# American International University-Bangladesh (AIUB)

## Department of Computer Science Faculty of Science & Technology (FST)

## Public Transport Optimization

A Software Engineering Project Submitted By

| Semester: Fall (24 – 25) | | Section: F | Group Number: 5 | |
|---|---|---|---|---|
| SN | Student Name | Student ID | Contribution (CO3+CO4) | Individual Marks |
| 01 | SAZID – AL – ABEDIN | 22-45999-1 | | |
| 02 | MD. SAIDUZZAMAN SOHAG | 22-46006-1 | | |
| 03 | MD. SADMAN HOSSAIN | 22-46061-1 | | |
| 04 | NOUROZE TARANNUM ANANNYA | 22-46062-1 | | |
| 05 | SEEMANTA TORAFDAR | 21-45968-3 | | |

The project will be Evaluated for the following Course Outcomes

| | |
|---|---|
| **CO3:** *Select* appropriate software engineering models, project management roles and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects | Total Marks |
| Appropriate Process Model Selection and Argumentation with Evidence | [5 Marks] |
| Evidence of Argumentation regarding process model selection | [5Marks] |
| Analysis the impact of societal, health, safety, legal and cultural issues | [5Marks] |
| Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report | [5Marks] |
| **CO4:** *Develop* project management plan to manage software engineering projects following the principles of engineering management and economic decision process | Total Marks |
| Develop the project plan, its components of the proposed software products | [5Marks] |

| | | |
|---|---|---|
| Identify all the activities/tasks related to project management and categorize them within the WBS structure. Perform detailed effort estimation correspond with the WBS and schedule the activities with resources | [5Marks] | |
| Identify all the potential risks in your project and prioritize them to overcome these risk factors. | [5Marks] | |

## Description of Student's Contribution in the Project work

Student Name: SAZID – AL – ABEDIN
Student ID: 22-45999-1
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2


_____
Signature of the Student

Student Name: MD. SAIDUZZAMAN SOHAG
Student ID: 22-46006-1
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2


_____
Signature of the Student

Student Name: MD. SADMAN HOSSAIN
Student ID: 22-46061-1
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2


_____
Signature of the Student

Student Name: NOUROZE TARANNUM ANANNYA
Student ID: 22-46062-1
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2

_____
Signature of the Student

Student Name: SEEMANTA TORAFDAR
Student ID: 21-45968-3
Contribution in Percentage (%):
Contribution in the Project:
- Contribution Description 1
- Contribution Description 2

_____
Signature of the Student

# Functional Requirements

1. **User Login**

   1.1 The software will allow users to log in with their registered email and password.

   1.2 The login credentials (email and password) will be verified against the database records.
   1.3 Upon successful login, the user will be directed to their personalized home page.
   1.4 If the login fails, the user will receive an error message indicating incorrect credentials.
   1.5 If the number of login attempts exceeds three, the system shall temporarily lock the account for one hour (optional function).

   **Priority Level**: High
   **Precondition**: User has a valid email and password.

2. **User Registration**

   2.1 The system shall allow new users to create an account by providing necessary information (name, email, password).
   2.2 The email address must be unique and verified through a confirmation link sent to the user's email.

   **Priority Level**: High
   **Precondition**: None.

3. **Route Search**

   3.1 The app shall provide a "From - To" search feature to recommend bus routes based on user input.
   3.2 The system shall display available bus routes, including stops and transfers.
   3.3 Users shall be able to filter routes based on travel time, number of transfers, and bus capacity.

   **Priority Level**: High
   **Precondition**: User is logged in.

4. **Live Bus Tracking**

4.1 The app will allow users to view real-time bus locations on a map using GPS data.
4.2 Users shall receive estimated arrival times (ETAs) for buses at their selected stops.
4.3 The system shall automatically update ETAs based on current traffic conditions.

**Priority Level**: High
**Precondition**: User has searched for a route.

5. **Bus Information**

5.1 The system shall provide detailed information about each bus, capacity, and occupancy status.
5.2 Users shall be able to tap on a bus to see additional details, including the estimated time of arrival (ETA) and current location.

**Priority Level**: Medium
**Precondition**: User has accessed bus route information.

6. **Ticket Purchase**

6.1 The app shall allow users to purchase tickets securely within the application.
6.2 Users shall have the option to pay via various digital payment methods (credit/debit cards, mobile wallets).
6.3 The system shall provide a QR code for ticket validation at the bus stop.

**Priority Level**: High
**Precondition**: User is logged in and has selected a route.

7. **Save Payment Option:**

7.1 The app will save the Payment information of the user if they allow to save the info to make the payment smoother.
7.2 It will be an one tap payment. (MFS info will be saved).

