Document Version: 1.0  
Project Name: AI-Powered eLearning Platform  
Date: \*\*\*\*\*\*

## 1. Introduction

### 1.1 Purpose

This document defines requirements for an AI-driven eLearning platform with personalized learning paths, interactive content, and secure access for students, instructors, and admins.

### 1.2 Scope

* Role-based authentication (Students, Instructors, Admins).
* AI-powered course recommendations and proctoring.
* Multilingual (English, Bengali, Arabic) and WCAG 2.1-compliant.
* Mobile (iOS/Android) and web support.

## 2. Epics & Requirements

### Epic 1: User Authentication and Profile Management

Description: Secure sign-up/login, role-based access, and AI-driven profile personalization.  
Functional Requirements:

1. FR1.1: Users can register via email/social login (Google, Facebook).
2. FR1.2: Multi-factor authentication (SMS/Email OTP).
3. FR1.3: GDPR-compliant data deletion request handling.  
   Non-Functional Requirements:

* NFR1.1: <2s response time for login.
* NFR1.2: Resistance to SQL injection/XSS (OWASP Top 10).  
  SQA Focus:
* Test MFA flows, session timeout, and data encryption.

### Epic 2: Course Creation and Management

Description: Tools for instructors to create AI-assisted courses.  
Functional Requirements:

1. FR2.1: Upload multimedia (MP4, PDF, SCORM).
2. FR2.2: AI suggests course structure based on learning objectives.  
   Non-Functional Requirements:

* NFR2.1: Support 500MB file uploads per course.  
  SQA Focus:
* Test cross-browser compatibility of course editor.

### Epic 3: AI-Powered Personalized Learning Paths

Description: Dynamic course recommendations and adaptive quizzes.  
Functional Requirements:

1. FR3.1: AI recommends courses based on user quiz performance.
2. FR3.2: Real-time progress dashboard for students.  
   SQA Focus:

* Validate recommendation accuracy (precision/recall metrics).

### Epic 4: Interactive Learning Experience

Description: Quizzes, forums, and live sessions with AI feedback.  
Functional Requirements:

1. FR4.1: AI grades short-answer questions with 90% accuracy.
2. FR4.2: Live session integration (Zoom API).  
   Non-Functional Requirements:

* NFR4.1: Support 1,000 concurrent live users.  
  SQA Focus:
* Test WCAG 2.1 AA compliance (e.g., screen reader support).

### Epic 5: Payment and Subscription Management

Description: Secure transactions with multi-currency support.  
Functional Requirements:

1. FR5.1: Stripe/PayPal integration for subscriptions.
2. FR5.2: Automated refund processing (<24h).  
   SQA Focus:

* Test PCI DSS compliance and failed payment handling.

### Epic 6: Admin Dashboard and Reporting

Description: AI-driven analytics for course performance.  
Functional Requirements:

1. FR6.1: Export reports in CSV/PDF.
2. FR6.2: Flag inappropriate content via AI moderation.  
   SQA Focus:

* Test RBAC (e.g., instructors cannot access admin analytics).

### Epic 7: Mobile App Integration

Description: Offline access and push notifications.  
Functional Requirements:

1. FR7.1: Download courses for offline viewing.
2. FR7.2: Push reminders for pending assignments.  
   Non-Functional Requirements:

* NFR7.1: <5% battery drain per hour of offline use.

### Epic 8: AI-Driven Proctoring and Assessment

Description: Facial recognition and automated grading.  
Functional Requirements:

1. FR8.1: Detect suspicious activity (e.g., multiple faces).
2. FR8.2: Generate certificates upon course completion.  
   SQA Focus:

* Test false-positive rates in proctoring (<5%).

### Epic 9: Multilingual and Accessibility Support

Description: RTL language support and WCAG compliance.  
Functional Requirements:

1. FR9.1: Switch UI language (English/Bengali/Arabic).
2. FR9.2: High-contrast mode for visually impaired users.  
   SQA Focus:

* Test bidirectional text rendering (Arabic RTL).

### Epic 10: Third-Party Integrations

Description: Zoom, Google Drive, and LMS integrations.  
Functional Requirements:

1. FR10.1: Single sign-on (SSO) via OAuth 2.0.
2. FR10.2: Sync course data with Moodle via API.  
   SQA Focus:

* Test API rate limits and data sync failures.

## 3. Traceability Matrix

| **Epic** | **User Stories** | **Test Cases** | **Status** |
| --- | --- | --- | --- |
| Epic 1 | US1-US5 | TC\_AUTH\_01-TC\_AUTH\_10 | Draft |
| Epic 3 | US12-US15 | TC\_AI\_01-TC\_AI\_08 | Reviewed |

## 4. SQA Strategy

1. Automation: Selenium for UI, Postman for APIs.
2. Performance: JMeter (1,000 virtual users).
3. Security: OWASP ZAP for penetration testing.

Approval:  
[Stakeholder Name], [Date]