COMSATS University Vehari Campus

Software Requirement Specification
(SRS DOCUMENT)

for

E Learning Platform

Version 1.5

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Revision History

Name	Date	Reason for Changes	Version

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Chapter 1

Introduction

The e-learning platform project will create an online space where students can easily access learning materials and courses. Users will be able to sign up, choose from different courses, watch video lessons, read content, and take notes. It will include features like tracking progress, categorizing courses, and providing certificates once a course is completed. The goal is to make learning easier and more interactive. [5]

1.1 Scope

The scope of an E-learning platform in daily life is substantial, as it has become a critical component of education and skill development worldwide. E-learning platforms break geographical barriers, providing access to education for people in remote areas or underserved communities. It allows anyone with internet access to learn and grow, expanding educational opportunities beyond traditional classrooms. E-learning platforms support continuous professional

development, offering courses in everything from software skills to soft skills. Many people use these platforms to gain certifications, develop new skills, or upskill to advance in their careers. [4]

1.2 Module

The major modules of the E-Learning Platform are include:

• **User Module:** Manages user registration, login, authentication, and roles (e.g., student or instructor). This module ensures secure access and helps personalize the platform experience based on user type.

• **Courses Module:** Allows instructors to create, edit, and delete courses, upload materials (like videos and PDFs), and categorize courses for easy browsing. This module serves as the core for content management.

• **Enrollment Module:** Facilitates course browsing and enrollment, allowing students to sign up for courses. It manages enrollment statuses and provides access to enrolled course materials.

• **Payment Module:** Easily pay your course fees online. Through our secure payment gateway, you can use multiple payment options such as credit/debit cards, jazzcash, and easypaisa. Your transaction will be completely safe and fast.

• **Certificate Generation Module:** Automatically generates completion certificates for students once they finish a course. The module includes options for downloading and sharing certificates online.

[3]

1.3 Overview

An e-learning platform is a digital learning environment that offers users (students and instructors) access to educational resources, structured courses, assessments, and interactive features from anywhere with internet connectivity. Its purpose is to facilitate convenient, flexible, and effective learning through technology.Users can create accounts, log in securely, and have access tailored to their roles, such as students or instructors. It ensures that each user has a customized experience.Instructors can design and manage courses by uploading resources like videos. Courses are categorized by subject, difficulty, and type, making navigation and access to relevant materials easier.[2]

Chapter 2

Overall Description

An e-learning platform is an online environment designed to facilitate education and training through digital means. It typically provides tools and resources for students and educators to access, create, and manage educational content, promoting an interactive learning experience.Users who can enroll in courses, access learning materials, complete assessments, and track their progress.Users who can create and manage courses, upload content, design assessments, and view student progress.Users who oversee platform operations, manage user accounts, handle course enrollments, and maintain the content library. [6]

2.1 Product Perspective

The product perspective of an e-learning platform outlines how it fits within an existing system or environment, its intended use cases, and the interactions between users and features.It supports integration with third-party applications, such as Google Classroom, Zoom

for live classes, or assessment tools like Proctoring Software. [1]

2.2 User Classes and Characteristics

The user classes for the E-Learning System include:

• **Admins:** Manage online course in which the student can learn the course easily

• **User:** user can come get to login into system ann then enroll into the subject. if they choose the paid course they will payment by easypaisa, jazzcash, debitcard etc.

2.3 Operating Environment

The software will function in the following environment:

- **Hardware environment:** A reliable web server is essential, typically using high-performance hardware to support multiple concurrent users.
- **software environment:** For backend your project, you're using PHP for server-side scripting with an SQL database for data storage and management. For frontend HTML, CSS, and JavaScript will render the user interface. PHP can be used to generate dynamic web pages. SQL-based databases (e.g., MySQL) for managing users, courses, and content data.
- **Web Browsers:** Apache or NGINX are commonly used for hosting PHP applications.
- **Platform Compatibility:** Ensure compatibility with major web browsers like Chrome, Firefox, Safari, and Edge.The e-learning platform should be OS-agnostic, allowing access from Windows, macOS, Linux, Android, and iOS. .

- **Scalability and Performance Requirements:** The system should handle large numbers of simultaneous users, especially during peak hours.For future growth, the backend should support horizontal or vertical scaling if needed.

2.4 Design and Implementation Constraints

Design and implementation constraints for the E-Learning platform include:

- **CON-1:** Use PHP for server-side scripting.
- **CON-2:** Utilize MySQL for data storage.
- **CON-3:** Develop the frontend with HTML, CSS, JavaScript, and Bootstrap for cross-browser compatibility and responsive design.
- **CON-4:** APIs for integration with existing educational management systems.

Chapter 3

Requirement Identifying Technique

This section explores various techniques for identifying requirements that are crucial in developing detailed functional requirements specifications. Identifying requirements is essential as it forms the basis for designing and building systems that effectively meet user needs. The selection of appropriate techniques depends largely on the type and complexity of the project at hand. Context diagrams play a critical role in visually mapping the interactions between the system under development and its external environment. Use Case diagrams are essential in defining the functional requirements of the system from a user-centered perspective.

3.1 Use Case Diagram

This section bridges high level requirements with detailed system design, offering a clear blueprint of how the software will be utilized in real world scenarios.

