

**Department of Computer Engineering, Bilkent University**  
**CS319 Object Oriented Software Engineering**  
**Group 11**  
**NFR, Various Diagrams and Mockups Report - D2**  
**Section 1 - Eray Tüzün**  
**16/03/2025**



Furkan Mert Aksakal 22003191  
Furkan Komaç 22102165  
Alper Biçer 22003097  
Erkan Can Arslan 22103948  
Deniz Yazıcı 21902557

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# 1. Non-Functional Requirements

## 1.1 Usability Requirements

**Role-Specific Dashboards:** Each user (TA, Instructor, Secretary, Admin, etc.) will see a role-specific dashboard relevant to their job.

**Responsive UI:** Frontend will be fully responsible across different devices such as desktop, tablet and mobile platforms.

**Real-Time Notifications:** Duty assignment, approval, and swap request notifications will be shown in real-time ( $\leq 2$  seconds) with a visual cue (e.g., badge icon).

**Duty Swap System:** TAs will have an easy-to-use interface to request, accept, or reject proctor duty swaps. All swap interactions will be preceded by confirmation dialogs for clarity.

## 1.2 Security/Safety Requirements

**Authentication:** All users must authenticate via secure login (username/password). Passwords will be securely stored.

**Authorization:** Role-Based Access Control (RBAC) is where users are restricted to seeing only features/data depending on their role.

**Data Protection:** Frontend-backend communications will be encrypted with HTTPS. Sensitive user data (e.g., personal data, logs) will be restricted access.

**Audit Logging:** Admins can see logs of significant system activities (e.g., duty creation, user management, data imports). Logs cannot be edited and are stored securely.

**Account Management:** Only admins allowed to CRUD (create / load / edit /delete) users. Forgotten passwords will be reset securely via email verification and token-based authentication.

## 1.3 Performance Requirements

**API Response Time:** 95% of all backend requests will respond within 2 seconds under normal load conditions.

**Concurrent Users:** The system must be able to handle a minimum of 200 concurrent users without a performance drop.

**Bulk Import Processing:** Excel imports of data (e.g., TA list, classroom data) of 10,000 records or less will be processed within 30 seconds.

**Page Load Time:** All core pages (e.g., dashboard, duty management) will load in under 5 seconds on standard wireless connections.

## 1.4 Reliability Requirements

**System Uptime:** The backend system (Django + MySQL) will have  $\geq 99.5\%$  uptime, if there is no scheduled maintenance work.

**Data Backups:** Routine every-day automated back-ups of core data (responsibilities, users, logs) will be preserved, and the recovery should be possible within 24 hours when data is missing.

**Conflict Prevention:** Scheduling conflicts (concurrent responsibilities, double bookings) will be prevented by checking for them upon assigning responsibilities.

**Failover Handling:** In case of API or database failure, the system will notify users and retry automatically or provide fallbacks.

## 1.5 Maintainability Requirements:

**Modular Architecture:** Django's MTV pattern and React component structure make it possible for code to be easily maintained. Every module (e.g., duty management, logging) is isolated so that updates are made separately.

**Code Documentation:** Backend APIs will be documented using Swagger, while frontend components will be provided with inline comments and JSDoc as and when needed.

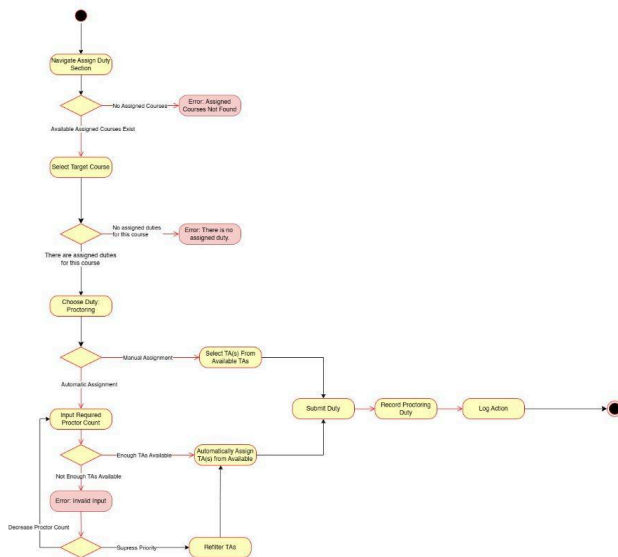
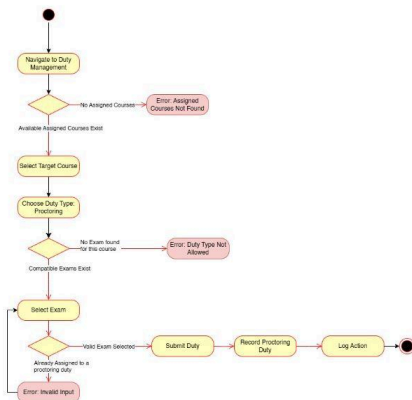
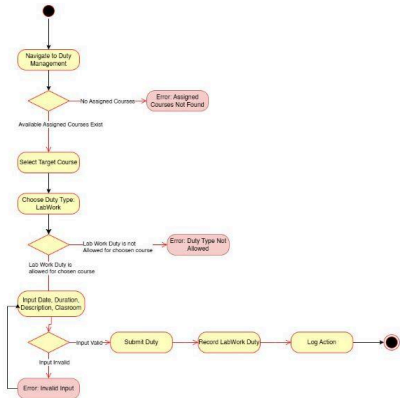
**Version Control:** Source code will be stored on GitHub with branching (development, staging, production) and pull request workflows.

