**SRS Document Development**

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**Software Requirements Specification (SRS)**

The software requirements have been detailed in the following template. The template aligns with the Essential Software Requirement Specification (SRS) – IEEE standard (Tsui et al., 2018). The course text, [Software Testing Foundations: A Study Guide for the Certified Tester Exam (4th ed.)](https://uagc.instructure.com/courses/140477/modules/items/7169874), and [Software Requirement Specification (SRS) Format by GeeksforGeeks](https://www.geeksforgeeks.org/software-requirement-specification-srs-format/#general-description) were referenced for the document's creation.

Software Requirements Specification

for

Education Portal Management System

Version 1.0 approved

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Order Express LLC

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Revision History

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# Introduction

## Purpose

This product is the initial version of Education Portal Management System version 1.0. This online course management system enables students to register, create profiles, and manage enrollments. This project's scope includes user registration, password management, profile management, and course enrollment management. The primary features include a landing page, login page, registration page, and the associated database and connections. The system is a web browser application that will interface with database management systems (DBMS) to handle data storage, retrieval, and management tasks.

## Document Conventions

All major headings in this document are formatted in 18-point font, while subheadings are in 14-point font, both using the Times font. The body text is set in an 11-point Arial font. The References section at the end of the document provides full citations. This document meets the Essential Software Requirements Specification (SRS) – IEEE standard. Priorities for higher-level requirements are assumed to be inherited by detailed requirements unless otherwise specified. Important notes or areas requiring attention will be highlighted in yellow.

## Intended Audience and Reading Suggestions

This document is intended for a diverse audience, including developers, project managers, users, testers, designers, documentation writers, compliance officers, and other stakeholders involved in the Education Portal Management System project. Its purpose is to provide clarity and understanding, serve as a basis for project planning, guide development teams, facilitate testing and quality assurance, support change management, and ensure stakeholder satisfaction (Rvvverendra400, 2024). Technical personnel involved in the software development process are advised to read this document in its entirety (Spillner et al., 2014). It should be read sequentially to ensure comprehensive understanding. While all stakeholders are encouraged to review the entire document, special attention should be paid to the requirements in sections three and five.

The document begins with overview sections that provide the high-level requirements, followed by sections describing the detailed requirements (Tsui et al., 2018). It includes an overall description of the product, covering product perspective, product functions, user classes and characteristics, operating environment, design and implementation constraints, user documentation, and assumptions and dependencies. The document then outlines the external user, hardware, software, and communication requirements. System features are detailed, and nonfunctional requirements for performance, safety, security, quality attributes, and business rules are identified. Any additional requirements not covered in previous sections are listed towards the end of the document. Appendix A defines relevant terms, while Appendix B provides analysis models.

## Project Scope

The scope of this project encompasses user registration, profile management, and course enrollment management. The system will feature a landing page that introduces the system and guides users to register for an account or sign in. It will ensure unique user IDs and securely store passwords and profiles in a database. Registered users can log in to the system anytime to view the courses available each semester, as offered courses vary between spring, summer, and fall. Students will have the ability to enroll in courses and cancel their enrollments. The system will enforce course enrollment caps based on each class's maximum capacity. Additionally, the system will enable students to add themselves to a waiting list and provide notifications when their status changes to enrolled.

This project aims to enhance user experience by offering an efficient, web-accessible system for managing profiles and registering for classes. It will provide real-time, accurate course availability, ensuring the university maintains modern, high-quality service standards. The system will align with the institution's business logic, supporting university staff by automating processes to manage high demand during enrollment periods and eliminating errors caused by human mistakes. It is designed to scale with institutional expansion and offers centralized database management to efficiently access and track user information. By implementing this system, the university aims to modernize administrative processes, reduce operational costs, and improve student satisfaction. This aligns with the university’s strategic goals of embracing digital transformation, improving service quality, and supporting sustainable growth.

