A blue and black logo

Description automatically generated, Picture

**CSE 6224**

**SOFTWARE REQUIREMENTS ENG**

**System Requirements Specification (SRS)**

**Title:**

**Campus Ride-Sharing Platform with Parking System Integration**

**TT2L**

**GROUP E** 

**KELVEN YEE KAI WEN 1211111244**

**KOH XUAN LIN 1211109618**

**OW KA SHENG 1211108820**

**SHAZREEN BINTI SHERIDAN 243UC247P3**

**Table of Contents**

[**1.0** **Introduction** 3](#_Toc198495291)

[**1.1** **Purpose** 3](#_Toc198495292)

[**1.2** **Scope** 3](#_Toc198495293)

[**1.3** **Product Overview** 4](#_Toc198495294)

[**1.3.1** **Product Perspective** 4](#_Toc198495295)

[**1.3.2** **Product Functions** 7](#_Toc198495296)

[**1.3.3** **User Characteristics** 10](#_Toc198495297)

[**1.3.4** **Limitations** 12](#_Toc198495298)

[**1.4** **Definition** 14](#_Toc198495299)

[**2.0** **References** 15](#_Toc198495300)

[**3.0** **Requirements** 16](#_Toc198495301)

[**3.1** **Functions** 16](#_Toc198495302)

[**3.2** **Performance Requirements** 17](#_Toc198495303)

[**3.3** **Usability Requirements** 18](#_Toc198495304)

[**3.4** **Interface Requirements** 19](#_Toc198495305)

[**3.5** **Logical Database Requirements** 20](#_Toc198495306)

[**3.6** **Design Constraints** 21](#_Toc198495307)

[**3.7** **Software System Attributes** 22](#_Toc198495308)

[**3.8** **Supporting Information** 23](#_Toc198495309)

[**4.0** **Verification** 24](#_Toc198495310)

[**4.1** **Verification Approach** 24](#_Toc198495311)

[**4.2** **Verification Criteria** 25](#_Toc198495312)

[**5.0** **Appendices** 26](#_Toc198495316)

[**5.1** **Assumptions and Dependencies** 26](#_Toc198495317)

[**5.2** **Acronyms and Abbreviations** 27](#_Toc198495318)

[**5.3** **Glossary** 28](#_Toc198495319)

# **Introduction**

## **Purpose**

The purpose of this document is to outline the specific requirements needed to develop the Campus Ride-Sharing Platform with Parking System Integration, designed for use by students, staff, and faculty of Multimedia University (MMU). This platform aims to encourage eco-friendly commuting, reduce campus congestion, and optimize parking space usage by allowing verified users to share rides and view real-time parking availability.

The development team, project manager, quality assurance team, university stakeholders, and IT support personnel involved in the system's integration and deployment are the target audience for this document.

## **Scope**

The Campus Ride-Sharing Platform with Parking System shall facilitate mainly the following operations:

1. User registration and login via MMU digital ID verification.
2. Establishment and participation in ride-sharing programs for users going in comparable routes.
3. Real-time availability of parking spaces within MMU campus areas.
4. Notifications regarding ride requests, confirmations, and cancellations.
5. Ride history tracking and user feedback collection.
6. Earn and redeem carpool incentives (e.g., priority parking, vouchers).
7. Ensure safety through emergency alert features and identity verification via MMU SSO authentication.

## **Product Overview**

### **Product Perspective**

The Campus Ride-Sharing Platform with Parking System Integration is an integrated module in MMU's online environment, providing ride-sharing coordination and parking management. It connects students, faculty, and employees with university infrastructure for secure, efficient, and environmentally friendly trips.

This platform communicates with several MMU infrastructure's central components, enabling seamless data exchanges between security, transport logistics, and parking management. It communicates with the MMU SSO Authentication to ensure user entry authentication, employs the Campus Parking Database for real-time tracking, and employs a Carpool Matching Engine to process ride requests and approval. Additionally, a notification system provides the alerts on ride confirmations, parking spots, incentive notifications, and emergency alerts.

Part of MMU's overall drive for increased mobility on campus, the platform supports safe and verified ride-sharing, better use of parking space, and sustainable behavior encouragement through reward-based incentives. Fully integrated with MMU's IT infrastructure, security controls, and parking facilities management, the platform offers a convenient commuting experience in compliance with the university policy.

#### **System Interfaces**

* User authentication via MMU SSO for validated logins.
* Campus Parking Database API for live parking spot availability.
* Ride-matching engine for processing carpool requests and approvals.

#### **User Interfaces**

* Mobile UI optimized for iOS & Android with an interactive dashboard.
* Three-step workflows for ride matching, approvals, and parking lookup.
* In-app messaging & notifications to improve coordination.

#### **Hardware Interfaces**

* GPS tracking for ride location validation.
* Mobile device sensor compatibility (Wi-Fi, GPS, push notifications).
* Campus parking control integration to enforce carpool zones.

#### **Software Interfaces**

* Push notification services linked to MMU’s existing IT infrastructure.
* Database integration for user profile management, ride history, and incentive tracking.
* API-based connectivity with MMU's parking and security systems.

