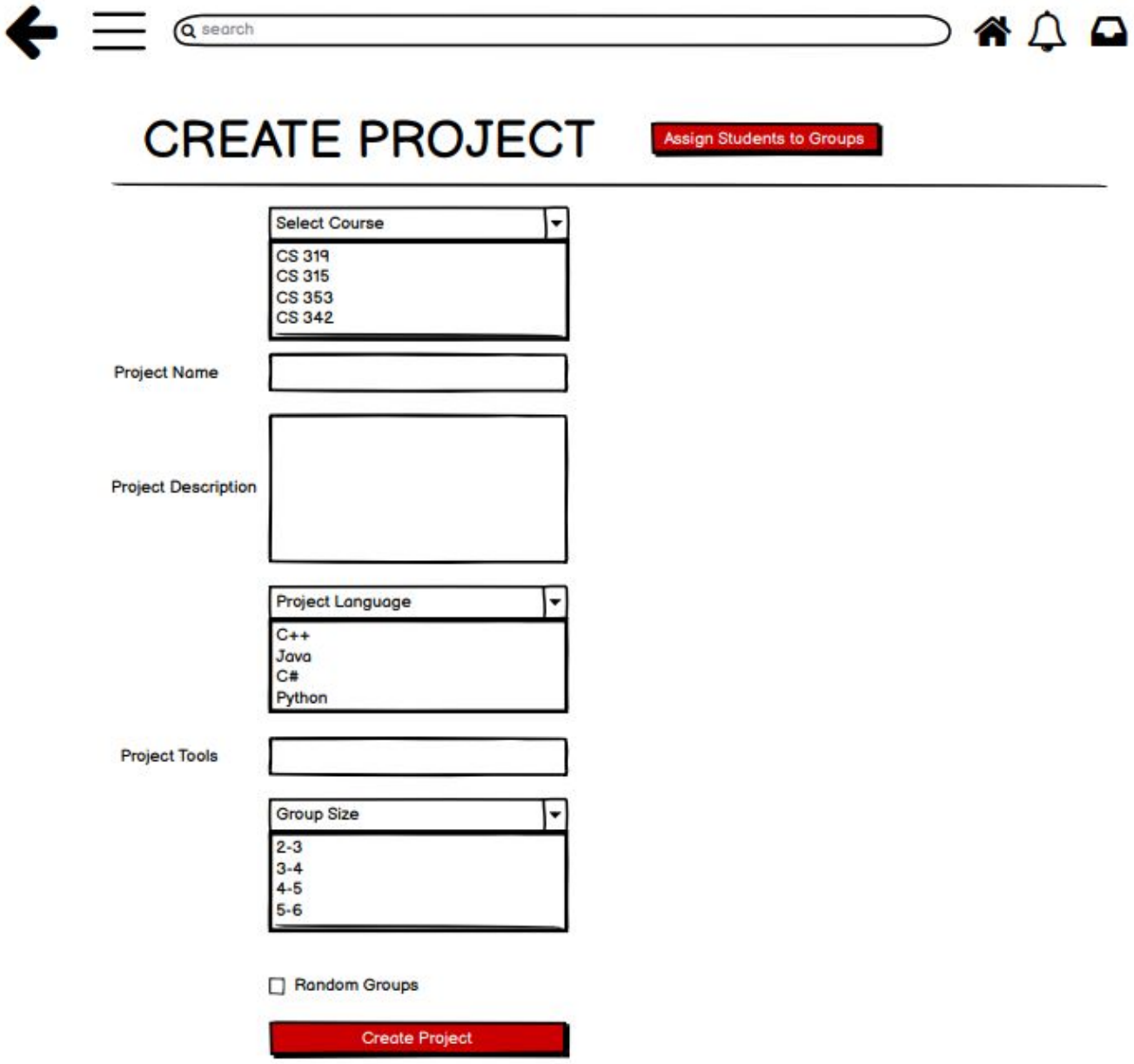


Figure 5.6.17 Create Project Page For Instructor

On this page, instructors can create a project by entering the required information for the project. They can also assign students to groups either randomly or manually. If the "Random Groups" checkbox is checked, the groups are formed randomly. If the "Assign Students to Groups" button is clicked, the instructor is directed to the page where the groups can be formed manually.

