**Task: Online Course Management System MVC Project Documentation**

**Project Overview**

This project is an online course management system designed to allow users to enroll in courses, access course materials, participate in discussions, and complete assignments. The application uses the MVC architectural pattern to ensure separation of concerns, scalability, and maintainability.

**Functional Requirements**

1. User Management
   * **Sign Up**: Users can register by providing a username, email, and password.
   * **Login/Logout**: Users can log in using their credentials and log out securely.
   * **Profile Management**: Users can view and update their profile information.
   * **Role Management**: Differentiate between students, instructors, and admin roles.
2. Course Management
   * **Course Creation**: Instructors can create new courses, including details like title, description, and schedule.
   * **Course Enrollment**: Students can enroll in available courses.
   * **Course Listing**: Users can view a list of available courses.
   * **Course Details**: Users can view detailed information about a specific course, including the syllabus and instructor information.
3. Content Management
   * **Material Upload**: Instructors can upload course materials such as lectures, reading materials, and resources.
   * **Assignment Creation**: Instructors can create and assign homework or projects.
   * **Content Access**: Students can access and download course materials.
4. Discussion Forum
   * **Post Creation**: Users can create new discussion posts.
   * **Commenting**: Users can comment on posts to engage in discussions.
   * **Moderation**: Admins and instructors can moderate discussions to ensure appropriate content.
5. Assignment Management
   * **Submission**: Students can submit assignments online.
   * **Grading**: Instructors can grade submitted assignments and provide feedback.
   * **Grade Viewing**: Students can view their grades and feedback for each assignment.
6. Admin Management
   * **User Management**: Admin users can manage user accounts and permissions.
   * **Course Management**: Admin users can manage course listings and enrollment.
   * **Content Moderation**: Admin users can oversee and moderate all content and discussions.

**Database Structure**

1. **Users Table**
   * **user\_id** (Primary Key, Integer, Auto Increment)
   * **username** (VARCHAR)
   * **email** (VARCHAR)
   * **password\_hash** (VARCHAR)
   * **role** (ENUM: 'student', 'instructor', 'admin')
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
2. **Courses Table**
   * **course\_id** (Primary Key, Integer, Auto Increment)
   * **title** (VARCHAR)
   * **description** (TEXT)
   * **instructor\_id** (Foreign Key, References **user\_id**)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
3. **Enrollments Table**
   * **enrollment\_id** (Primary Key, Integer, Auto Increment)
   * **user\_id** (Foreign Key, References **user\_id**)
   * **course\_id** (Foreign Key, References **course\_id**)
   * **created\_at** (DATETIME)
4. **Materials Table**
   * **material\_id** (Primary Key, Integer, Auto Increment)
   * **course\_id** (Foreign Key, References **course\_id**)
   * **title** (VARCHAR)
   * **file\_path** (VARCHAR)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
5. **Assignments Table**
   * **assignment\_id** (Primary Key, Integer, Auto Increment)
   * **course\_id** (Foreign Key, References **course\_id**)
   * **title** (VARCHAR)
   * **description** (TEXT)
   * **due\_date** (DATETIME)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
6. **Submissions Table**
   * **submission\_id** (Primary Key, Integer, Auto Increment)
   * **assignment\_id** (Foreign Key, References **assignment\_id**)
   * **user\_id** (Foreign Key, References **user\_id**)
   * **file\_path** (VARCHAR)
   * **grade** (DECIMAL)
   * **feedback** (TEXT)
   * **submitted\_at** (DATETIME)
   * **graded\_at** (DATETIME, Nullable)
7. **Discussions Table**
   * **discussion\_id** (Primary Key, Integer, Auto Increment)
   * **course\_id** (Foreign Key, References **course\_id**)
   * **user\_id** (Foreign Key, References **user\_id**)
   * **title** (VARCHAR)
   * **content** (TEXT)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)
8. **Comments Table**
   * **comment\_id** (Primary Key, Integer, Auto Increment)
   * **discussion\_id** (Foreign Key, References **discussion\_id**)
   * **user\_id** (Foreign Key, References **user\_id**)
   * **content** (TEXT)
   * **created\_at** (DATETIME)
   * **updated\_at** (DATETIME)

**Workflow**

1. **User Registration and Login**
   * Users register and log in to the application.
   * Authentication is managed using secure password hashing.
   * Users are assigned roles (student, instructor, admin) upon registration or by admin assignment.
2. **Course Creation and Enrollment**
   * Instructors create courses with relevant details.
   * Students browse and enroll in courses of interest.
3. **Content Management and Access**
   * Instructors upload course materials.
   * Students access and download materials as needed.
4. **Assignment Submission and Grading**
   * Instructors create assignments and set due dates.
   * Students submit their assignments online.
   * Instructors grade assignments and provide feedback.
   * Students view their grades and feedback.
5. **Discussion and Interaction**
   * Users participate in course discussions by creating posts and commenting.
   * Admins and instructors moderate discussions to maintain a productive environment.
6. **Admin Oversight**
   * Admin users manage user accounts, course listings, and content moderation.
   * Admins ensure the smooth operation of the system and address any issues.