#### **Communications Interfaces**

* Secure HTTPS protocol for encrypted data transmissions.
* Campus-wide notification integration for ride status alerts and rewards.

#### **Memory Constraints**

* Lightweight mobile storage usage for cached ride and parking data.
* Optimized low-bandwidth transactions to reduce overhead.

#### **Operations**

* User-initiated ride matching and approval system.
* Automated ride confirmations & parking availability updates.
* Scheduled leaderboard tracking to promote high-participation incentives.

#### **Site Adaptation Requirements**

* Campus-wide maps integration displaying active parking zones.
* Compliance with MMU branding and security policies.

#### **Interfaces with Services**

* Cloud-based ride management & authentication for scalability.
* Potential third-party integrations for expanding ride networks beyond MMU.

### **Product Functions**

The Campus Ride-Sharing Platform with Parking system Integration shall provide the following primary functions:

**User Account Management:**

* FR-1: Allow users to register using their MMU credentials
* FR-2: Enable users to create and manage their profile information
* FR-3: Support user preference settings for ride matching
* FR-4: Provide account deactivation and data management options

**Ride Offering and Requesting:**

* FR-5: Allow users to offer rides by specifying origin, destination, time, and available seats
* FR-6: Enable users to request rides by specifying pickup location, destination, and time
* FR-7: Support recurring ride scheduling for regular commutes
* FR-8: Provide ride modification and cancellation capabilities

**Ride Matching and Coordination**

* FR-9: Match ride requests with available offerings based on route compatibility
* FR-10: Calculate and display estimated arrival times for riders
* FR-11: Facilitate in-app communication between drivers and passengers
* FR-12: Support multi-stop ride coordination for optimal carpooling

**Parking System Integration**

* FR-13: Display real-time parking availability across campus zones
* FR-14: Reserve priority parking spots for verified carpools
* FR-15: Provide navigation to available parking areas
* FR-16: Track historical parking usage patterns

**Safety and Security**

* FR-17: Verify user identity through MMU SSO authentication
* FR-18: Provide SOS emergency alert functionality
* FR-19: Enable ride tracking for designated emergency contacts
* FR-20: Support rider rating and review system

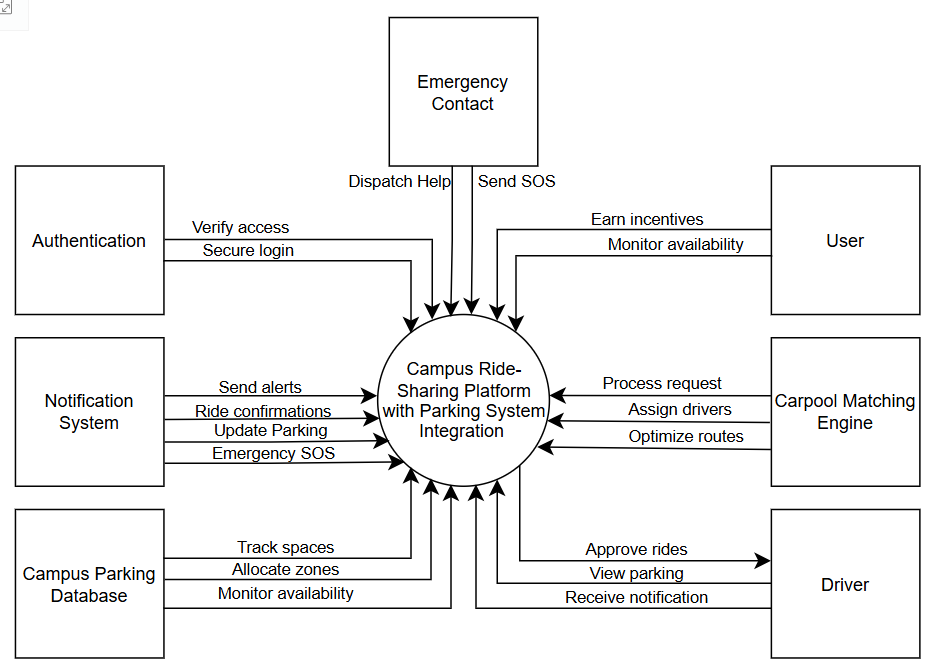
**Incentive Management**

* FR-21: Award eco-points for successful carpooling participation
* FR-22: Provide a leaderboard of top carpoolers
* FR-23: Enable redemption of rewards (parking credits, campus vouchers)
* FR-24: Track carbon emission reduction through ride sharing

**Reporting and Analytics**

* FR-25: Generate personal ride history and statistics
* FR-26: Provide system usage reports for administrators
* FR-27: Calculate environmental impact metrics
* FR-28: Support customizable data export functionality

Figure 1.0 shows the context of Campus Ride-Sharing Platform with Parking System Integration.



