Software Requirements Specification

for

Learning Management System

Version 1.0 approved

Prepared by Group 5

UIT

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Revision History

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# Introduction

<The introduction presents an overview to help the reader understand how the SRS is organized and how to use it.>

## Document Purpose

This Software Requirements Specification (SRS) defines the functional and non-functional requirements for the Learning Management System (LMS). The LMS will provide tools for instructors to create, organize, and manage courses; for students to enroll in and complete courses; and for administrators to oversee system operations.  
The intended audience of this document includes project stakeholders, developers, testers, system architects, and documentation writers. It serves as the formal agreement of system requirements and the basis for design, implementation, and validation.

## Document Conventions

<Describe any standards or typographical conventions used, including the meaning of specific text styles, highlighting, or notations. If you are manually labeling unique requirement identifiers, you might specify the format here for anyone who needs to add one later.>

## Project Scope

The LMS will support online learning by providing the following capabilities:

* Instructors can create courses, upload resources (videos, PDFs, quizzes), and assign tasks.
* Students can search for courses, enroll in courses, use provided resources, and receive certificates.
* The system supports gamification features such as badges, points, and leaderboards; it also supports course notification, provides reports of student progress.
* Administrators can manage users, roles, and system configurations.  
  The LMS aims to improve the learning experience by enabling personalized learning paths, real-time progress tracking, and accessible content delivery across devices.

## References

* Existing LMS platforms (Moodle) for feature benchmarking.

# Overall Description

<This section presents a high-level overview of the product and the environment in which it will be used, the anticipated users, and known constraints, assumptions, and dependencies.>

## Product Perspective

The Learning Management System (LMS) is a standalone web-based application that may integrate with third-party tools such as video conferencing platforms (Zoom, Microsoft Teams), content repositories (Google Drive, OneDrive), and external authentication systems (LDAP, OAuth, Single Sign-On).  
It is designed to replace manual or fragmented learning processes by centralizing course creation, delivery, and progress tracking in a single platform. The system will support web browsers and mobile devices, ensuring accessibility for diverse user groups.

## User Classes and Characteristics

The LMS will serve the following primary user classes:

* **Students:** Learners who can enroll in courses, access learning materials, complete assessments. They may have varying levels of technical proficiency.
* **Instructors:** Educators who create courses, upload and organize content, assign activities, evaluate student performance, and provide feedback. They are expected to have moderate technical skills.
* **Administrators:** Users responsible for managing accounts, roles, course catalogs, and system configurations. They are expected to have advanced system knowledge.
* **External Stakeholders (optional):** Guests, auditors, or corporate partners who may access specific reports or learning materials.

## Operating Environment

* **Hardware:** Standard web servers or cloud infrastructure with support for scalability.
* **Software:**
  + Server: Linux or Windows Server environment.
  + Database: MySQL/PostgreSQL/SQL Server (to be finalized).
  + Application: Web application using standard frameworks (e.g., .NET, Java, or Node.js).
  + Client: Any modern web browser (Chrome, Edge, Firefox, Safari) and mobile devices (iOS, Android).
* **Network:** Stable internet connection required for online access.

## Design and Implementation Constraints

<Describe any factors that will limit the options available to the developers. These might include: corporate or regulatory policies; hardware limitations (timing or memory requirements); interfaces to other applications; specific technologies, tools, and databases to be used; programming language requirements or restrictions.>

## Assumptions and Dependencies

<List any assumed factors (as opposed to known facts) that could affect the requirements stated in the SRS. These could include third-party or commercial components that you plan to use, reuse expectations, issues around the development or operating environment, or constraints. The project could be affected if these assumptions are incorrect, are not shared, or change. Also identify any dependencies the project has on external factors outside its control.>

# System Features

<This template illustrates organizing the functional requirements for the product by system features, the major services provided by the product. You may prefer to organize this section by use case, mode of operation, user class, object class, functional hierarchy, stimulus, response, or combinations of these, whatever makes the most logical sense for your product.>

## User Authentication

### Description

Allow users (students, instructors) to register, log in. Priority: **High**.

### Stimulus/Response Sequences

* + User enters credentials → System validates → Grants access or shows error.
  + User requests password reset → System sends reset link to registered email.

### Functional Requirements

* + FR-001: The system provides Login modal including Email textbox, password textbox, Login button, Sign-up button and Forgot password link.
  + FR-002: The system validates credentials.
  + FR-003: The system grants access to the website after successful validation.
  + FR-004: The system provides Sign-up modal including these textboxes: Full name, Email, password, Sign-up button, Login button.
  + FR-005: The system validates Email.
  + FR-006: The system records a new account after successful validation and grants access to the website.
  + FR-007: The system informs an error message when validation is failed.
  + FR-008: The system provides Forgot password modal including Email textbox, Reset password button.
  + FR-009: The system sends Reset password link to the entered Email.
  + FR-010: The system provides Reset password modal including new password textbox, confirm password textbox and Change button.
  + FR-011: The system saves changed password and grants access to the website.

