



SECJ2203: Software Engineering

System Documentation (SD)

**QMS-Flow - Integrated Quality Management System for
Avialite Sdn. Bhd.**

Version 2.0

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Faculty of Computing

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Revision Page

a. Overview

This system documentation covers the introduction, system requirements, personas, system features, launch phase, user story details, performance and design constraints.

b. Target Audience

Avialite management, auditors, engineers and course instructors.

c. Project Team Members

Member Name	Role	Task	Status
Rasyid	Team Leader/Analyst	System Features and Launch Phase	Complete
Rafiq	Project Manager	Performance & Design Cons	Complete
Hazim	QA Engineer	Introduction	Complete
Afiq Shahir	Developer	User Story	Complete
Afiq Irfan	Developer	Persona	Complete

d. Version Control History

Version	Primary Author(s)	Description of Version	Date Completed
1.0	Muhammad Abdul Rasyid Bin Murad	Completed Chapter 1 & 2, Section 02	07/12/2025
2.0	Muhammad Afiq Irfan bin Zuraimi		4/1/2026

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1. Introduction

1.1 Purpose

This System Documentation (SD) / Software Requirements Specification (SRS) describes the functional and non-functional requirements, scope, interfaces, and constraints for **QMS-Flow, an Integrated Quality Management System** tailored for Avialite Sdn. Bhd. The purpose of this document is to provide a single, authoritative reference for stakeholders (Avialite management, engineers, and auditors), the development team (Tech TiTan), and course instructors to ensure that the system design and implementation satisfy the agreed requirements and meet ISO 9001:2015 compliance needs. Key deliverables defined by this document include the functional requirement set, user personas, use cases, performance and security requirements, and launch/sprint planning.

1.2 Scope

The QMS-Flow software product will be a web-based, centralized quality management platform that replaces manual and fragmented QMS processes at Avialite Sdn. Bhd. The system will:

- Provide centralized **Document Control** with versioning, metadata, approval workflows, and audit trails.
- Provide a **Traceability** capability linking customer complaints, CAPA records, training logs, and equipment calibration history.
- Support **CAPA (Corrective and Preventive Action)** lifecycle: create, assign, track, verify, and close CAPAs.
- Provide **Audit Management** tools: schedule audits, record findings, link findings to CAPAs, and track follow-ups.
- Manage **Training Records** and training assignments with completion tracking and linkage to CAPA or competence requirements.
- Manage **Equipment** registry and calibration schedules with alerts and history.

- Offer **Dashboards & KPI Reporting** for management oversight (CAPA closure rate, audit completion, training compliance, calibration status). Out of scope (initial release): full ERP/production control, manufacturing process automation, and third-party QMS vendor integrations beyond basic import/export (CSV/PDF) for legacy compatibility. The system is designed to integrate with Avialite's existing on-premise environment and preserve legacy workflows where possible to reduce disruption.

Primary benefits and objectives

- Improve document accuracy and prevent outdated SOP usage.
- Reduce compliance risk and speed corrective actions.
- Provide traceable audit evidence to support ISO 9001:2015 certification readiness.
- Increase operational visibility via real-time dashboards for management decision-making.

1.3 Definitions, Acronyms and Abbreviation

QMS	Quality Management System.
QMS-Flow	The name of the proposed Integrated Quality Management System for Avialite.
SOP	Standard Operating Procedure.
CAPA	Corrective and Preventive Action.
RBAC	Role-Based Access Control.
UAT	User Acceptance Testing

KPI	Key Performance Indicator.
RTO	Recovery Time Objective.
RPO	Recovery Point Objective.
ISO 9001:2015	International Standard for Quality Management Systems (clause references used throughout the design and requirements).

1.4 References

Primary source materials used to prepare this SRS:

- **Project 1 (Proposal)** - QMS-Flow Project Proposal (Tech TiTan / Avialite).
This proposal provides background, a problem statement, proposed modules (Document Control, Traceability, Audit Management, CAPA, Training, and Equipment), and the project schedule referenced for scope and priorities.
- **Project SE SRS Template** - SECJ2203 SRS/SD template and earlier SRS draft for QMS-Flow.
- **Project SE SDD Template** - SECJ2203 SDD/SD template and earlier SDD draft for QMS-Flow.
- External standards (informative): ISO 9001:2015 (documented information and performance evaluation clauses) - referenced in Requirements and Design Constraints sections.

1.5 Overview

This subsection should:

- a) *Describe what the rest of the SD contains;*
- b) *Explain how the SD is organized.*

Give an overview of the content of this SD document.

2. Specific Requirements

This section of the System Documentation (SD) explains the Software Requirements Specification (SRS) for the **QMS-Flow System**. It provides a clear and complete description of all system requirements to ensure that the design and development of the system meet the needs of Avialite Sdn. Bhd. The requirements help developers understand what the system must do, and they guide testers to check whether the system works correctly. These requirements cover both functional and non-functional parts of the system and support the main users, such as staff, supervisors, quality managers, and auditors.

This section also ensures that the system supports the goals of improving document control, tracking complaints, managing training, and ensuring ISO 9001:2015 compliance.

Key points in this section include:

1. Inputs and Outputs

- All inputs, such as user actions, uploaded documents, complaint reports, training updates, or calibration requests.
- All outputs such as notifications, approval status updates, complaint progress, training results, and calibration reminders.

2. System Function

- A breakdown of the main functions the system will perform, such as document approval, complaint handling, CAPA tracking, training management, and equipment calibration management
- These functions describe how the system responds to user inputs and how it produces results or updates.

3. User-Centric Requirement

- Requirements that can be seen or experienced by users such as staff, supervisors, QA managers, and auditors.
- This ensures the system is easy to use, clear, and helpful in daily work operations.

4. Compliance and Standards

- Requirements that help the system meet ISO 9001:2015 standards, including document control, traceability, audit trails, and proper record keeping.
- This ensures the system supports quality management and follows industry guidelines.

2.1 Persona

Different types of users with different roles and skills will use the QMS-Flow System. These include production engineer, admin, quality managers, and auditors. Most engineers have basic computer skills and need a simple system that they can understand easily. Admins and quality managers are more experienced users who require system features to plan documents, training, complaints, and equipment records. Auditors need to review information and check compliance. Analyzing these users with these different roles helps the development team design a system that matches their abilities to support their daily tasks. By knowing their needs, behavior, and challenges, the system can be made user-friendly, clear, and suitable for the work environment at Avialite Sdn. Bhd.

2.1.1 Persona 1 (Engineer)

The Engineer is central to maintaining ISO 9001-compliant operational records, daily registering new documents, updating equipment, tracking training, and initiating CAPA. Their simultaneous technical and documentation duties require a fast, accurate, and structured data entry system. To support productivity and compliance, the interface must be clear, consistent, and easy to use, minimizing complexity and manual errors.

2.1.1.1 Description

Name	Amir Hakim
Age	27
Role	Engineer (uses modules for Document Control, Training Records, CAPA, and Equipment Management)
Technical Skill	Moderate. Able to use computers for daily tasks, fill forms, upload files, and navigate structured modules. Not specialized in IT but learns new systems quickly.
Experience	3–5 years in engineering operations involving maintenance, production processes, and reporting non-conformances. Familiar with equipment handling, documentation, and safety compliance.
Motivations	Wants a fast and simple system to manage documents, track training status, update equipment records, and initiate CAPA without dealing with manual paperwork. Motivated by efficiency, compliance, and reducing repetitive manual tasks.
Goals	<ul style="list-style-type: none">• Maintain accurate equipment records and calibration dates.• Quickly initiate CAPA when problems arise.• Ensure training records for staff are updated and compliant.

Behaviours	<ul style="list-style-type: none"> • Upload documents immediately after preparing them. • checks equipment statuses regularly. • Follow clear system prompts and guided workflows.
Pain Points	<ul style="list-style-type: none"> • Hard to track which documents are the latest/approved version. • Equipment calibration dates are easily forgotten without notifications. • CAPA processes can be confusing if steps are not clearly guided.

2.1.1.2 User Need

The Engineer needs a streamlined interface to upload and manage documents with version control, a guided CAPA initiation linked to complaints, and equipment calibration scheduling and status tracking.

2.1.1.3 User Stories

1. As an Engineer,

I want to upload SOPs with version control so that documents are traceable and current.

2. As an Engineer,

I want to initiate CAPA linked to complaints so that corrective actions are properly tracked.

3. As an Engineer,

I want to manage equipment calibration schedules so that compliance is maintained.

2.1.2 Persona 2 (Manager)

The Manager oversees multi-departmental quality assurance, relying on accurate system data for informed decisions, approving documents, monitoring KPIs, and ensuring timely CAPA completion. Effective compliance evaluation requires real-time, up-to-date records and consistent document versions. The system's accuracy directly influences quality outcomes; thus, a structured, easily navigable system is vital for managerial oversight and maintaining ISO 9001 standards.

2.1.2.1 Description

Name	Farah Nadira
Age	35
Role	Quality Manager (oversees approvals, KPI monitoring, compliance, and CAPA oversight)
Technical Skill	Intermediate. Comfortable with dashboards, reports, approvals, and system navigation. Uses multiple QMS tools daily.
Experience	10–12 years in quality assurance, process improvement, audit preparation, and document control oversight.
Motivations	Wants accurate information for decision-making, smooth approval processes, and an organized system that reduces administrative workload.
Goals	<ul style="list-style-type: none">● Monitor KPIs in real time.● Ensure CAPA actions are completed on time.● Maintain compliance across engineering and production teams .
Behaviours	<ul style="list-style-type: none">● Reviews and approves documents promptly.● Cross-checks audit findings and assigns corrective actions.● Communicates with engineers about training & equipment

	status.
Pain Points	<ul style="list-style-type: none">• Overwhelmed by large volumes of documents awaiting approval.• Difficult to track CAPA progress without system reminders.• Manual coordination between departments leads to delays.

2.1.2.2 User Need

The Manager needs a dashboard to monitor KPIs across CAPA, audits, training, and equipment. They also need document approval workflows with clear status updates and training assignments and progress tracking tools.

2.1.2.3 User Stories

1. As a Manager,

I want to approve or reject documents so that only validated SOPs are published.

2. As a Manager,

I want to assign training to employees so that competency gaps are addressed.

3. As a Manager,

I want to generate KPI reports so that I can evaluate departmental performance.

