**PRODUCTION**

**COST**

**CALCULATOR**

**Software Requirements Specification (SRS)**

**Project:** Production Cost Calculator  
**Version:** 1.0  
**Prepared By:** Danishan Farookh  
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**Tech Stack:**

* **UI:** Next.js (.js / .jsx)
* **Styling:** CSS Modules (.module.css / .css)
* **Backend:** Node.js + Express.js
* **Database:** MySQL
* **Authentication:** JWT

**1. Introduction**

**1.1 Purpose**

The Production Cost Calculator is a web-based application designed to enable manufacturers to **accurately calculate the cost of production** per batch and per unit, incorporating raw materials, labor, machine usage, overheads, wastage, packaging, transportation, and profit margins. The system will generate **reports, dashboards, historical comparisons, and scenario simulations** to support pricing and strategic decision-making.

**1.2 Scope**

* Web-based platform for manufacturers.
* Core modules: Product Management, Material Management, Labor, Machines, Overheads, Batch Cost Calculation, Reports, Dashboards, Scenario Simulation, User Management.
* Secure JWT-based authentication and role-based access.
* Exportable reports in PDF/Excel format.
* Scalable for future integration with ERP/inventory, mobile app, AI cost prediction, multi-currency, and tax calculations.

**1.3 Definitions, Acronyms, and Abbreviations**

* **FR:** Functional Requirement
* **NFR:** Non-Functional Requirement
* **ERP:** Enterprise Resource Planning
* **MVP:** Minimum Viable Product
* **JWT:** JSON Web Token

**2. Overall Description**

**2.1 Product Perspective**

This system is a **standalone web application** with a **modular architecture**. All data is stored in a relational database (MySQL) to facilitate batch-wise calculations and historical comparisons. Future scalability is considered for AI cost predictions, mobile app integration, and ERP connectivity.

**2.2 Product Functions**

1. User authentication and role-based access.
2. Product and raw material management.
3. Labor, machine, and overhead input and calculations.
4. Batch cost calculation (total cost, unit cost, break-even).
5. Profit margin application and selling price suggestion.
6. Scenario simulation (“what-if” analysis).
7. Reports, dashboards, and export functionality.
8. Historical tracking and comparison between batches/products.

**2.3 User Classes and Characteristics**

|  |  |  |
| --- | --- | --- |
| User Role | Access Level | Responsibilities |
| Admin | Full | Manage users, configure system, manage all modules |
| Production Manager | Medium | Create batches, input costs, view reports, dashboards |
| Accountant / Finance | Medium | Access reports, approve costs |
| Staff / Operator | Limited | Input batch data, view limited dashboards |

**2.4 Operating Environment**

* Web browsers: Latest Chrome, Edge, Firefox, Safari.
* Backend: Node.js + Express.js.
* Database: MySQL.

**2.5 Design and Implementation Constraints**

* Must support 50+ concurrent users.
* All sensitive data encrypted.
* Database must handle 100,000+ batch records efficiently.
* Modular architecture to allow future enhancements.

**3. Functional Requirements (FRs)**

**3.1 User Management**

* **FR1:** User registration, login, logout (JWT-based).
* **FR2:** Role-based access: Admin, Production Manager, Accountant, Staff.
* **FR3:** Admin can add/edit/delete users.
* **FR4:** Password reset functionality.
* **FR5:** JWT token refresh and expiration handling.

**3.2 Product Management**

* **FR6:** Add/Edit/Delete products: name, SKU, batch size, description.
* **FR7:** Support multiple batch sizes per product.
* **FR8:** Search/filter products by name, SKU.
* **FR9:** Product list pagination and sorting.

**3.3 Raw Material Management**

* **FR10:** Add/Edit/Delete raw materials: name, unit price, unit type, vendor, stock quantity.
* **FR11:** Auto-calculate total material cost = quantity × unit price.
* **FR12:** Save frequently used materials for reuse.
* **FR13:** Search/filter raw materials.
* **FR14:** Track stock quantity and alert when low.

**3.4 Vendor Management**

* **FR15:** Add/Edit/Delete vendors: name, contact, email, address.
* **FR16:** Link vendors to materials for cost tracking.