5.6.18 Assign Student to Groups Page

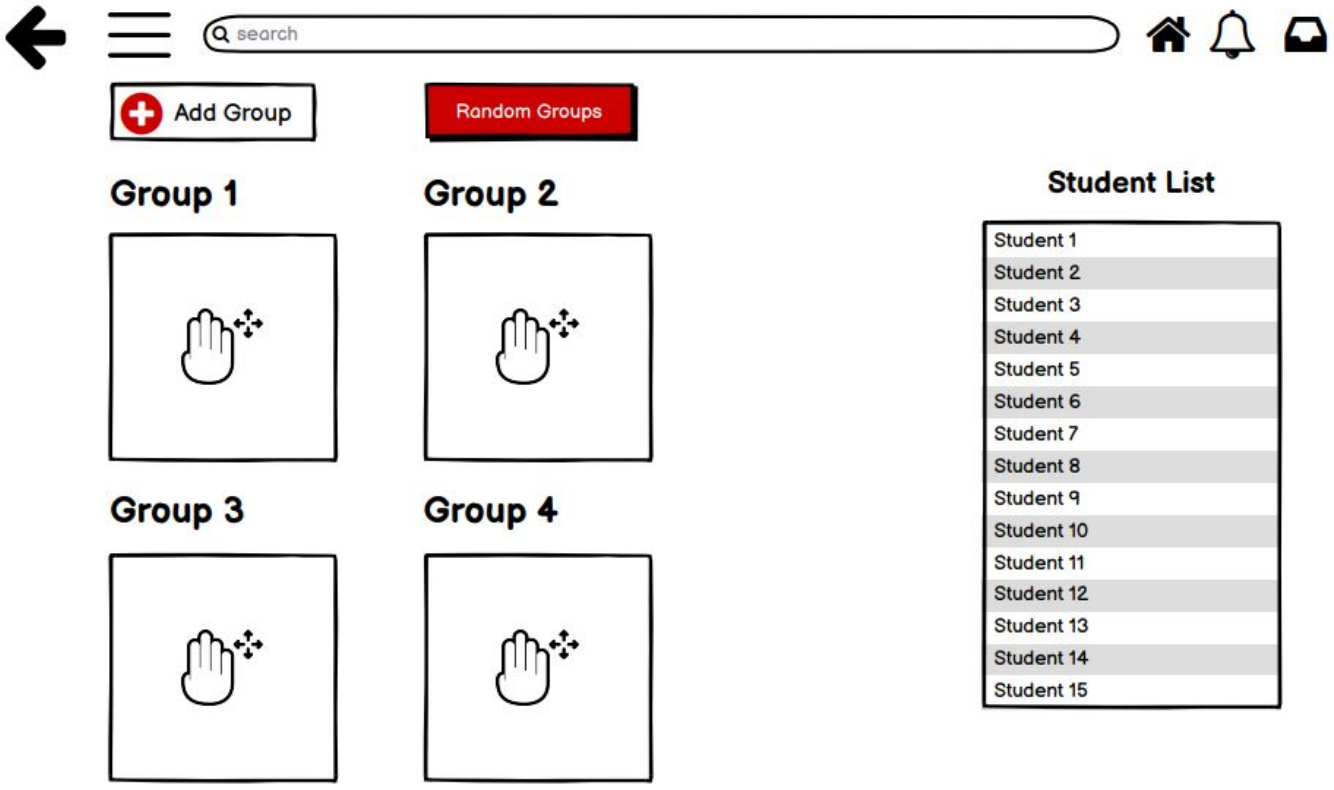


Figure 5.6.18 Assign Student to Groups Page

On this page, instructors can create groups for the project, delete groups, assign students to groups with drag and drop, or create groups randomly.

5.6.19 Grades Page

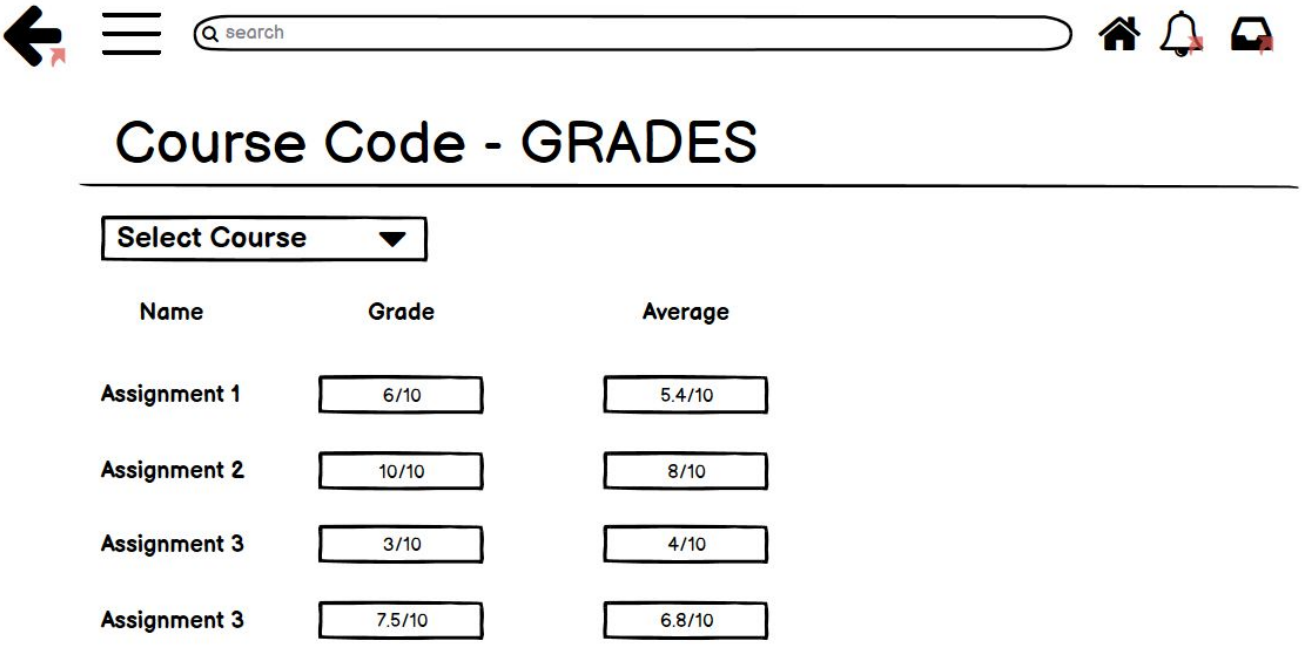


Figure 5.6.19 Grades Page

On this page, students can see their grades and average grades for each course they are enrolled in. Students can click on the "Grades" tag from the drop menu on their homepage to access this page.