3.1.1 Log In

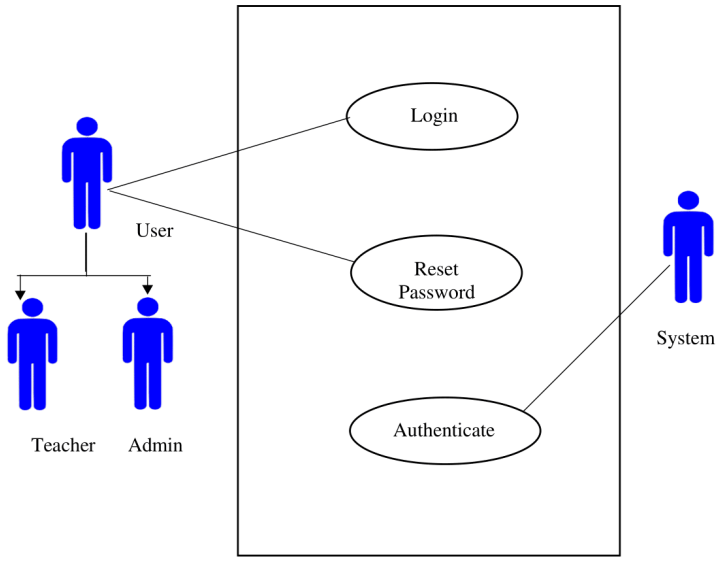


FIGURE 3.1: Use Case Diagram of an login system

3.1.1.1 Detail Use Case Table for Login

Use Case ID	**UC-1**
Use Case Name	**Login**
Actors	Primary Actor: User (Teacher, Admin)

Description	Users (students and instructors) must be able to register using email or social media accounts and log in securely.Forgot password functionality should be included.
Trigger	A user initiates the login process by entering their username and password on the login page and submits the information.
Pre conditions	PRE-1. The user must be registered in the E-learning system system. PRE-2. The user must have a valid username and password.
Post conditions	POST-1. The user is granted access to the system and redirected to their respective dashboard. If authentication fails, the user is presented with an error message and given the option to retry.
Normal Flow	1. The user navigates to the learning platform login page. 2. The user enters their username and password. 3. The user selects their role from the dropdown (Teacher or Admin). 4. The user clicks the “Login”” button. 5. The system validates the entered credentials against the stored user data. 6. If the credentials are valid: - The system redirects the user to their respective dashboard (Teacher or Admin).
Alternative Flows	Reset Password: If the user forgets their password, they can click the ”Forgot Password” link.

	The system prompts the user to enter their registered email address. The system sends a password reset link to the entered email address. The user follows the instructions in the email to reset their password.
Exceptions	E1: User enters incorrect credentials: 1- The system displays an error message indicating incorrect username or password. 2- The user is prompted to re-enter their credentials. E2: System is down or unavailable: 1- The system displays a message indicating that the service is temporarily unavailable. 2- The user is advised to try again later.
Business Rules	BR-1: Only registered users can log in. BR-2: Passwords must meet the specified security criteria (e.g., minimum length, complexity). BR-3: User accounts must be active to allow login.
Assumptions	It is assumed that users will remember their credentials or have access to their registered email for password reset.

TABLE 3.1: Use Case: Login

3.1.2 Manage Classes and Subjects

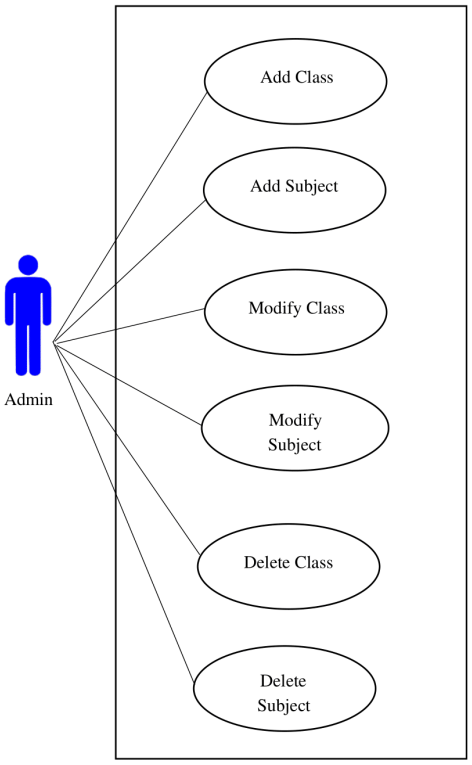


FIGURE 3.2: Use Case Diagram of Manage Classes and Subjects System

3.1.2.1 Detail Use Case Table for Manage Class

Use Case ID	**UC-2**
Use Case Name	**Manage Classes and Subjects**
Actors	Admin
Description	This Use Case allows the admin to manage classes and subjects within the system. The admin can add, modify, and delete classes and subjects. This management capability helps keep the academic structure updated and organized according to the institution's requirements.

Trigger	Admin chooses to manage classes or subjects
Pre conditions	PRE-1. Admin must be logged into the system with appropriate privileges
Post conditions	POST-1. The updated list of classes and subjects is saved in the system. System reflects accurate and current academic structure.
Normal Flow	1. Admin accesses the manage classes and subjects interface. 2. Admin chooses to add, modify, or delete a class or subject. 3. Admin provides the necessary information for the chosen action. 4. System processes the request and updates the list of classes and subjects accordingly.
Alternative Flows	1. Admin attempts to add a class or subject that already exists. 2. Admin tries to modify a non-existing class or subject. 3. Admin tries to delete a class or subject that is linked with active records.
Exceptions	1. Admin attempts to delete a class or subject that is currently in use. 2. Admin provides incomplete or invalid information.
Business Rules	BR-1: Only admins can manage classes and subjects. BR-2: Each class and subject must have a unique identifier. BR-3: Classes and subjects cannot be deleted if they are associated with active records.

