Project Design Phase–II

Technology Stack (Architecture & Stack)

Date	2 November 2025
Team ID	NM2025TMID01472
Project Name	Education organization
Team Size	4
Maximum Marks	14 Marks

Technical Architecture

The deliverable shall include the architectural diagram as below and the information as per Table 1 & Table 2.

Example: Education Management System for Online & Offline Learning Modes

Reference:
https://research.aimultiple.com/learning-management-system/

Architecture Diagram

(illustrative textual version – you can draw it in draw.io or Lucidchart)

```
[Student/Teacher/Admin Web UI]
        ↓
[Application Logic Layer]
  → User Authentication (API)
  → Course Management
  → Attendance Tracking
  → Assessment & Results
        ↓
[Database Layer]
  → Student Records
  → Course Content
  → Exam Data
        ↓
[File Storage / Cloud Storage]
  → Assignments, Notes, Media Files
        ↓
[Analytics / ML Layer]
  → Learning Progress Analysis
  → Performance Prediction
        ↓
[External APIs]
  → Payment Gateway (Fees)
  → SMS/Email Notifications
```

Guidelines Followed:

- All processes as Application Logic / Technology Block
- Infrastructural demarcation (Cloud)

- External interfaces (APIs, LMS plugins)
- Data storage components/services
- Interface to machine learning model (student performance insights)

Table 1 – Components & Technologies

S.No	Component	Description	Technology
1	User Interface	Web portal for students, teachers, and admins	React.js / HTML5 / CSS
2	Application Logic-1	Handles user authentication and role-based access	Node.js / Express.js
3	Application Logic-2	Course, attendance, and timetable management	Node.js API Services
4	Application Logic-2	Exam scheduling, submission, grading automation	Node.js / Python (Flask)
5	Database	Stores student records, grades, and attendance	MySQL / MongoDB
6	Cloud Database	Managed cloud storage for scalability	AWS RDS / Firebase
7	File Storage	Managed cloud storage for scalability	AWS S3 / Google Cloud Storage
8	External API-1	Payment Gateway Integration for fees	Razorpay / Stripe API
9	External API-2	SMS and Email Notifications	Twilio / SendGrid
10	Machine Learning Model	Predicts student performance and dropout risk	Python (Scikit-learn)
11	Infrastructure(server/ cloud)	Hosted on cloud environment for high availability	AWS EC2 / Google Cloud (SaaS)

Table 2 – Application Characteristics

S.No	Characteristics	Description	Technology
1	Open-Source Framework	Uses open-source web and backend frameworks	React.js, Node.js
2	Security Implementations	Role-based access, encrypted communication	JWT, HTTPS, OAuth 2.0
3	Scalable Architecture	Horizontally scalable microservice-based system	Docker, Kubernetes
4	Availability	99.9% uptime with cloud hosting redundancy	AWS Auto Scaling
5	Performance	Optimized for fast load times and low	Redis Caching, CDN

		latency	