5.6.19 Inbox Page

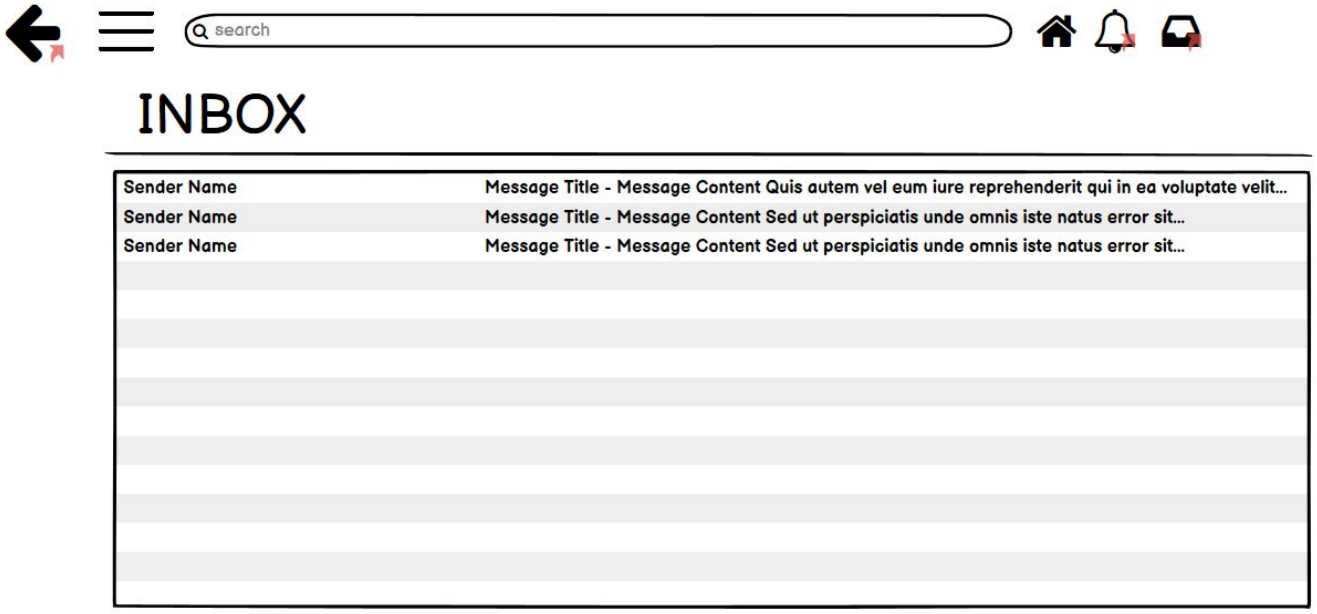


Figure 5.6.19 Inbox Page

On this page, users can view messages sent by other users. If they click on the message, they can view the message's details.

5.6.20 Message Page

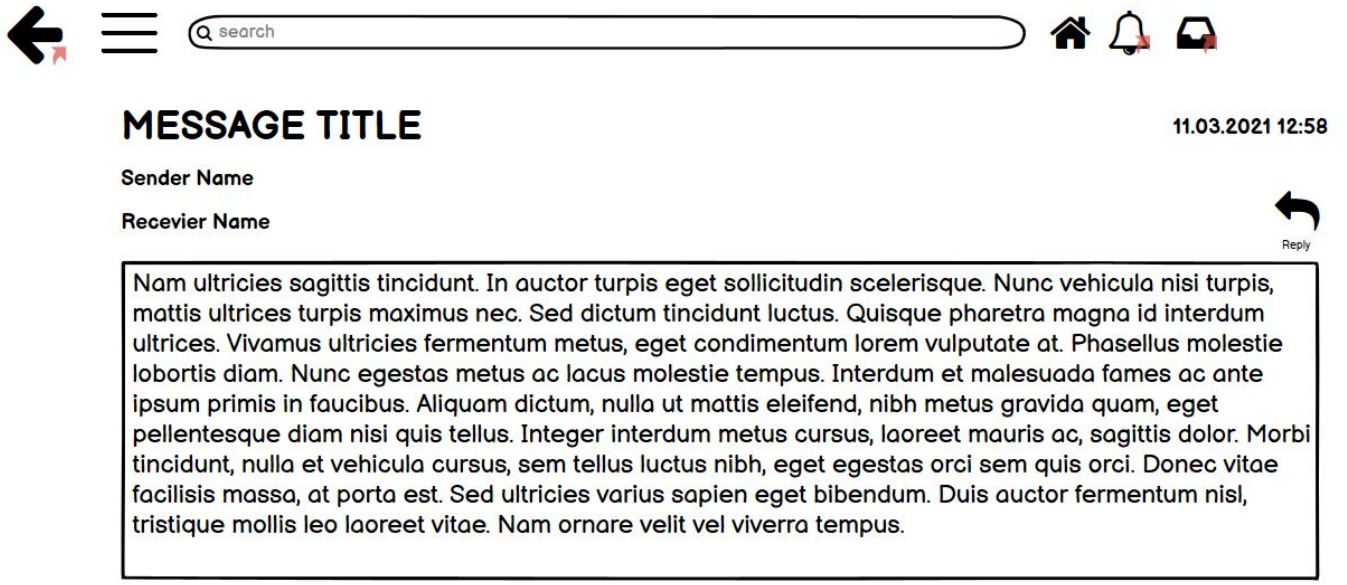


Figure 5.6.20 Message Page

In this page, users can view the messages in detail. Also, users can reach the page where they can reply to the person who sent the message by clicking on the "Reply" button.

