# 🎯 \*\*PHASE 1: Backend Setup & API Integration\*\* (Week 1-2)

### 1. \*\*Netlify Functions Development\*\*

Create serverless functions in `netlify/functions/`:

```bash

📁 netlify/functions/

├── auth.mts *# Authentication endpoints*

├── bundles.mts *# Bundle management*

├── notifications.mts *# Push notifications*

├── quality.mts *# Quality control*

├── production.mts *# Production stats*

├── google-sheets.mts *# Google Sheets integration*

└── wage-calculation.mts *# Wage calculations*

```

**\*\*Priority APIs to implement:\*\***

- **\*\*Authentication\*\***: Login/logout for 50+ operators

- **\*\*Bundle Management\*\***: CRUD operations for work bundles

- **\*\*Real-time Updates\*\***: WebSocket connections for live updates

- **\*\*Google Sheets Sync\*\***: WIP data import from production sheets

### 2. \*\*Firebase Collections Setup\*\*

Structure your Firestore database:

```javascript

*// Firestore Collections Structure*

📁 Firestore Database:

├── operators/ # 50+ operator profiles

├── bundles/ # Work bundles with flexible sizing

├── notifications/ # Real-time notifications

├── quality\_issues/ # Defect tracking

├── production\_stats/ # Daily/weekly/monthly stats

├── wage\_records/ # Earnings tracking

└── size\_configs/ # Size configuration mappings

```

### 3. \*\*Google Sheets Integration\*\*

- Set up Google Sheets API

- Create WIP data parser for your specific sheet format

- Implement auto-sync every 15-30 minutes

- Handle LOT numbers with multiple articles (2233+2288+2211)

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## 🎯 \*\*PHASE 2: Core Features Implementation\*\* (Week 3-4)

### 4. \*\*Work Flow Management\*\*

- **\*\*Bundle Creation\*\***: From WIP data with flexible sizes

- **\*\*Work Assignment\*\***: Supervisor → Operator delegation

- **\*\*Real-time Handoffs\*\***: Bundle → Next Station

- **\*\*Progress Tracking\*\***: Live completion percentages

### 5. \*\*Quality Control System\*\*

- **\*\*Defect Categories\*\***: Fabric, stitching, size/color issues

- **\*\*Quality Reporting\*\***: Operator → Supervisor workflow

- **\*\*Rework Management\*\***: Failed bundles re-assignment

- **\*\*Quality Metrics\*\***: Daily/weekly quality scores

### 6. \*\*Notification System\*\*

- **\*\*Push Notifications\*\***: Work assignments, quality alerts

- **\*\*Real-time Updates\*\***: Bundle status changes

- **\*\*Efficiency Alerts\*\***: Idle stations, bottlenecks

- **\*\*Achievement Notifications\*\***: Target completions

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## 🎯 \*\*PHASE 3: Advanced Features\*\* (Week 5-6)

### 7. \*\*Line Balancing & Efficiency\*\*

- **\*\*Real-time Monitoring\*\***: All 50 operators simultaneously

- **\*\*Bottleneck Detection\*\***: Identify slow stations

- **\*\*Work Optimization\*\***: Suggest next best assignments

- **\*\*Efficiency Scoring\*\***: Individual and team metrics

### 8. \*\*Wage Calculation System\*\*

- **\*\*Daily Earnings\*\***: Real-time piece-rate calculations

- **\*\*Monthly Reports\*\***: Auto-generated payslips

- **\*\*Overtime Tracking\*\***: Beyond standard hours

- **\*\*Bonus Calculations\*\***: Quality and efficiency bonuses

### 9. \*\*Production Analytics\*\*

- **\*\*Dashboard Widgets\*\***: Live production metrics

- **\*\*Historical Trends\*\***: Week/month/year comparisons

- **\*\*Export Reports\*\***: CSV/PDF for management

- **\*\*Performance Rankings\*\***: Top performers tracking

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## 🎯 \*\*PHASE 4: Mobile Optimization & PWA\*\* (Week 7)

### 10. \*\*Mobile Experience\*\*

- **\*\*Touch Optimization\*\***: Large buttons for production floor

- **\*\*Offline Functionality\*\***: Work without internet

- **\*\*Background Sync\*\***: Auto-upload when reconnected

- **\*\*App Installation\*\***: PWA install prompts

### 11. \*\*Device-Specific Features\*\*

- **\*\*Operator Phones\*\***: Work completion, quality reports

- **\*\*Supervisor Tablets\*\***: Line monitoring, work assignment

- **\*\*Management Dashboards\*\***: Production overview, analytics

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## 🎯 \*\*PHASE 5: Testing & Deployment\*\* (Week 8)

### 12. \*\*Testing Strategy\*\*

- **\*\*Unit Tests\*\***: Component functionality

- **\*\*Integration Tests\*\***: API endpoints

- **\*\*User Testing\*\***: With actual operators

- **\*\*Performance Testing\*\***: 50+ concurrent users

### 13. \*\*Production Deployment\*\*

- **\*\*Netlify Deployment\*\***: Automatic CI/CD

- **\*\*Firebase Rules\*\***: Security configuration

- **\*\*Domain Setup\*\***: Custom domain configuration

- **\*\*SSL & Security\*\***: HTTPS enforcement

## **Development Phases**

### **Phase 1: Core Foundation (Week 1-2)**

**Priority: Build the essential working system**

**1.1 Basic Setup & Authentication**

* React PWA project setup with Tailwind CSS
* Firebase configuration and basic authentication
* Nepali/English language context setup
* Basic operator login system
* Mobile-responsive layout foundation

**1.2 Essential Data Models**

* Bundle structure and management
* Operator profiles and roles
* Basic notification system
* Local storage for offline capability

### **Phase 2: Operator Interface (Week 3-4)**

**Priority: Get operators working on the system**

**2.1 Operator Dashboard**

* Current work display
* Work queue visibility
* Daily statistics
* Basic work completion flow

**2.2 Work Management**

* Work assignment acceptance
* Work completion with piece counting
* Quality issue reporting
* Real-time handoff between operators

### **Phase 3: Supervisor Features (Week 5-6)**

**Priority: Enable line management**

**3.1 Supervisor Dashboard**

* Real-time line monitoring
* Work assignment interface
* Line efficiency tracking
* Bundle tracking system

**3.2 Analytics & Optimization**

* Basic production analytics
* Efficiency opportunity alerts
* Work load balancing tools

### **Phase 4: Advanced Features (Week 7-8)**

**Priority: Complete the core system**

**4.1 Management Dashboard**

* Production overview
* Monthly wage calculations
* Advanced analytics
* System administration

**4.2 Integration & Polish**

* Google Sheets WIP integration
* Chrome push notifications
* Offline synchronization
* Performance optimization

### **Phase 5: Enhancements (Week 9-10)**

**Priority: Add requested features**

**5.1 Self-Service Features**

* Operator self-assignment system
* Operation dropdown selections
* Self-completion declarations

**5.2 Localization Complete**

* Bikram Sambat calendar integration
* Complete Nepali date/time system
* Advanced language features