# Project Design Phase-II

## Technology Stack (Architecture & Stack)

Date: 21 January 2025

Team ID: LTVIP2025TMID32094

Project Name: EduTutor AI – Personalized Learning with Generative AI

Maximum Marks: 4 Marks

## Technical Architecture

The architecture of EduTutor AI integrates AI-powered quiz generation, role-based user experience, and visual analytics. The system includes a Streamlit frontend, Python backend, IBM Granite language model, and local JSON storage. Plotly is used for visualization, and future versions aim to migrate to cloud infrastructure for scalability.

## Table-1: Components & Technologies

|  |  |  |
| --- | --- | --- |
| S.No | Component Description | Technology |
| 1 | User Interface – Web application with role-based tabs | Streamlit |
| 2 | Application Logic – Quiz generation and content generation | Python, IBM Granite LLM |
| 3 | Learning Module & Library System | Python, Streamlit |
| 4 | Authentication and Role Management | Streamlit session state |
| 5 | Database (local) | JSON file-based storage |
| 6 | Data Visualization | Plotly, Pandas |
| 7 | AI Model Integration | IBM Granite, HuggingFace Transformers |
| 8 | Future Cloud Hosting | IBM Cloud |

## Table-2: Application Characteristics

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| --- | --- | --- |
| S.No | Characteristic Description | Technology |
| 1 | Open-Source Frameworks – Technologies used are freely available and community supported | Streamlit, Python, HuggingFace Transformers |
| 2 | Security – User role authentication and file isolation | Streamlit session, local file permissions |
| 3 | Scalable Architecture – Designed for future migration to microservices/cloud | Modular Python structure, IBM Cloud (future) |
| 4 | Availability – Local availability, with potential for 24/7 uptime on cloud | Cloud Foundry (future) |
| 5 | Performance – Optimized model calls and lightweight file I/O | Efficient API calls, caching in memory |