**Priority Level:** Medium
**Precondition**: user have to make at least one payment using any payment option.

8. **Live Notifications**

   8.1 The app shall send push notifications to users about their selected bus's real-time status (delays, arrivals).
   8.2 Users shall have the option to enable or disable notifications in their settings.

   **Priority Level**: Medium
   **Precondition**: User has opted in for notifications.

9. **User Profile Management**

   9.1 Users shall be able to view and edit their personal information (name, email, password, age, phone number)
   9.2 The system shall allow users to view their purchase history and current tickets.

   **Priority Level**: Medium
   **Precondition**: User is logged in.

10. **Show Ticket Info:**
    10.1 After purchasing a ticket , details of that ticket will be showed and  will be mailed to the user.
    10.2 User can download the PDF version of the ticket.

    **Priority Level**: High
    **Precondition**: User have  purchased a ticket.

11. **User Rating System for Buses**

    11.1 The app shall allow users to rate their bus experience after each journey (e.g., cleanliness, punctuality, driver behavior).
    11.2 The system shall aggregate ratings to help operators identify areas for improvement.

    **Priority Level**: Low
    **Precondition**: User has completed a trip.

12. **Accessibility Features**

12.1 The app shall include features for users with disabilities, such as voice commands and visual aids.
12.2 Information about wheelchair-accessible buses and routes shall be clearly displayed.

**Priority Level**: High
**Precondition**: None.

13. **Multi-Language Support**

13.1 The app shall provide multi-language support to accommodate users from different linguistic backgrounds.
13.2 Users shall be able to select their preferred language during registration and in settings.

**Priority Level**: Medium
**Precondition**: None.

**Role: Vehicles Owner**

## 1. Bus Owner Registration and Validation

**1.1** The system shall allow bus owners to register by entering their National ID (NID) and other necessary details.

**1.2** The system shall validate the bus owner's details through the BRTC (Bangladesh Road Transport Corporation) and NID database to ensure legitimate registration.

**Priority Level**: High
**Precondition**: None.

## 2. Bus Owner Profile Management

**2.1** The bus owner shall be able to view and manage the details of their buses, including bus numbers, routes, and schedules.

**2.2** The system shall allow the bus owner to update their personal and business information (name, business details, contact information).

**Priority Level**: Mediam
**Precondition**: Bus owner is registered and logged in.

## 3. Employee Management

**3.1** The bus owner shall be able to add employees (drivers, conductors) to their company account by providing the employee's details and assigning a password.

**3.2** The system shall allow the bus owner to update or delete employee accounts.

**3.3** The system shall allow the bus owner to change the passwords of employees, with the restriction that only the owner can change employee passwords.

**Priority Level**: High
**Precondition**: Bus owner is logged in.

## 4. Employee Ticket Verification and Bus Information

**4.1** Employees (drivers, conductors) shall be able to log in with a unique password provided by the bus owner.

**4.2** Employees shall have the option to scan passenger tickets (QR code-based) and verify the ticket for validity.

**4.3** Employees shall have access to view route details, including the current bus location and ETA, as well as the list of passengers on the bus.

**4.4** The system shall allow employees to view detailed information about passengers, such as name, contact info, and ticket validity.

**Priority Level**: High
**Precondition**: Employee is logged in.

## 5. Passenger Check-in and Check-out Verification

**5.1** The system require employees to scan a passenger's ticket when they get on the bus to validate the passenger's entry.

**5.2** The system require employees to scan a passenger's ticket again when they get off to confirm that they have completed their journey.

**5.3** If a passenger fails to check out, the system shall apply an additional charge for the unverified journey.

**Priority Level**: High
**Precondition**: Employee has scanned the ticket when a passenger get in.

## 6. Real-Time Bus Vacancy and Seat Availability

**6.1** The system shall allow the bus owner and employees to view real-time bus occupancy and available seats.

**6.2** When a passenger checks in and out, the system shall update the seat availability in real time for both the client and the bus owner apps.

**6.3** The system shall notify the bus owner and employees when the bus reaches full capacity.

**Priority Level**: High
**Precondition**: Bus is operating and has passengers.

## 7. Bus Owner Financial Overview and Reporting

**7.1** The bus owner shall be able to view financial reports, including daily earnings, ticket sales, and outstanding charges due to unverified check-outs.

**7.2** The system shall allow the bus owner to generate and export financial reports for further analysis.

**Priority Level**: Medium
**Precondition**: Bus owner is logged in.