Assumptions	None

TABLE 3.2: Detail Use Case Table for Manage Classes and Subjects

3.1.3 Manage Teacher

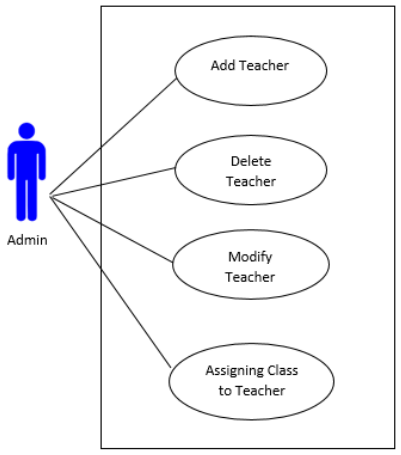


FIGURE 3.3: Use Case Diagram of Manage Teacher System

3.1.3.1 Detail Use Case Table for Manage Teacher

3.1.3.1.1 Add a Teacher

Use Case ID	**UC-3**
Use Case Name	**Add a Teacher**
Actors	Primary Actor: Admin Secondary Actors: None
Description	The admin can add a new teacher to the system . The admin gives the teachers their contact details, personal information, and class and subject assignments. This data is stored by the system, which also makes the instructor available for scheduling and other purposes.

Trigger	The admin decides to add a new teacher to the system.
Pre conditions	PRE-1. Admin is logged into the system. PRE-2. Admin has the necessary permissions to add a teacher.
Post conditions	POST-1. Teacher's details are stored in the system. POST-2. Teacher is assigned to specific classes and subjects.
Normal Flow	1. The admin goes to the "Add Teacher" tab. 2.The admin completes the teacher's contact and personal information. 3. The admin places the teacher in charge of particular subjects and classes. 4. The admin sends the form. 5.The assignments and teacher information are stored in the system.
Alternative Flows	None
Exceptions	E1: The teacher's details are incomplete. 1. System prompts the admin to complete all required fields.
Business Rules	BR-1 Only admins with the necessary permissions can add teachers.
Assumptions	Assume that the admin has all the necessary information about the teacher.

Table 3.3: Detail Use Case Table for Add a Teacher

3.1.3.1.2 Update Teacher Details

Use Case ID	**UC-4**
Use Case Name	**Update Teacher Details**
Actors	Primary Actor: Admin Secondary Actors: None
Description	This Use Case enables the admin to update the details of an existing teacher. The admin can modify personal information, contact details, and the classes or subjects the teacher is assigned to. The system updates the records accordingly and ensures that any changes are reflected in the scheduling and other related functionalities.
Trigger	The admin decides to update a teacher's details.
Pre conditions	PRE-1. Admin is logged into the system. PRE-2. Admin has the necessary permissions to update teacher details.
Post conditions	POST-1. Teacher's updated details are stored in the system. POST-2. Updated assignments are reflected in the scheduling system.
Normal Flow	1. Admin navigates to the "Update Teacher Details" section. 2. Admin selects the teacher to update. 3. Admin modifies the teacher's personal and contact details. 4. Admin updates the teacher's class and subject assignments.

	5. Admin submits the form. 6. System stores the updated details and assignments.
Alternative Flows	None
Exceptions	E1. The updated details are incomplete. 1. System prompts the admin to complete all required fields.
Business Rules	BR-1 Only admins with the necessary permissions can update teacher details.
Assumptions	Assume that the admin has all the necessary information for the update.

Table 3.4: Detail Use Case Table for Update Teacher Details

3.1.3.1.3 Delete a Teacher

Use Case ID	**UC-5**
Use Case Name	**Delete a Teacher**
Actors	Primary Actor: Admin Secondary Actors: None
Description	This Use Case allows the admin to delete a teacher from the system. The admin selects the teacher to be removed, and the system verifies if the teacher is currently assigned to course. If not, the teacher is removed from the system, and all related records are updated. If the teacher is assigned, the system prompts the admin to reassign or handle these dependencies before deletion.
Trigger	The admin decides to delete a teacher.

Pre conditions	PRE-1. Admin is logged into the system. PRE-2. Admin has the necessary permissions to delete a teacher.
Post conditions	POST-1. Teacher's details are removed from the system. POST-2. All related records are updated.
Normal Flow	1. Admin navigates to the "Delete Teacher" section. 2. Admin selects the teacher to be deleted. 3. System checks for any assignments or dependencies. 4. If there are no dependencies, the teacher is deleted. 5. If there are dependencies, the system prompts the admin to handle these before deletion. 6. Admin handles the dependencies and proceeds with deletion. 7. System deletes the teacher and updates the records.
Alternative Flows	None
Exceptions	ER-1: Teacher has current assignments or dependencies. 1. System prompts the admin to handle the dependencies. • If dependencies are handled, proceed with deletion. • If dependencies are not handled, terminate the deletion process.

Business Rules	BR-1 Only admins with the necessary permissions can delete teachers.
Assumptions	Assume that the admin has verified the need to delete the teacher and any potential impact.

Table 3.5: Detail Use Case Table for Delete a Teacher

3.1.4 Additional Information

3.1.4.1 Event Frequency

Frequent logins by students and instructors, especially if classes or activities are ongoing.Viewing lessons, videos, or reading materials happens daily as students engage with course content.

3.1.4.2 Occasional Events

Webinars, guest lectures, or live QA sessions are occasional but valuable events on the platform.Updates or maintenance to keep the platform running smoothly.

3.1.4.3 Monthly or Periodic Events

New courses or modules may open for enrollment monthly or at set intervals.Some platforms run monthly assessments or grading, depending on the course duration.

