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SOFTWARE REQUIREMENTS SPECIFICATION

**For**

**e LearningManagement System**

**Prepared by:-**

*T. HARIBABU*

*A.MADHAN*

*A.SIVANANTHAM*

# Introduction

## Purpose

The main objective of this document is to illustrate the requirements of the project e Management system. The document gives the detailed description of the both functional and non-functional requirements proposed by the client .The purpose of this project is to provide a friendly environment to maintain the details of books and library members .The main purpose of this project is to maintain easy circulation system using computers and to provide different reports. This project describes the hardware and software interface requirements using ER diagrams and UML diagrams.

## Document Conventions

* + - Entire document should be justified.
    - Convention for Main title

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* + - Convention for Sub title

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* + - Convention for body

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## Scope of Development Project

The scope of the E-Learning Management System (E-LMS) development project is dedicated to the transformation of traditional learning methods into an advanced, internet-based application. The primary goal is to provide instructors and students with a seamless platform for managing online courses, enabling instructors to create and deliver courses, and students to enroll, track progress, and participate in assessments. The E-LMS serves as a comprehensive user interface, facilitating efficient interactions and addressing the evolving needs of educational institutions and organizations transitioning to online learning.

It offers features such as course management, enrollment tracking, and progress monitoring, ensuring adaptability and customization based on specific requirements. The project can be easily implemented under various situations. The language used for developing the project is Java as it is quite advantageous than other languages in terms of performance, tools available, cross platform compatibility, libraries, cost (freely available), and development process.

## Definitions, Acronyms and Abbreviations

JAVA -> platform independence SQL-> Structured query Language ER-> Entity Relationship

UML -> Unified Modeling Language

IDE-> Integrated Development Environment SRS-> Software Requirement Specification

## References

* + - Books

 Software Requirements and Specifications: A Lexicon of Practice, Principles and Prejudices (ACM Press) by Michael Jackson

"E-Learning by Design" by William Horton

"The Online Teaching Survival Guide: Simple and Practical Pedagogical Tips" by Judith V. Boettcher and Rita-Marie Conrad

* + - Websites

**https://** [**https://www.scribd.com/document/517662301/E-learning-management-system-Project-Report**](https://www.scribd.com/document/517662301/E-learning-management-system-Project-Report)

[**http://ebookily.net/doc/srs-library-management-system**](http://ebookily.net/doc/srs-library-management-system)

# Overall Descriptions

## Product Perspectiv

Use Case Diagram of Library Management System

This is a broad level diagram of the project showing a basic overview. The users can be either staff or student.. This System will provide a search functionality to facilitate the search of resources. This search will be based on various categories viz. book name or the ISBN. Further the library staff personnel can add/update the resources and the resource users from the

system.The users of the system can request issue/renew/return of books for which they would have to follow certain criteria.

## Product Function

Entity Relationship Diagram of Library Management System

The Online Library System provides online real time information about the books available in the Library and the user information. The main purpose of this project is to reduce the manual work. This software is capable of managing Book Issues, Returns, Calculating/Managing Fine, Generating various Reports for Record-Keeping according to end user requirements. The Librarian will act as the administrator to control members and manage books. The member’s status of issue/return is maintained in the library database. The member’s details can be fetched by the librarian from the database as and when required. The valid members are also allowed to view their account information.

## User Classes and Characteristics

The system provides different types of services based on the type of users . For an e-learning management system (e-LMS), there are distinct user roles and their corresponding features:

User Classes and Characteristics for E-Learning Management System:

1. Admin/Instructor:

- Can create and manage courses.

- Has access to student enrollment and course completion reports.

- Can add, edit, and organize course content.

- Can communicate with and provide support to students.

2. Student/Learner:

- Can enroll in available courses.

- Can track their course progress and view completion certificates.

- Can access course materials and resources.

- Can interact with instructors and peers through discussion forums or messaging features.

These roles and their associated features aim to provide a tailored experience for both administrators and learners within the e-learning environment.

## Operating Environment

The product will be operating in windows environment. The e-Learning Management System is a website and shall operate in all famous browsers, for a model we are taking Microsoft Internet Explorer,Google Chrome,and Mozilla Firefox.Also it will be compatible with the IE 6.0. Most of the features will be compatible with the Mozilla Firefox & Opera 7.0 or higher version. The only requirement to use this online product would be the internet connection.

