Functional Requirements

User Registration and Authentication

- The system must enable students and faculty members to register their vehicles by entering details such as their full name, university ID, vehicle model, and license plate number.
- It must automatically validate vehicle information during both entry and exit by comparing it with stored registration records.
- Vehicles not registered in the system or with mismatched information shall be denied access to the garage.

Real-Time Parking Status

- The system must receive continuous input from garage sensors to determine which parking spaces are available or occupied.
- Parking status data should be updated instantly as vehicles enter or leave.
- A dashboard must display the total count of vacant and occupied parking spaces in real time.

User and Administrator Interfaces

- A user web interface must allow registered members to:
    - View real-time garage capacity and available parking spots.
    - Request optional services such as electric-vehicle (EV) charging or car cleaning.
- An administrator web interface must allow admins to:
    - Approve and manage user vehicle registrations.
    - Monitor occupancy per zone or for the entire garage.

- Review and handle user service requests.

Service Management

- The system must record, track, and manage all EV charging and car-cleaning requests submitted by users.
- It must log each completed service with the corresponding date, time, and user ID for reference.

Activity Logging and Reporting

- All vehicle entries, exits, and service-related actions must be automatically logged by the system.
- Administrators should be able to view or export daily and monthly reports summarizing garage usage and service statistics.

Non-Functional Requirements (FURPS+ Model)

Category	Requirement
Usability	The system interfaces must be user-friendly and responsive, allowing users to locate an available parking spot in no more than three clicks.
Reliability	The system must function continuously (24/7) with at least 99% uptime, and it should recover from any sensor malfunction within five minutes.
Performance	Data from sensors must update and appear on the dashboard within two seconds.
Security	Only authenticated users and administrators may access dashboards, and all data communication must be encrypted using SSL.

Category	Requirement
Scalability (+)	The system must be capable of scaling to handle at least 500 parking spaces and support deployment across multiple campuses.