**3.5 Labor Management**

* **FR17:** Add/Edit/Delete labor entries: direct/indirect, rate per hour, overtime rate.
* **FR18:** Input hours worked per batch.
* **FR19:** Auto-calculate total labor cost.
* **FR20:** Filter labor entries by type, name, or rate.

**3.6 Machine & Utility Management**

* **FR21:** Add/Edit/Delete machines: name, cost per hour, maintenance cost.
* **FR22:** Input machine hours per batch.
* **FR23:** Add utility costs (electricity, water).
* **FR24:** Auto-calculate total machine + utility cost per batch.

**3.7 Overhead Management**

* **FR25:** Add/Edit/Delete overheads: name, type (fixed/percentage), value.
* **FR26:** Apply overheads to batches automatically.
* **FR27:** Track monthly/annual overhead totals.

**3.8 Wastage / Scrap Handling**

* **FR28:** Input material wastage percentage per batch.
* **FR29:** Auto-adjust material cost based on wastage.
* **FR30:** Input scrap resale value to reduce net batch cost.

**3.9 Packaging & Transportation**

* **FR31:** Input packaging cost per unit/batch.
* **FR32:** Input transportation/logistics cost.
* **FR33:** Auto-add to total batch cost.

**3.10 Profit Margin**

* **FR34:** Apply profit margin (percentage or fixed).
* **FR35:** Suggest selling price automatically.
* **FR36:** Show profit per unit and per batch.

**3.11 Batch Management**

* **FR37:** Create production batches with all cost components.
* **FR38:** Auto-calculate total batch cost, unit cost, break-even quantity.
* **FR39:** Edit/Delete batch entries.
* **FR40:** Search/filter batch by product, date, cost.

**3.12 Reports & Dashboards**

* **FR41:** Generate cost breakdown charts: material %, labor %, overhead %.
* **FR42:** Batch-wise, monthly, yearly cost comparison.
* **FR43:** Export reports to PDF/Excel.
* **FR44:** Dashboard KPIs: total cost, cost per unit, profit margin, break-even points.
* **FR45:** Interactive charts with drill-down capability.

**3.13 Scenario / “What-If” Simulation**

* **FR46:** Simulate cost changes (e.g., raw material price increase).
* **FR47:** Auto-recalculate total and unit costs dynamically.
* **FR48:** Compare scenarios side by side.

**3.14 History & Database Management**

* **FR49:** Save past batch calculations with timestamps.
* **FR50:** Compare multiple products/batches.
* **FR51:** Versioning of calculations for audit purposes.

**3.15 Search & Filters**

* **FR52:** Global search across products, batches, raw materials, vendors.
* **FR53:** Advanced filters by date, cost range, product, batch size, vendor, labor type.

**3.16 Notifications & Alerts**

* **FR54:** Alert when raw material stock is low.
* **FR55:** Notify when batch cost exceeds threshold/budget.

**3.17 Security & Compliance**

* **FR56:** Role-based access control.
* **FR57:** JWT authentication with refresh/expiration.
* **FR58:** Audit trail of all CRUD operations.
* **FR59:** Data encryption for financial data.

**3.18 Export & Integration**

* **FR60:** Export batch reports to PDF/Excel.
* **FR61:** Optional future integration with ERP/inventory systems via API.

**4. Non-Functional Requirements (NFRs)**

1. **Performance:** Calculations <2 seconds, reports <5 seconds.
2. **Reliability:** Uptime 99.5%, transaction-safe batch calculations.
3. **Security:** HTTPS/SSL, encrypted storage, audit trails.
4. **Usability:** Intuitive UI, real-time validation, responsive design.
5. **Maintainability:** Modular architecture, automated backups.
6. **Extensibility:** Support future AI cost prediction, mobile app, multi-currency, tax integration.
7. **Compatibility:** Latest browsers (Chrome, Edge, Firefox, Safari).

**5. External Interfaces**

* **UI:** Next.js + CSS Modules for input forms, dashboards, charts.
* **Backend:** Node.js + Express.js REST API.
* **Database:** MySQL (normalized tables for products, batches, materials, labor, machines, overheads).
* **Authentication:** JWT-secured API endpoints.
* **Export:** PDF/Excel using libraries (SheetJS, jsPDF).

**6. Assumptions & Dependencies**

* Accurate user input for materials, labor, machine hours.
* Stable internet connection for web app.
* Future ERP or inventory integrations depend on client’s system compatibility.