**Project Design Phase-II**

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| **Date** | **25 June 2025** |
| **Team ID** | **LTVIP2025TMID20425** |
| **Project Name** | **LearnHub: Your Center for Skill Enhancement** |
| **Mentor Name** | **Dr Shaik Salma Begam** |
| **Maximum Marks** | **4 Marks** |

**Technology Stack (Architecture & Stack)**

**Technical Architecture**

**Description:** LearnHub is an online learning platform designed to deliver skill-based courses through a scalable, secure, and user-friendly web application. It supports learner registration, course browsing, enrollment, progress tracking, and admin management. The architecture follows a **3-tier model** with microservices for scalability and cloud deployment for high availability.

You can include a diagram showing:

* Frontend (Web UI)
* Backend Services (Course Management, User Auth, Progress Tracking)
* Database Layer (Cloud DB + Local Storage)
* External APIs (e.g., Certification, Aadhar Verification)
* ML Model (Personalized Course Recommendations)

**Table 1: Technology Stack Components**

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| --- | --- | --- | --- |
| **S.No** | **Component** | **Description** | **Technology Used** |
| 1 | User Interface | Web interface for learners and admins | HTML, CSS, JavaScript, React.js |
| 2 | Application Logic-1 | Learner registration, login, course browsing | Python (Flask/Django) |
| 3 | Application Logic-2 | Speech-to-text for accessibility | IBM Watson STT |
| 4 | Application Logic-3 | Chatbot for learner support and FAQs | IBM Watson Assistant |
| 5 | Database | Stores user data, course content, progress tracking | MySQL, MongoDB |
| 6 | Cloud Database | Scalable cloud-based storage for course materials and user data | IBM Cloudant, Firebase |
| 7 | File Storage | Stores course videos, PDFs, certificates | IBM Block Storage, AWS S3 |
| 8 | External API-1 | Weather API for scheduling outdoor workshops | IBM Weather API |
| 9 | External API-2 | Identity verification for certification | Aadhar API |
| 10 | Machine Learning Model | Personalized course recommendation engine | TensorFlow, Scikit-learn |
| 11 | Infrastructure | Deployment on cloud with container orchestration | Kubernetes, Docker, IBM Cloud Foundry |

**Table 2: Application Characteristics**

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| --- | --- | --- | --- |
| **S.No** | **Characteristic** | **Description** | **Technology Used** |
| 1 | Open-Source Frameworks | Frameworks used for development | React.js, Flask, Django |
| 2 | Security Implementations | User authentication, data encryption, secure APIs | SHA-256, OAuth 2.0, IAM, HTTPS, OWASP |
| 3 | Scalable Architecture | Microservices architecture with containerization | Docker, Kubernetes |
| 4 | Availability | Load balancing and distributed servers for uptime | NGINX, IBM Cloud Load Balancer |
| 5 | Performance | Caching, CDN, optimized queries, async processing | Redis, Cloudflare CDN, Indexed DB |