2.1.3 Persona 3 (Admin)

The Admin maintains system integrity for documentation, training, and equipment tracking. Responsibilities include managing accounts, updating records, ensuring data accuracy, and providing technical support. Admins rely on clear, dependable workflows for system reliability, needing stability, precision, and efficient controls to keep information accurate, accessible, and compliant with ISO 9001. Inaccurate data or system issues severely impede their ability to maintain compliance-ready records.

2.1.3.1 Description

Name	Syed Tariq
Age	42
Role	System Administrator (manages system access, user accounts, and supports Traceability & CAPA module)
Technical Skill	Advanced. Skilled in system configuration, user management, troubleshooting, data validation, and maintaining digital records.
Experience	6–8 years in administrative and system management roles, familiar with QMS platforms, database maintenance, and digital workflows.
Motivations	wants a stable, error-free system that is easy to maintain. Motivated by minimizing user issues, ensuring data accuracy, and maintaining smooth system operations.
Goals	<ul style="list-style-type: none">● Manage user accounts and access permissions efficiently.● Ensure training and equipment records are accurate and updated.● Maintain system data integrity and prevent duplicate or incorrect entries.
Behaviours	<ul style="list-style-type: none">● Regularly updates training and equipment information.

	<ul style="list-style-type: none"> ● Monitors user activity for accuracy and compliance. ● Provides system support for staff who face technical issues.
Pain Points	<ul style="list-style-type: none"> ● High volume of update requests from engineers and managers. ● System downtime or lag affects administrative tasks. ● Difficulty managing large numbers of document or record changes during audit periods.

2.1.3.2 User Need

The Admin requires centralized training record management, CAPA assignment and progress tracking, and integration with audit and equipment modules.

2.1.3.3 User Stories

1. As an Admin,

I want to manage training records so that employee competencies are documented and updated.

2. As an Admin,

I want to monitor CAPA progress so that corrective actions are completed and traceable.

2.1.4 Persona 4 (Auditor)

The Auditor is tasked with verifying the company's adherence to ISO 9001 requirements. Performing audits on a periodic basis (monthly, quarterly, or annually), their work hinges on accessing accurate, complete, and traceable documentation. They focus specifically on validating calibration and training records, assessing CAPA effectiveness, and scrutinizing overall paperwork quality. Consequently, the integrity and accuracy of system-generated documents are critical to their function.

2.1.4.1 Description

Name	Yi wen
Age	48
Role	Internal / External Quality Auditor
Technical Skill	High experience with digital QMS platforms, audit software, and compliance tools
Experience	More than 20 years performing internal and external audits in manufacturing and service sectors
Motivations	Responsible for reviewing whether the organization conforms with ISO 9001 requirements, performs scheduled audits and evaluates paperwork related to complaints , investigations, corrective actions (CAPA), calibration, training records, and management review outputs.
Goals	<ul style="list-style-type: none">• Review complaint and CAPA history with complete traceability• Before closing, confirm the effectiveness of the corrective measures.• Check that training, calibration, and management evaluations are appropriately documented• Detect gaps or unsafe practices early
Behaviours	<ul style="list-style-type: none">• Uses the system during monthly, quarterly, or yearly audits

	<ul style="list-style-type: none"> ● reviews CAPA timelines, evidence, and efficacy tests in-depth. ● Communicates follow-up remedial actions to the Quality Manager ● Cross-checks inquiry notes and attached documents
Pain Points	<ul style="list-style-type: none"> ● Records are often incomplete or stored in multiple places ● Hard to verify effectiveness when evidence is missing ● Calibration and training records are sometimes outdated

2.1.4.2 User Need

The auditor needs tools to schedule audits with scope and reminders, Forms to record findings and trigger CAPA if needed, and Access to complete CAPA and training for verification.

2.1.4.3 User Stories

1. As an Auditor,

I want to schedule internal and external audits so that compliance checks are planned and resources are allocated. (This traces to UC003: Schedule Audit)

2. As an Auditor,

I want to record audit findings and non-conformances so that CAPAs can be officially initiated. (This traces to UC004: Record Audit Findings)

2.2 System Features

QMS-Flow is designed as a hybrid Quality Management System (QMS) platform that integrates seamlessly into Avialite Sdn. Bhd.'s legacy workflows while replacing manual, fragmented processes with a centralized and automated solution. The system provides a closed-loop compliance cycle aligned with ISO 9001:2015 standards, ensuring that document control, traceability, CAPA, audits and management review are unified in one environment. The system features are illustrated in Figure 2.2.1 below. The detailed description of each module and function is tabulated in Table 2.2.1.

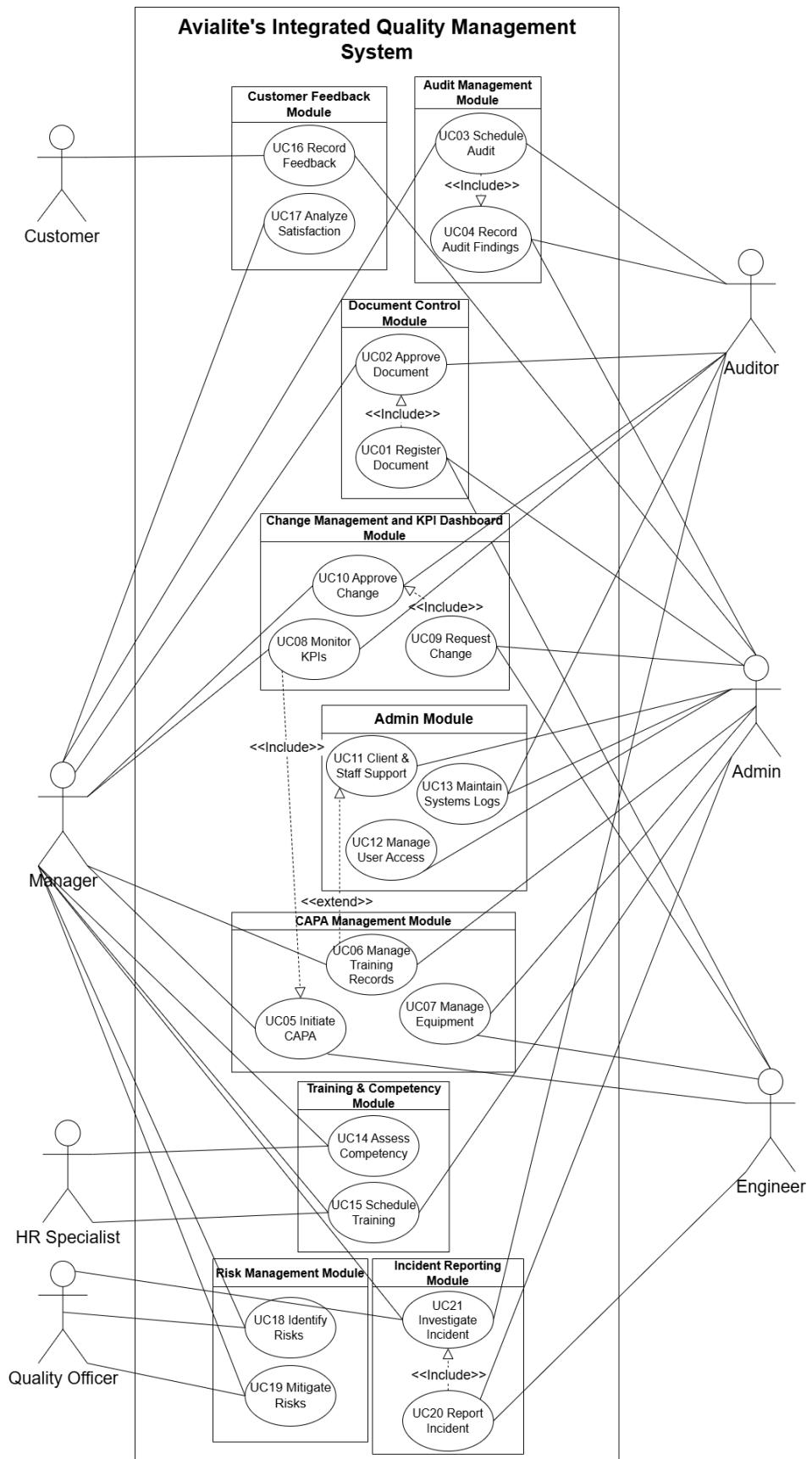


Figure 2.2.1: Use Case Diagram for QMS-FLow

Table 2.2.1 : Description of Module and Functions for Integrated Quality Management System

Use Case	Function	Description
UC01	Register Document	Captures new documents into the system with metadata for traceability.
UC02	Approve Document	Ensures documents are reviewed and formally approved before use.
UC03	Schedule Audit	Plans audit dates, scope, and assigns auditors.
UC04	Record Audit Findings	Logs audit results and evidence.
UC05	Initiate CAPA	Starts corrective or preventive actions when issues are found.
UC06	Manage Training Records	Updates staff training logs when CAPA requires competency improvement.
UC07	Manage Equipment	Tracks calibration, maintenance, and equipment readiness linked to CAPA.
UC08	Monitor KPIs	Collects and displays performance indicators for management review.
UC09	Request Change	Allows staff to propose processes and document changes.
UC10	Approve Change	Formal approval of the requested change.
UC11	Client & Staff Support	Handles inquiries, routes issues, and provides general support.
UC12	Manage User Access	Assigns roles, permissions, and controls system security.
UC13	Maintain System Logs	Keeps audit trails of system activity for accountability.

UC14	Assess Competency	Evaluates staff skills against role requirements.
UC15	Schedule Training	Plans training sessions to close competency gaps.
UC16	Record Feedback	Captures customer complaints, suggestions, or satisfaction data.
UC17	Analyze Satisfaction	Reviews feedback trends to measure customer satisfaction.
UC18	Identify Risks	Detects potential risks in processes, products, or compliance.
UC19	Mitigate Risks	Defines and tracks actions to reduce or eliminate identified risks.
UC20	Report Incident	Provides a structured way to log incidents or nonconformities.
UC21	Investigate Incident	Conducts root cause analysis and corrective action.

[Include domain model i.e. **class diagram** without the operation part – only attributes without details on visibility and type, explain each class and its attributes including the relationships among the classes, see the example.]