**Extensibility:** The system will accommodate future extensions of new duty types, roles, and reporting functionality with minimal interruption to existing functionality.

## 2. Activity Diagrams

For better quality: [click here](#)

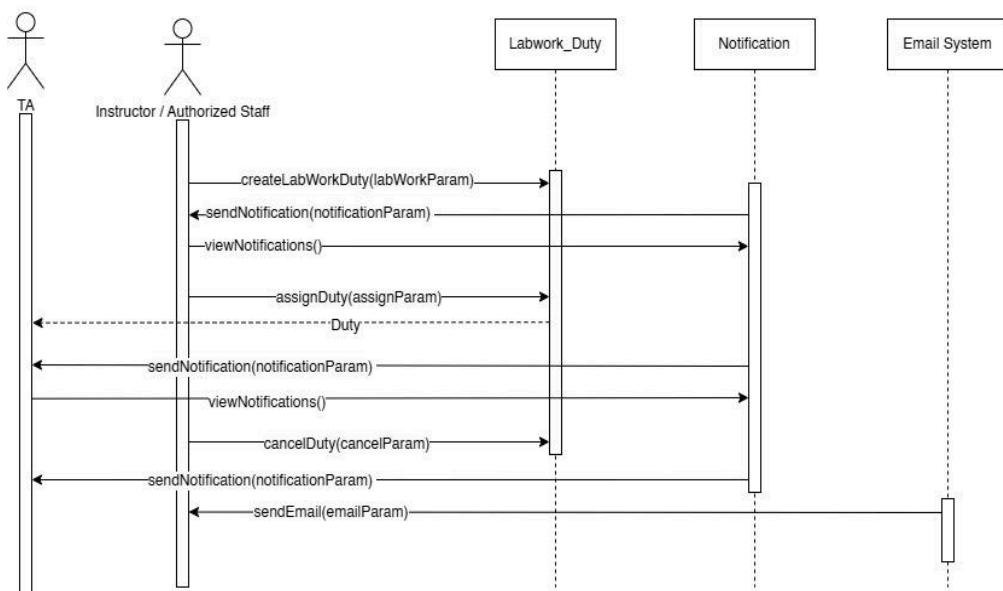
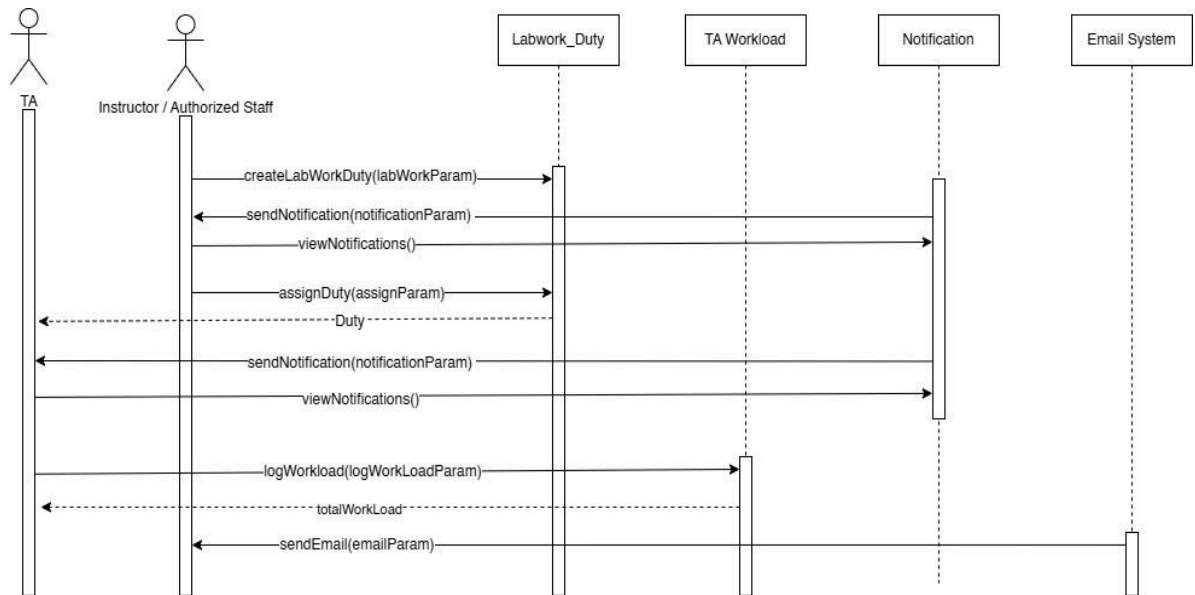
1. Activity Diagram: Creating the lab work duty.
2. Activity Diagram: Creating the proctoring duty.
3. Activity Diagram: Assign proctoring duty.



### 3. Sequence Diagrams

For better quality: [click here](#)

1. Sequence Diagram: Creating, assigning the lab work duty and entering duty workload.
2. Sequence Diagram: Creating, assigning and canceling lab work duty.



**Note:** First sequence diagram illustrates the process of creating a lab work duty, assigning it to a TA, and marking the corresponding workload. Notifications are sent after both creation and assignment of the duty, and are visible to the TA. Once the TA marks the workload, the total workload is fixed and a confirming email is sent. This diagram does not cover cancellation or modification of duties. Second sequence diagram shows the creation, assignment, and subsequent cancellation of a lab work task. Both creation and cancellation operations trigger notifications, which are visible to the TA. After cancellation, an informatory email is sent to the TA. Workload logging procedure is not shown in this diagram.

