



# Quality Assurance Office Monitoring System: Academic Standards Compliance and Document Management System

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## ABSTRACT

The increasing demands for quality assurance and standards compliance in higher education institutions create challenges in monitoring academic documents, validating compliance status, and maintaining records efficiently. The Academic Standards Compliance and Document Management System (ASCOM) is developed to automate, streamline, and centralize compliance monitoring across academic units. This study presents the design and implementation of ASCOM as an IoT-inspired, cloud-supported monitoring system capable of tracking submissions, validating compliance indicators, managing document repositories, and generating real-time reports. The system integrates workflow automation, role-based access, and document lifecycle management to ensure transparency, efficiency, and alignment with institutional and accrediting-body standards. Results demonstrate improved processing time, reduced documentation errors, and enhanced visibility of compliance status.

**Key words :** Academic standards, document management, compliance monitoring, ASCOM system.

## 1. INTRODUCTION

Academic institutions increasingly rely on information systems to support quality assurance, monitoring, and data-driven decision-making processes. [1] emphasized the importance of evaluation and quality assurance mechanisms in computing-based monitoring systems, highlighting how systematic validation improves reliability and performance. In a related context, [2] demonstrated that IoT-based automation and monitoring systems significantly enhance operational efficiency and record accuracy in institutional environments.

Ensuring data quality is a critical requirement for monitoring systems. [3] provided a comprehensive survey of data quality measurement and monitoring tools, underscoring the need for continuous validation to maintain trustworthy information systems. Similarly, [4] proposed standardized quality control and assurance practices to ensure consistency, reliability, and compliance in large-scale information repositories.

Within academic and research environments, quality assurance practices are essential to support accreditation and institutional performance. [5] reviewed data quality assurance practices in research repositories and emphasized their role in sustaining long-term data integrity. [6] further demonstrated that structured quality assurance systems directly contribute to successful international accreditation efforts in higher education institutions.

Quality assurance systems have also been widely adopted in educational management. [7] showed that implementing internal quality assurance systems leads to measurable improvements in school performance and governance. [8] reinforced these findings by highlighting how systematic quality assurance frameworks improve educational service delivery and management effectiveness.

International perspectives on educational quality assurance further stress the importance of standardized monitoring systems. [9] discussed how adherence to international quality assurance and management standards strengthens institutional accountability and transparency. Additionally, [10] emphasized that quality assurance and quality management systems are fundamental tools for continuous improvement and informed decision-making in education systems.

In response to these findings, this study presents the development and evaluation of the ASCOM Monitoring System, a web-based platform designed to support academic

service compliance, document monitoring, and reporting through a centralized and quality-driven approach.

Specifically, this study seeks to address the following concerns:

1. How may the ASCOM Monitoring System be developed using the Waterfall Model and IEEE software engineering recommendations in terms of:
  - 1.1 Requirements specification;
  - 1.2 Planning;
  - 1.3 System design;
  - 1.4 Development and implementation;
  - 1.5 Testing;
  - 1.6 Deployment;
  - 1.7 Maintenance;
2. How may the ASCOM Monitoring System be evaluated by IT experts and end-users in terms of the following quality attributes:
  - 2.1 Functional suitability;
  - 2.2 Performance efficiency;
  - 2.3 Compatibility;
  - 2.4 Usability;
  - 2.5 Reliability;
  - 2.6 Security;
  - 2.7 Maintainability;
  - 2.8 Portability

## 2. METHODOLOGY

### 2.1 Research Design

The Waterfall Model was used as the basis for developing the ASCOM Monitoring System. This model was adopted as the research design methodology due to its structured and systematic approach to software development. As a research design, the Waterfall Model follows a sequential or linear progression through distinct phases, similar to a cascading waterfall, wherein each phase must be completed before proceeding to the next.

Additionally, the system's development adopted the IEEE (Institute of Electrical and Electronics Engineers) Recommendations in Software Engineering. These recommendations consist of established standards and best practices for the development, documentation, testing, and maintenance of software systems. They cover critical software engineering activities such as requirements analysis, system design, coding, testing, and documentation.

By adhering to IEEE guidelines, the developers ensured that the ASCOM Monitoring System was built with a high level of quality, reliability, and maintainability. These standards promote consistency and interoperability in software

development, enabling better collaboration and understanding among development teams. Furthermore, compliance with IEEE recommendations enhances the credibility and trustworthiness of the software, providing significant benefits to both developers and end-users.

## 3. RESULTS

### 1. Design and Development of ASCOM Monitoring System

The ASCOM Monitoring System was successfully designed and developed through the Waterfall Software Development Model and by adopting the IEEE Recommendation in Software Engineering. The systematic and sequential nature of the Waterfall Model ensured that each development phase was completed and validated before proceeding to the next. The IEEE recommendations guided the development, documentation, and testing activities, ensuring that the system met established software engineering standards. The phases involved in the entire development process are outlined and discussed below.

#### 1.1 Requirements Specification

This phase played a vital role in the development of the ASCOM Monitoring System. Requirements specification involves defining and documenting the functional and non-functional requirements that the system must satisfy to address the operational needs of the institution and its stakeholders.

