**Table of Contents**

[1.0 Introduction 1](#_Toc198858238)

[2.0 Problem Statement 1](#_Toc198858239)

[3.0 Objectives 1](#_Toc198858240)

[4.0 Scope 1](#_Toc198858241)

[5.0 Stakeholders 2](#_Toc198858242)

[5.1 Stakeholders Engagement Plan 3](#_Toc198858243)

[6.0 Assumptions 3](#_Toc198858244)

[7.0 Constraints 3](#_Toc198858245)

[7.1 Technical Constraints 3](#_Toc198858246)

[7.2 Resource Constraints 4](#_Toc198858247)

[7.3 Time Constraints 4](#_Toc198858248)

[7.4 Legal and Ethical Constraints 4](#_Toc198858249)

[8.0 Expected Outcomes 4](#_Toc198858250)

[9.0 Success Criteria 5](#_Toc198858251)

# **Introduction**

The project aims to reduce traffic congestion and illegal parking on campus. In addition, the project has launched a carpooling service to provide vehicles to students or faculty members on campus to reduce the number of vehicles on campus. This carpooling service will not only reduce the number of vehicles, but also naturally reduce air pollution.

# **Problem Statement**

|  |  |
| --- | --- |
| **Problems** | **Description** |
| Overcrowded parking lots | Less parking amount for vehicles. |
| Lack of carpool services | Not convenient for users who have no transport |
| Time wasted searching for parking | Waste time for searching parking spots. |
| Parking barrier | illegal parking in campus |

# **Objectives**

|  |  |
| --- | --- |
| **Goals** | **Description** |
| G1 | Reduce single-occupancy vehicle trips |
| G2 | Improve parking space utilization |
| G3 | Provide a digital platform for carpool matching and scheduling |
| G4 | Integrate security and verification mechanisms |

# **Scope**

This project is to develop a ride-sharing application that helps reduce parking congestion on campus by allowing students, faculty, and staff to easily coordinate carpools. It aims to promote more efficient, convenient platforms and ensure only verified university members can access the platform through digital ID verification.

**Include**

|  |  |
| --- | --- |
| **Components** | **Description** |
| User Interface | A responsive web and/or mobile application that allows users to register, log in, request carpools, and view parking information. |
| Real-Time Parking Updates | Integration with sensors or admin input to display real-time parking lot statuses. Users will be able to view available parking areas before arriving on campus. |
| University Parking System | Establish connection to the university’s parking system to allow for real-time checking and update users about parking availability |
| University Database System | Establish a connection to the university’s current database to access and update user’s profile and records of carpool |

**Exclude**

|  |  |
| --- | --- |
| **Components** | **Description** |
| Automated License Plate Recognition | Integration with ALPR systems for parking enforcement is excluded from the current scope. |
| Off-Campus Parking Management | Parking lots and policies outside the campus boundary will not be managed or displayed within the system. |
| Multi-Language Support | The system will be developed and tested in English only. The localization or internationalization features will not be supported in the initial release. |
| Third-Party Ride-Sharing Integration | Integration with external services such as Uber, Lyft, or Grab for ride coordination is not included. |

# **Stakeholders**

This section identifies the key stakeholders involved in or affected by the Campus Carpooling and Parking Integration System. Stakeholders play vital roles in shaping the requirements, validating the system, and ensuring its long-term success. They are categorized based on their level of involvement and interest in the system.

|  |  |  |
| --- | --- | --- |
| **Classification** | **Users** | **Justification** |
| Primary | Student | They seek to reduce commuting costs and access timely parking information. |
| Staff | They may use the system for organizing or request carpools and reserve parking. |
| Admin | Control users access and monitoring system activities. |
| Secondary | IT Services | Responsible for deploying, maintaining, and securing the software infrastructure. They ensure uptime, integration with campus systems, and data protection compliance. |
| Security | Their role includes ensuring that registered vehicles and users comply with campus security guidelines. They may access system data during emergencies or conflicts. |

## **5.1 Stakeholders Engagement Plan**

|  |  |  |
| --- | --- | --- |
| **Stakeholder Group** | **Engagement Method** | **Frequency** |
| Students and Staff | Online survey | Early design, ongoing |
| IT services | Technical meetings, system documentation | Development, launch |
| Security | Security briefings, role clarification | Design, deployment |
| Admin | Reports, presentation | After launch |

# **Assumptions**

This section outlines key assumptions made during the planning and requirements elicitation phase of the project. These assumptions are conditions believed to be true, though they have not been fully validated at the time of documentation.

