

# Project Design Phase

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## 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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