

## Legend

**Red - Previous Requirements**

**Yellow - After Refinement of the requirements**

## 4.2 Business Operation Requirements

This section defines the Business Operations Requirements (Biz Ops) for the EduFlow Staff Scheduling Mobile App. Biz Ops requirements describe the primary business purpose of the system, the organisational responsibilities involved in its use, and the operational rules under which the system is expected to operate. These requirements are expressed at an abstract level and avoid implementation detail.

Each Biz Ops requirement is explicitly linked to either a Level 0 or Level 1 node in the Requirements Tree to ensure traceability between business intent and system realisation

### 4.1 L0 - Mobile Device Platform

#### **REQ-BIZ-L0-01: Mobile Device Platform Operation (Essential)**

The system shall operate on commercial off-the-shelf Android and iOS mobile devices as the primary operational platform for scheduling and attendance-related activities

##### **Constraints:**

- System usage is limited to academic scheduling and attendance operations
- Access is restricted to authorised users

##### **Assumptions:**

- Users possess compatible Android or iOS smartphones
- Users are able to install and operate mobile applications

##### **Regulations:**

- Personal Data Protection Act (PDPA)

#### **REQ-BIZ-L0-01: Cross-Platform Support (Essential)**

The system must be delivered as a native mobile application compatible with both Android (Version 12+) and iOS (Version 15+).

##### **Constraint:**

- The application must maintain a consistent feature set across both operating systems.

##### **Assumption:**

- Target devices have active internet connectivity and meet the minimum hardware specifications for the supported OS versions.

#### **REQ-BIZ-L0-02: Functional Scope (Essential)**

The system shall provide dedicated modules for academic scheduling and attendance tracking.

**Constraint:**

- Usage of these modules must be restricted to users authenticated via provided email and password.

**Assumptions:**

- Accurate academic timetables and student enrollment lists are available via the institution's backend database API.
- The institution has a predefined registry of "Authorized Users" (Staff/Student) to map permissions correctly.

**Regulations:**

- Personal Data Protection Act (PDPA)

**REQ-BIZ-L0-02: Mobile Attendance Interaction (Essential)**

The system shall support attendance interactions through the mobile platform during scheduled teaching sessions

**Constraints:**

- Attendance interactions occur only during authorised teaching sessions
- Attendance interactions are limited to institutional use

**Assumptions:**

- Teaching staff are able to present attendance taking methods (e.g. QR codes) via institutional display methods (e.g. projectors)
- Students possess mobile devices capable of participating in attendance taking interactions

**Regulations:**

N/A

**REQ-BIZ-L0-03: Attendance Capture (Essential)**

The mobile application must enable students to record attendance by scanning a system-generated QR code which will be provided by the teachers.

**Constraint:**

- Attendance recording shall only be active during the window of a scheduled session as defined by the Institutional Timetable.

**Assumptions:**

- Teaching venues are equipped with functional display hardware (projectors/screens) to show the capture method.
- The mobile device's camera is functional and permitted to access the application for scanning.

**Regulations:**

N/A

## **4.2 L1 - Application Components**

### **REQ-BIZ-L1-01: Entry Representation (Essential)**

The system shall present a visible application entry point on the mobile device that allows users to launch the application

### **REQ-BIZ-L1-02: User Authentication (Essential)**

The system shall present an authentication interface to users prior to granting access to system functions

### **REQ-BIZ-L1-03: Scheduling and Timetable Presentation (Essential)**

The system shall present scheduling and timetable information relevant to the authenticated user.

### **REQ-BIZ-L1-04: Attendance Interaction Interface (Essential)**

The system shall present an interface that allows authorised users to initiate and conduct attendance interactions during scheduled sessions.

### **REQ-BIZ-L1-05: Attendance Information Display (Essential)**

The system shall present attendance-related information to users for viewing and reference purposes.

### **REQ-BIZ-L1-05: Attendance Record Display (Essential)**

The system shall display attendance records relevant to the authenticated user.

## 5 Technical Requirements

This section defines the Technical Requirements for the EduFlow Staff Scheduling Mobile App. These requirements specify the technical configuration, platform compatibility, software environment, security management, and operational characteristics necessary to implement and support the system. The requirements are defined within the boundary established by the Level 0 and Level 1 nodes of the Requirements Tree.

### 5.1 L0 - Mobile Device Platform

#### **REQ-TCR-L0-01: Mobile Operating System Compatibility (Essential)**

The system shall be compatible with commercial off-the-shelf Android and iOS operating systems.

##### **Constraints:**

- Support is limited to mobile operating systems officially supported by device manufacturers.

##### **Assumptions:**

- Users operate devices running supported Android or iOS versions.