The hardware configuration include Hard Disk: 40 GB, Monitor: 15” Color monitor, Keyboard: 122 keys. The basic input devices required are keyboard, mouse and output devices are monitor, printer,Camera etc.

## Assumptions and Dependencies

The assumptions are:-

* + - The coding should be error free
    - The system should be user-friendly so that it is easy to use for the users
    - The information of all users, courses and instructors must be stored in a database that is accessible by the website
    - The system should have more storage capacity and provide fast access to the database
    - The system should provide search facility and support quick transactions
    - The Learning System is running 24 hours a day
    - Users may access from any computer that has Internet browsing capabilities and an

Internet connection

* + - Users must have their correct usernames and passwords to enter into their online accounts and do actions

The dependencies are:-

* + - The specific hardware and software due to which the product will be run
    - On the basis of listing requirements and specification the project will be developed and run
    - The end users (admin) should have proper understanding of the product
    - The system should have the general report stored
    - The information of all the users must be stored in a database that is accessible by the Library System
    - Any update regarding the courses and learning materials in the e-learning management system must be recorded in the database, ensuring that the entered data is accurate and up-to-date.

## Requirement

Software Configuration:-

This software package is developed using java as front end which is supported by sun micro system. Microsoft SQL Server as the back end to store the database.

Operating System: Linux, windows 11, Windows 10 Language: Java Runtime Environment, JavaFX, scene Builder.

Database: MS SQL Server (back end)

Hardware Configuration:-

Hard Disk: 200GB

RAM: 32 MB or more

Servers: High-performance Servers

## Data Requirement

In this e-learning management system project, the system will process user queries such as account creation, course selection, and enrollment. Upon receiving these queries, the system will provide solutions related to course access, progress tracking, and user account details. When users request their account details, the system will display the date, time, and the courses currently associated with their account.

# External Interface Requirement

## GUI

The E-Learning Management System (E-LMS) is designed to offer a user-friendly graphical interface for both administrators and users. Administrators can efficiently perform tasks such as creating, updating, and viewing course details. The GUI includes the following features:

* + - Users can generate quick reports, such as course enrollment and progress within specific time frames.
    - It provides stock verification and search facility based on different criteria.
    - The user interface must be customizable by the administrator
    - All the modules provided with the software must fit into this graphical user interface and accomplish to the standard defined
    - The user interface is customizable by administrators, allowing them to tailor it according to their preferences.
    - The user interface should be able to interact with the user management module and a part of the interface must be dedicated to the login/logout module

Login Interface:-

In the login interface, users can either register or log in. For new users, registration involves entering details to create an account. Once registered, users can log in using their username and password. Incorrect entries prompt an error message.

Search:-

Users can search for courses by entering the course name, providing a streamlined process for locating desired content.

Categories View:-

The system includes a categories view, presenting available course categories and empowering administrators to manage them by adding, editing, or deleting categories.

Administrator Control Panel:-

This control panel allows administrators to oversee user management, including adding or removing users, as well as managing course resources, including addition, editing, or removal of courses.

# System Features

The users of the system should be provided the surety that their account is secure. This is possible by providing:-

* User Authentication and Validation: Members should be required to authenticate themselves using unique member IDs or usernames along with secure passwords. This helps ensure that only authorized individuals have access to the system.
* Administrator Monitoring: The administrator should have the capability to monitor and manage accounts effectively. This includes updating account statuses, flagging attempts by members to exceed resource access limits, and enforcing penalties for late submissions or other policy violations.
* It is important to enforce strict privacy measures, ensuring that members can only access and manage their own accounts. The administrator should have exclusive access to view and manage all member accounts, maintaining proper accountability and data security.

# Other Non-functional Requirements

## Performance Requirement

The proposed system that we are going to develop will be used as the Chief performance system within the different campuses of the university which interacts with the university staff and students.

## The e-learning management system is designed to meet rigorous performance requirements that ensure an efficient and effective platform for educators and learners alike.

## The system should be scalable to support a maximum number of concurrent users.

## Integration with other learning management systems (LMS) or external tools is subject to specified performance requirements.