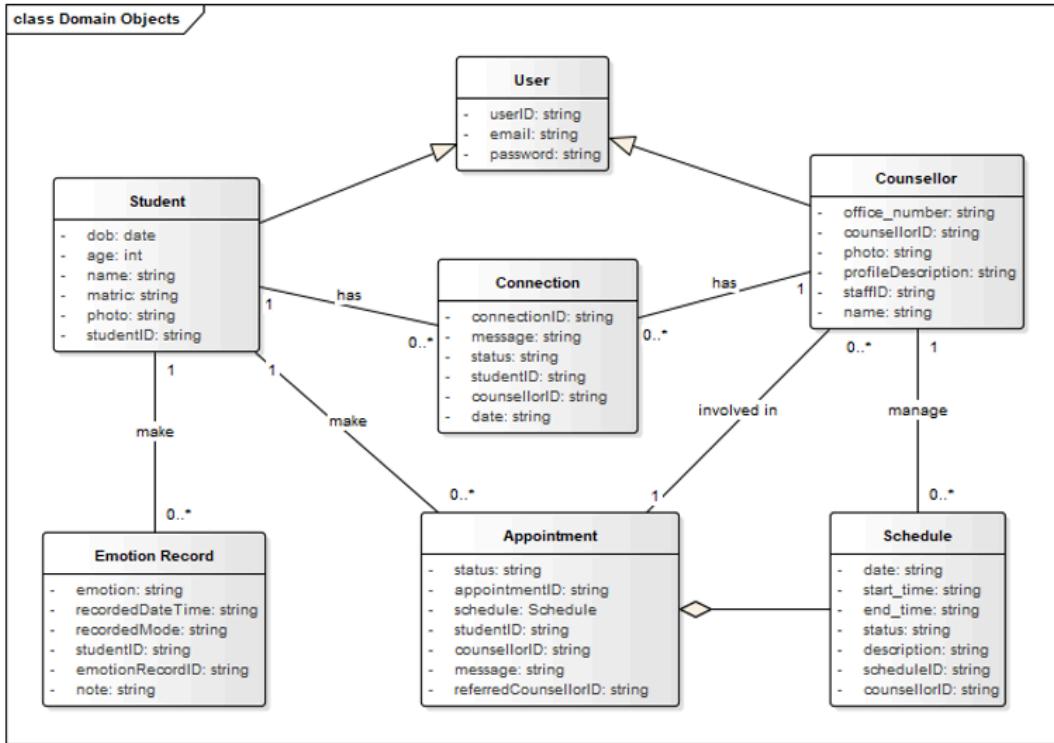


Figure X.X: Domain Model for <Name of the System>

[Include domain model i.e. **class diagram** without the operation part – only attributes without details on visibility and type, explain each class and its attributes including the relationships among the classes, see the example. For the **class with the states only**, consider including its state machine diagram, see the example for state machine diagram of Account class]

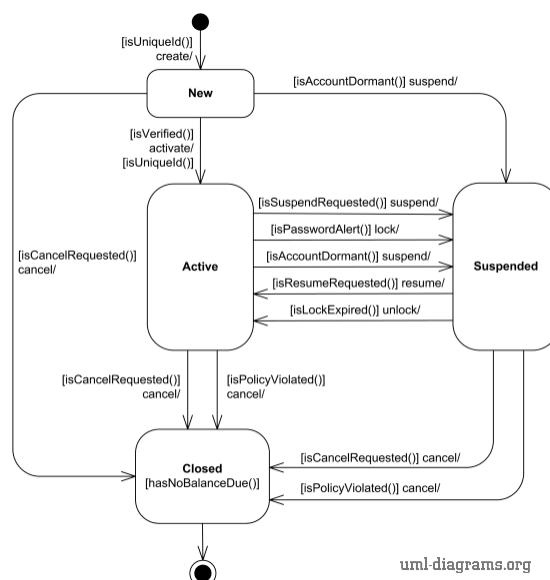


Figure X.X: State Machine Diagram for <Name of the System>

As this is often the largest and most important part of the SRS, the following principles apply:

- a) *Specific requirements should be stated in conformance with all the characteristics described in 4.3. (IEEE Std 830-1998)*
- b) *Specific requirements should be cross-referenced to earlier documents that relate.*
- c) *All requirements should be uniquely identifiable. [Provide ID to each functional requirement]*
- d) *Careful attention should be given to organizing the requirements to maximize readability.*

*[For each functional requirement, indicate its details using **use case description**. Include **sequence diagram** for each use case i.e. functional requirement. Combine alternate flows in the same sequence diagram. Split only if they are too cluttered to be combined.]*

2.1 Launch Phase

Product Backlog [describe more on product backlog];

Sprint	Team members assigned
<i>Sprint #1</i> <i>Which user story assigned to this Sprint</i> [you can also specify based on which module you want to develop for each sprint – based on your use case diagram]	
<i>Sprint #2</i> <i>Which user story assigned to this Sprint</i>	
<i>Sprint #n</i> <i>Which user story assigned to this Sprint</i>	

Sprint	User Story	Team Member Assigned
Sprint #1 UC001 (Register Document) and UC002 (Approve Document) [Document Control Module]	As an engineer, I want to upload documents with version control so that SOPs are traceable.	Rasyid, Afiq Shahir
	As a manager, I want to approve and reject documents so that only valid SOPs are published.	
Sprint #2 UC005 (Initiate CAPA) and UC006 (Manage Training Record) [Traceability and CAPA Management Module]	As an engineer, I want to initiate CAPA linked to complaints so that corrective actions are tracked.	Afiq Irfan, Hazim
	As a manager, I want to assign training to employees so that competency gaps are addressed.	
Sprint #3 UC003 (Schedule Audit) and UC004 (Record Audit Findings) [Audit Management Module]	As an auditor, I want to schedule audits so that compliance checks are planned.	Rafiq, Hazim
	As an auditor, I want to record audit findings so that CAPAs can be initiated.	
Sprint #4 UC007 (Manage Equipment) and UC008 (Monitor KPIs) [Traceability, CAPA, and KPIs Management Module]	As an engineer, I want to record equipment calibration schedules so that compliance is maintained.	Rasyid, Afiq Shahir

2.2 User Story Details

[Provide ID for each user story such as US001 and so on...]

Include User Story Description for each use case as in the example below. If there are any alternative flows, add the rows accordingly. Otherwise, just remove the rows. Ensure each User Story has its own unique ID and the name of the heading corresponds to the name of use case in the use case diagram (refer to Figure 2.1). Different scenarios of a user story require separate descriptions.]

2.4.1 US001: User Story <User Story 1>

Table 2.1: User Story Description for <Name of Use Case>

User story: <Name of Use Case>
ID: USxxx
User Story Description As a customer of the bank I want to be able to log into the system So that I can use bank products
Flow of events: 1. 2.

3.	...
Alternative flow n:	
Acceptance Criteria Postcondition precondition other conditions	
Exception flow: (if any in the event of error)	

[Include sequence diagram and activity diagram for each respective user story. See example below.
May consider including different scenarios in different diagrams, if necessary, to avoid clutter.]

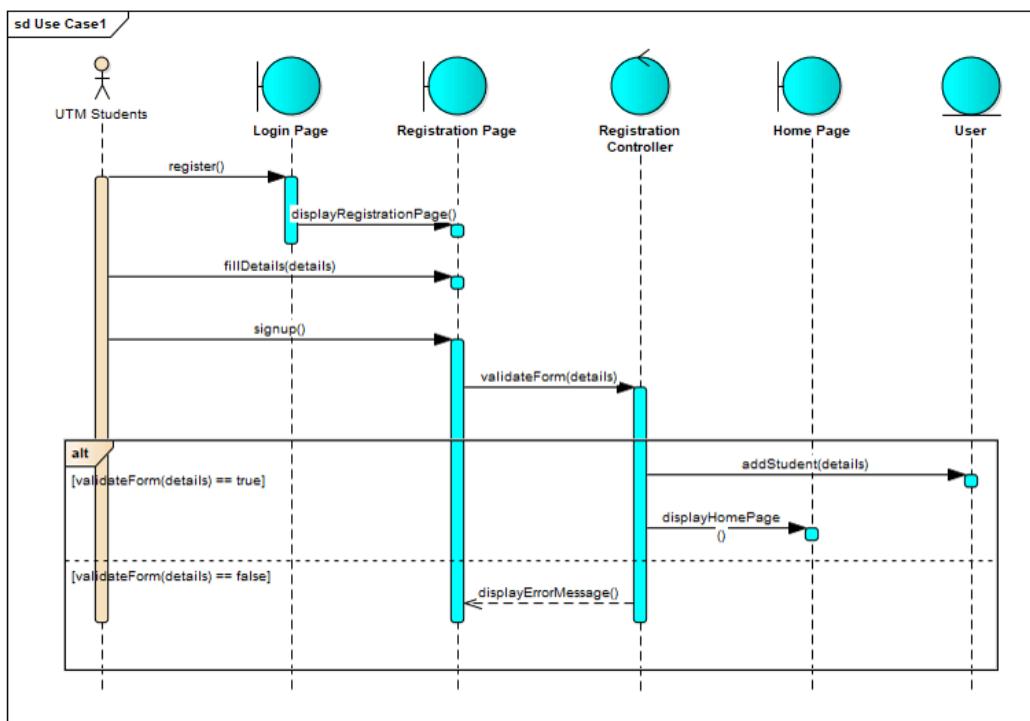


Figure 2.5: Sequence Diagram for <Name of User Story/Scenario if more than one scenario>

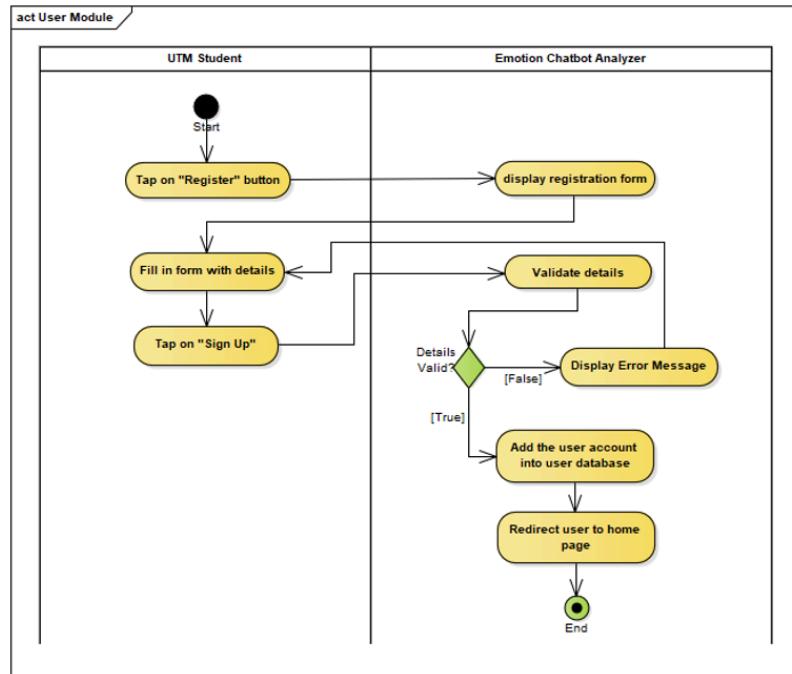


Figure 2.2: Activity Diagram for <<Name of User Story>>

2.4.2 US002: User Story <User Story 2>

2.4.3 US003: User Story <User Story 3>

2.4.4 USxxn User Story <User Story n>

...

