

Project Design Phase

Solution Architecture

| Field | Details |
|-------------------|---|
| Date | 21 February 2026 |
| Team ID | LTVIP2026TMIDS47806 |
| Project Name | LearnHub: Your Center for Skill Enhancement |
| Individual Member | C. Karthik |
| Maximum Marks | 4 Marks |

Architecture Overview

The OLP application follows the MVC (Model-View-Controller) pattern within a RESTful MERN stack. The three-tier architecture consists of:

| Layer | Technology | Responsibility |
|----------------------|----------------------------------|--|
| View (Frontend) | React.js + Vite, Antd, Bootstrap | Renders UI for Student, Teacher, Admin; handles API calls via Axios |
| Controller (Backend) | Node.js + Express.js | Processes API requests; applies JWT auth middleware; routes to correct handler |
| Model (Database) | MongoDB + Mongoose | Stores and retrieves users and course data; enforces schema via Mongoose |

Backend Module Breakdown

- config/config.js — MongoDB connection setup using Mongoose
- middleware/authMiddleware.js — JWT token verification for protected routes
- models/userModel.js — Mongoose schema: _id, name, email, password, type
- models/courseModel.js — Mongoose schema: _id, userID (FK), C_educator, C_categories, C_title, C_description, sections, C_price, enrolled
- routes/userRoutes.js — Register, login, course browsing and enrollment endpoints
- routes/teacherRoutes.js — Course and section management endpoints
- routes/adminRoutes.js — Admin user/course management endpoints
- index.js — Express server entry point; configures CORS, body-parser, routes

Frontend Module Breakdown

- src/pages/student/ — Course listing, enrollment, course player, certificate
- src/pages/teacher/ — Course creation form, section management, dashboard

- `src/pages/admin/` — Admin dashboard, user list, all-course management
- `src/components/` — Shared reusable UI components (navbar, cards, forms)
- `src/App.jsx` — Root component with React Router for client-side navigation

Data Flow Summary

Student/Teacher/Admin → React UI → Axios HTTP Request → Express API → authMiddleware (JWT check) → Controller → Mongoose → MongoDB → JSON Response → React UI update

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