5.6.21 Notifications Page

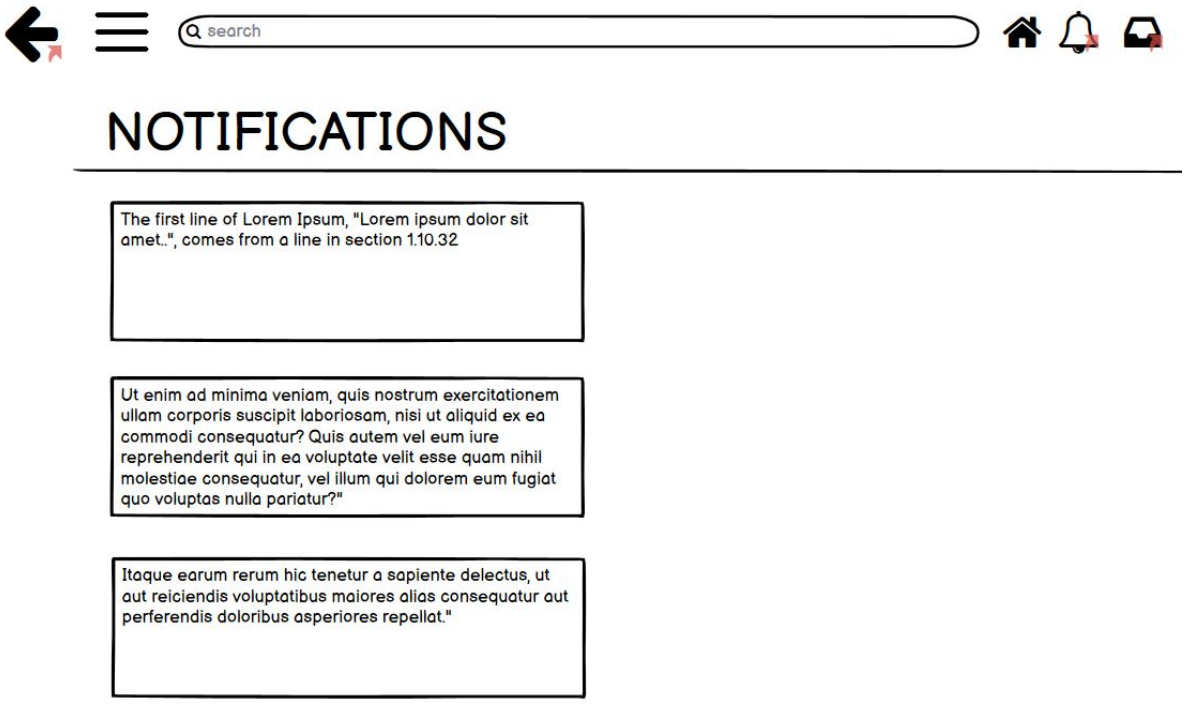


Figure 5.6.21 Notifications Page

Users can view their notifications on this page. If they click on the notifications, they reach the relevant page.

5.6.22 Enroll in a Course Page For Students

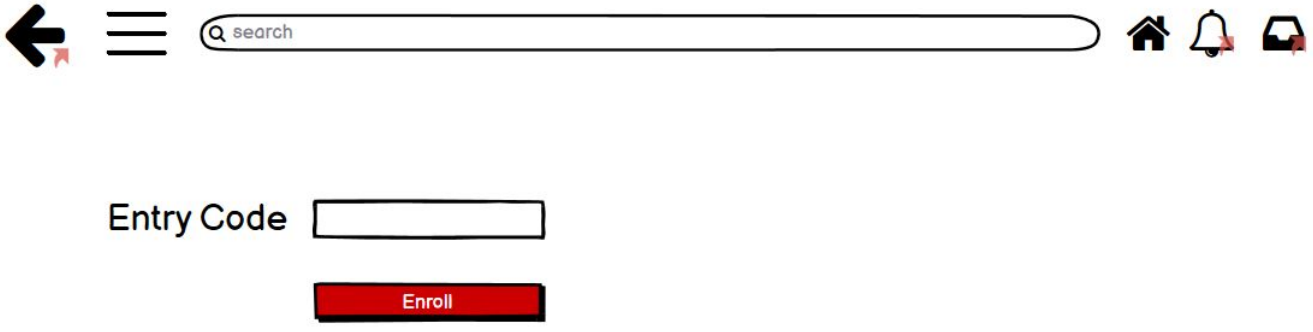


Figure 5.6.22 Enroll in a Course Page For Students

On this page, students enroll in the course by entering the unique course code given to them by the instructors. To access this page, users should click on the "Enroll in a Course" button on the "Courses Page for Students" page.