2.5 Performance and Other Requirements

This section details the non-functional requirements (NFRs) necessary to ensure QMS-Flow operates effectively within Avialite's environment.

2.5.1 Performance Requirements

- Response Time:
 - The system must load dashboard pages within 2 seconds and complete document search queries within 3 seconds over the internal network.
- Throughput:
 - The system must support simultaneous access by at least 50 concurrent users (management, engineers, and auditors) without performance degradation.
- Capacity:
 - The database must support the storage of up to 10,000 document versions and 5 years of historical audit data without archival.
- Availability:
 - The system must maintain 99.9% availability during business hours (8:00 AM – 6:00 PM) to ensure uninterrupted access to SOPs and audit logs.

2.5.2 Security Requirements

- Access Control:
 - The system must implement strictly Role-Based Access Control (RBAC). Only users with the "Manager" role can approve documents, and only "Auditors" can close audit findings.
- Data Integrity:
 - The system must maintain an immutable Audit Trail for all document changes, capturing the User ID, Timestamp, and Action (Create, Edit, Approve, Delete).

- Encryption:
 - All sensitive data (employee competency records and proprietary technical drawings) must be encrypted at rest (AES-256) and in transit (TLS 1.2+).

2.5.3 Reliability and Recoverability

- Data Backups:
 - The system must perform automated incremental backups daily and full backups weekly.
- Recovery Time:
 - In the event of a system failure, the system must be recoverable within 4 hours (RTO) with a maximum data loss of 1 hour (RPO).

2.6 Design Constraints

This section outlines the limitations and standards that strictly govern the design and development of QMS-Flow.

2.6.1 Regulatory and Compliance Constraints

- ISO Compliance:
 - The system workflow must strictly adhere to ISO 9001:2015 clauses regarding "Documented Information" (Clause 7.5) and "Performance Evaluation" (Clause 9).
- Auditability:
 - The system architecture must prevent the deletion of any finalized audit records or approved CAPA reports to satisfy external regulatory audits.

2.6.2 Hardware and Software Constraints

- Browser Compatibility:
 - The web interface must be fully functional on the latest stable versions of Google Chrome and Microsoft Edge, as these are the standard browsers used at Avialite Sdn. Bhd.
- Legacy Integration:
 - The system must be able to export reports in .CSV and .PDF formats to ensure compatibility with legacy reporting tools used by upper management.
- Hosting:
 - The system must be deployable on the existing Avialite on-premise Windows Server environment (or specified Cloud Provider) with limited internet bandwidth for external access.

2.6.3 User Interface Constraints

- Mobile Accessibility:

- The "Approve Document" and "Record Audit Findings" modules must be responsive and usable on tablet devices (iPad/Android) to facilitate on-site factory audits.
- Language:
 - The user interface must be provided in English, as it is the operational language of Avialite Sdn. Bhd

3 System Architectural Design

3.1 Architecture Style and Rationale

The architectural style chosen for the development of the QMS-Flow system is the **Layered Architecture**. This architectural style arranges the system into a set of logical layers where each layer is responsible for a specific group of functionalities and provides services to the layer above it. The lowest layer represents the core services of the system such as data storage and access while higher layers focus on application logic and user interaction. This structure allows the system to be developed in an organized manner.

The layered architecture is suitable for QMS-Flow because it is a web-based system that must support multiple quality management modules such as Training Management, Corrective Action (CAPA), Equipment and Device Management, and Management Review. By separating the system into layers, each QMS module can be developed, maintained, and upgraded independently without affecting other parts of the system. This approach supports incremental development, allowing new modules or features to be added over time as organizational requirements evolve.

Another important reason for selecting this architectural style is its ability to localize changes within the system. When changes and modifications are made to one layer, only the adjacent layers are affected. This reduces the risk of system-wide errors and improves maintainability. For QMS-Flow, this is especially important as ISO 9001:2015 requirements may change or require updates to processes and documentation.

Moreover, layered architecture supports multi-level access control and security which

is important for QMS-Flow since there are different user roles . Security checks and authorization rules can be enforced in appropriate layers that users only access functions permitted by their role. Thus, the best choice for QMS-Flow system is layered structure.

3.2 Component Model

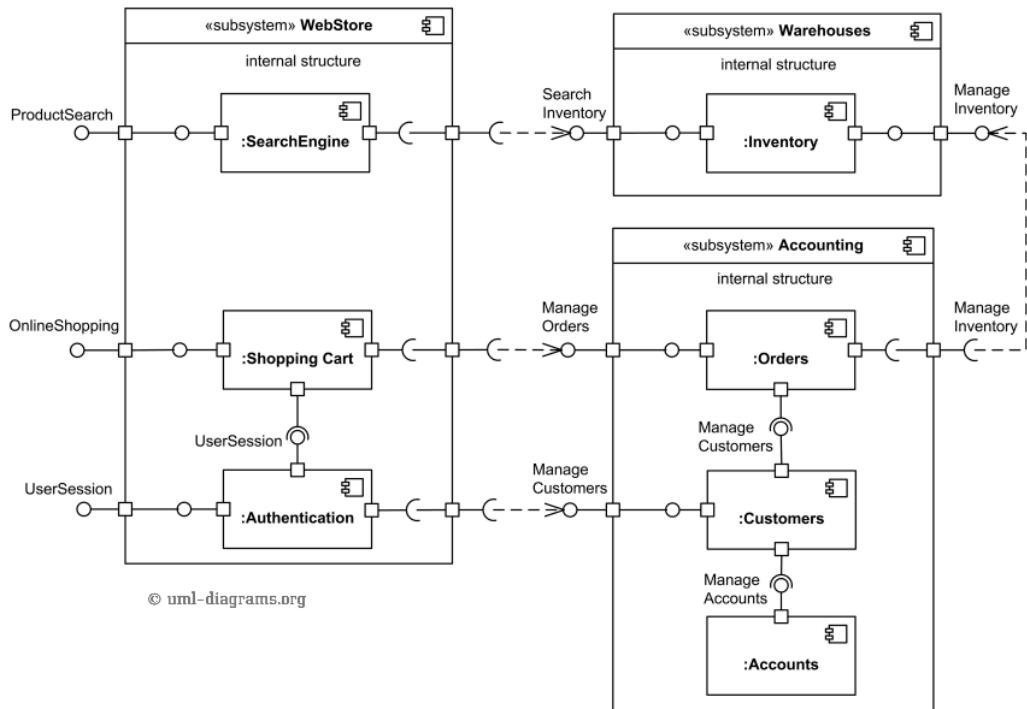


Figure 3.1: Component Diagram of <Name of the System>

4 Detailed Description of Components

This section of SD serves as part of SDD that describes each module or subsystem in the project.

4.1 Complete Package Diagram

Include the overall package diagram of your system here. [Example package diagram for a Sale System adapted from Satzinger (2011)] Indicate the navigation visibility based on the dependency among classes in the design class diagram. If the diagram is too cluttered, simplify the classes by showing the class name only without showing the attributes and methods. The details can be shown in the following class diagram sub-section for respective subsystem/package.

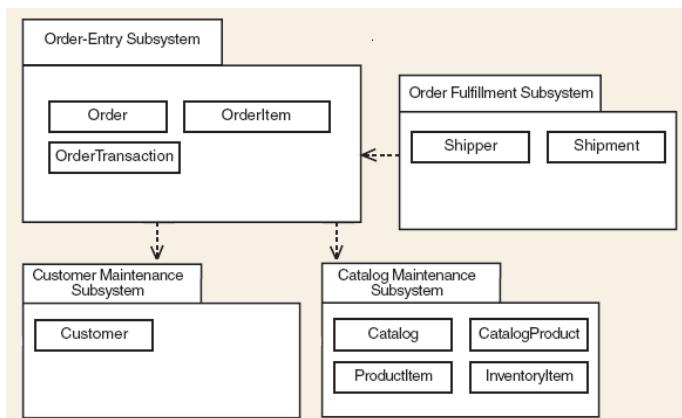


Figure 4.1: Package Diagram for <Name of the System>

4.2 Detailed Description

For each subsystem/package there must be ONE class diagram and several sequence diagrams based on how many use cases you have in the subsystem/package. Use branching in sequence diagram to combine alternate flow in the same sequence diagram. If the diagram is cluttered, consider a new sequence diagram for respective scenario/alternate flow. The given example includes view, domain and data access layer in respective packages. Organise subsystem/package according to the chosen architectural style. Note that if you choose model-view-controller (MVC) or other architectural styles, then the packages should follow the selected styles. However, for the scope of this course, you may follow the example.

4.4.2 P001: <Name of Package 1> Subsystem

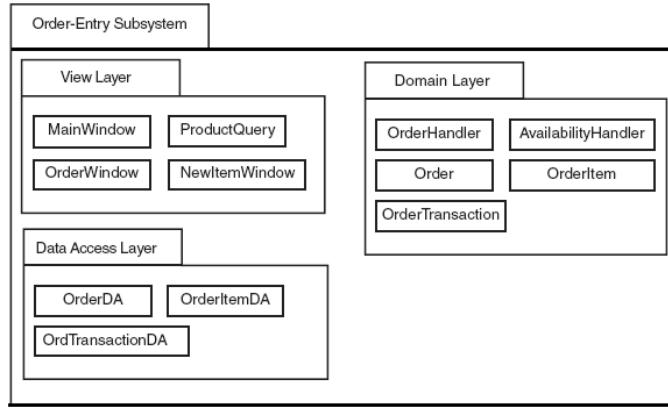


Figure 4.2: Package Diagram for <Name of Package 1> Subsystem

4.4.2.1 Class Diagram

Include class diagram to represent all classes in the respective subsystem/package. Include the controller classes.