3.2 Usecase of overall e learning platform system

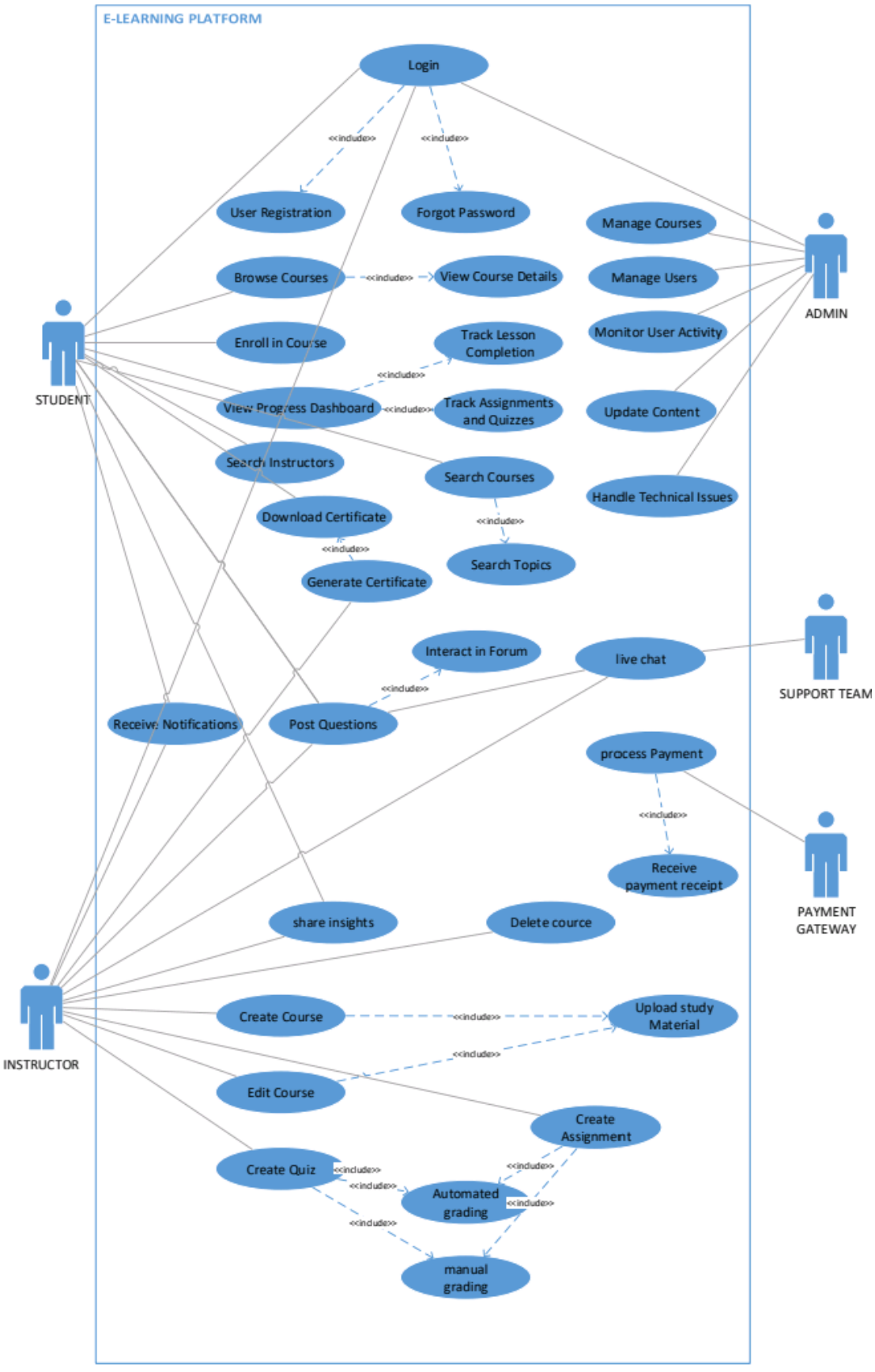


FIGURE 3.4: Use Case Diagram of an overall e learning system