## References

The following are documents referred to in this SRS document:

* Psinas, M. (2012, March 12). Role Based Access Control in PHP. SitePoint.

[Role Based Access Control in PHP — SitePoint](https://www.sitepoint.com/role-based-access-control-in-php/)

* [Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/?form=MG0AV3)
* [Cybersecurity | NIST](https://www.nist.gov/cybersecurity)
* [phpMyAdmin - Downloads](https://www.phpmyadmin.net/downloads/)
* [Bootstrap · The most popular HTML, CSS, and JS library in the world.](https://getbootstrap.com/)
* [General Data Protection Regulation (GDPR) – Legal Text](https://gdpr-info.eu/)
* [What is FERPA? | Protecting Student Privacy](https://studentprivacy.ed.gov/faq/what-ferpa)

# Overall Description

## Product Perspective

The education portal management system is a new, self-contained system. The user interface includes landing, registration, login, profile management, and course enrollment pages. The landing page allows users to access the login page or registration page. The registration page lets students register a user account with a unique ID and password, collecting profile information, including username, phone, email, and other necessary information. The login page authenticates users to ensure only authorized access is permitted (Spillner et al., 2014). The course enrollment page enables users to view available courses depending on the semester (spring, summer, and fall), enroll in a course, cancel enrollment, and add themselves to a waiting list if a course is full. Additionally, the system will notify the first user on the waiting list if an opening in the course becomes available.

The backend services include user management and course management. User management handles registration, authentication, and profile management. Course management will manage course information, enrollment, waitlist functionality, and notifications to inform users about their enrollment status. The database will store user information, including user profiles, unique user IDs, and passwords. Additionally, the database will store course details, enrollment information, and waitlists.

**Figure 1**

A diagram of a software company

AI-generated content may be incorrect.*Education Portal Management System High-Level Diagram*

## Product Features

The functions of the product are as follows (details will be provided in Section 3):

* User registration: Users can create an account with a unique ID and password.
* Authentication: Ensures authorized access only to registered users in the database.
* Course management: Manages course information, capacity control, enrollment, and canceled enrollments.
* Waitlist management: Allows users to be added to a weight list and receive notification if an opening becomes available.

(UML diagrams, such as class, sequence, and activity diagrams are provided in the UML Design Document. A high-level data flow diagram (DFD) will also be included to illustrate the major groups of related requirements and how they relate. An SRS is an evolving document that will be updated and amended as necessary throughout the development process (Chikh & Alajmi, 2024).)

## User Classes and Characteristics

User classes will include administrators, admission office personnel, students, and instructors. Administrators can access the entire system and configure changes as necessary. Administrators provide technical expertise and hold the highest security and privileges. Admission office personnel can view student accounts, edit and update user profiles, and add and edit courses. The admission staff are educated and skilled with sufficient expertise to operate the system with basic troubleshooting skills. Students can view online courses, manage enrollment, and edit and update user profiles. Students are provided system instructions and education during freshman onboarding. Instructors can view and edit courses. Instructors have moderate technical expertise and are capable of sufficiently using the system. [Role-Based Access Control](https://www.sitepoint.com/role-based-access-control-in-php/) (RBAC) will manage user classes, as detailed in the referenced link (Psinas, 2012).

## Operating Environment

The application is a web-based platform accessible via modern web browsers such as Chrome, Edge, and Firefox. It runs in a cloud environment with a web-based front end and a MySQL database back end. The system is accessible through a secure browser and can be viewed on various devices, including personal computers, tablets, and mobile devices. The cloud environment operates on server infrastructure provided by cloud service providers. The MySQL database is hosted by a server hosting service, with additional space available for purchase to ensure system scalability.