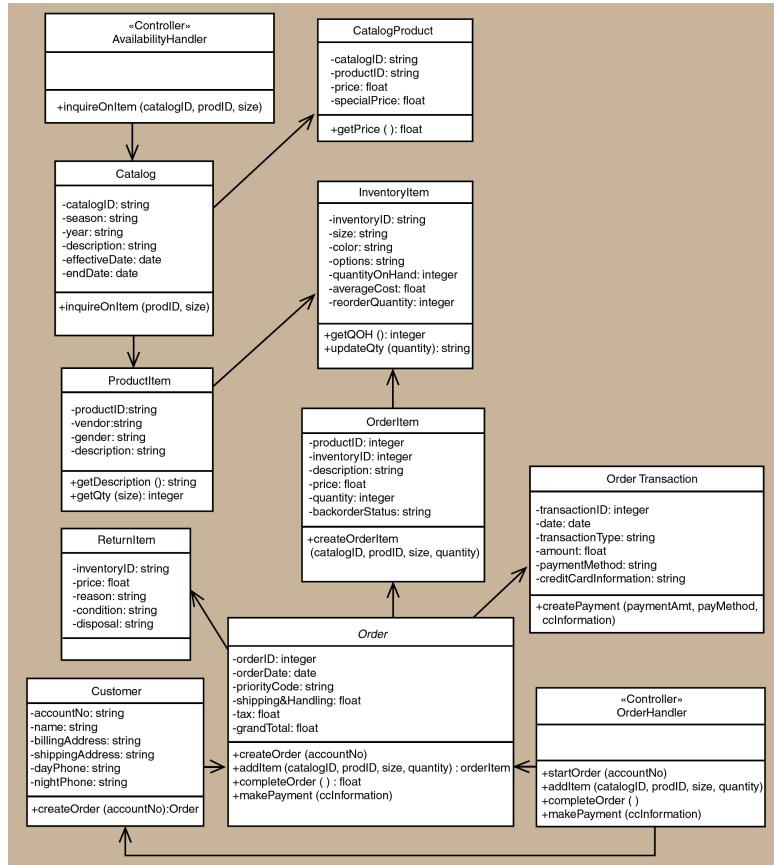


Figure 4.3: Class Diagram for <Name of Package 1> Subsystem

List all methods in a table for respective entity (add the table accordingly), then write its algorithm.

Example of algorithm as shown below.

Step1: Start

Step2: Read/input A and B

Step3: If A greater than B then C=A

Step4: If B greater than A then C=B

Step5: Print C

Step6: End

Entity Name	e.g. Order
Method Name	e.g. createOrder
Input	
Output	
Algorithm	<ol style="list-style-type: none">1. Start2. ...3. End

4.4.2.2 Sequence Diagram

Include sequence diagram for each respective use case in your package. In these examples only sequence diagram Create New Phone Order Scenario and Cancel an Order Scenario are shown. Include the final sequence diagram that comprises view layer, controller, and its problem domain (entity) and data access layer. Provide a unique code for each scenario of sequence diagram to be used in Section 7: Requirements Matrix. If you have only one scenario, then you only need one sequence diagram.

a) SD001: Sequence diagram for Create New Phone Order

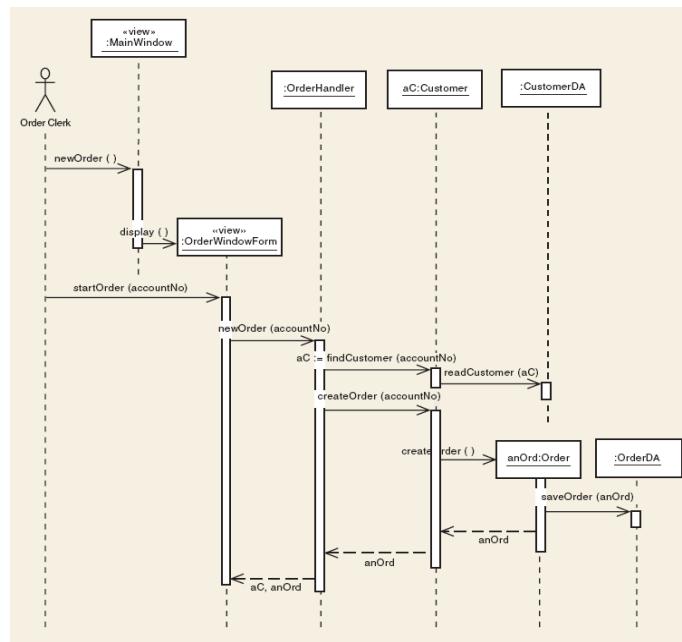


Figure 4.4: Sequence Diagram for <Create New Phone Order Scenario>

b) SD002: Sequence diagram for Create Cancel an Order Scenario

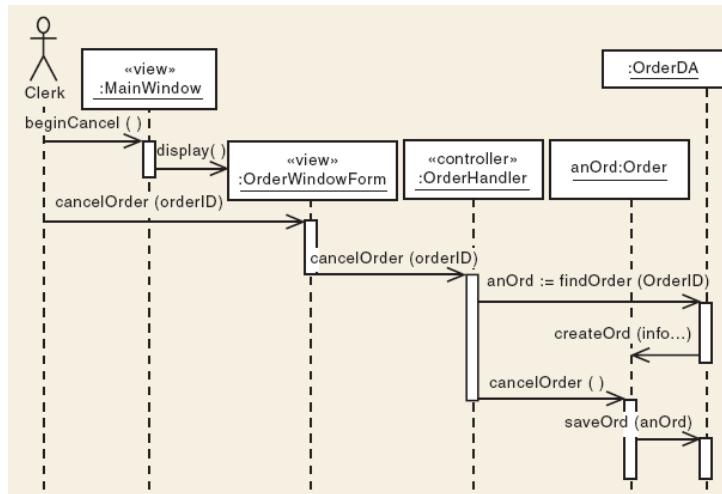


Figure 4.5: Sequence Diagram for <Cancel an Order scenario>

4.4.3 P002: <Name of Package 2> Subsystem

4.4.3.1 Class Diagram

4.4.3.2 Sequence Diagram

4.4.4 P003: <Name of Package n> Subsystem

4.4.4.1 Class Diagram

4.4.4.2 Sequence Diagram

5 Data Design

5.4 Data Description

Explain how the information domain of your system is transformed into data structures. Describe how the major data or system entities are stored, processed, and organized. List the database(s) or data storage items. For a small system, there is normally only one database. It consists of all the tables in which for object-oriented they are classes/objects as also stated in the domain model. Use table for the listing.

The major data or systems entities are stored into a relational database named as..., processed and organized into n entities as listed in Table 5.1.

Table 5.1: Description of Entities in the Database

No.	Entity Name	Description

5.5 Data Dictionary

Alphabetically list the system entities or major data along with their types and descriptions (class/object, attributes). Focus on classes in domain layer; omit the controller/handler class. Use tables for easy listing as shown below.

5.5.2 Entity: <First Entity>

Attribute Name	Type	Description

5.5.3 Entity: <Second Entity>

Attribute Name	Type	Description

6 User Interface Design

6.1 Overview of User Interface

The interface for QMS-FLOW is aimed at providing a simple, secure, and user-friendly environment to support quality management according to ISO 9001:2015. The interface is designed to ensure that the system is clear and consistent to enable the factory personnel to move easily through the system without much training. The system has a dynamic web-based design. For desktop users, there is a persisting side bar to navigate through, and for mobile users such as floor operators, there is a simplified version of the interface designed for handheld interaction.

Key Design Features:

- Role-Based Access Control (RBAC): The user's role determines how the interface changes dynamically and guaranteeing security:
 - Engineers: Get access to a simple dashboard for tracking training status and recording complaints.
 - Managers: Examine team competency matrices, equipment lists, and departmental metrics.
 - Admins: Access approval processes, strategic analytics, and complete system controls.
 - Auditors: Access a restricted "Read-Only" mode for verification Purposes.
- Visual Status Indicators: The system indicates status using a standard "Traffic Light" color scheme to facilitate prompt decision-making:
 - Green: Indicates compliance or completed tasks ("Certified", "Resolved", "Active").
 - Orange/Amber: Indicates warnings or upcoming deadlines ("Due Soon", "Pending").
 - Red: Highlights critical failures or expired items ("Overdue", "Non-Compliant").
- Consistent Navigation: A standardized sidebar menu with module links (such as Dashboard, CAPA Management, and Reports) is present on the left side of every desktop screen. This guarantees that users are always aware of their location within the system.
- Interactive Dashboards: Users are shown relevant dashboards with charts and summary cards after logging in. These are more than just static displays and

they enable users to promptly recognize and take action on critical activities, such awaiting approvals.

- Data Integrity & Feedback: Every action has clear feedback from the system. Sensitive operations (such as audit trails) are monitored in thorough logs for security purposes, and certain views (such as the Auditor Dashboard) have conspicuous banners to denote limited access modes.

6.2 Screen Images

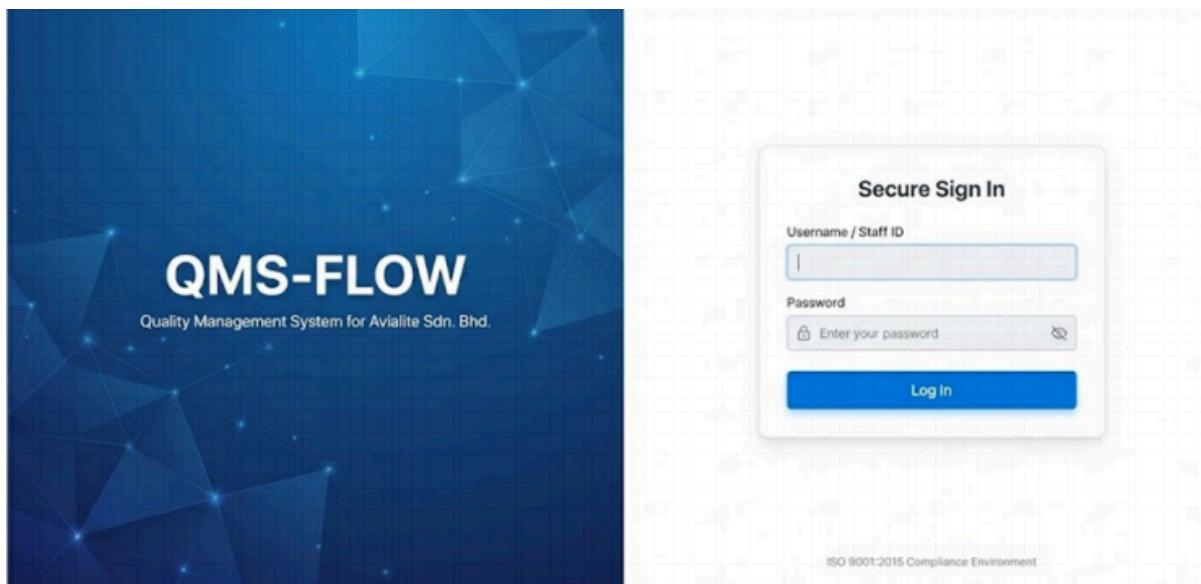


Figure 6.1 : Overview of Login Page

Description : a secure authentication screen that requires a password and a distinct username or staff ID in order to access the system.

