**Test Plan:   
Airline Reservation and Management System**

**1. Introduction**

**Objective:**  
To ensure the airline application functions correctly across all components, including web, mobile, backend services, and third-party integrations.

**Scope:**  
Covers functional, integration, UI/UX, security, performance, and regression testing of the entire application.

**Out of Scope:**  
Hardware testing of airline kiosks, airline operations unrelated to the app (e.g., baggage handling systems).

**2. Test Objectives**

* Verify flight search, booking, and payment functionalities.
* Ensure accurate user registration and authentication.
* Validate check-in, boarding pass generation, and seat selection.
* Test integrations with third-party services like payment gateways and SMS/email APIs.
* Ensure secure data handling and compliance (e.g., GDPR, PCI-DSS).

**3. Test Components & Features**

**3.1. User Management**

* Registration/Login (email, phone, social login)
* Profile management
* Loyalty program (frequent flyer points, status tiers)
* Password reset and security questions

**3.2. Flight Search and Booking**

* Search flights by date, destination, flexible dates
* Filter by airline, fare class, duration, stops
* Booking flow (one-way, round-trip, multi-city)
* Add-ons (baggage, meals, insurance, seat selection)

**3.3. Payment Gateway**

* Credit/debit cards, net banking, wallets, UPI
* Currency handling (multi-currency support)
* 3D Secure and OTP handling
* Payment failure/retry scenarios
* Refund and cancellation workflows

**3.4. Ticketing and Confirmation**

* E-ticket generation
* PDF download, email, SMS confirmation
* PNR creation and retrieval

**3.5. Check-in Module**

* Online check-in window logic (e.g., 24 hrs before departure)
* Seat selection
* Boarding pass generation (PDF/QR)
* Special requests (wheelchair, child assistance)

**3.6. Flight Schedule and Status**

* Real-time flight status
* Delay, cancellation, and rescheduling notifications

**3.7. Notifications and Communication**

* Email and SMS alerts
* Push notifications (for mobile)
* Language/localization support

**3.8. Admin and Backend**

* Flight and fare management
* Reporting/dashboard (sales, occupancy)
* Customer support interface
* User access control and roles

**4. Types of Testing**

**4.1. Functional Testing**

* Module-by-module verification
* Boundary values, valid/invalid inputs

**4.2. Integration Testing**

* Payment gateway
* Email/SMS services
* Airline inventory systems

**4.3. UI/UX Testing**

* Responsive design (mobile, tablet, desktop)
* Accessibility (WCAG compliance)
* Navigation consistency

**4.4. Performance Testing**

* Load testing during peak booking times
* Stress testing for backend
* API response time monitoring

**4.5. Security Testing**

* SQL injection, XSS
* Authentication and authorization
* Data encryption (at rest, in transit)

**4.6. Regression Testing**

* Automated suite after every release
* Focus on core booking, payment, and check-in flows

**4.7. Usability Testing**

* Customer journey feedback
* Ease of use, error handling clarity

**5. Test Environment Setup**

* Web browsers (Chrome, Firefox, Safari, Edge)
* Mobile devices (iOS/Android, major versions)
* Backend test environment with simulated airline inventory
* Mock services for payments, email, SMS

**6. Test Data Requirements**

* Valid and invalid user credentials
* Multiple flight scenarios (fully booked, delayed, etc.)
* Payment test cards (success, failure, fraud)

**7. Tools and Automation**

* Test Management: Jira, TestRail
* Automation: Selenium, Appium, Postman (API), Cypress
* CI/CD: Jenkins, GitHub Actions
* Performance: JMeter, LoadRunner
* Security: OWASP ZAP, Burp Suite

**8. Risk & Mitigation**

| Risk | Impact | Mitigation |
| --- | --- | --- |
| Payment gateway downtime | High | Implement retry and fallback |
| Flight schedule API failure | High | Cache schedules, alerting |
| Test data pollution | Medium | Automated cleanup scripts |

**9. Deliverables**

* Test plan document
* Test cases with traceability
* Test execution reports
* Defect reports and metrics
* Final sign-off

**10. Schedule**

| Phase | Duration |
| --- | --- |
| Test Planning | 1 week |
| Test Case Design | 2 weeks |
| Test Execution | 4 weeks |
| Regression & Closure | 1 week |