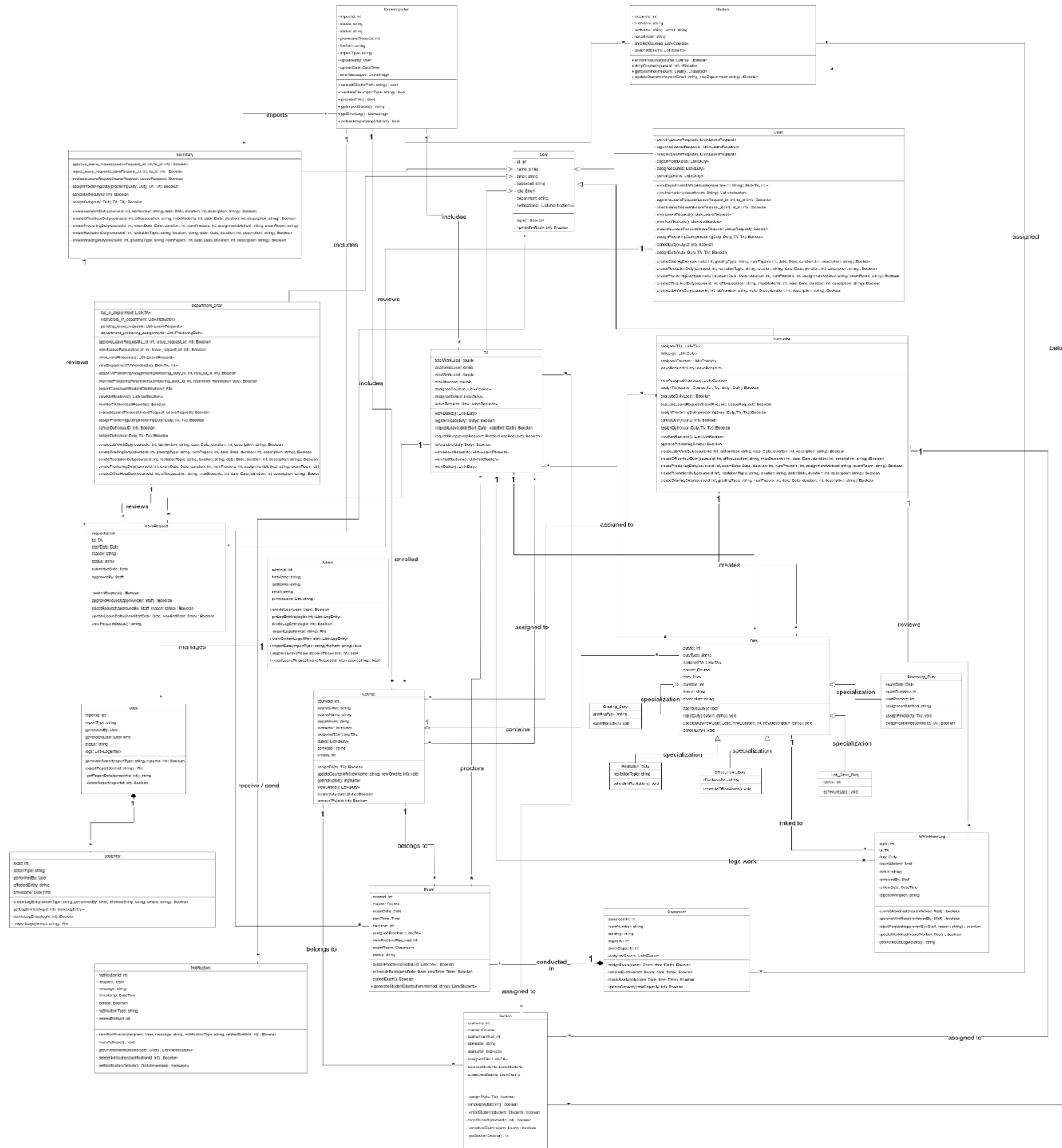
Authorized Staff means Dean, Department Chair, Secretary besides Instructor.

**Parameters in the Sequence Diagram:**

- **labWorkParam:** courseId: int, labNumber: string, date: Date, duration: int, description: string
- **assignParam:** duty: Duty, TA: TA
- **notificationParam:** recipient: User, message: string, notificationType: string, relatedEntityId: int
- **logWorkLoadParam:** duty: Duty
- **emailParam:** receiver: String, sender: String, message: String, attachment: File
- **cancelParam:** dutyID: int

## 4. Class Diagram

For better quality: [click here](#)