## Design and Implementation Constraints

The system must adhere to the following regulations and standards:

* [Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/?form=MG0AV3)
* [Cybersecurity | NIST](https://www.nist.gov/cybersecurity)
* [General Data Protection Regulation (GDPR)](https://gdpr-info.eu/)
* [Family Educational Rights and Privacy Act (FERPA)](https://studentprivacy.ed.gov/faq/what-ferpa)

The application will be provided in English and will apply good programming practices. The system will use HTTPS, TCP/IP, and SFTP protocols for secure communication. It will implement the business logic of the university and follow university policy. The system will use PhpMyAdmin to manage and access the MySQL database.

The initial system version will be a closed system but can be modified later to interact with existing systems. The cloud environment operates on server infrastructure provided by cloud service providers, ensuring scalability and reliability. Security considerations will include regular updates and monitoring to protect against vulnerabilities. Daily general security and system monitoring will be the responsibility of the university's cybersecurity department. Order Express LLC will handle initial personnel training upon system deployment. They will also provide an online user guide and educational materials for the student onboarding course. Additionally, Order Express will advise on the material covered in the onboarding class. Instructors will be responsible for administering the onboarding course.

## User Documentation

The following user documentation will be provided for the education portal management system:

* Online user guide (available in PDF and HTML formats)
* Educational materials for the student onboarding course (including interactive tutorials and PDF guides)

## Assumptions and Dependencies

The system dependencies and assumptions are as follows:

* The system uses a third-party hosting service and depends on their infrastructure.
* The system uses PhpMyAdmin to manage the database.
* The system integrates with a MySQL database.
* To ensure compatibility, the system requires one of the following updated web browsers: Chrome, Edge, or Firefox.
* The system will use PHP, JavaScript, HTML, and CSS.
* The system depends on reliable network infrastructure and connectivity with the necessary security precautions such as firewalls and intrusion detection and prevention systems.
* The system must follow the regulations and standards provided in section 2.5.

Note: Alterations in the assumptions and dependencies could impact the requirements outlined in the SRS.

# System Features

## Registration, Profile, and Authentication

3.1.1 Description and Priority

The system provides a feature for user registration. The user form will be created from the application form and include the applicant's name, phone, email, and necessary information. The system ensures that each registered user has a unique user ID. The system provides login capabilities so authorized users may access the system. If the user is not registered, they cannot enter the system. If registration and user authentication are not correctly implemented, security risks could be imposed, including unauthorized access or system unavailability. This feature has high prioritization.

3.1.2 Stimulus/Response Sequences

1. Registration Stimulus: At the landing page, the user selects registration. The user is directed to the registration page. The user fills out the registration form and clicks submit.

Registration Response Sequence: The system creates the new user account, generates a unique user ID, and saves profile information in the database.

1. Login Stimulus: The user logs into the system using their unique ID and password.

Login Response Sequence: The user provides credentials to log in. The system checks that the credentials exist in the database. If a positive match is found, the system grants the user access. If no match is found, the system denies access and responds with an error message instructing the user that their credentials were invalid and to retry login.

1. Unique ID Stimulus: The user attempts to create a login with an existing ID.

Unique ID Response Sequence: The system validates the user ID against other user IDs stored in the database. A match is found. The system rejects the registration form with an error message to inform the user that the ID is unavailable and to select a different ID.

3.1.3 Functional Requirements

The functional requirements for this feature are as follows:

* REQ-1: The system will provide a registration page with a form that collects name, phone, email, etc.
* REQ-2: Each new user will have a unique ID. If the ID already exists, the system will provide an error message.
* REQ-3: The system will store the registration information and credentials in the database as the user profile.
* REQ–4: The system must allow registered users to log into it with their credentials. The system will provide an error message if the user cannot be validated.

## Course Management

3.2.1 Description and Priority

The system will provide functionality that allows users to view courses, enroll in courses, cancel course enrollment, and add themselves to a course waiting list if the course is at maximum capacity. If a course is at maximum capacity and a user cancels enrollment, the system will notify the first user on the waiting list. Additionally, the system will allow courses to have different maximum capacities. The course management function is designed to enhance the user experience, allowing users to manage courses at their convenience. If course management is not implemented correctly, it could lead to disruptions in academic operations, including over-enrollment, inability to enroll in or view courses, and poor user experience. Such issues may result in a decrease in student admissions to the university. The prioritization of this feature is high.

