OLP – Development Documentation

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The development strategy for the Online Learning Platform (OLP) is centered around modular implementation and agile iteration, ensuring adaptability and smooth feature rollouts. The platform is structured with clearly defined responsibilities for the frontend, backend, and integration layers.

**1. Backend Development:**

* **Tech Stack:** Node.js with Express.js.
* **Functionality:** Develop secure REST APIs for:
  + User registration and authentication
  + Course creation, editing, and deletion
  + Enrolling users in courses
  + Tracking progress and quiz submissions
  + Certification generation
* **Database:** MongoDB Atlas, with Mongoose for schema modeling and relations.

**2. Frontend Development:**

* **Tech Stack:** React.js (with Tailwind CSS for styling).
* **UI Pages:**
  + Home page with featured courses
  + Login & Signup with validation
  + Dashboard (role-specific)
  + Course listing and detailed view
  + Lesson player and progress bar
  + Certificate generation/download page

**3. Authentication & Role Management:**

* Role-based access (Student / Teacher / Admin).
* JSON Web Tokens (JWT) for secure API access.
* Middleware for protecting routes based on roles.

**4. Course Module Features:**

* Teachers can:
  + Upload videos, notes, and quizzes
  + Monitor student performance
* Students can:
  + Access content module-wise
  + Mark lessons as completed
  + Attempt quizzes and earn certificates

**5. Testing Strategy:**

* Manual testing for user flows like registration, login, course viewing, and certification.
* API testing using Postman for:
  + Endpoint response verification
  + Error handling scenarios
  + Authorization and validation

**6. Deployment Plan:**

* **Frontend:** Hosted on [Vercel](https://vercel.com).
* **Backend:** Deployed via [Render](https://render.com) or [AWS EC2].
* **Database:** MongoDB Atlas with cloud access and IP whitelisting.
* **CI/CD:** Optional GitHub Actions for automatic deployment and updates.