Purpose : to tightly regulate access and guarantee that only individuals with the proper authorization can access the system.

The screenshot displays the QMS-FLOW Engineer Dashboard. On the left, a dark sidebar lists navigation options: Dashboard (selected), Log Complaint, SOP Library, My Training, and Settings. The main content area is titled 'Dashboard' and 'Staff / Operator'. It features a 'Quick Actions' section with a blue button labeled '+ Create New Complaint Report' and a grey button labeled 'View Latest SOPs'. Below this is a table titled 'My Recent Submissions' showing five entries:

Date	Complaint ID	Issue Summary	Status
April 24, 2024	CMP-00487	Machine misalignment causing defects	Pending
April 22, 2024	CMP-00472	Quality issue with raw materials	Resolved
April 21, 2024	CMP-00468	Calibration issue with measuring equipment	Resolved
April 18, 2024	CMP-00455	Incorrect documentation in SOP-103	Resolved
April 16, 2024	CMP-00441	Packaging defects observed	Resolved

At the bottom, it says 'Showing 1 to 5 of 25 entries' with navigation buttons for 'Prev', '1', 'Next', and 'Next >'. In the top right corner, there is a user profile icon for 'Production Operator'.

Figure 6.2: Overview of Engineer Dashboard

Description : The primary hub of engineers, which includes “Quick Action” as generating reports and a table that displays the status of “My Recent Submissions”.

Purpose : To enable employees to monitor the status of their own submissions and promptly report problems.

The screenshot shows the QMS-FLOW application interface. On the left is a dark blue sidebar with the title 'QMS-FLOW' at the top. Below it are several menu items: Dashboard, Log Complaint, SOP Library, My Training (which is highlighted in blue), and Settings. The main content area has a white background and features the title 'My Competency Profile: Operator A'. At the top of this section, there are two status indicators: 'Job Role: Machine Operator' (with a gear icon) and 'Compliance Status: Action Required' (with a warning triangle icon). Below these is a table titled 'Assigned Training Modules'.

Module Name	Validity/Expiry	Status	Action
Fire Safety Protocols	Valid until Oct 2026	Certified	[Download Cert]
Heavy Machinery Handling	Expiring in 5 Days	Due Soon	[Start E-Learning]
Hygiene Standard v2.0	Expired Yesterday	Non-Compliant	[Retake Test]

Figure 6.3: Overview of Engineer “My Training” Page

Description: shows the competency profile of the logged-in user, including assigned modules with "Certified," "Expiring," or "Non-Compliant" status indicators.

Purpose: to assist staff members in keeping an eye on their own credentials and acting before certifications expire.

The screenshot displays the QMS-FLOW application interface for logging a new customer complaint. The left sidebar features a dark blue background with a network-like pattern and contains navigation links: Dashboard, Log Complaint (which is highlighted in blue), SOP Library, My Training, and Settings. The main content area has a light gray background and shows the 'Log New Complaint' form. At the top of the form, there is a breadcrumb trail: Dashboard > Customer Complaints > New Record. Below the breadcrumb, the title 'Log New Complaint' is displayed. The form is divided into three steps: 1. Identification (the current step, indicated by a blue circle with the number 1), 2. Issue Details (indicated by a gray circle with the number 2), and 3. Evidence Upload (indicated by a gray circle with the number 3). The 'Identification' step contains the following fields: 'Complaint Source' (set to 'Customer Email'), 'Product Batch Number' (containing the value 'XXXXXX' with a green checkmark icon to its right), 'Date of Occurrence' (with a date input field and a calendar icon), and 'Initial Description' (a text area with placeholder text 'Briefly brikef description of complaint.'). At the bottom right of the form are two buttons: 'Cancel' and 'Next Step'.

Figure 6.4: Overview of Engineer “Log Complaint” Page

Description: The complaint source, batch number, date, and a description of the problems are all included in this recommended form for reporting non-conformances.

Purpose: to ensure that all relevant information is recorded for research by standardizing data collecting.

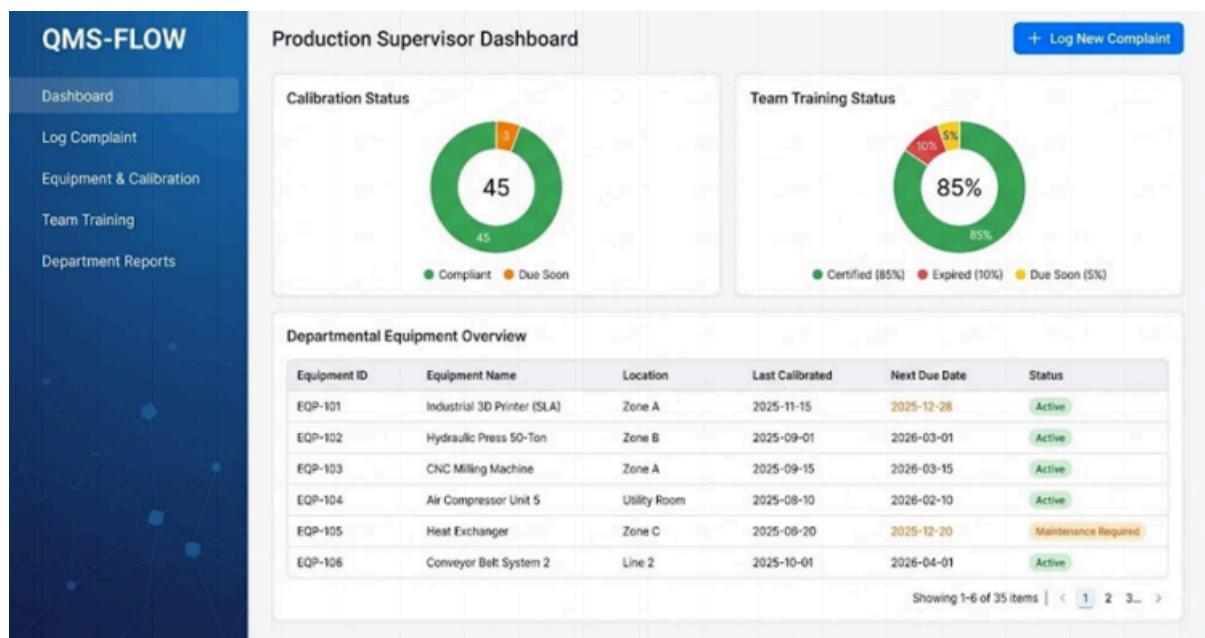


Figure 6.5: Overview of Manager Dashboard

Description: A list of equipment with "Due Soon" notifications comes after a management view that displays departmental data via charts for training and calibration.

Purpose: to give supervisors a high-level summary on the state of the department and impending deadlines.

Date	Meeting Type	Topic	Attendees	Action Items	Minutes File
2025-12-28	Shift Handover	Night Shift Target Handoff	12 Staff	Pending (2)	PDF
2025-12-20	Toolbox Talk	Machine Guarding Safety	20 Staff	Closed	PDF
2025-12-15	Quality Briefing	Defect Reduction Plan	8 Staff	In Progress	PDF
2025-12-10	Shift Handover	Day Shift Handover Notes	15 Staff	Closed	PDF
2025-12-05	Safety Talk	PPE Compliance Review	18 Staff	Closed	PDF
2025-11-28	Quality Briefing	New SOP Introduction	22 Staff	Pending (1)	PDF
2025-11-20	Shift Handover	Weekend Production Plan	10 Staff	Closed	PDF

Figure 6.6: Overview of Manager “Department Reports” Page

Description: A digital diary that keeps track of internal communications like "Shift Handover" and "Safety Talks," along with meeting minutes and attendance statistics.

Purpose: to maintain continuity across shifts and produce a traceable record of operational briefings.

All Assets	Due < 30 Days	Out of Service	Calibration Overdue			
Asset ID	Equipment Name	Serial No.	Last Calibrated	Next Due	Status	Certificate
EQP-101	Industrial 3D Printer	SN-9982	2025-01-15	2026-01-15	Valid	
EQP-105	Heat Exchanger Unit	SN-4421	2024-12-20	2025-12-20	Expiring	
EQP-109	Conveyor Motor B	SN-1102	2024-06-01	2025-06-01	Non-Compliant	
EQP-112	CNC Lathe Machine X1	SN-8875	2025-01-20	2026-01-20	Valid	
EQP-118	Digital Caliper Set	SN-3321	2024-07-15	2025-07-15	Valid	
EQP-121	Air Compressor 500L	SN-1144	2024-11-30	2025-05-30	Valid	
EQP-125	Hydraulic Press 20T	SN-5582	2023-12-01	2024-12-01	Non-Compliant	
EQP-130	Oven (High Temp)	SN-9902	2025-02-01	2026-02-01	Valid	
EQP-134	Microscope (Optical)	SN-6678	2024-12-28	2025-12-28	Expiring	
EQP-141	Tensile Tester	SN-7721	2025-01-10	2026-01-10	Valid	

Showing 1-10 of 250 items | < 1 2 3 ... >

Figure 6.7: Overview of Manager “Equipment & Calibration” Page

Description: a thorough inventory of all departmental assets, with calibration dates and status badges such as "Valid," "Expiring," or "Non-Compliant" displayed.

Purpose: to keep track of maintenance schedules in order to avoid using uncalibrated equipment.