3.2.2 Stimulus/Response Sequences

1. Course View Stimulus: A user selects a semester to view all available classes. Course View Response Sequence: A request is made for the system to query all available classes during a specific semester (spring, summer, or fall). The system queries the database. The query is provided to the user to view. The query provides information on class, description, and enrollment capacity.
2. Enroll Stimulus: A user attempts to enroll in a class.

Enroll Response Sequence: The system receives the enrollment request and verifies that the class capacity is less than the maximum for the selected course. If the course is less than the maximum capacity, the user will be added to the course list, and the course capacity will increase by one.

1. Cancel Enrollment Stimulus: A user cancels a class they are currently enrolled in.

Cancel Enrollment Response Sequence: The system receives the request to cancel enrollment. The system decreases the course's current capacity by one. If the course has users on the waiting list, it will notify the first user on the list of availability.

1. Full Enrollment Stimulus: A course is full, and a user adds themselves to the waiting list.

Full Enrollment Response Sequence: The system receives the request to be added to the waiting list. The system adds the user to the waiting list. Users are added sequentially in the order in which requests are made.

3.2.3 Functional Requirements

* REQ–5: The system must allow all users to view available courses by semester (spring, summer, fall).
* REQ–6: The system must allow users to view courses in any semester.
* REQ–7: Each course must be assigned a maximum capacity.
* REQ–8: The system must allow the maximum capacity to be configured by course.
* REQ–9: The system must validate that the current number of enrolled students is less than the maximum capacity before validating enrollment requests.
* REQ–10: Each course must have a waiting list associated with it.
* REQ–11: The waiting list must be prioritized in sequential order of user requests.
* REQ–12: The system must allow users to enroll in courses.
* REQ–13: The system must update the current course capacity with successful enrollment completion.
* REQ–14: The system must allow users to cancel course enrollment.
* REQ–15: After enrollment cancellation, the system must update the current course capacity.
* REQ–16: If a course has users on a waiting list and a user cancels enrollment in that course, the system must notify the first user on the waiting list of availability.

# External Interface Requirements

## User Interfaces

The application will be accessible via a web browser. The header of each document will feature the university name and logo. A navigation bar at the top will provide links to the login, registration, profile, courses, and home pages. The application will exclusively use the Arial font, and all buttons will have a black border. The layout shown in Figure 2 will be consistent across all application pages. The interface will comply with [Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/?form=MG0AV3) and use contrasting colors to enhance visibility. The product will implement an HTML responsive web design to ensure compatibility with all screen sizes and resolutions.

**Figure 2**

A screenshot of a computer

AI-generated content may be incorrect.Sample Screen Image

## Hardware Interfaces

This is a cloud-based application accessed via a browser. The application will be accessible to personal computers, desktops, tablets, and smartphones with up-to-date Chrome, Firefox, or Edge browsers. This system will leverage existing hardware and networking resources. Data will be transported via communication protocols, including HTTPS, TCP/IP, and SFTP. Data interaction includes user input, authentication, storage, and retrieval. Data formatting will align with [Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/?form=MG0AV3) and reflect the business needs and logic of the university.

## Software Interfaces

The system will adhere to [ISO/IEC 27001:2022 - Information Security Management Systems](https://www.iso.org/standard/27001?form=MG0AV3) standards. It will connect to an Employee Portal Database to store and retrieve user and course information. Information will be exchanged via communication protocols, including HTTPS, TCP/IP, and SFTP. [PhpMyAdmin 5.2.2](https://www.phpmyadmin.net/downloads/) is used to manage the database. PhpMyAdmin used MySQL servers. The application will be accessible to the latest version of Chrome, Edge, or Firefox web browser via a hosting service where the application files will be stored. The [Bootstrap](https://getbootstrap.com/) framework will support front-end development and files.