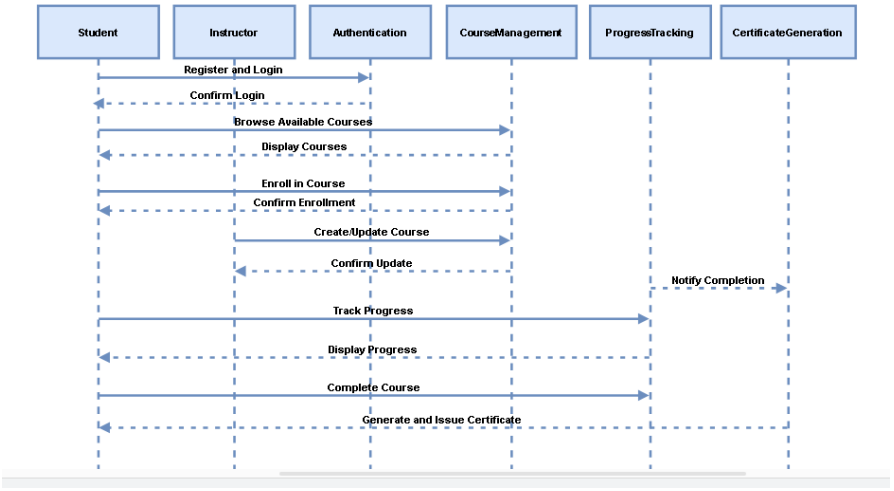


FIGURE 3.5: sequence daigram

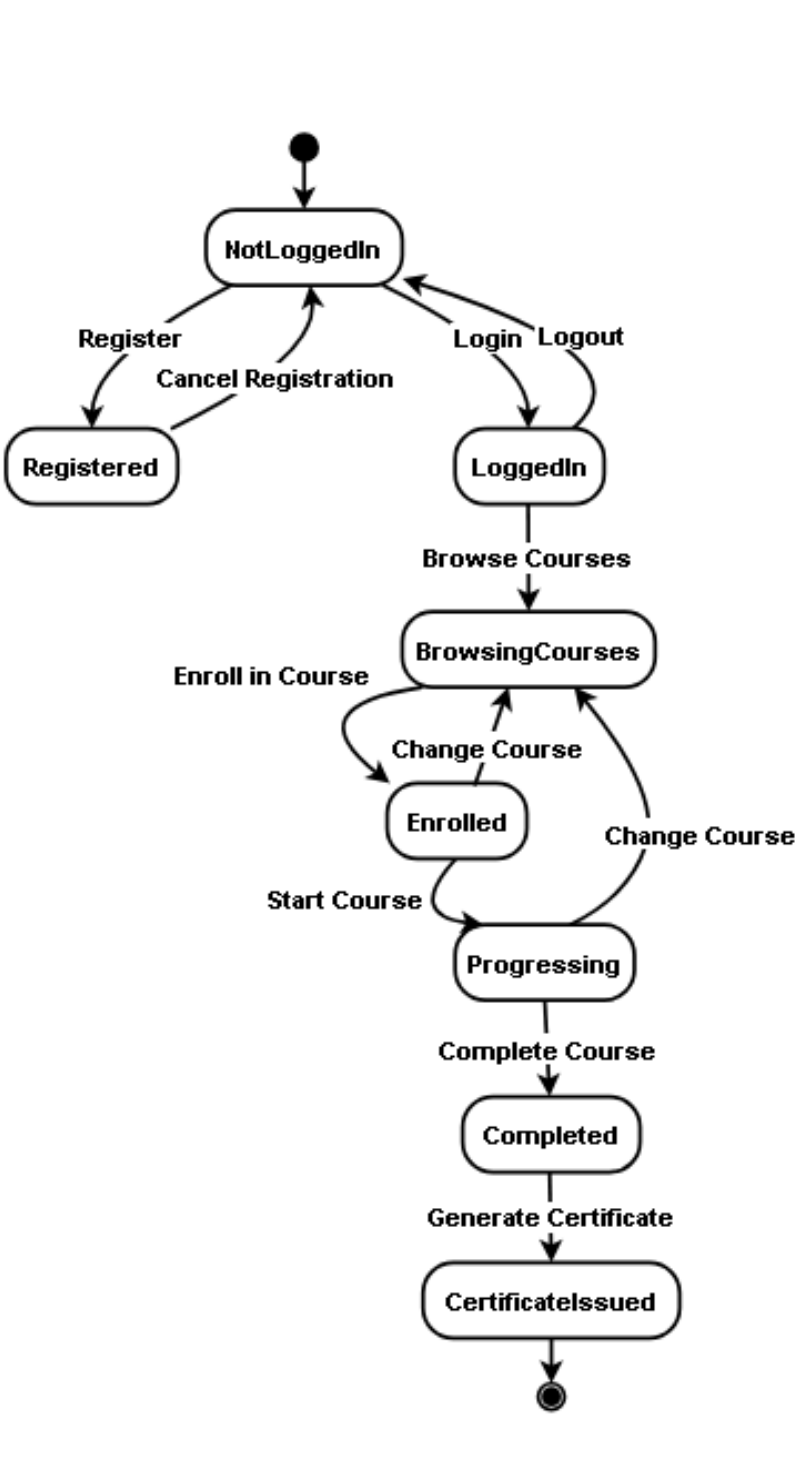


FIGURE 3.6: state diagram.

