Horizontal Architecture Flow Diagram

React + Vite

Student Interaction → React Router → Components (Pages/Cards) → State (Hooks) —API Request→ Axios (HTTP)

State (Hooks) —Real-time Event→ Socket.io Client

Micro-Services / Logic

Axios (HTTP) —HTTP Request→ Express Gateway (CORS/Hub) —Authorized→ Auth Middleware (JWT)

Socket.io Client —Bi-directional→ Live Updates

Express Gateway (CORS/Hub) —Live Updates→ Socket.io Server

Controllers

Auth Middleware (JWT) → Course Controller → PDF Parser Service

Review Controller → Reviews Collection

Sentiment Analysis

MongoDB Atlas

Auth Controller → Users Collection → Courses Collection