## Communications Interfaces

The application will function via a web browser and follow HTTPS, TCP/IP, and SFTP protocols. SSL/TLS certificates will be used to secure communications. Data will be displayed in the browser using HTML5, CSS3, and JavaScript. Information will be collected using electronic forms and stored on the Employee Portal Database. The application will use SQL queries to store and retrieve information from the database.

# Other Nonfunctional Requirements

## Performance Requirements

The system should respond to requests within **two seconds** to maintain user engagement and provide seamless interaction. It should handle at least **10,000 concurrent registrations and 50,000 concurrent course enrollment activities** to accommodate high-volume enrollment periods. User authentication must be validated within **two seconds** of submission to ensure secure access. The system must also respond to query requests within **two seconds**. Open-course availability notifications should be sent within **three seconds** after a user cancels their course. The system should accommodate at least **150,000 user profiles** to include all students and personnel. System uptime should be **99.9%** to ensure availability for students and staff. Additionally, the system should be scalable to support university growth and increased user load.

## Safety Requirements

The system will follow the [General Data Protection Regulation (GDPR)](https://gdpr-info.eu/) and the [Family Educational Rights and Privacy Act (FERPA)](https://studentprivacy.ed.gov/faq/what-ferpa). Sensitive data transmission will follow HTTPS and SSL/TLS protocols. User input will be validated before submission. Data corruption or loss could impact the accuracy of user-profiles and course information. Data validation checks and integrity audits should be performed regularly. The system’s database should be backed up regularly, at least once daily. Good programming practices will be followed to ensure queries do not result in unintentionally lost or altered data.

## Security Requirements

The system will follow the [NIST Cybersecurity Standards](https://www.nist.gov/cybersecurity). User access will be authenticated. Users will be provided with a unique ID and password stored in the database that will be used for authorization validation. Strong password policies will be enforced. The system will follow the [General Data Protection Regulation (GDPR)](https://gdpr-info.eu/) and the [Family Educational Rights and Privacy Act (FERPA)](https://studentprivacy.ed.gov/faq/what-ferpa). Only necessary information will be collected and stored to mitigate risk if a breach does occur. An incident response plan, recovery plan, and business continuity plan should be outlined to mitigate risk if a breach does occur (Wills, 2022). Sensitive data transmission will follow HTTPS and SSL/TLS protocols. User input will be validated before submission. User access and permission will be managed using [Role-Based Access Control](https://www.sitepoint.com/role-based-access-control-in-php/). The system should be continuously monitored.

## Software Quality Attributes

System availability should have an uptime of 99.9%. The system should have an error rate of less than 0.01% to ensure reliability. System usability should be inherent to users, achieving at least 85% user satisfaction approval during system validation. The system should be easy to maintain and repair, with maintenance tasks completed within 24 hours and an average resolution time of 8 hours. The system should be accessible on any device that supports an up-to-date Chrome, Edge, or Firefox web browser. The system should be scalable to accommodate the university's growth and increased user load.

# Other Requirements

The development and deployment of the system must stay within the budget specified by the university. The project should be delivered within the agreed-upon timeframe.

Appendix A: Glossary

**Database:** An organized collection of data.

**HTTPS (Hypertext Transfer Protocol Secure):** A secure version of HTTP, the protocol used for transferring data over the internet.

**Landing Page:** The initial webpage users see when accessing the Education Portal Management System.

**Uptime:** The percentage of time that a system is available and functioning correctly.

**User ID:** A unique identifier assigned to each registered user within the system.

Appendix B: Analysis Models

Please refer to the UML Design Model document.

Appendix C: Issues List

The section will be added as the project progresses. It will contain a dynamic list of the open requirements issues that remain to be resolved, including TBDs, pending decisions, information that is needed, conflicts awaiting resolution, and the like.

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The link to the public repository, eduPortal, for the project: <https://github.com/TheresaMusselman/eduPortal.git>