1. The development team will have consistent access to the university’s parking system and digital ID verification service. These systems need to be up and running, with reliable APIs, we can integrate them smoothly.
2. Students and staff being open to the idea of ride-sharing and willing to use the platform as part of their regular commute.
3. The project needs a university admin to actively back the launch, promotion, and ongoing use of the platform across campus.
4. Users are expected to know how to use a mobile or web app things like logging in, navigating screens, and filling out simple content.

# **Constraints**

This section outlines the known limitations or restrictions that will affect the development, deployment, or performance of the Campus Carpooling and Parking Integration System.

## **7.1** **Technical Constraints**

|  |  |
| --- | --- |
| **Types** | **Description** |
| Integration with Legacy Systems | The system must interface with existing campus systems which may have outdated or limited APIs. |
| Data Privacy and Security Compliance | The system must comply with the university's data protection regulations, especially in handling user location, schedule, and vehicle data. |
| Platform Support | The system will be web-based and optimized for mobile browsers. |

## **7.2 Resource Constraints**

|  |  |
| --- | --- |
| **Types** | **Description** |
| Limited Budget for Hardware | The project may assume the use of simulated or manually updated parking data if real-time IoT sensors are not yet funded or deployed. |
| Manpower and Expertise | Development will be carried out by a small project team, possibly within a course or academic timeline, limiting the complexity that can be implemented. |

## **7.3 Time Constraints**

|  |  |
| --- | --- |
| **Types** | **Description** |
| Academic Semester Deadline | The system must be developed, tested, and presented within the duration of one academic semester, which affects the scope of deliverables. |

## **7.4 Legal and Ethical Constraints**

|  |  |
| --- | --- |
| **Types** | **Description** |
| Carpool Liability Exclusion | The university may not accept legal responsibility for incidents during carpools. Legal disclaimers must be included in the system. |
| User Consent Requirements | Users must explicitly consent to data usage during registration, in accordance with ethical standards. |

# **Expected Outcomes**

The project will deliver a set of tangible and usable components that reflect the core objectives of the Campus Carpooling and Parking Integration System. These deliverables represent both technical outputs and documentation that support system use, evaluation, and future maintenance.

|  |  |
| --- | --- |
| **Types** | **Description** |
| Functional Software Prototype | User registration and login |
| Carpool services and reserve parking |
| Parking availability display |
| User dashboard |
| Admin panel for managing users and parking data |
| Software Requirements Specification | Functional and non-functional requirements |
| Use cases and user stories |
| System constraints, assumptions, and scope |
| Stakeholder analysis and elicitation outcomes |
| User Interface Designs | Main user flows |
| Admin and user dashboards |
| Carpool listing and booking screens |
| Parking availability visual interface |
| System Architecture and Design Diagrams | Component architecture diagram |
| Database schema |
| Sequence diagrams and class models |
| User Manuals and Training Guide | Students or staff on how to register, request carpool, and reserve parking |
| Admins on how to update parking data, monitor usage, and manage reports |
| Test Plan and Results | Test scenarios and test cases |
| Bug reports and resolution status |
| Final Project Report | Project background and problem statement |
| Elicitation plan and survey results |
| Functional requirements and design approach |

# **Success Criteria**

This section defines the measurable outcomes that will be used to determine whether the Campus Carpooling and Parking Integration System has successfully achieved its objectives. These criteria encompass user satisfaction, technical performance, and overall impact on campus transportation efficiency.

|  |  |  |
| --- | --- | --- |
| **Success Area** | **Metric** | **Target Threshold** |
| User Satisfaction | Percentage of users reporting satisfaction with usability and reliability | More or equal to 70% of surveyed users |
| Number of active users during initial deployment | More or equal to 50 users within the first month |
| System Functionality | Accuracy of carpool request suggestions | More or equal to 90% relevance rate |
| Accuracy and timeliness of parking data | Real-time or simulated data with minimal delay |
| Performance and Reliability | System uptime during the testing phase | Up to 99% |
| Response time for login/registration | Less or equal than 3 seconds |
| Presence of critical bugs or security issues | None identified during final testing |
| System Architecture and Design Diagrams | Completion of all planned deliverables | 100% on time |
| Execution of planned stakeholder engagement activities | All sessions completed as scheduled |
| Core feature implementation based on SRS | All essential functions in MVP |