Data gathering was conducted through structured interviews and consultations with key stakeholders, including the Quality Assurance (QA) personnel, faculty members, librarians, and academic administrators. These stakeholders are directly involved in ASCOM-related monitoring activities and provided comprehensive information regarding existing workflows, documentation practices, monitoring challenges, and expected system functionalities.

During this phase, data were gathered on current ASCOM monitoring processes, document submission and validation procedures, compliance tracking mechanisms, reporting practices, and coordination among offices. The identified challenges included delayed document verification, lack of centralized monitoring, inconsistent records, and limited real-time access to compliance status.

Based on the gathered information, the following key system requirements were identified:

- Centralized document submission and storage
- Role-based access for QA personnel, faculty, librarians, and administrators

- Monitoring and validation of ASCOM documents
- Automated notifications and reminders for compliance requirements
- Real-time dashboards and progress tracking
- Generation of reports for accreditation and internal assessment

The documented requirements from this phase served as the foundation for all subsequent phases of the Waterfall Model, ensuring that the system aligns with institutional quality assurance needs and supports efficient and accurate monitoring.

### 1.2 Planning

The planning phase was essential in ensuring the successful development of the ASCOM Monitoring System. During this phase, project objectives, system scope, resource requirements, timelines, and constraints were clearly defined and organized.

A comprehensive development plan was prepared to guide the implementation of the system. This plan outlined development activities, tools to be used, task assignments, and potential risks that could affect project completion. Risk mitigation strategies were also identified to address possible technical, operational, and scheduling issues.

As development progressed, regular reviews were conducted to accommodate refinements and additional requirements identified by stakeholders. These updates ensured that the system remained aligned with institutional needs while maintaining adherence to the original project goals.

### 1.3 Designing

The designing phase transformed the documented requirements into a detailed system blueprint that guided the development of the ASCOM Monitoring System. This phase focused on defining system architecture, user interactions, database structure, and interface design.

The system was designed as a web-based application accessible through standard web browsers, supporting document monitoring, validation, reporting, and analytics for quality assurance processes.

#### a. Technical Specification

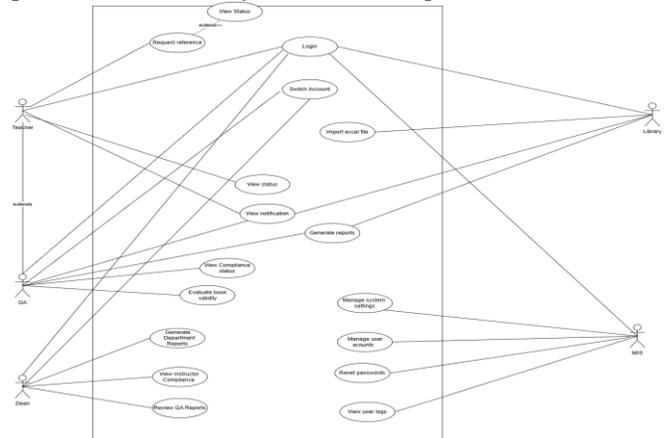
The ASCOM Monitoring System is a web-based application that requires a personal computer with internet connectivity.

The following technologies were used in the system design and development:

- HTML5
- CSS3
- JAVASCRIPT
- PHP
- BOOTSTRAP
- MYSQL

#### b. Use Case Diagram

The system's graphical user interface (GUI) was designed to provide a user-friendly and intuitive experience.

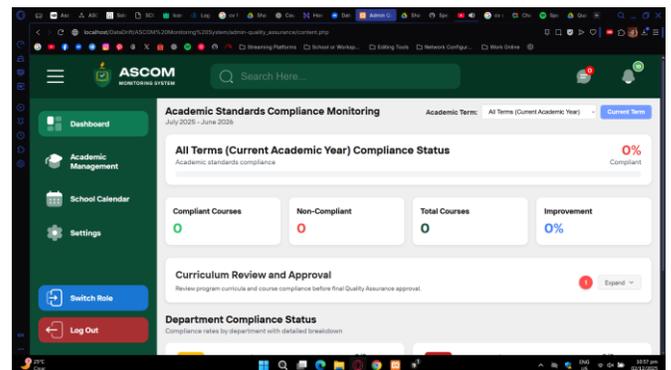


**Figure 1:** Use Case Diagram for ASCOM Reference Monitoring,

Figure 1 presents the Use Case Diagram for ASCOM Reference Monitoring, showing interactions between QA personnel, faculty members, librarians, and administrators in submitting, validating, and monitoring documents

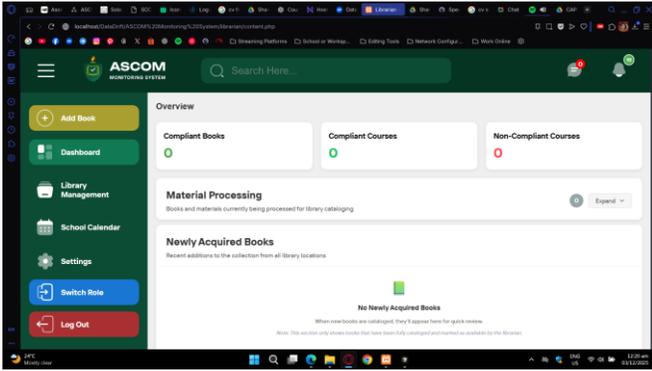
#### c. Interface Design

The GUI system ensures a seamless experience for both staff and the admin.