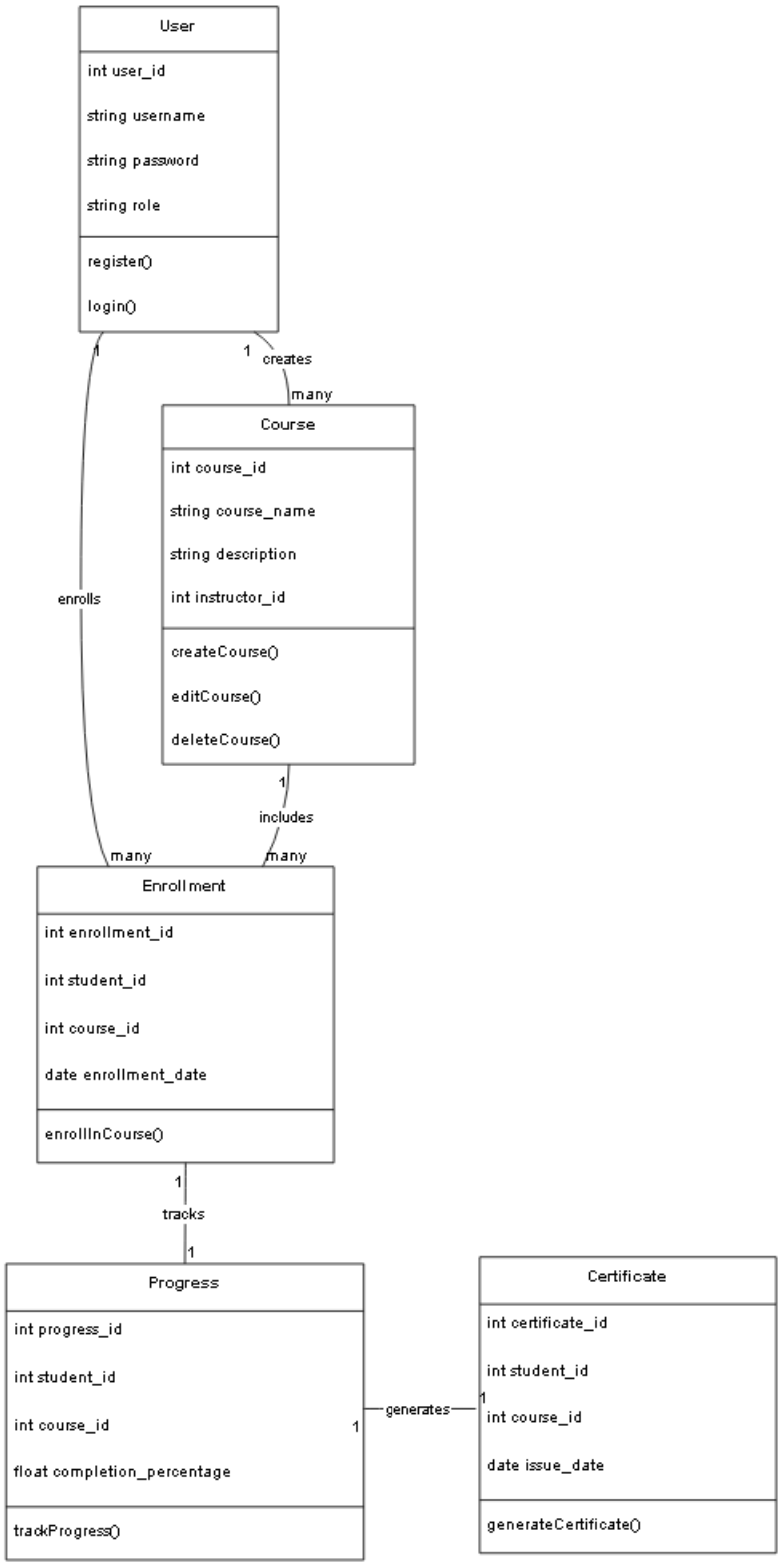


FIGURE 3.7: class diagram.

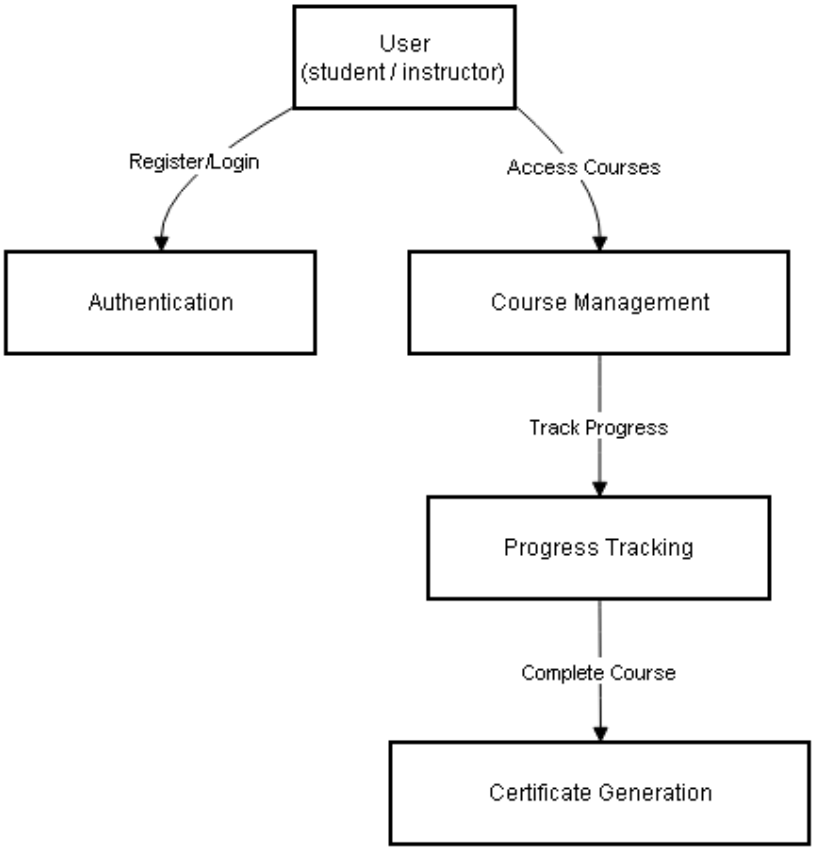
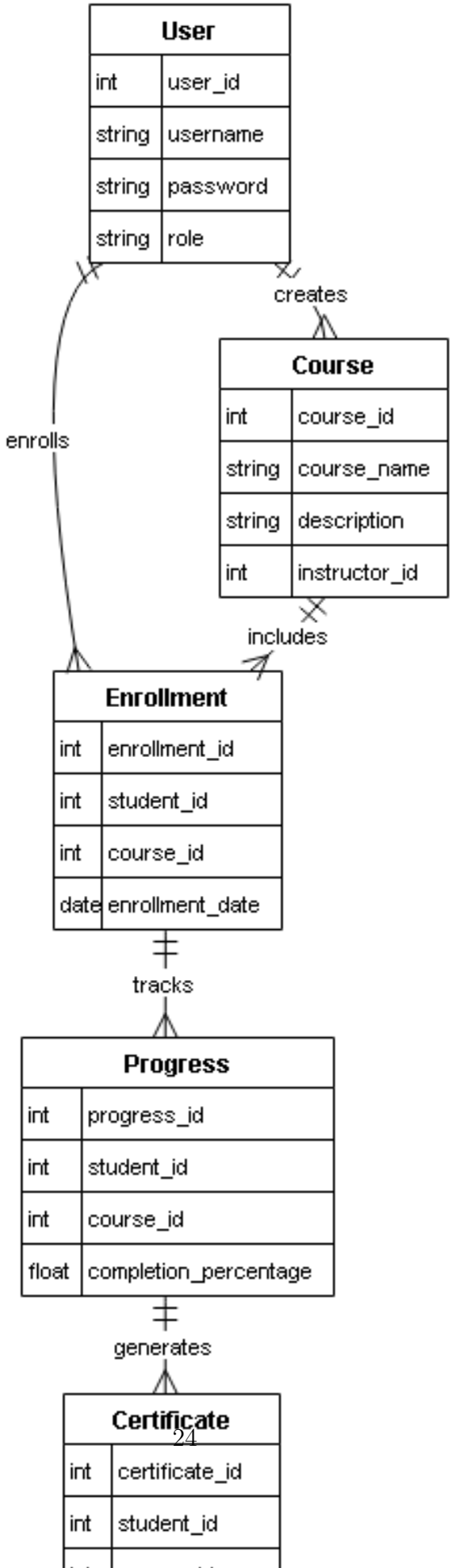


