

# Functional Requirements

## 1. User Management (5 Features)

Handles authentication, user profiles, and access control.

1. **User Registration** – Allow new users (students, instructors, admins) to create accounts.
2. **User Login & Authentication** – Authenticate users securely using JWT.
3. **Profile Management** – Update profile details, profile picture, and contact info.
4. **Role-based Access Control** – Define privileges for student, instructor, and admin roles.
5. **View Profile** – Display user profile with enrolled courses, certificates, and mentorship data.

## 2. Course Management (5 Features)

Focuses on instructors managing courses and lessons.

6. **Course Creation** – Instructors create courses with title, description, and category.
7. **Course Editing** – Modify existing course information or update content.
8. **Lesson Upload & Resource Management** – Add videos, PDFs, or documents to lessons.
9. **Course Listing & Filtering** – Display all courses filtered by category, level, or instructor.
10. **Course Details Page** – Show course overview, instructor info, and learner progress bar.

## 3. Enrollment & Progress Tracking (5 Features)

Manages how students enroll and track learning progress.

11. **Course Enrollment** – Students can enroll in courses of their choice.
12. **Progress Tracking** – Track lesson completion and update student progress percentage.

- 13. Completion Certificates** – Generate course completion certificates automatically.
- 14. Progress Report Export (PDF)** – Export learning progress and achievements as PDF.
- 15. Dashboard Display** – Student dashboard showing all enrolled courses and progress summary.

## **4. Mentorship & Discussion (5 Features)**

Encourages communication and guidance within the platform.

- 16. Discussion Forum** – Students post questions in course-specific discussion boards.
- 17. Reply to Questions** – Instructors or peers reply to posted questions.
- 18. Upvote & Mark Helpful** – Users can upvote or mark best answers.
- 19. Mentorship Session Scheduling** – Schedule one-on-one mentorship sessions with instructors.
- 20. Notifications** – Send alerts for replies, upcoming sessions, or new messages.

## **5. Recommendation & Administration (5 Features)**

Includes admin tools, AI-based recommendations, and reporting.

- 21. Course Recommendations** – Recommend courses based on user interests and history.
- 22. Track Learning Stats** – Display analytics for student learning hours and engagement.
- 23. Admin Dashboard** – Admin can view and manage users, courses, and reported content.
- 24. Report Management** – Handle inappropriate content or user reports.
- 25. System Analytics** – Provide insights on user activity, top-rated courses, and system usage trends.

# Non-Functional Requirements

## Security

- Use **JWT authentication** for all protected routes.
- Passwords must be hashed using **bcryptjs**.
- Prevent unauthorized access via **role-based control**.

## Scalability

- Backend API and MongoDB should support future scaling for more users and data.
- The system architecture allows microservice or container-based deployment (future-ready).

## Usability

- Use **Bootstrap** for responsive UI on mobile and desktop.
- Provide a consistent and intuitive user experience for all roles.

## Maintainability

- Modular backend with separated controllers, routes, and models.
- Version control via **GitHub (main, development, feature branches)**.

## Reliability

- Regular data backups in MongoDB Atlas.
- Application should recover from crashes without data loss.

## Performance

- The system should load dashboards and course pages within **3 seconds**.
- The backend must handle **100+ concurrent users** efficiently.