**REQUIREMENT ANALYSIS**

This section outlines the requirements needed to build the IoT-integrated tricycle booking system. It consists of functional, non-functional and system requirements.

**Functional Requirements**

*User Management:*

* Students, tricycle drivers, and administrators will have their specific roles in the system.
* Students can register, log in and update their profiles.
* Admins can approve or decline user registration requests.
* Tricycle drivers will use RFID authentication to log in.

*Booking System:*

* Students can request a ride from specified location within the campus though the app.
* Drivers confirms the ride requests in real-time, regardless whether they have reached the maximum passenger capacity (4 passenger).
* Real-time updates on driver availability.
* Students can cancel bookings before the ride starts if the driver has not confirmed it.

*IoT Integration:*

* Drivers will log in using RFID cards.
* The system will display real-time driver availability though Wi-Fi module.
* Only authenticated drivers will be allowed to receive ride requests.

*Tracking and Notifications:*

* Students can view available drivers in real time.
* Both students and driver will receive a notification when the booking is confirmed or canceled.
* Drivers will be notified as soon as new booking request is made.

*Generating Reports:*

* The system will keep records of all booking transaction and ride history.
* The administrators of the system have access to view the reports of booking transactions for monitoring.

**Non-Functional Requirements**

*Usability:*

* The system must have a user-friendly interface, making it accessible for mobile and web application.
* Students should be able to book a ride in just few simple steps or ways.
* The system must be flexible on various devices and different screen sizes.

*Performance:*

* The system must handle multiple users simultaneously without lag.
* Booking must be done quickly.

*Security:*

* The system must use strong security measures to protect user data and booking transaction.
* Students’ login information must protect with encryption to keep accounts secure.
* Drivers must use their own RFID card to verify their identity.
* All the booking records and user data must be stored safely in a database.

*Availability and Reliability:*

* The system will be available every day starting from 6:00 AM and will be close at 7:00 PM.
* IoT devices must provide a real-time update with minimal delays about bookings.

*Scalability:*

* The system must handle an increasing user of tricycle booking system.
* The backend should be flexible enough to support future enhancements and the addition of new features

System Requirements

*Hardware:*

* RFID Readers: These will verify the drivers’ RFID card before they can confirm booking requests.
* Wi-Fi Modules: These will show the available driver at the moment.
* Servers: These will store all the booking transactions and user information, which keep everything organized and easy to access when needed.
* Mobile Devices: Students will use these devices to book rides through the app.

*Software:*

* Mobile App: Available on both Android and iOS, this app will allow users to easily book rides.
* Web Dashboard: This will be used by admins and drivers to manage operations and monitor activities.
* Database: MySQL will be used to securely store user accounts and transaction history.
* Backend Development - PHP, ….
* IoT Platform - Manages RFID authentication for drivers and ensures real-time updates.