FIGURE 3.8: data flow diagram


User
int
user_id
string
username
string
password
string
role
creates
Course
int
course_id
string
course_name
string
description
int
instructor_id
enrolls
includes
Enrollment
int
enrollment_id
int
student_id
int
course_id
date
enrollment_date
tracks
Progress
int
progress_id
int
student_id
int
course_id
float
completion_percentage
generates
Certificate
int
certificate_id
int
student_id

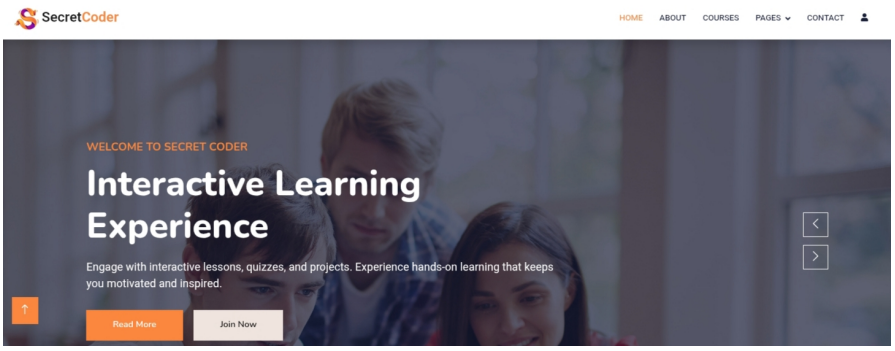


FIGURE 3.10: home page for website

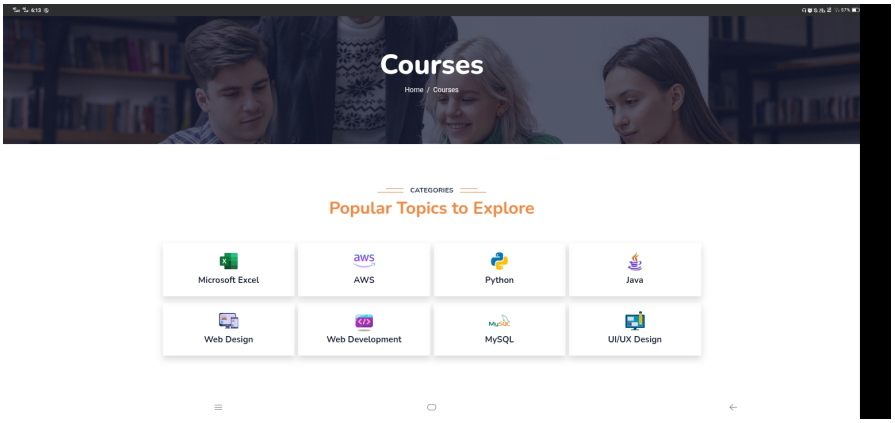


FIGURE 3.11: course page

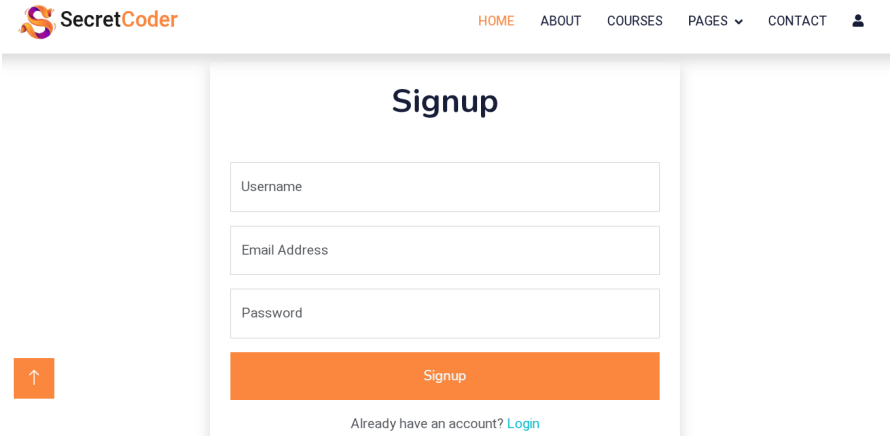


FIGURE 3.12: successfully sign$_u$*ppage*

Chapter 4

Functional Requirements

4.1 Functional Requirements

This section outlines the functional requirements of the E-learning Platform, organized by feature.

4.1.1 User Login and Registration

Users (students and instructors) must be able to register using email or social media accounts and log in securely. Forgot password functionality should be included.