5.6.23 Create Assignment Page For Instructors

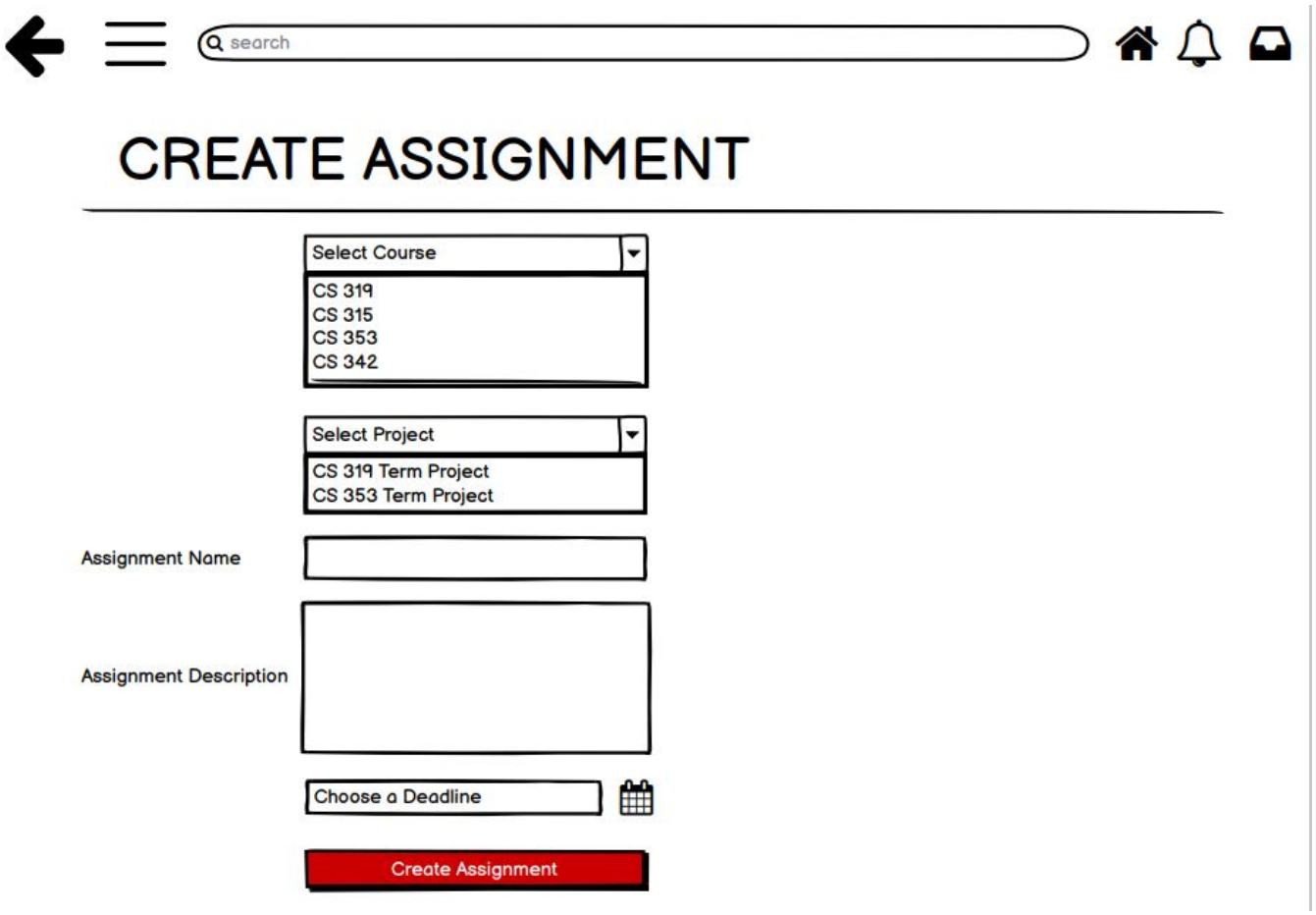


Figure 5.6.23 Create Assignment Page For Instructors

On this page, instructors can create a new assignment after entering the required information for the assignment.