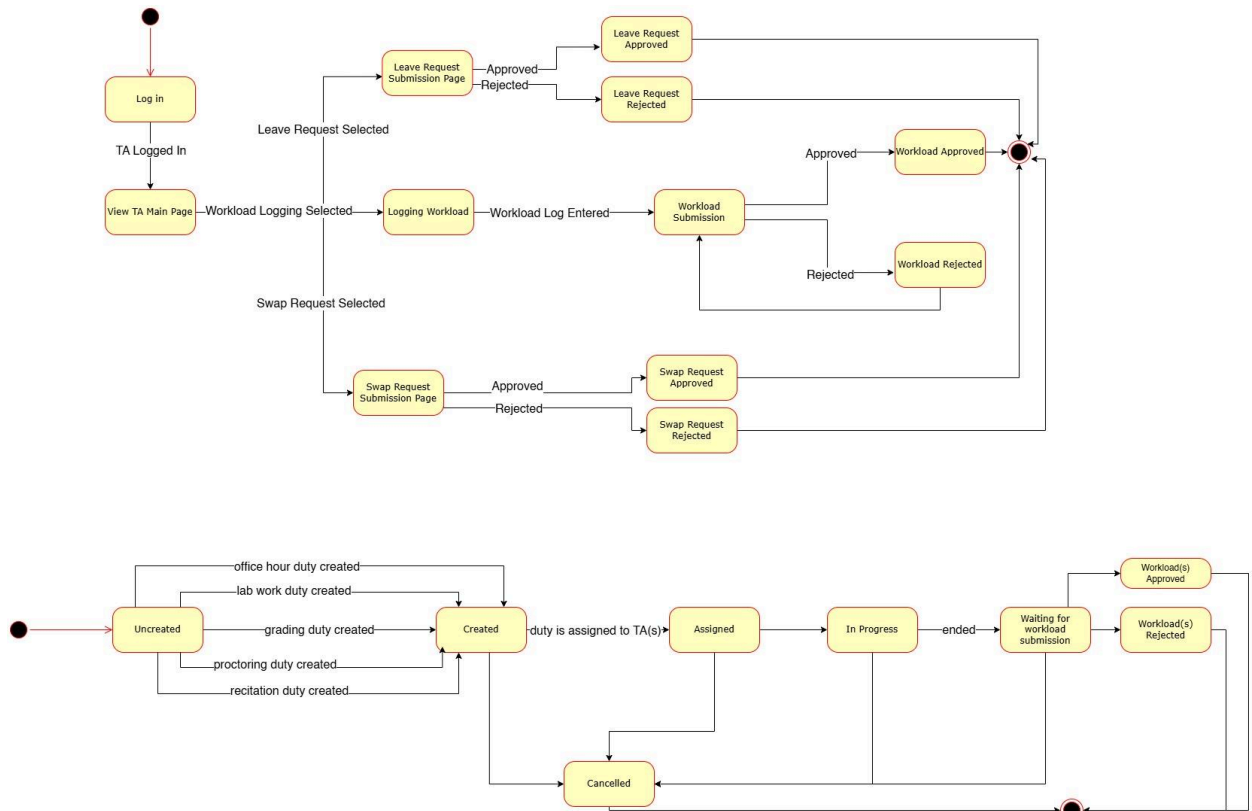




## 5. State Diagrams

For better quality: [click here](#)

1. State Diagram: All states of the user TA.
2. State Diagram: All states of a duty.



**Note:** First diagram shows the workflow available to a TA when logged into the system. The TA can visit the main page and select one of three options: leave request, workload logging, or swap request. Each of these requests gets approved or denied, leading to respective end states. If the workload log gets denied, the TA can submit the log again. Second diagram illustrates the lifecycle of different responsibilities like office hour, lab work, grading, proctoring, and recitation. Responsibilities get uncreated before becoming created, then afterwards either assigned to TAs or canceled. Assigned responsibilities get in progress before waiting for workload submission. Submitted workloads are approved or denied. Canceled responsibilities do not proceed to workload submission and are therefore eliminated from the lifecycle. This chart does not have duty editing or reassignment after being created.