4.1.1.1 FR-1: User Management

Identifier	FR-1
Title	User Management
Requirement	Users (students and instructors) must be able to register using email or social media accounts and log in securely.
Source	User perspective
Rationale	Forgot password functionality included.
Business Rule (if required)	Only admins have the authority to manage classes and subjects.
Dependencies	None
Priority	High

Table 4.1: Description of FR-1

4.1.1.2 FR-2: Course Management

Identifier	FR-2
Title	Course Management
Requirement	Instructors should be able to create, edit, and delete courses
Source	Instructors perspective
Rationale	This functionality empowers admins to maintain teacher accounts and permissions.
Business Rule (if required)	Only teacher have to manage their course.
Dependencies	None
Priority	High

Table 4.2: Description of FR-2

4.1.1.3 FR-3: Enrollment System

Identifier	FR-3
Title	Enrollment System
Requirement	Students must be able to browse courses and enroll in the ones they choose.
Source	User perspective
Rationale	The platform should display course details like description,
Business Rule (if required)	(if applicable), duration, and instructor info.
Dependencies	Depends on FR-1 (User Management)
Priority	High

Table 4.3: Description of FR-3

4.2 Course Management

Instructors should be able to create, edit, and delete courses. The system should allow instructors to upload video lectures, PDFs, and other study materials. Courses should be categorized for easy navigation.

4.2.1 FR-4: Progress Tracking

Identifier	FR-4
Title	Progress Tracking
Requirement	Students should be able to see their progress on a dashboard
Source	User perspective
Rationale	The system should track students' detail, including completed course, and overall course completion.
Business Rule (if required)	Student take course and get learned
Dependencies	None
Priority	Medium

Table 4.4: Description of FR-4

4.3 Admin Panel

There should be an admin panel for managing users, courses, and the overall platform.Admins should have the ability to monitor user activity, update course content, and handle technical issues.

4.3.1 FR-9: Admin Panel

Identifier	FR-9
Title	Admin panel Roll
Source	User perspective, System perspective
Rationale	None
Business Rule (if required)	• Only admins have the authority to manage platform • Teachers can create question papers

Dependencies	None
Priority	High

Table 4.5: Description of FR-9

Chapter 5

Non Functional Requirements

5.1 Performance

The platform should load quickly and provide smooth navigation, even when handling a large number of users and courses

- A failure is defined as any instance where the system does not respond to user input within 10 seconds or crashes unexpectedly.
- The platform should have quikly performance
- To protect from failure, the system should implement regular

5.2 Scalability

- The system should be able to handle an increasing number of users and courses without compromising performance.
- It must support scalability for adding more courses, content, and users as the platform grows.

5.3 Security

- Data must be protected using encryption techniques, especially for sensitive information like login credentials and payment details.
- The platform must implement secure authentication (such as multi-factor authentication) to prevent unauthorized access.
- Regular backups should be scheduled to prevent data loss.

5.4 Availability

- The platform should have 99.9 percent uptime, ensuring that users can access it anytime without interruptions
- It must be reliable and accessible 24/7 to support learners in different time zones.

5.5 Usability

- The interface should be simple and easy to use, with minimal learning required for both students and instructors.
- Navigation should be intuitive, with clear labels and consistent design throughout the platform.

5.6 Maintainability

- The platform code should be well-documented and modular, making it easy for developers to update or fix issues.ebner2007learning
- System updates and maintenance should be simple to perform without causing major disruptions.

Chapter 6

External Interface Requirements

For your e-learning platform, the external interface requirements outline how the platform will interact with users and any external systems or services. Here's a breakdown of typical external interface requirements:

6.1 User Interface Requirements

Provide forms for user sign-in, registration, and password recovery.

6.1.1 GUI Standards

- Display a dashboard for students and teachers with an overview of courses, progress, and upcoming deadlines.
- Each course should have pages for syllabus, materials, assignments, quizzes, and grades.
- Each course should have pages for syllabus, materials, assignments, quizzes, and grades.

6.1.2 Standards for Elements

- Fonts, icons, button labels, images, and color schemes must be consistent across all screens.
- Field tabbing sequences should be logical and facilitate quick navigation.
- Commonly used controls, such as dropdowns, checkboxes, and radio buttons, should be standardized.

6.1.3 Screen Layout and Resolution

- The interface must support various screen resolutions and maintain usability on different devices (desktops, tablets, mobile phones).
- Screen layouts should be responsive and adapt to different device sizes.

6.1.4 Standard Buttons and Navigation

- Every screen should include standard buttons such as "Submitted," "ok," "Help," and navigation links like "Home" and "Back."
- Shortcut keys should be provided for frequently used actions to enhance user efficiency.

6.1.5 Quizes and message Display Conventions

- Quizes, confirmation messages, and informational alerts should follow a standard format and be clearly displayed to users.
- Quizes should be concise and informative, guiding users on how to solve or confirming successful actions.

6.1.6 Layout Standards for Localization

- The interface should be designed to facilitate software localization, and easy way to learning.

6.1.7 Accessibility

- Accommodations should be made for visually impaired users, including support for screen readers, high-contrast themes, and adjustable font sizes.

6.2 API Integration

Integrate with payment services (e.g., Stripe, PayPal) for course enrollment and fee payments.

6.2.1 Content Management system

Description: If using a CMS, connect with it to manage content (videos, documents, etc.) on the platform.

Requirements:

1. Support SQL-based interaction.
2. Ensure secure data with encryption (e.g SSL/TLS).
3. Include backup and recovery mechanisms.

6.2.2 Video Streaming Services

Description: Use APIs like YouTube, Video, or custom streaming to embed or manage video lectures.

6.3 Database Interface

Establish connections with the SQL database to manage users, courses, exams, and performance data.Track user progress, completed courses, grades, and history for reporting and personalized recommendations.

6.4 Notification Services

Send notifications for enrollment, assignment deadlines, and reminders through email or SMS.For mobile app users, provide push notifications for updates, deadlines, or announcements.

6.4.1 Third Party Integration

Integrate with content providers (like Coursera, edX, or similar) if needed for access to broader course material.Allow users to sync their course schedules with external calendars (Google Calendar, Outlook).

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