5.6.24 Send Message Page

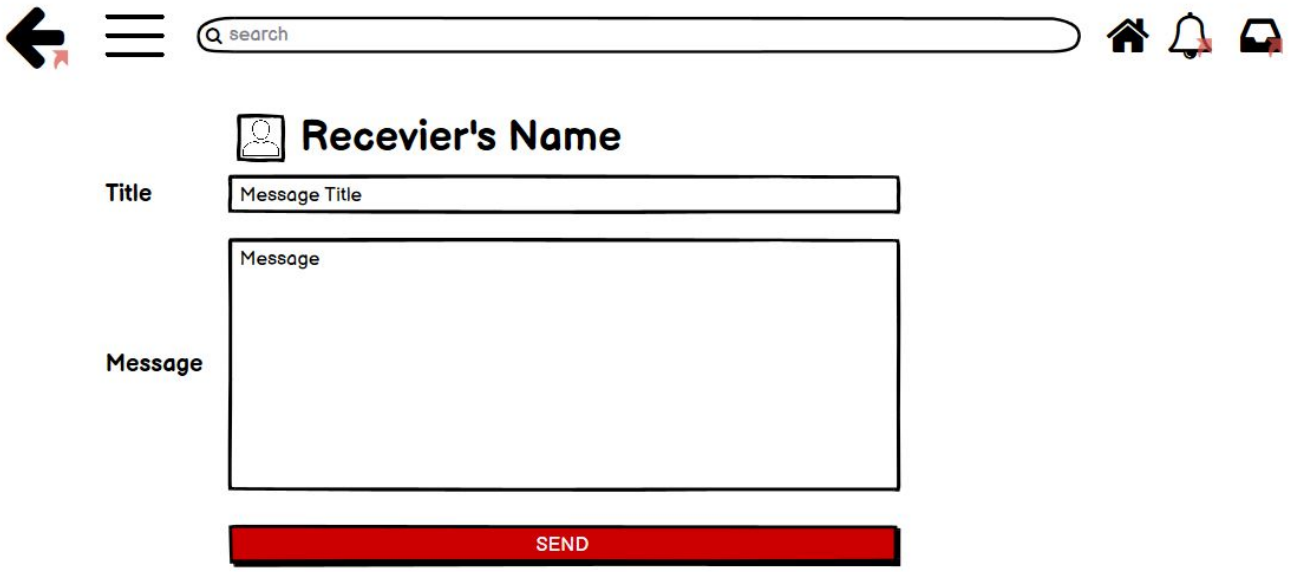


Figure 5.6.24 Send Message Page

Users can send messages to other users they want by entering the message title and message content on this page. To access this page, click on the "Send Message" button in the profile of the person to whom the message will be sent.

5.6.25 Create Post Page

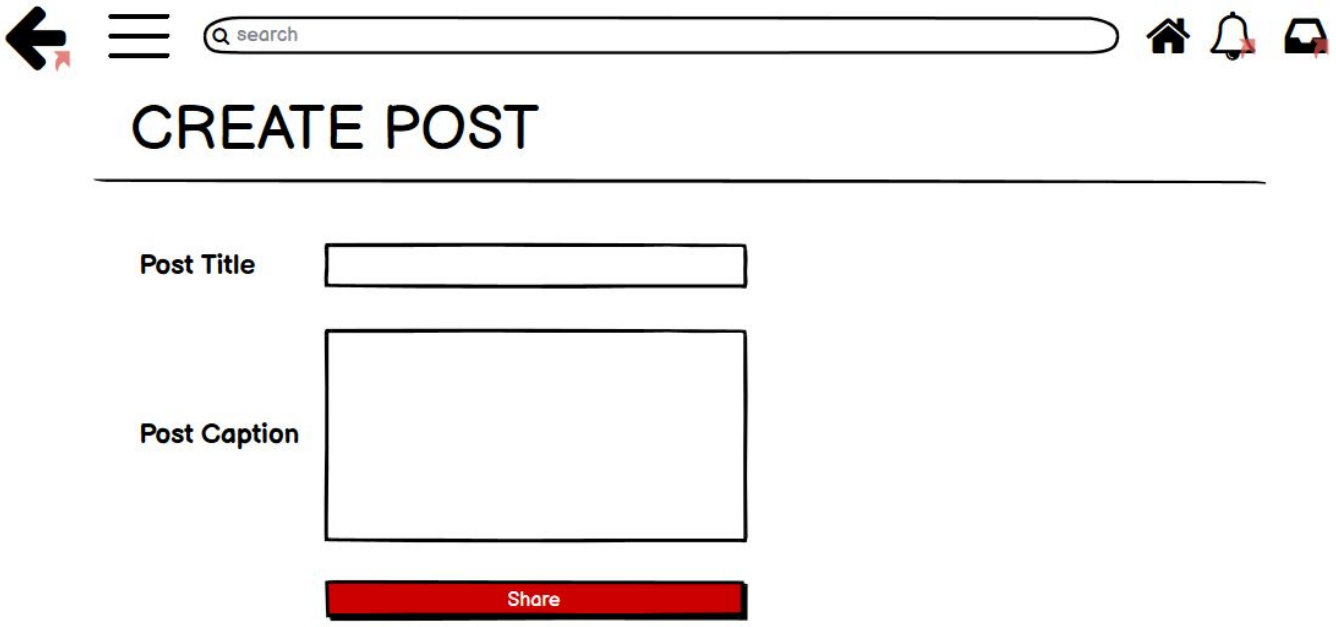


Figure 5.6.24 Send Message Page

\Users can share the post on the course or project forums by entering the post title and post text on this page. To access this page, users must go to their course's or group's forum page and click on the "Create Post" button.