# 6. Mockups

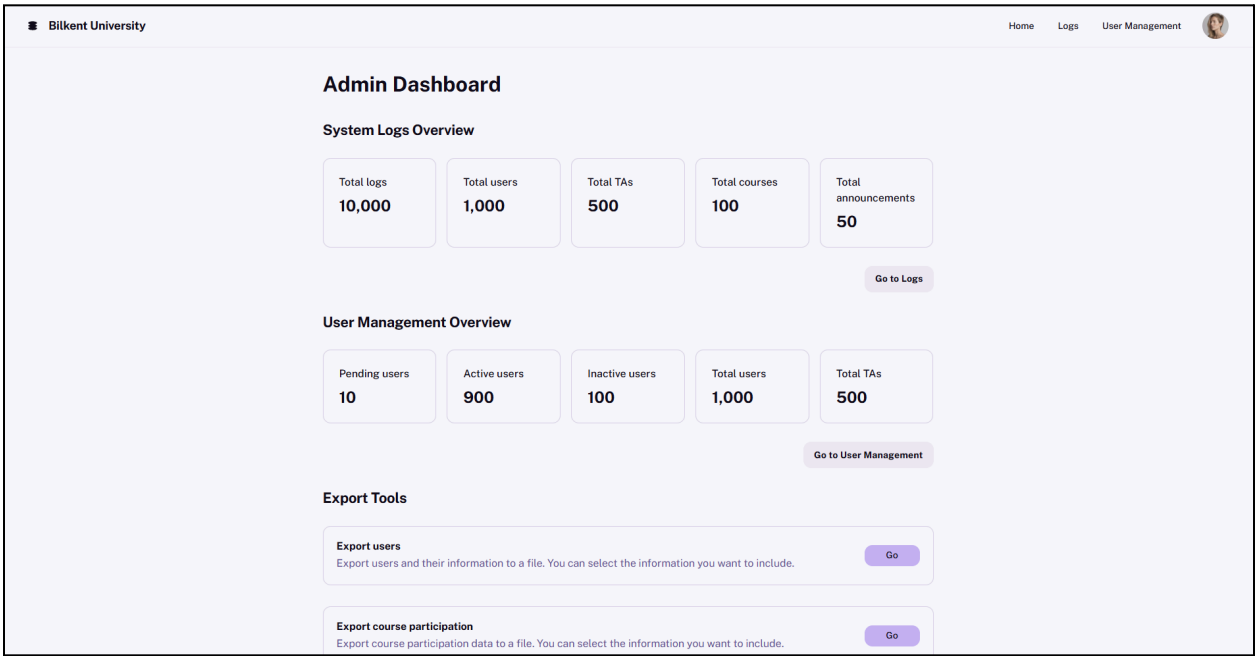


Figure 1: Admin Home Page

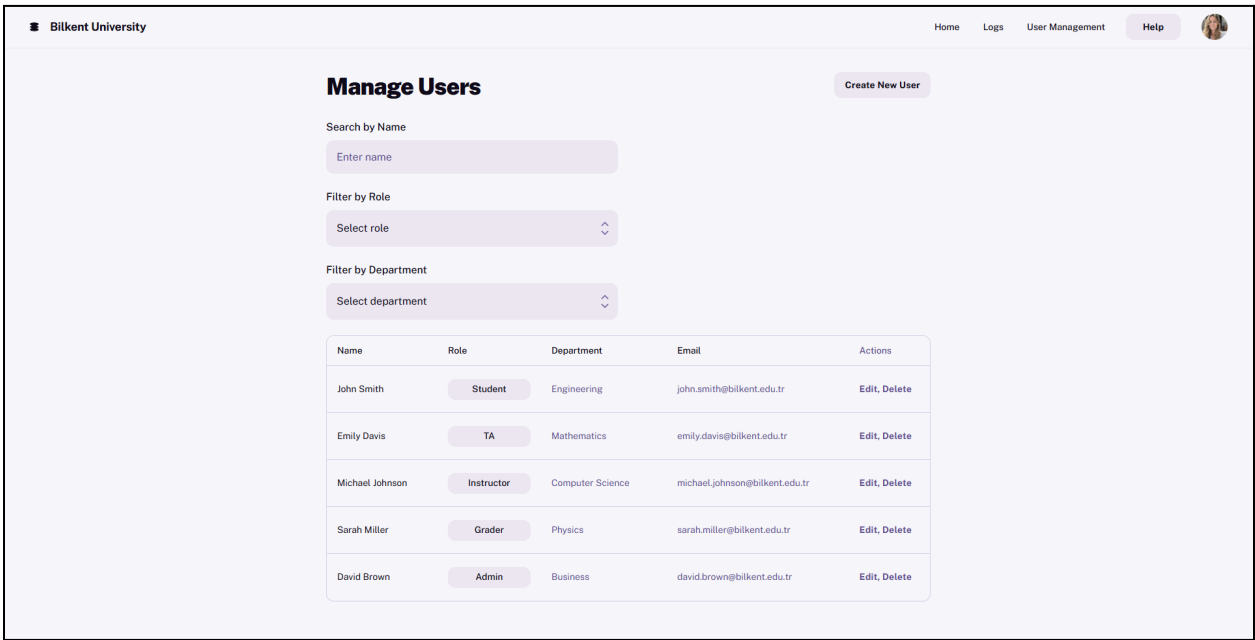


Figure 2: Admin Manage User Page

Bilkent University

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Help

Assign TAs to Duties

Step 1: Select a course

Course

Step 2: Select unassigned duties

Duty	Unassigned TAs
Lab	0
Recitation	1
Homework	2
Project	0

Step 3: Choose assignment method

☒ Automatic Assignment

☐ Manual Assignment

Figure 3: Assign Duty Main Page

Bilkent

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Course / CS101

Assignment

Automatic Assignment

No eligible TAs found

No eligible TAs found

No eligible TAs are available to assign. You can override restrictions or request additional TAs.