Staff ID	Name	Role	Assigned Training	Completion Date	Expiry Date	Status
OP-001	Ali Ahmad	Operator	Safety Lvl 1	2025-10-10	2026-10-10	Certified
OP-004	Sarah Lee	Packer	Hygiene Protocols	2023-05-20	2025-05-20	Expired Action Required
OP-005	Raj Kumar	Technician	Machine Maintenance	2025-11-01	2026-11-01	Certified
OP-008	Mei Ling	Quality Inspector	QMS Auditing Basics	2024-12-15	2026-12-15	Certified
OP-012	David Chen	Forklift Driver	Advanced Forklift Safety	2024-08-01	2025-08-01	Expired Action Required
OP-015	Fatima Hassan	Assembly Line	ESD Control	2025-09-30	2026-09-30	Certified
OP-019	Kenji Tanaka	Supervisor	Leadership in Safety	2023-11-20	2025-11-20	Expired Action Required
OP-022	Elena Petrova	Operator	Chemical Handling	2025-01-10	2026-01-10	Certified

Showing 1-8 of 20 items | < 1 2 3 >

Figure 6.8: Overview of Manager “Team Training Matrix” Page

Description: Each team member's training status is listed in a matrix, with expired certifications highlighted in red for prompt attention.

Purpose: to determine skill gaps and guarantee the workforce's continued competence and compliance.



Figure 6.9: Overview of Admin / Manager Dashboard

Description: Important KPIs like "Open CAPAs" and "Compliance Score," as well as a list of urgent approval activities, are displayed in the system command center.

Purpose: to prioritize high-risk items that need management action and to offer strategic monitoring.

The screenshot shows a software interface for 'QMS-FLOW' titled 'Case #CMP-2025-882: Machine Overheating'. The status is 'In Progress'. On the left, a sidebar lists 'Dashboard', 'CAPA Management' (which is selected), 'Audit Schedules', 'Management Review', and 'Reports'. The main content area has a header 'Root Cause Analysis' with a dropdown set to 'Fishbone Diagram'. A detailed description box states: 'Analysis indicates a gradual failure of the primary thermal sensor (P/N TS-450-A) due to prolonged exposure to high operational temperatures, leading to inaccurate readings and subsequent overheating of the main hydraulic pump. The cooling fan actuation logic was not triggered correctly as a result of the sensor drift.' Below this is an 'Evidence' section with links to 'thermal_log.pdf' and 'photo_evidence.jpg'. A 'Corrective Action Plan' section contains a table with two rows:

Action Step	Assigned To	Due Date	Status
Replace Temp Sensor	Maintenance Team	20-Oct-2025	Pending
Recalibrate Machine 5	Ext. Vendor	22-Oct-2025	Scheduled

Figure 6.10: Overview of Admin / Manager “CAPA Management” Page

Description: An investigative management workflow screen containing a "Corrective Action Plan" with tasks and a "Root Cause Analysis" section.

Purpose: to record the examination and fixing of non-conformances in accordance with ISO guidelines.

The screenshot shows the QMS-FLOW interface for managing review meetings. On the left, a sidebar menu includes 'Dashboard', 'CAPA Management', 'Audit Schedules', 'Management Review' (which is highlighted in blue), and 'Reports'. The main content area is titled 'Management Review Meetings' and features a button '+ Schedule New Meeting'. Below this, a section for the 'Next Scheduled Review: Q4 2025' displays the date (15-Dec-2025), organizer (Quality Manager), and status (Agenda Finalized). An 'Agenda Preview' lists four items: 1. Review of Quality Policy & Objectives ... 2. Customer Satisfaction Survey Results ... 3. Audit Findings Summary ... 4. Resource Allocation Review ... With buttons for 'Edit Agenda' and 'View Minutes'. Below this is a section for 'Past Meeting History' with a table:

Date	Meeting Name	Status	Actions
15-Sep-2025	Q3 2025 Review	Completed	View Minutes
15-Jun-2025	Q2 2025 Review	Completed	View Minutes
15-Mar-2025	Q1 2025 Review	Completed	View Minutes
15-Dec-2024	Q4 2024 Review	Completed	View Minutes
15-Sep-2024	Q3 2024 Review	Completed	View Minutes

Figure 6.11: Overview of Admin / Manager “Management Review” Page

Description: An executive review scheduling interface that shows the agenda for the upcoming meeting and a list of previous reviews that have been finished.

Purpose: to lead sessions for strategic planning and ongoing improvement.

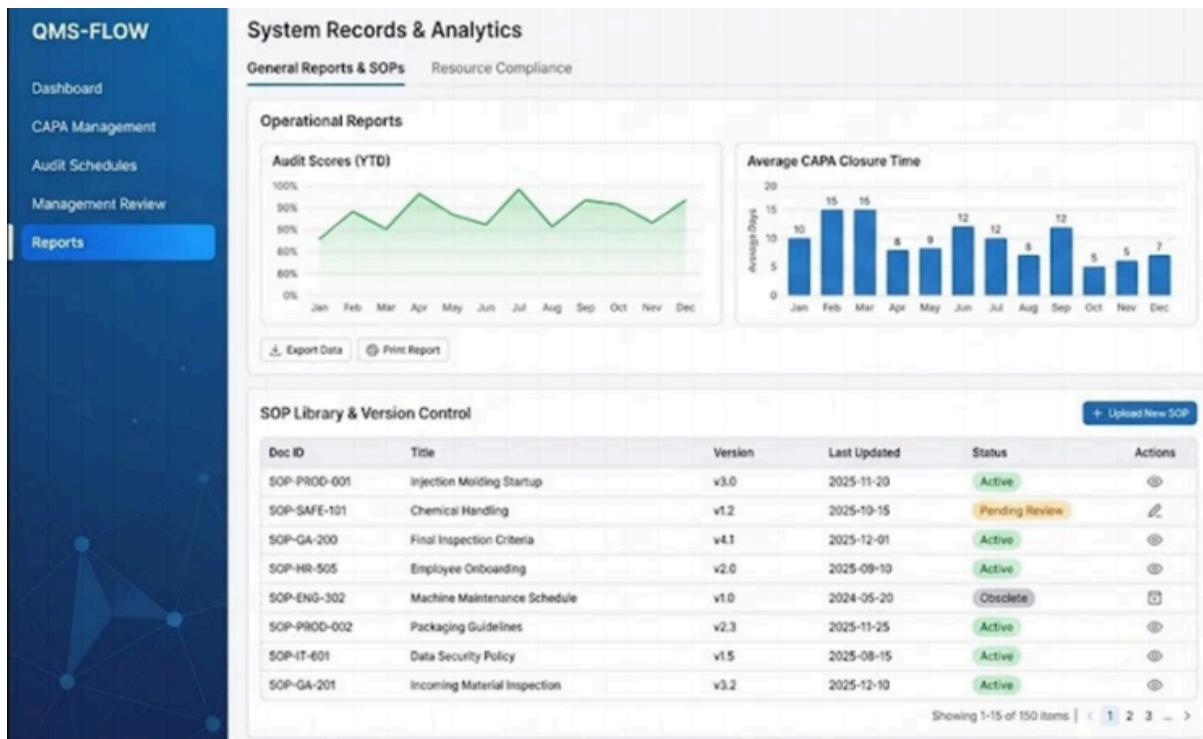


Figure 6.12: Overview of Admin / Manager “General Reports & SOPs” Page

Description: a unified view with the "SOP Library" with version control at the bottom and operational analytics charts at the top.

Purpose: to track versions of system documentation and examine trends in quality.

The screenshot shows a split-screen interface for 'System Records & Analytics'. On the left, a sidebar menu lists 'QMS-FLOW' with options: Dashboard, CAPA Management, Audit Schedules, Management Review, and Reports (which is highlighted). Below the menu is a decorative background graphic of a network of blue dots connected by lines.

The main content area has two tabs: 'General Reports & SOPs' and 'Resource Compliance' (which is selected). The 'Resource Compliance' section is divided into two tables:

- Equipment Calibration Status** (Left Table):

ID	Name	Last Calibrated	Next Due	Status
EQP-101	3D Printer	2024-12-28	2025-12-28	Active
EQP-105	Heat Exchanger Unit	2024-12-20	2025-12-20	Active
EQP-109	Conveyor B	2023-06-01	2024-06-01	Overdue ⚠
EQP-112	CNC Lathe Machine X1	2025-01-20	2026-01-20	Active
EQP-118	Digital Caliper Set	2024-07-15	2025-07-15	Active
EQP-121	Air Compressor 500L	2024-05-30	2025-05-30	Active
EQP-125	Hydraulic Press 20T	2023-12-01	2024-12-01	Overdue ⚠
- Staff Training Matrix** (Right Table):

Staff Name	Role	Certification	Expiry Date	Status
Ali Ahmad	Operator	Safety Lvl 1	2026-10-10	Valid
Sarah Lee	Packer	Hygiene Protocols	2025-05-20	Expired ⚠
Raj Kumar	Technician	Machine Maintenance	2026-11-01	Valid
Mei Ling	Quality Inspector	QMS Auditing Basics	2026-12-15	Valid
David Chen	Forklift Driver	Advanced Forklift Safety	2025-08-01	Expired ⚠
Fatima Hassan	Assembly Line	ESD Control	2026-09-30	Valid
Kenji Tanaka	Supervisor	Leadership in Safety	2025-11-20	Expired ⚠

Figure 6.13: Overview of Admin / Manager “Resource Compliance” Page

Description: A split-screen display that simultaneously tracks "Staff Training" and

"Equipment Calibration" to identify compliance issues throughout the factory

Purpose: to check compliance of people's training and equipment calibration from a single perspective.

Top Section (Visual Schedule)

January 2025											
Sun	Mon	Tue	Wed	Thu	Fri	Sat					
30	31	1	2	3	4	5	6	7	8	9	10
				EXT-2025-01 External			11	12	13	14	
	14	15	16	AUD-2025-01 Internal		19	20	21			
	21	22	23	24	25	26	27	28	29	30	
					AUD-2025-02 Internal						

Legend: Internal Audit (Blue), External ISO Certification (Purple), Supplier Audit (Grey)

Bottom Section (Detailed List)

Upcoming Audits List						
Audit ID	Target Department	Lead Auditor	Scheduled Date	Status	Actions	
AUD-2025-01	Production Line A	John Smith (Internal)	15-Jan-2025	Confirmed	View Plan	Edit Scope
AUD-2025-02	HR & Training	Jane Doe (Internal)	20-Feb-2025	Planning	View Agenda	Edit Scope
EXT-2025-01	ISO 9001 Surveillance	SOS External	10-Mar-2025	Scheduled	View Plan	Edit Scope
AUD-2025-03	Quality Control Lab	Emily Davis (Internal)	22-Jan-2025	Confirmed	View Plan	Edit Scope
SUP-2025-01	Component Supplier X	Mark Wilson (Internal)	05-Mar-2025	Planning	View Agenda	Edit Scope

Figure 6.14: Overview of Admin / Manager “Audit Schedules” Page

Description: a planning screen with a comprehensive list of upcoming internal and external audits as well as a visual calendar for the annual audit program.

