**✅ Project Design Phase**

**Solution Architecture**

**Date**

29 June 2025

**Team ID**

LTVIP2025TMID49959

**Project Name**

Your Center for Skill Enhancement (Online Learning Platform)

**Maximum Marks**

4 Marks

**✅ Solution Architecture**

**Solution architecture** bridges business problems with technological solutions. Its purpose in this project is to:

* Find the best tech stack to deliver a centralized, user-friendly online learning platform.
* Describe the system’s structure, components, behavior, and interactions to stakeholders.
* Define the platform’s major features, development phases, and technical requirements.
* Provide technical specifications guiding development, deployment, and future scaling.

**✅ Solution Architecture Description**

* The **Online Learning Platform (OLP)** is developed using the **MERN stack (MongoDB, Express.js, React.js, Node.js).**
* The architecture follows a **client-server model**:
  + Frontend developed in React.js + Vite for fast build times and modern UI.
  + Backend implemented in Node.js with Express.js, handling business logic and API routing.
  + MongoDB used for storing data like user profiles, courses, enrollments, and payments.
* **JWT-based authentication** ensures secure logins and role-based access for students, teachers, and admins.
* **Stripe payment gateway** integrated for secure transactions for premium courses.
* Dynamic dashboards display key data like:
  + User statistics
  + Course progress
  + Payment history
* Certificates are generated dynamically using PDF libraries.
* Platform designed as **responsive and scalable**, accessible on desktop and mobile devices.

**✅ Solution Architecture Diagram**

Below is a **textual diagram** you can recreate in Word (using SmartArt → Horizontal Hierarchy, or PowerPoint shapes):

[ Frontend (React.js + Vite) ]

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[ Student Dashboard ] [ Teacher Dashboard ]

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[ Admin Dashboard ] [ Course Management ]

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[ Backend (Node.js + Express.js) ]

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[ Auth API ] [ Payment API (Stripe) ]

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[ Course API ] [ Certificate Generation ]

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[ MongoDB Database ]

**✅ Explanation of the Diagram**

* **Frontend Layer:**
  + Built with React.js + Vite for fast UI rendering.
  + Separate dashboards for students, teachers, and admins.
* **Backend Layer:**
  + Node.js + Express.js handles all API requests.
  + Routes for authentication, course management, payments, and certificates.
* **Database Layer:**
  + MongoDB stores:
    - Users
    - Courses
    - Enrollment data
    - Payment transactions
    - Certificates
* **Security:**
  + JWT ensures secure sessions.
* **Payments:**
  + Stripe integrated for premium course payments.

✅ **Outcome:**  
This architecture ensures the **Online Learning Platform** is:

* Modular and scalable
* Secure for transactions and data
* Efficient for managing large user bases
* Adaptable for future enhancements like video streaming or analytics