Override Restrictions

Request Additional TAs

Request additional TAs for this course




Figure 4: Automatic Assignment Fail Page

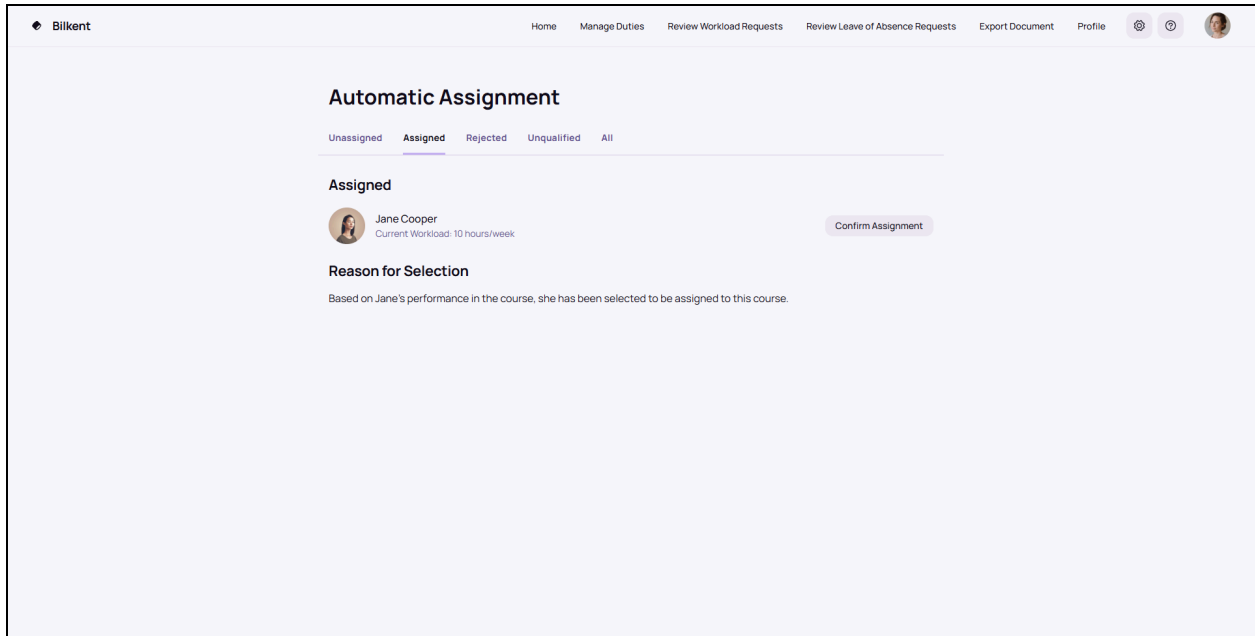


Figure 5: Automatic Assignment Success Page

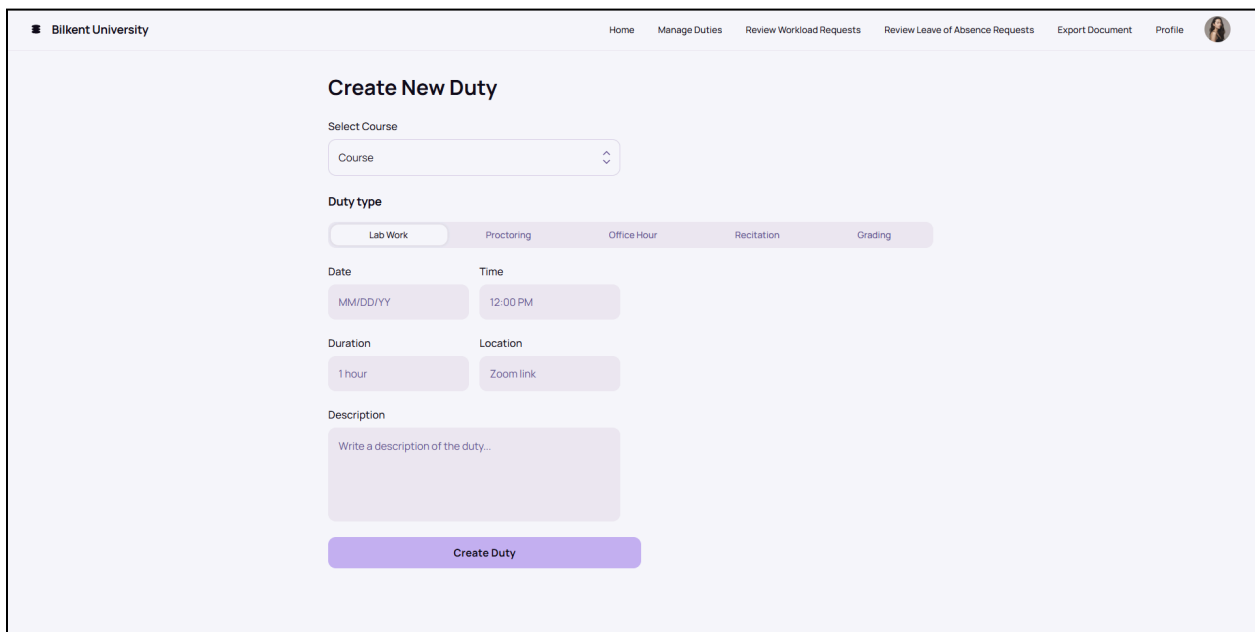


Figure 6: Create Duty Page

Bilkent University

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Select Course

Course

Duty type

Lab Work

Proctoring

Office Hour

Recitation

Grading

Date

MM/DD/YY

Time

12:00 PM

Duration

1 hour

Location

Zoom link

Grading Method

Rubric, Feedback Form, etc.

Description

Write a description of the duty...

Create Duty

Figure 7: Create Grading Session Page

Bilkent University

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Select Course

Course

Duty type

Lab Work

Proctoring

Office Hour

Recitation

Grading

Date

MM/DD/YY

Time

12:00 PM

Duration

1 hour

Location

Zoom link

Student Count

10

Expected Questions

General or Specific

Description

Write a description of the duty...

Create Duty

Figure 8: Create Office Hour Page

Course

**Duty type**

Lab Work
Proctoring
Office Hour
Recitation
Grading

Date

Time

MM/DD/YY

12:00 PM

Duration

Location

1 hour

Zoom link

**Description**

Write a description of the proctoring duty...

**Exam Type**

Midterm, Final, etc.

Number of Students

Max Duration

100

3 hours

**Proctoring Software**

Select Software

Create Proctoring Duty

Figure 9: Create Proctoring Page

Bilkent University
Home
Manage Duties
Review Workload Requests
Review Leave of Absence Requests
Export Document
Profile

Select Course

Course

**Duty type**

Lab Work
Proctoring
Office Hour
Recitation
Grading

Date

Time

MM/DD/YY

12:00 PM

Duration

Location

1 hour

Zoom link

**Number of Students**

Enter the number of students

**Topics to Cover**

Enter the topics to cover

Create Recitation Duty

Figure 10: Create Recitation Page

Bilkent University

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Export Classroom Distribution

Select an exam/course

Midterm Exam in CS101, Fall 2022

Generate

Summary

Course	CS101, Fall 2022
Date	Oct 13, 2022
Number of Students	150
Classrooms Used	3

Export as Excel

Export as PDF

Figure 11: Export Distribution Page

Bilkent University

Dashboard

Courses

Students

Grades

Attendance

Reports

Help

Import Data via Excel

Select an import type and upload the corresponding Excel file. Note that you may need to import multiple files for some import types.