5.6.26 Create Group Page

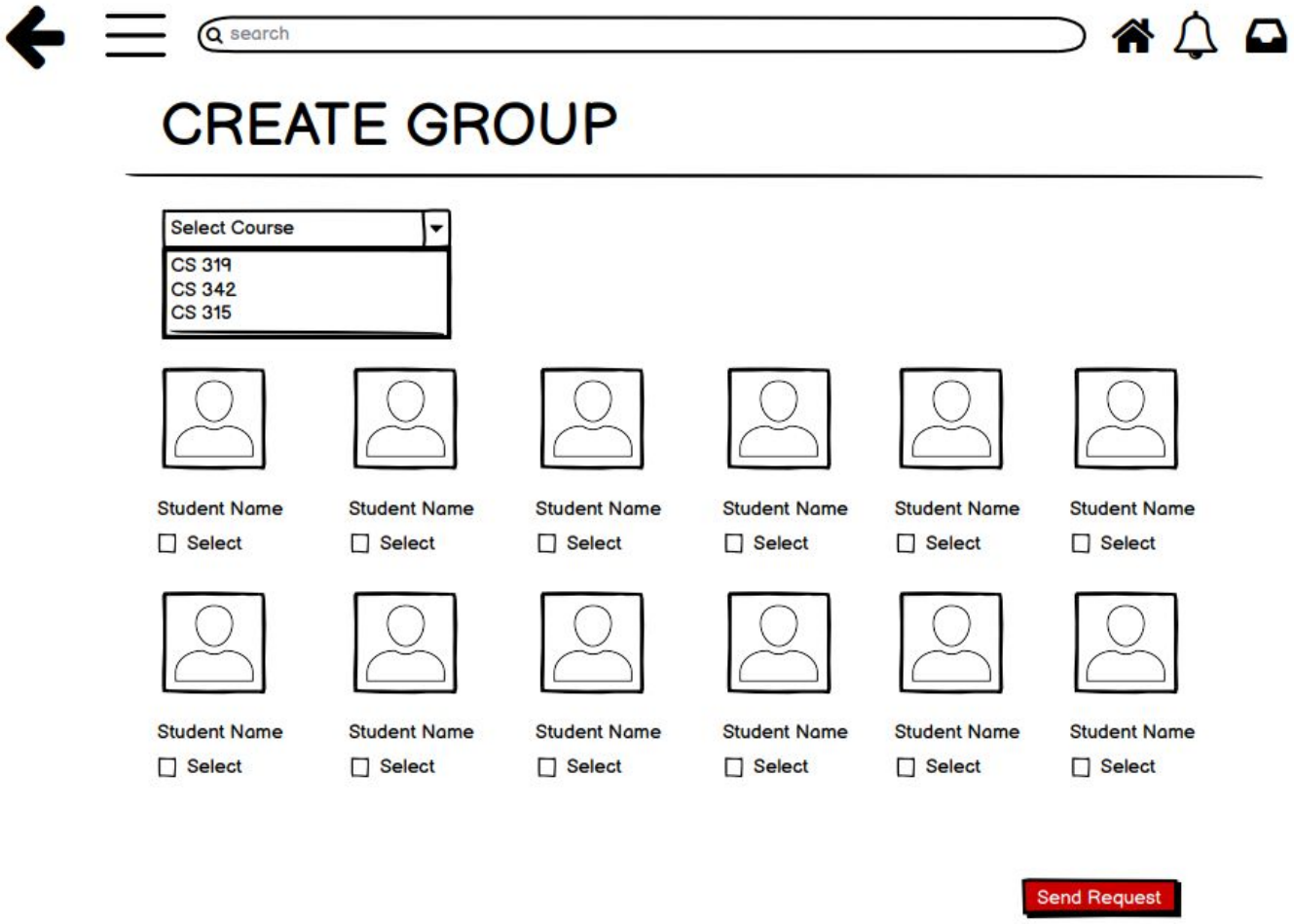


Figure 5.6.26 Create Group Page

In this page, students can send a request to other students to create a new group if the group formation process is ongoing. To access this page, students should click on the "Create Group" button on the "Detailed Course Page for Students" page.