**Figure 1.0 Campus Ride-Sharing Platform with Parking System Integration Context Diagram**

The user initially logs in to the system and authenticates their identity using the MMU User Authentication. They can order a ride once successfully logged in, which is handled by the Carpool Matching Engine. When a match is found, the driver is notified of the ride information as well as information on available parking spaces. The system also sends out notifications, like ride confirmations and updates, through the Notification System to keep everyone informed. At the same time, the Campus Parking Database keeps track of parking spaces in real time to help with efficient allocation. Emergency Contact is available to provide quick responses in case of any emergencies to ensure safety throughout the ride.

### **User Characteristics**

The system will serve the following user groups, each with specific characteristics and expectations:

**Students**

* Primary user group representing approximately 70% of the user base
* Typically, aged 18-25 with high technological proficiency
* Have varied and sometimes irregular schedules
* Usually operate on limited budgets, making cost-sharing appealing
* Often live in clusters near campus or in designated student housing
* Primary motivation: cost savings and convenience

**Faculty**

* Representing approximately 15% of the user base
* More regular and predictable schedules aligned with class timetables
* Higher expectations for reliability and professionalism
* Often commute from more diverse locations
* Primary motivation: reduced parking stress and environmental considerations

**Staff**

* Representing approximately 15% of the user base
* Regular working hours (typically 8:00 AM - 5:00 PM)
* Consistent commuting patterns
* Primary motivation: convenience and potential for social connections

**System Administrators**

* Small group responsible for system maintenance and monitoring
* Require comprehensive understanding of all system features
* Need access to administrative functions and reports
* Technical expertise allowing for system configuration and troubleshooting
* Primary focus: system efficiency, security, and user satisfaction

**All Users**

* Must possess basic mobile device proficiency
* Require MMU digital credentials for authentication
* Need reliable internet access for real-time features
* Should understand basic navigation concepts
* Will need clear guidelines on emergency procedures

The system shall accommodate these diverse user groups by providing intuitive interfaces, clear instructions, and tailored messaging appropriate to each user's role and technical proficiency level.

### **Limitations**

The Campus Ride-Sharing Platform with Parking System Integration operates under the following constraints and limitations:

**Technical Limitations**

* The system operates only within the geographical boundaries of MMU campuses and immediate surroundings (within 10km radius).
* Real-time parking data accuracy depends on the reliability of MMU's existing parking sensors and infrastructure.
* GPS accuracy is limited to approximately 5-10 meters, which may affect precise pickup coordination.
* The platform requires internet connectivity for core functionalities; offline mode supports only limited features.
* Mobile application performance may vary across different device specifications and operating system versions.

**Operational Limitations**

* The system can support a maximum of 1,000 concurrent active ride sessions.
* Ride matching will operate only during campus operational hours plus an additional buffer of 2 hours before and after (5:00 AM - 11:00 PM).
* Emergency SOS features require campus security personnel availability, which may fluctuate.
* System maintenance windows will be scheduled weekly, during which certain features may be unavailable.
* User verification is contingent upon the reliability of MMU's SSO authentication system.

**Regulatory Limitations**

* The system does not provide commercial ride-sharing services and cannot be used for profit-generating activities.
* The platform is not a substitute for public transportation or commercial ride-hailing services.
* Insurance coverage for ride-sharing activities is not provided by the system or the university.
* Data retention policies comply with Malaysian personal data protection regulations, limiting historical data availability.
* The system does not enforce legal agreements between riders beyond the user terms and conditions.

**Business Limitations**

* Initial rollout will be limited to the main campus, with phased expansion to satellite campuses.
* The incentive system operates within the constraints of the university's allocated budget for sustainability initiatives.
* Integration with third-party services is subject to existing university contracts and procurement procedures.
* System customization capabilities are constrained by the development team's resources and timeline.
* Priority parking spot allocation is subject to availability and university parking management policies.

## **Definition**

|  |  |
| --- | --- |
| SSO | Single Sign-on authentication for users. |
| KPIs | Key Performance Indicators for tracking ride efficiency. |
| SOS | Emergency notification feature for safety alerts. |
|  |  |
|  |  |

# **References**

IEEE. (2018). *ISO/IEC/IEEE 29148:2018 Systems and software engineering—Life cycle processes— Requirements engineering.* [https://www.iso.org/standard/72089.html](https://www.iso.org/standard/72089.html%20)

*MMU Sustainability Policies*. (n.d.). Retrieved May 17, 2025, from <https://www.mmu.edu.my/wp-content/uploads/2025/01/MMU-Sustainability-Policy-new-2025.pdf>

# **Requirements**

## **Functions**

## **Performance Requirements**

## **Usability Requirements**

## **Interface Requirements**

## **Logical Database Requirements**

## **Design Constraints**

## **Software System Attributes**

## **Supporting Information**

# **Verification**

## **Verification Approach**

## **Verification Criteria**



# **Appendices**

## **Assumptions and Dependencies**

## **Acronyms and Abbreviations**

|  |  |
| --- | --- |
| SRS | System Requirements Specification |
| MMU | Multimedia University |
| ID | Identification |
| SSO | Single Sign- On |
| KPIs | Key Performance Indicators |
| SOS | Safe Operating Stop |
|  |  |

## **Glossary**