#### **REQ-TCR-L0-02: Cross-Platform Application Framework (Essential)**

The system shall be implemented using a development framework or approach that supports deployment to both Android and iOS platforms.

##### **Constraints:**

- Platform-specific implementations shall not prevent functional parity across supported platforms.

##### **Assumptions:**

- A single development approach can be adopted to support both platforms.

#### **REQ-TCR-L0-03: Programming Language and Tooling (Essential)**

The system shall be developed using industry-supported programming languages and development tools suitable for mobile application development.

##### **Constraints:**

- Unsupported or deprecated languages and tools shall not be used.

##### **Assumptions:**

- Development tools selected are compatible with the institution's IT environment.

#### **REQ-TCR-L0-03: Programming Language and Tooling (Essential)**

The system must be developed using Swift 5.0+ (iOS) and Kotlin 1.9+ (Android). All development must utilize the current stable versions of Xcode and Android Studio.

##### **Constraint:**

- Third-party libraries with "Deprecated" status in official documentation shall not be included in the production build.

##### **Assumptions:**

- The institution's IT environment provides the necessary network permissions to access official Apple Developer and Google Play Console endpoints and allows the installation of IDE-specific SDKs.

**REQ-TCR-L0-04: Hosting and Server Environment (Essential)**

The system shall rely on an institution-managed or vendor-managed server environment to support application services and data storage.

**Constraints:**

- Hosting solutions must be compatible with the institution's existing IT infrastructure.

**Assumptions:**

- Server and network infrastructure are provisioned outside the project scope.

**REQ-TCR-L0-05: Data Security Management (Essential)**

The system shall implement technical measures to protect personal and attendance-related data during storage and transmission.

**Constraints:**

- Security controls must be applied consistently across mobile and server components.

**Assumptions:**

- Users access the system through trusted personal or institutional devices.

**Regulations:**

- Personal Data Protection Act (PDPA)

**REQ-TCR-L0-06: Browser and Device Constraints (Acceptable)**

The system shall not require browser-based access and shall be optimised for mobile device usage only.

**Constraints:**

- Desktop or browser-only access is outside the system scope.

**Assumptions:**

- Mobile devices are the primary access method for users.

**REQ-TCR-L0-07: Documentation Availability (Acceptable)**

The system shall be supported by appropriate technical and user documentation to facilitate deployment, operation, and maintenance.

**Constraints:**

- Documentation scope is limited to system usage, configuration, and maintenance guidance.

**Assumptions:**

- Documentation is intended for institutional IT staff and end users.

**REQ-TCR-L0-07: Technical Documentation (Essential)**

The system must be delivered with a Technical Maintenance Manual including API specifications, database schemas, and deployment configurations.

**Constraint:**

- Documentation must be provided in a machine-readable format (e.g., Markdown or PDF).

**Assumption:**

- Institutional IT staff possess the necessary technical skills to interpret standard architectural diagrams.

**REQ-TCR-L0-08: User Documentation (Desirable)**

The system shall include a User Guide covering core application workflows and troubleshooting steps.

**Constraint:**

- The guide must be accessible directly within the application via a "Help" or "FAQ" section.

**Assumption:**

- The users possess basic mobile device proficiency (e.g., navigating menus, using touch gestures).
- The primary language of the user base is English.

## **5.2 L1 - Application Components**

### **REQ-TCR-L1-01: Authentication and Access Control Mechanism (Essential)**

The system shall implement technical mechanisms to enforce authenticated and authorised access to application components.

### **REQ-TCR-L1-02: QR-Based Attendance Support (Essential)**

The system shall support technical generation of attendance taking methods, such as QR codes, for use during scheduled sessions.

### **REQ-TCR-L1-03: Performance Expectations (Desirable)**

The system shall be designed to provide response times of less than 3 seconds for common user interactions under normal operating conditions

### **REQ-TCR-L1-04: Session Continuity (Desirable)**

The system shall maintain user sessions for a minimum of 8 hours without requiring re-authentication, and shall preserve unsaved attendance data for up to 15 minutes in the event of temporary network disconnection, allowing users to complete interactions without data loss.

### **REQ-TCR-L1-04: Session Duration Management (Desirable)**

The system shall maintain an authenticated user session for a minimum of 8 continuous hours without requiring re-authentication.

### **REQ-TCR-L1-05: Offline Data Preservation (Desirable)**

The system shall preserve unsaved attendance data for up to 15 minutes during temporary network disconnection.

### **REQ-TCR-L1-06: Maintainability and Update Support (Acceptable)**

The system shall support maintenance activities, including updates and defect resolution, without disrupting core application usage.