5.6.27 Find Group Page For Students

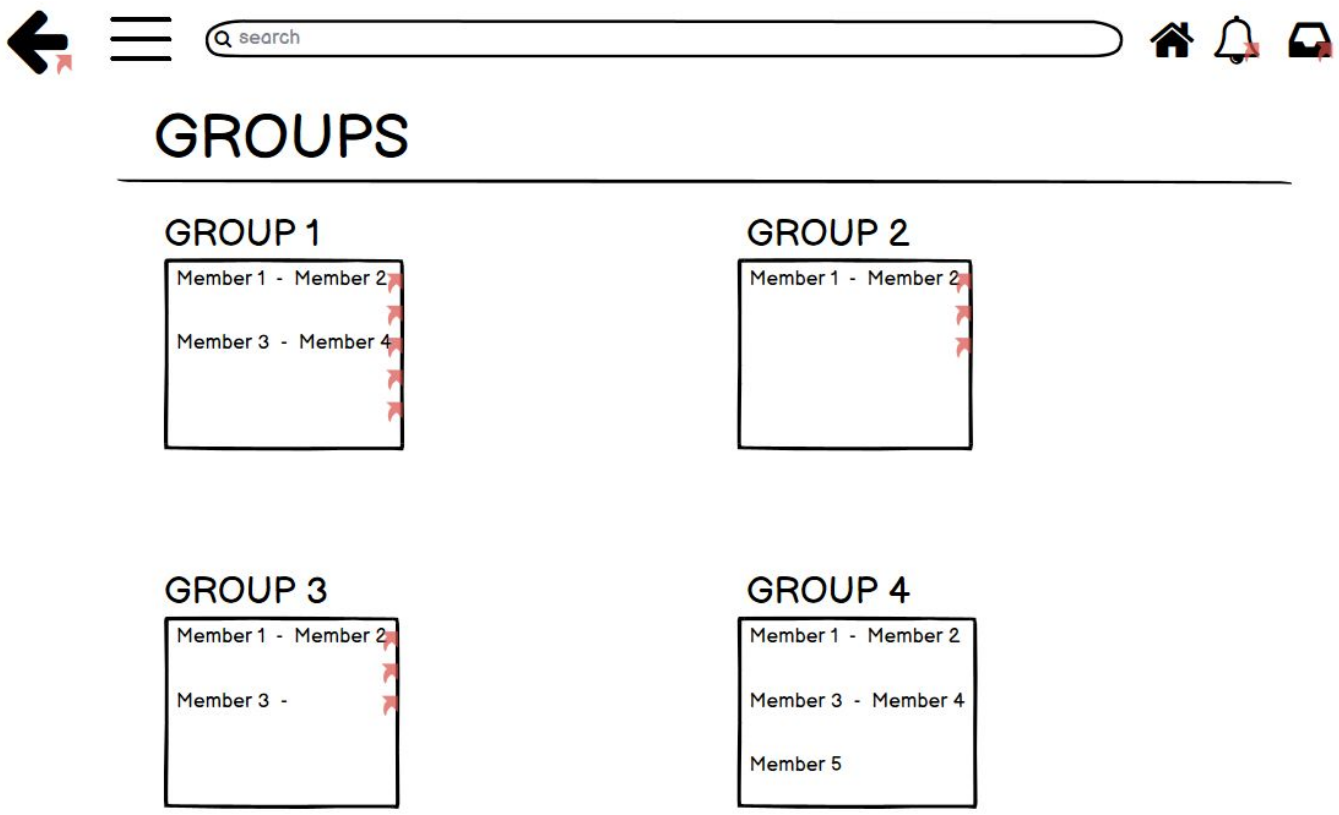


Figure 5.6.27 Find Group Page For Students

If students click on the "Find Group" button on the "Detailed Course Page for Students" page, they will reach this page. On this page, they can see the groups in the formation process. If they click on a group's label, they will be redirected to another page where they can send a request to join the group.

5.6.28 Send Request To Join a Group For Students

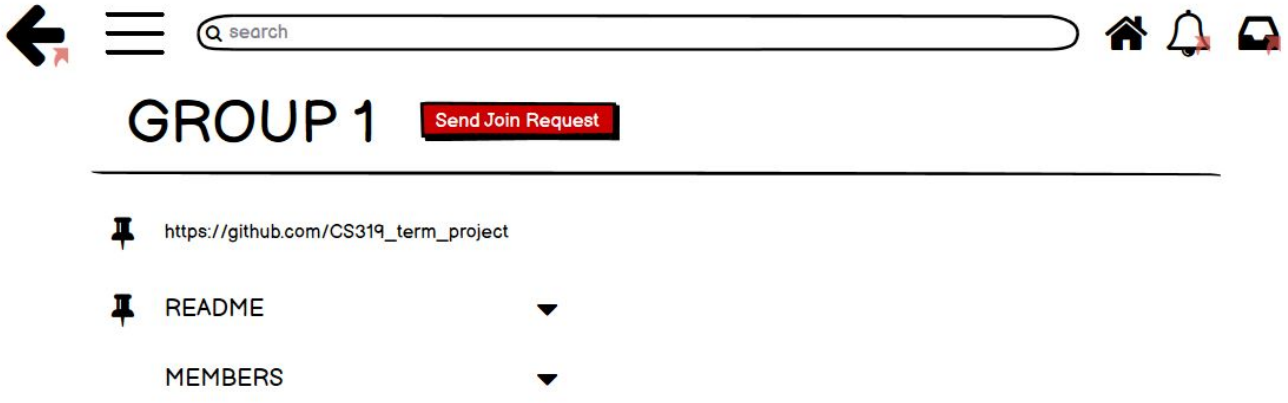


Figure 5.6.28 Send Request to Join a Group For Students

On this page, students can see the members and other information of the group that is in the formation process and send a request to join the group by clicking on the "Send Join Request" button.

5.6.29 Change Password Page

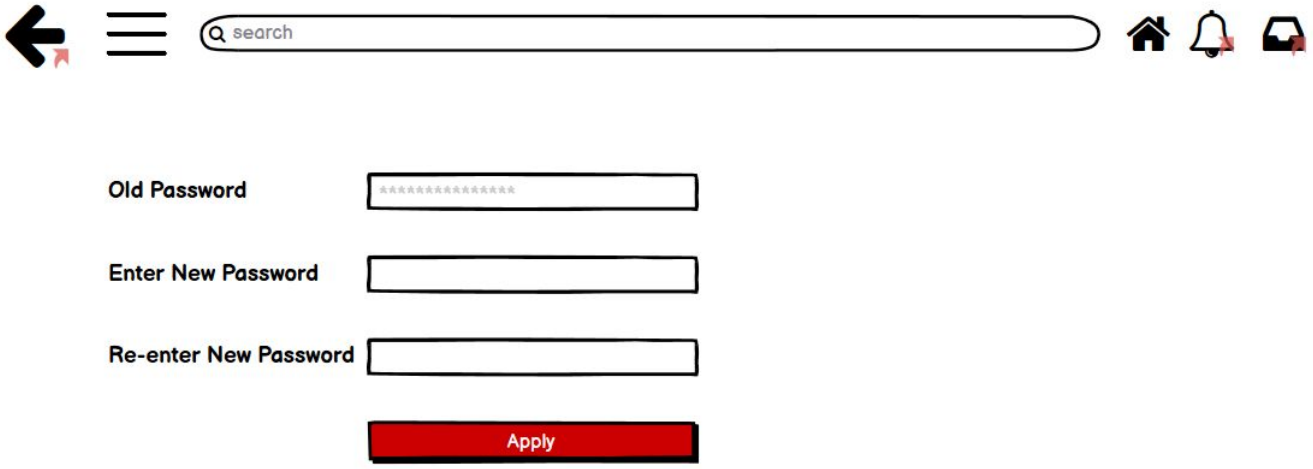


Figure 5.6.29 Change password page

On this page, users can change their passwords. To access this page, the user should go to their profile and click on the "Change Password" button.