**User Requirements Document**

**Bike Rental Web Application**

### 1. Overview

This document defines the user requirements for the bike rental web application. The platform aims to deliver a seamless and efficient bike rental experience in Dublin, catering to various user groups, including casual riders, subscribers, business owners, and maintenance staff.

### 2. Goals of the Project

The primary goal of this project is to create a user-friendly and reliable bike rental system that enhances urban mobility while ensuring operational efficiency and scalability. The system should:

* Provide an intuitive interface for users to rent and return bikes with minimal effort.
* Offer secure and flexible payment options.
* Support different user roles, ensuring personalized experiences for casual riders, subscribers, business administrators, and maintenance staff.
* Enable business owners to manage rentals, monitor bike usage, and optimize fleet distribution.
* Integrate real-time tracking and maintenance features to improve service reliability and bike availability.
* Ensure a scalable and extendable architecture that can support future enhancements.

**3. User Roles & Needs**

**3.1 Casual Riders (Tourists & Occasional Users)**

* **Sign up/Login** via email, Google, or social media.
* **View available bikes** on an interactive map.
* **Reserve & unlock** bikes using QR codes or a PIN.
* **Pay easily** via credit card, PayPal, or digital wallets.
* **Track ride details** (distance, cost, duration).
* **Access customer support** for troubleshooting.

**3.2 Subscribers (Regular Users)**

* All features available to casual riders.
* **Subscription plans** for monthly/yearly rentals.
* **Discounted rates** for long-term users.
* **Ride history & usage statistics** dashboard.
* **Auto-renewal & easy cancellation** options.

**3.3 Business Owners (Administrators)**

* **Manage bike inventory** (availability, condition, location).
* **Set rental pricing & subscription plans.**
* **Monitor real-time bike usage** with GPS tracking.
* **Analyze user trends** to optimize bike distribution.
* **Handle user support requests** and process refunds.

**3.4 Maintenance Staff**

* **View maintenance alerts** for damaged/missing bikes.
* **Update bike status** (available, under repair, lost).
* **Optimize bike redistribution** to high-demand areas.
* **Access location-based task assignments.**

**4. Functional Requirements**

**4.1 User Authentication & Profiles**

* Secure **sign-up/login system** with multiple authentication methods.
* **User dashboard** displaying rental history, payments, and active bookings.
* **Profile management** (update payment details, preferences, etc.).

**4.2 Bike Rental & Availability**

* **Live map** displaying available bikes & rental stations.
* **One-click bike reservation & QR-based unlocking.**
* **Flexible rental plans** (pay-per-use, daily, weekly, subscription).
* **Automated ride tracking** with GPS and trip summaries.

**4.3 Payment & Billing System**

* **Multiple payment options** (credit card, PayPal, Apple Pay, Google Pay).
* **Automatic billing** for subscriptions.
* **Transparent pricing** with estimated trip costs.
* **Refund & cancellation policies** for flexibility.

**4.4 Safety & Security Features**

* **GPS tracking** for lost/stolen bike recovery.
* **Emergency button** for quick support in case of issues.
* **Geofencing** to enforce no-parking zones.
* **Bike locking system** to prevent unauthorized use.

**4.5 Admin & Maintenance Dashboard**

* **Real-time fleet management** with bike status updates.
* **Automated maintenance alerts** for damaged bikes.
* **Usage analytics** to track demand & optimize bike placement.
* **User feedback & issue reporting** for service improvements.

**5. Non-Functional Requirements**

**5.1 Performance & Scalability**

* The system must handle **high user traffic** and support future expansion.
* Optimized for **fast loading times** and **real-time updates.**

**5.2 Security & Compliance**

* **End-to-end encryption** for user data & transactions.
* **GDPR compliance** for data protection.
* **Regular security audits** to prevent vulnerabilities.

**5.3 User Experience (UX) & Accessibility**

* **Mobile-first design** for seamless access across devices.
* **Intuitive user interface** for effortless navigation.
* **Accessibility features** to accommodate users with disabilities.

**6. Project Feasibility**

**6.1 Timeline & Development Plan**

* **Three-month development period (Jan 27 – Apr 28)** with a **prototype demo every 3 weeks**.
* **Prioritize core features** (authentication, rentals, payments, mapping) before enhancements.
* **Development milestones:**
  + **Week 3:** Basic booking system.
  + **Week 6:** Payment integration.
  + **Week 9:** Admin dashboard & analytics.

**6.2 Potential Risks & Contingency Plans**

1. **Limited Team Capacity**
   * **Risk:** High workload could lead to burnout.
   * **Solution:** Focus on MVP features & ensure knowledge-sharing within the team.
2. **Technical Challenges**
   * **Risk:** Potential issues with database, APIs, or security.
   * **Solution:** Allocate debugging time & maintain thorough documentation.
3. **Strict Deadlines & Unexpected Delays**
   * **Risk:** Bugs or unforeseen problems affecting timelines.
   * **Solution:** Include buffer time in final weeks to resolve last-minute issues.
4. **User Testing & Feedback Implementation**
   * **Risk:** Major usability issues discovered late in development.
   * **Solution:** Conduct early-stage testing with simulated users.

**7. Future Enhancements**

* **Loyalty rewards** for frequent riders.
* **Referral system** to encourage user growth.
* **Integration with public transport schedules.**
* **E-bike & scooter support** for broader mobility options.
* **AI-driven demand prediction** to optimize bike distribution.