Import Course Offerings

Import Course Offerings

Upload

Import TA List

Import TA List

Upload

Import Staff List

Import Staff List

Upload

Import Classroom Info

Import Classroom Info

Upload

Import Exam Classroom-Student Distribution

Import Exam Classroom-Student Distribution

Upload

Success/Error Messages

No messages yet

Figure 12: Import Excel Page

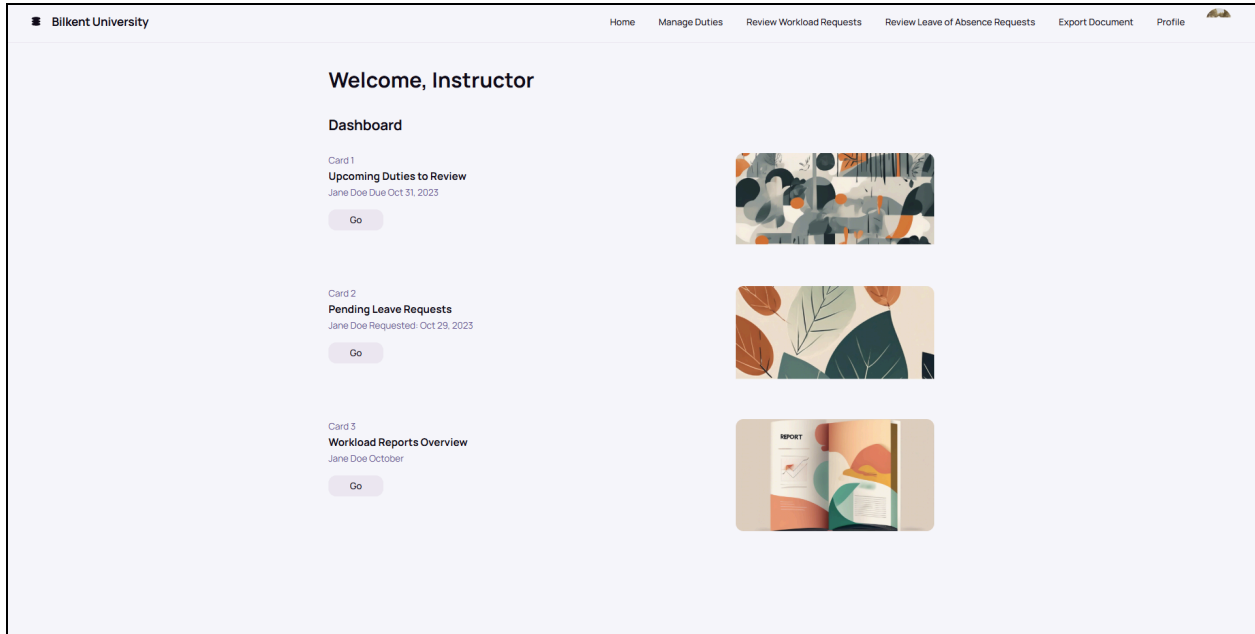


Figure 13: Instructor Home Page

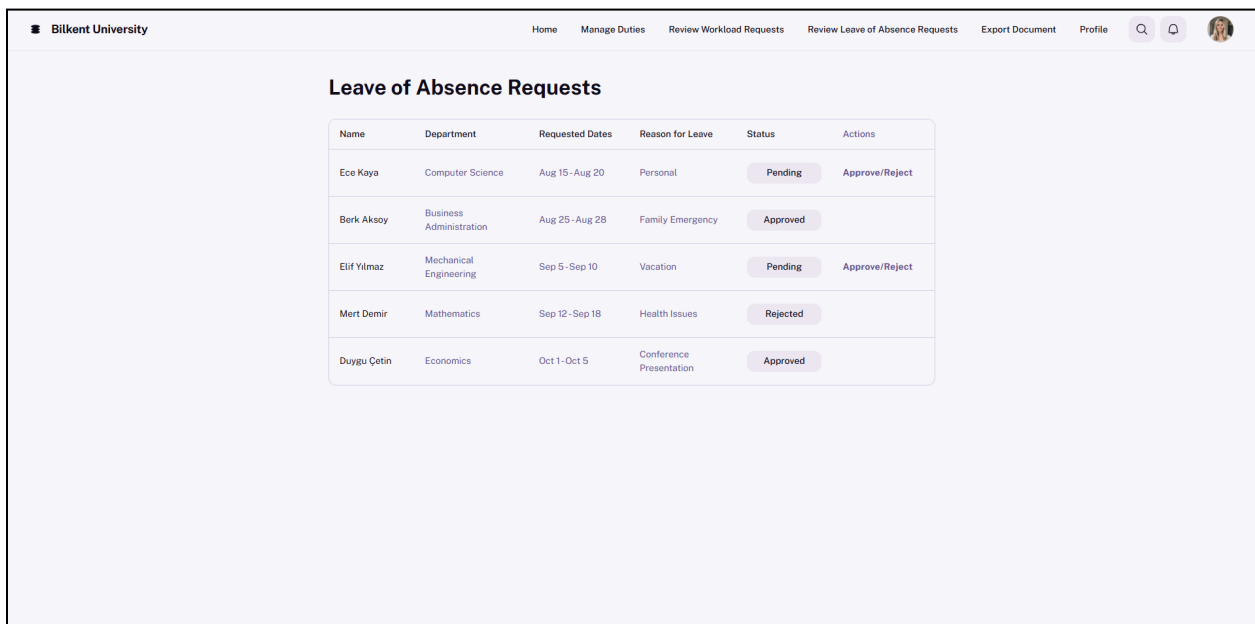



Figure 14: Leave of Absence Review Page



Bilkent University

For studentsFor instructorsSign up



Welcome to Bilkent University TA Management System

Bilkent ID

Password

☐ Remember me

Sign in

[Forgot your password?](#)