**Figure 2:** QA Dashboard

Figure 2 shows the Dashboard Interface, which provides an overview of ASCOM compliance status and monitoring progress.



**Figure 3:** Reference Management Interface

Figure 3 illustrates the Reference Management Interface, which enables users to upload, view, and manage academic references

#### 1.4 Development/Implementation

The development and implementation phase involved translating the system design into a functional web-based application. System modules were coded based on the approved design specifications and integrated to ensure seamless functionality.

The following tools and technologies were used during implementation:

- PHP – for server-side processing
- MySQL – for database management
- JavaScript – for client-side interaction
- Bootstrap – for responsive interface design

Core system features implemented during this phase included document submission and validation, role-based access control, monitoring dashboards, automated notifications, and report generation. Development followed best practices to ensure modularity, security, and maintainability.

#### 1.5 Testing

The testing phase ensured that the ASCOM Monitoring System met all specified requirements and quality standards. Testing activities were conducted throughout development to identify and resolve functional and technical issues.

System testing and user acceptance testing were performed with QA personnel and selected end-users. The evaluation focused on system functionality, usability, performance, and reliability. Test results confirmed that the system effectively improved monitoring efficiency, document accuracy, and accessibility of ASCOM-related information.

#### 1.6 Deployment

The deployment phase involved making the ASCOM Monitoring System accessible to end-users. The system was deployed on a web server and configured for institutional use.

Final system checks were conducted to ensure correct functionality in a real-world environment. User accounts were created, and stakeholders were oriented on system usage. Deployment ensured that authorized users could securely access the system anytime through a web browser.

#### 1.7 Maintenance

The maintenance phase focuses on the continuous monitoring, enhancement, and support of the ASCOM Monitoring System. A maintenance plan was established to address system updates, security improvements, and user support needs.

Regular monitoring ensures system reliability, data integrity, and compatibility with evolving institutional requirements. Maintenance activities also include bug fixes, performance optimization, and feature enhancements as needed.

## 4. SYSTEM EVALUATION

### IT Experts' Evaluation of ASCOM Monitoring System

- *The system was given an evaluation score of **4.61** based on the functional suitability of its features, indicating that it is **Highly Functional**.*
- *According to its performance efficiency, the system received an evaluation score of **4.60**, which signifies that it is **Highly Efficient**.*
- *The system obtained an evaluation score of **4.57** in terms of compatibility, indicating that it is **Highly Compatible** with different platforms and environments.*
- *Based on usability, the system achieved an evaluation score of **4.73**, showing that it is **Highly Usable** and easy to operate.*
- *In terms of reliability, the system received an evaluation score of **4.63**, classifying it as **Highly Reliable** during system operations.*
- *The security aspect of the system attained an evaluation score of **4.63**, indicating that the system is **Secure** in protecting data and access.*
- *According to maintainability, the system achieved an evaluation score of **4.58**, signifying that it is **Highly Maintainable** and easy to update or enhance.*
- *The system received an evaluation score of **4.57** based on portability, indicating that it is **Highly Portable** across different devices and environments.*

### End-Users Evaluation of ASCOM Monitoring System

- *According to the end-user evaluation, the system attained an evaluation score of **4.44** based on the*

*functional suitability of its features, indicating that it is **Highly Functional**.*

- *In terms of performance efficiency, the system received an evaluation score of **4.34** from the users, signifying that it is **Highly Efficient** in processing tasks.*
- *The system's compatibility was evaluated with a score of **4.35**, indicating that it is **Highly Compatible** with existing academic workflows.*
- *Based on usability, the system achieved an evaluation score of **4.43**, showing that it is **Highly Usable** and user-friendly for daily operations.*

## 5. CONCLUSION

The results lead to the following conclusions:

1. The ASCOM Monitoring System was evaluated by both IT experts and end-users through system testing to assess its overall performance, functionality, and effectiveness in supporting academic quality assurance processes.
2. The end-user evaluation indicated that the system is highly functional, efficient, compatible, and usable, reflecting its capability to support document monitoring, compliance tracking, and reporting activities within the institution.
3. The IT expert evaluation revealed that the system is highly functional, efficient, compatible, usable, reliable, secure, maintainable, and portable, demonstrating that it meets the required software quality standards and technical expectations.
4. Overall, the ASCOM Monitoring System received high evaluation ratings from both end-users and IT experts, indicating that it is a reliable, efficient, and effective web-based system that successfully passed system testing.
5. The system has strong potential to significantly improve academic quality assurance operations by providing a centralized platform for monitoring ASCOM documents, enhancing data accuracy, improving accessibility, and supporting informed decision-making.
6. Future enhancements may focus on refining the user interface, strengthening system security features, and further optimizing system performance to better address user feedback and evolving institutional requirements.

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