Purpose: to guarantee that the audit program is organized and carried out on time.

The screenshot shows the QMS-FLOW Auditor Dashboard. On the left, there is a sidebar with the title "QMS-FLOW" and a blue header bar containing the word "Dashboard". Below the sidebar, there are several menu items: "Complaint History (View)", "CAPA Records (View)", "Training Matrices (View)", and "Audit Trails". The main content area has a yellow banner at the top stating "VIEW ONLY MODE: You have read-only access for verification purposes." Below this, there is a section titled "Recent System Activity Log for Verification" which contains a table of recent actions. The table has columns for "Timestamp", "User Role", "Action Taken", "Record ID", and "Action". The data in the table is as follows:

Timestamp	User Role	Action Taken	Record ID	Action
2025-10-27 10:15 AM	Supervisor	Updated Calibration Record	EQP-101	View Details
2025-10-27 09:45 AM	Quality Manager	Approved CAPA Plan	CAPA-2025-001	View Details
2025-10-26 04:30 PM	Production Operator	Submitted New Complaint	CMP-00492	View Details
2025-10-26 03:15 PM	Training Coordinator	Added New SOP to Library	SOP-105	View Details

Figure 6.15: Overview of Auditor Dashboard

Description: a limited view with a "Read-Only" banner and completed with necessary sidebar for easy access to view necessary document and modifications and shows quick access to recent system activity log

Purpose: to provide easy access and history of recent system activity log for verification

System Audit Trail & Change Log						
READ-ONLY MODE: EXTERNAL AUDITOR						
Filter by User		Filter by Date Range		Filter by Record ID		Event Type (Create/Edit/Delete)
All Users	All Users	Start Date	End Date	Enter ID...	Event Type (Create/Edit/Del...)	Apply Filters
2025-12-28 14:30:05	Supervisor_A	Update	EQP-105	Next Due Date	2025-12-20	2026-12-20
2025-12-28 10:15:22	Admin_Main	Approval	SOP-SAFE-101	Status	Pending	Published
2025-12-27 09:05:00	Operator_Z	Login Failed	System Access	-	-	Invalid Password
2025-12-27 08:45:10	Admin_Main	Create	USR-205	User Account	-	New User Created
2025-12-26 16:20:35	Quality_Mgr	Delete	DOC-OLD-99	Document	Archived	Document Deleted
2025-12-26 15:10:05	Supervisor_B	Update	TRN-REC-55	Completion Date	2025-12-25	2025-12-26
2025-12-26 11:05:44	System_Auto	System Event	Backup	Daily Backup	Pending	Completed
2025-12-26 09:30:21	Auditor_Ext	View	CAPA-2025-08	CAPA Record	-	Record Viewed
2025-12-25 14:00:00	Admin_Main	Update	SYS-CONFIG	Timeout Setting	30 min	60 min
2025-12-25 10:00:00	Operator_Y	Login Success	System Access	-	-	Session Started

Showing 1-10 of 500+ entries | < 1 2 3 4 5 ... >

Figure 6.16: Overview of Auditor “Audit Trails” Page

Description: a limited view with a "Read-Only" banner and a complete "System Audit Trail" log that documents each user action and data modification.

Purpose: to show data integrity and make it possible for external auditors to confirm system history without making any modifications.

QMS-FLOW

Archived Record - Modification Disabled

CAPA Record #CMP-882: Machine Overheating

CLOSED

Root Cause Analysis

Fishbone Diagram Analysis

Analysis identified primary root cause as failure of thermal sensor (P/N TS-450-A) due to prolonged exposure to high operational temperatures, leading to inaccurate readings and delayed cooling system activation. Contributory factor included outdated preventive maintenance schedule for sensor replacement.

Corrective & Preventive Action Plan

Action ID	Action Description	Assigned To	Due Date	Completion Date	Status	Action
ACT-001	Replace Thermal Sensor (TS-450-A) on Machine 5	Maintenance Team	2025-10-20	2025-10-18	Completed	View Log
ACT-002	Update Preventive Maintenance Schedule for Sensors	Engineering Dept	2025-10-25	2025-10-24	Completed	View Log
ACT-003	Conduct Training on New Maintenance Procedures	Training Coordinator	2025-11-01	2025-10-30	Completed	View Log
ACT-004	Verify Effectiveness of Corrective Actions	Quality Assurance	2025-11-15	2025-11-14	Effective	View Log

Auditor Verification

I have verified this record conforms to ISO 9001 standards.

Mark as Verified

Figure 6.17: Overview of Auditor “CAPA Records” Page

Description: An "Auditor Verification" checkbox is located at the bottom of a locked view of a closed record with alteration disabled.

Purpose: To enable auditors to safely examine and confirm old data.

7 Requirements Matrix

Below is the Traceability Matrix, which is utilized as a traceability tool for the QMS FLOW System as a whole. The traceability matrix links the high-level subsystems in the QMS FLOW System (P001 to P004), as well as their use cases (UC001 to UC011), to particular elements of design, such as Sequence Diagrams and Entities. All functional requirements must, therefore, be backed by corresponding elements within these traceability matrices, thus validating the system's consistency and completeness in terms of design.

The sequence diagrams for each use case vs. corresponding classes (entities) are listed as in Table 7.1.

Table 7.1: Description of Entities in the Database

Persona, Use Case, Sequence Diagram	Cu sto r	O r d e r	Ca tal og	Cat alo g Pro du ct	Pr od uc t Ite m	O rd er It e m	R et ur n It e m	Inv ent ory Ite m	KPI / Das hbo ard	Noti ficat ions
P1, UC001, SD001: Upload SOP & Version Control	X		X	X						
P1, UC002, SD002: Initiate CAPA (linked to Complaint)	X	X					X			

P1, UC003, SD003: Manage Equipment Calibration	X				X					X
P2, UC004, SD004: Approve/Reje ct Documents	X	X		X						X
P2, UC005, SD005: Assign Training to Employees	X	X				X				
P2, UC006, SD006: Generate KPI Reports					X	X	X	X	X	
P3, UC007, SD007:\ Manage User Accounts & Access	X									
P3, UC008, SD008: Maintain Training/Equi p. Records					X	X				
P4, UC009, SD009: Schedule Audit	X	X						X		X

P4, UC010, SD010: Record Audit Findings (Trigger CAPA)						X	X		
P4, UC011, SD011: Verify CAPA Effectiveness			X			X	X		

8 Test Cases

This is a numbered list of tests. Use tables to group similar tests. For each test, specify:

- *Test ID and name*
- *Additional description if test name is not descriptive enough*
- *The input data*
- *The expected output data*
- *The actual output data (not in the scope of this course – leave blanks)*
- *Result: pass or fail (not in the scope of this course – leave blanks)*

8.4 TC001: Test <Name of Package 1> Subsystem: <Name of Use Case (UC001)>

List all test cases before providing the details for each under each package/subsystem and use case.

This test contains the following test cases:

- (a) TC001_01: Test <Scenario of sequence diagram1 (SD001)>
- (b) TC001_02: Test <Scenario of sequence diagram2 (SD002)>
- (c) ...

8.4.2 TC001_01: Test <state scenario of sequence diagram1 (SD001)>

Provide the details for each test case in the test case template (Excel). For the scope of this course, leave blanks for the columns on actual results and pass/fail status. See the example below for better understanding. If there are alternate and exception scenarios, include respective test cases under this sub-section also.

This test contains the following alternate and exception scenarios (if any):

- (a) TC001_01_01: Test <alternate scenario1 of sequence diagram1 (SD001)>
- (b) TC001_01_02: Test <exception scenario1 of sequence diagram1 (SD001)>
- (c) ...

Test Case ID	BU_001	Test Case Description	Test the Login Functionality in Banking		
Created By	Mark	Reviewed By	Bill	Version	2.1
QA Tester's Log	Review comments from Bill incorporate in version 2.1				
Tester's Name	Mark	Date Tested	1-Jan-2017	Test Case (Pass/Fail/Not)	Pass
S #	Prerequisites:		S #	Test Data	
1	Access to Chrome Browser		1	Userid = mg12345	
2			2	Pass = df12@434c	
3			3		
4			4		
Test Scenario	Verify on entering valid userid and password, the customer can login				
Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended	
1	Navigate to http://demo.guru99.com	Site should open	As Expected	Pass	
2	Enter Userid & Password	Credential can be entered	As Expected	Pass	
3	Click Submit	Cutomer is logged in	As Expected	Pass	

8.4.3 TC001_02: Test <Scenario of sequence diagram2 (SD002)>

Provide the details for this test case.

8.4.4 TC001_n: Test <Scenario of sequence diagram n (...)>

Provide the details for this test case.

8.5 TC002: Test <Name of Package 2> Subsystem: <Name of Use Case (UC002)>

List all test cases before providing the details for the second use case in module1. Include the sub-sections accordingly.

This test contains the following test cases:

- (a) TC002_01: Test <Scenario of sequence diagram4 (SD004)>
- (b) TC002_02: Test <Scenario of sequence diagram5 (SD005)>
- (c) ...

8.6 TC003: Test <Name of Package 3> Subsystem: <Name of Use Case (UC003)>

List all test cases before providing the details for the first use case in module2. Include the sub-sections accordingly.

This test contains the following test cases:

- (a) TC003_01: Test <Scenario of sequence diagram6 (SD006)>
- (b) TC003_02: Test <Scenario of sequence diagram7 (SD007)>
- (c) ...

Appendix A: Traceability Matrix

Test Case ID	Use Case ID/ Sequence Diagram ID	Package ID
TC001 for <Name of Package 1> Subsystem <ul style="list-style-type: none">• TC001_01• TC001_02	UC001 <ul style="list-style-type: none">• SD001• SD002	P001
TC002 for <Name of Package 2> Subsystem <ul style="list-style-type: none">• TC002_01• TC002_02	UC002 <ul style="list-style-type: none">• SD004• SD005	P001
TC003 for <Name of Package 3> Subsystem <ul style="list-style-type: none">• TC003_01• TC003_02	UC003 <ul style="list-style-type: none">• SD006• SD007	P002
...		