Figure 15: Login Page

Bilkent University


HomeSwap DutiesLog WorkloadLeave of AbsenceExport DocumentProfile

TA Management System

Kerem Goktas

kerem@bilkent.edu

Upload Photo



Full Name

Email

Password

Save Changes

Figure 16: Manage Profile Page

Bilkent University

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Manual Assignment

Duty details

Course

CS 61B

Title

Lab 1 (Mon 11:00)

Start date

01/01/2023

End date

01/01/2023

Time

11:00-12:00

Available TAs

Name	Department	Current Workload Hours	Eligibility Notes	
Alice	CS	20	Eligible	Assign
Bob	Economics	18	Eligible	Assign
Eve	Math	22	On Leave	Assign
Grace	Physics	19	Eligible	Assign
Ivan	Chemistry	25	Workload Limit Exceeded	Assign

Figure 17: Manual Assign Page

Bilkent

Home

Manage Duties

Review Workload Requests

Review Leave of Absence Requests

Export Document

Profile

Modify Existing Duty

Duty Type	Course	Date	Time	Assigned TA	
Lab	CS101	Sep 1, 2023	6:00 PM	Jane Smith	Edit
Recitation	CS102	Sep 2, 2023	6:00 PM	John Doe	Edit
Grading	CS103	Sep 3, 2023	6:00 PM	Alice Johnson	Edit
Lab	CS104	Sep 4, 2023	6:00 PM	Bob Brown	Edit
Grading	CS105	Sep 5, 2023	6:00 PM	Eve Davis	Edit

Edit Duty

Date


Time

Duration

Description

Update Duty

Figure 18: Modify Duty Page



Home


Manage Duties


Review Workload Requests


Review Leave of Absence Requests

Export Document

Profile



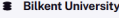




### Review Duty Log Requests

TA Name	Duty Type	Course	Date	Duration	Description	Status
Megan Lee	Office Hours	CS101	Sep 14	60 min	Help students with homework	In Review
John Smith	Lab	BIO201	Sep 15	120 min	Grade lab reports	Completed
Emily Davis	Grading	ENG301	Sep 16	90 min	Present on a topic	To Review
David Johnson	Exam Proctoring	MATH101	Sep 17	45 min	Supervise a midterm	In Progress
Sophia Brown	Grading	CHEM201	Sep 18	75 min	Grade assignments	Rejected
Michael Wilson	Recitation	PHYS301	Sep 19	105 min	Recitation session	Completed
Emma Rodriguez	Recitation	ART401	Sep 20	50 min	Provide guidance on a project	To Review

Figure 19: Review Duty Logs Page



Home


Swap Duties


Log Workload


Leave of Absence


Export Document

Profile











### Request Leave of Absence

Start Date



End Date



Reason

Submit Request

Your request has been submitted.

Figure 20: TA Absence Request Page

Bilkent University

[Home](#)
[Swap Duties](#)
[Log Workload](#)
[Leave of Absence](#)
[Export Document](#)
[Profile](#)

## Create Duty Swap Request

Step 1: Select your duty

33%

Your upcoming duties

CS 101 - Introduction to Computer Science Section 1

CS 101 - Introduction to Computer Science Section 1, 2, 3 1st of January 2023, 09:40-10:30

Select

Step 2: Find a duty to swap with

66%

Available duties from other TAs

CS 101 - Introduction to Computer Science Section 2

CS 101 - Introduction to Computer Science Section 2 1st of January 2023, 09:40-10:30

Request Swap

CS 101 - Introduction to Computer Science Section 1

CS 101 - Introduction to Computer Science Section 1 1st of January 2023, 09:40-10:30

Request Swap

CS 101 - Introduction to Computer Science Section 3

CS 101 - Introduction to Computer Science Section 3 1st of January 2023, 09:40-10:30

Request Swap

CS 101 - Introduction to Computer Science Section 4

CS 101 - Introduction to Computer Science Section 4 1st of January 2023, 09:40-10:30

Request Swap

Send Request

Figure 21: TA Create Swap Page

Bilkent University

[Home](#)
[Swap Duties](#)
[Log Workload](#)
[Leave of Absence](#)
[Export Document](#)
[Profile](#)

## Welcome, Elif Yavuz

Upcoming duties

Lab 01

CS101- Introduction to Computer Science

Today

Lab 02

CS101- Introduction to Computer Science

Tomorrow

Lab 03

CS101- Introduction to Computer Science

3 days from now

Lab 04

CS101- Introduction to Computer Science

4 days from now

Lab 05

CS101- Introduction to Computer Science

5 days from now

Lab 06

CS101- Introduction to Computer Science

6 days from now

Lab 07

CS101- Introduction to Computer Science

7 days from now

Go to duty logs

Contact

Campus

Emergency

2023 Bilkent University

Figure 22: TA Home Page

Bilkent University

Dashboard

Courses

Students

Instructors

Duties

Reports

Help

Lena Paul

Teaching Assistant

All

Approved

Pending

Rejected

Duty Log Form

Log Completed Duty

Course

Select a course

Duty Type

Select a duty type

Minutes Worked

Enter minutes worked

Submit Duty Log

Your duty log has been submitted and is pending approval from the instructor.

Figure 23: TA Before Logging Duty Page

Bilkent University

Dashboard

Courses

Students

Instructors

Duties

Reports

Help

Lena Paul

Teaching Assistant

All

Approved

Pending

Rejected

Duty Log Form

Course	Duty	Minutes Worked	Status
CS101	Grading	120	Approved
CS102	Teaching Lab	180	Pending
CS103	Office Hours	60	Rejected
CS104	Exam Proctoring	240	Approved

Figure 24: TA Log Duty Page

