Chemical Inventory Management System - Requirements Document

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# 1. Introduction

## a. Purpose

This document outlines the software design requirements for a chemical inventory system developed for MassBay Community College STEM Laboratory. The system is designed to manage chemical entries, track hazard information, support SDS sheet integration, and enhance laboratory safety through features like barcode scanning and lifecycle tracking.

## b. Scope

The system provides an interface for managing a dynamic database of chemical containers, including their storage location, hazard classification, manufacturer/vendor, and SDS access. It supports both barcode scanning and manual entry of chemicals, provides lifecycle and safety tracking, and allows for administrative functions and audit logging.

## c. Definitions & Acronyms

- SDS: Safety Data Sheet

- CAS: Chemical Abstracts Service registry number

- GHS: Globally Harmonized System

- UI: User Interface

- CSV: Comma-Separated Values

# 2. Overall Description

## a. User Needs

- Lab managers and staff need a system to easily input, search, and manage chemicals.

- Users must be able to retrieve SDS documents quickly.

- Safety features such as hazard visibility, low-stock warnings, and expiration alerts are critical.

- Administrative staff must manage users and audit system activity.

## b. System Features

### i. System Setup

- Login system with username/password

- File structure includes SDS, chemical entries, locations, and user profiles

### ii. UI Design

- Sidebar navigation with icons (Search, Add Chemical, Locations, SDS Files, Order Requests, Admin)

- 16:9 layout optimized for desktop view

- Buttons for scan, logout, and add new chemical on each page header

- Modular layout with consistent component positioning

### iii. Advanced UI Features (Highlighted: Feature Expansion)

- Chemical Lifecycle Tracking (Added → In Use → Disposed)

- Low Inventory / Expiry / Hazard Alerts

- Scan to Add via Camera / Barcode Reader

### iv. Admin Interface

- User Management (add/edit/disable roles)

- Audit Log: track user actions with timestamp and affected items

# 3. Data

## a. Input & Output

- Input: Manual entry forms, barcode scanner, SDS uploads

- Output: Table views, export to Excel/CSV, SDS document views

## b. Storage & Session Management

- Persistent database (e.g., MySQL or SQLite)

- Session-based state management for UI transitions and temporary user data

# 4. Usability

## a. UI Elements

- Button controls: Add, Edit, Delete, Move Location, Download SDS

- Form inputs: Chemical name, CAS, vendor, location, hazard tags, purchase date

- Table views with column filters and sortable headers

## b. UI Considerations

- Responsive layout targeting widescreen monitors (16:9)

- Sidebar menu always visible for quick access

- Icons used consistently for each function

## c. Error Prevention & User Guidance

- Required field validation on form submission

- Warning prompts before destructive actions

- Tooltip hints for complex fields

# 5. Reliability & Availability

## a. Error Handling & Feedback

- Error prompts for invalid or missing form data

- Visual feedback on successful/failed actions

## b. Data Retention & Backup

- Regular backup to downloadable formats

- SDS files stored with consistent naming and metadata

# 6. Technology Requirements

## a. Assumptions & Dependencies

- Java 21+, JavaFX for UI implementation

- Apache POI for Excel export

- Integration with camera for QR/Barcode scanning

- Modern browser for testing

# 7. Performance

## a. Speed & Responsiveness

- Table interactions complete in <1s

- Navigation between modules is instant

## b. Compatibility & Optimization

- Optimized for desktop use

- Consistent rendering on Chrome, Edge, Firefox