## System Feature 2 (and so on)

# Data Requirements

<This section describes various aspects of the data that the system will consume as inputs, process in some fashion, or create as outputs.>

## Logical Data Model

<A data model is a visual representation of the data objects and collections the system will process and the relationships between them. Include a data model for the business operations being addressed by the system, or a logical representation for the data that the system itself will manipulate. Data models are most commonly created as an entity-relationship diagram.>

## Data Dictionary

<The data dictionary defines the composition of data structures and the meaning, data type, length, format, and allowed values for the data elements that make up those structures. In many cases, you're better off storing the data dictionary as a separate artifact, rather than embedding it in the middle of an SRS. That also increases its reusability potential in other projects.>

## Reports

<If your application will generate any reports, identify them here and describe their characteristics. If a report must conform to a specific predefined layout you can specify that here as a constraint, perhaps with an example. Otherwise, focus on the logical descriptions of the report content, sort sequence, totaling levels, and so forth, deferring the detailed report layout to the design stage.>

## Data Acquisition, Integrity, Retention, and Disposal

<If relevant, describe how data is acquired and maintained. State any requirements regarding the need to protect the integrity of the system's data. Identify any specific techniques that are necessary, such as backups, checkpointing, mirroring, or data accuracy verification. State policies the system must enforce for either retaining or disposing of data, including temporary data, metadata, residual data (such as deleted records), cached data, local copies, archives, and interim backups.>

# External Interface Requirements

<This section provides information to ensure that the system will communicate properly with users and with external hardware or software elements.>

## User Interfaces

<Describe the logical characteristics of each interface between the software product and the users. This may include sample screen images, any GUI standards or product family style guides that are to be followed, screen layout constraints, standard buttons and functions (e.g., help) that will appear on every screen, keyboard shortcuts, error message display standards, and so on. Define the software components for which a user interface is needed. Details of the user interface design should be documented in a separate user interface specification.>

## Software Interfaces

<Describe the connections between this product and other software components (identified by name and version), including other applications, databases, operating systems, tools, libraries, websites, and integrated commercial components. State the purpose, formats, and contents of the messages, data, and control values exchanged between the software components. Specify the mappings of input and output data between the systems and any translations that need to be made for the data to get from one system to the other. Describe the services needed by or from external software components and the nature of the intercomponent communications. Identify data that will be exchanged between or shared across software components. Specify nonfunctional requirements affecting the interface, such as service levels for responses times and frequencies, or security controls and restrictions.>

## Hardware Interfaces

<Describe the characteristics of each interface between the software and hardware (if any) components of the system. This description might include the supported device types, the data and control interactions between the software and the hardware, and the communication protocols to be used. List the inputs and outputs, their formats, their valid values or ranges, and any timing issues developers need to be aware of. If this information is extensive, consider creating a separate interface specification document.>

## Communications Interfaces

<State the requirements for any communication functions the product will use, including e-mail, Web browser, network protocols, and electronic forms. Define any pertinent message formatting. Specify communication security or encryption issues, data transfer rates, handshaking, and synchronization mechanisms. State any constraints around these interfaces, such as whether e-mail attachments are acceptable or not.>

# Quality Attributes

## Usability

<Specify any requirements regarding characteristics that will make the software appear to be “user-friendly.” Usability encompasses ease of use, ease of learning; memorability; error avoidance, handling, and recovery; efficiency of interactions; accessibility; and ergonomics. Sometimes these can conflict with each other, as with ease of use over ease of learning. Indicate any user interface design standards or guidelines to which the application must conform.>

## Performance

<State specific performance requirements for various system operations. If different functional requirements or features have different performance requirements, it's appropriate to specify those performance goals right with the corresponding functional requirements, rather than collecting them in this section.>

## Security

<Specify any requirements regarding security or privacy issues that restrict access to or use of the product. These could refer to physical, data, or software security. Security requirements often originate in business rules, so identify any security or privacy policies or regulations to which the product must conform. If these are documented in a business rules repository, just refer to them.>

## Safety

<Specify requirements that are concerned with possible loss, damage, or harm that could result from use of the product. Define any safeguards or actions that must be taken, as well as potentially dangerous actions that must be prevented. Identify any safety certifications, policies, or regulations to which the product must conform.>

## [Others as relevant]

<Create a separate section in the SRS for each additional product quality attribute to describe characteristics that will be important to either customers or developers. Possibilities include availability, efficiency, installability, integrity, interoperability, modifiability, portability, reliability, reusability, robustness, scalability, and verifiability. Write these to be specific, quantitative, and verifiable. Clarify the relative priorities for various attributes, such as security over performance.>

# Internationalization and Localization Requirements

<Internationalization and localization requirements ensure that the product will be suitable for use in nations, cultures, and geographic locations other than those in which it was created. Such requirements might address differences in: currency; formatting of dates, numbers, addresses, and telephone numbers; language, including national spelling conventions within the same language (such as American versus British English), symbols used, and character sets; given name and family name order; time zones; international regulations and laws; cultural and political issues; paper sizes used; weights and measures; electrical voltages and plug shapes; and many others.>

# Other Requirements

<Examples are: legal, regulatory or financial compliance, and standards requirements; requirements for product installation, configuration, startup, and shutdown; and logging, monitoring and audit trail requirements. Instead of just combining these all under "Other," add any new sections to the template that are pertinent to your project. Omit this section if all your requirements are accommodated in other sections. >

# Glossary

<Define any specialized terms that a reader needs to know to understand the SRS, including acronyms and abbreviations. Spell out each acronym and provide its definition. Consider building a reusable enterprise-level glossary that spans multiple projects and incorporating by reference any terms that pertain to this project.>

# Analysis Models

<This optional section includes or points to pertinent analysis models such as data flow diagrams, feature trees, state-transition diagrams, or entity-relationship diagrams. You might prefer to insert certain models into the relevant sections of the specification instead of collecting them at the end.>