## Video streaming quality is specified to ensure clear and smooth playback, potentially incorporating adaptive bitrate streaming for varying user internet speeds

## Safety Requirement

safety requirements for an e-learning management system are integral to ensuring the secure handling user data, privacy, and the overall integrity of the platform. Data security is paramount, necessitating robust encryption mechanisms for all user data to prevent unauthorized access or potential breaches.

The implementation of secure user authentication processes, including multi-factor authentication, is critical to verifying user identities and preventing unauthorized entry.

## Security Requirement

* + - System will use secured database
    - System will have different types of users and every user has access constraints
    - Proper user authentication should be provided
    - No one should be able to hack users’ password
    - Ensure data encryption for sensitive information such as user credentials, grades, and personal details.

## Requirement attributes

## The user requirements for an e-learning management system (LMS) are fundamental to creating a platform that effectively serves the needs of both educators and learners

* + - The project should be open source

## A key expectation is an intuitive user interface, allowing easy navigation and access to courses and materials.

## The system should support a straightforward registration process, enabling users to create and manage their profiles seamlessly.

## User Requirement

The users of the system are members and Librarian of the university who act as administrator to maintain the system. The members are assumed to have basic knowledge of the computers and internet browsing. The administrators of the system should have more knowledge of the internals of the system and is able to rectify the small problems that may arise due to disk crashes, power failures and other catastrophes to maintain the system. The proper user interface, user manual, online help and the guide to install and maintain the system must be sufficient to educate the users on how to use the system without any problems.

The admin provides certain facilities to the users in the form of:-

* + - Backup and Recovery
    - Forgot Password
    - Data migration i.e. whenever user registers for the first time then the data is stored in the server
    - Data replication i.e. if the data is lost in one branch, it is still stored with the server
    - Auto Recovery i.e. frequently auto saving the information
    - Maintaining files i.e. File Organization
    - The server must be maintained regularly and it has to be updated from time to time

# Other Requirements

## Data and Category Requirement

## For an e-learning management system (LMS), there are various data and category requirements to consider. Users are typically categorized as teaching staff, librarians, administrators, and students, each with different access rights. Administrators may have the ability to modify, delete, and append data, while other users, except librarians, may only have rights to retrieve information from the database. Similarly, books are also categorized, and the LMS should display relevant data based on these categories, using a specific coding format.

## Appendix

A: Administrator, Authentication, Authorization B: Courses, Content Management C: Curriculum, Compliance, Competency D: Data Management, User Dependencies G: Grading, Gamification K: Knowledge Transfer L: Learning Path, LMS, Learner M: Modules, Multimedia N: Notifications, Navigation O: Online Assessments P: Progress Tracking, Performance Metrics R: Reporting, Resource Management S: Student Support, Security Measures U: User Interface, User Experience, User Groups

## Glossary

The following are the list of conventions and acronyms used in this document and the project as well:

* + - Administrator: A login id representing a user with user administration privileges to the software
    - LMS (Learning Management System)
    - DLC (Digital Learning Content)
    - SQL: Structured Query Language; used to retrieve information from a database
    - SQL Server: A server used to store data in an organized format
    - CMS (Content Management System)
    - User Interface Layer: The section of the assignment referring to what the user interacts with directly
    - SCORM (Sharable Content Object Reference Model)
    - Data Storage Layer: The section of the assignment referring to where all data is recorded
    - VLE (Virtual Learning Environment)
    - LTI (Learning Tools Interoperability).
    - Class diagram: It is a type of static structure diagram that describes the structure of a system by showing the system’s cases, their attributes, and the relationships between the classes
    - Interface: Something used to communicate across different mediums
    - Unique Key: Used to differentiate entries in a database

## Class Diagram

A class is an abstract, user-defined description of a type of data. It identifies the attributes of the data and the operations that can be performed on instances (i.e. objects) of the data. A class of data has a name, a set of attributes that describes its characteristics, and a set of operations that can be performed on the objects of that class. The classes’ structure and their relationships to each other frozen in time represent the static model. In this project there are certain main classes

which are related to other classes required for their working. There are different kinds of relationships between the classes as shown in the diagram like normal association, aggregation, and generalization. The relationships are depicted using a role name and multiplicities. Here ‘Librarian’, ‘Member’ and ‘Books’ are the most important classes which are related to other classes.