Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	31 January 2026
Team ID	LTVIP2026TMIDS88360
Project Name	Civil engineering insight studio
Maximum Marks	4 Marks

Technical Architecture:

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	**User Interface**	Web-based interactive dashboard for text input and real-time translation display.	Streamlit, HTML5, CSS3
2.	**Application Logic-1**	Core backend processing, API orchestration, and text pre-processing.	Python
3.	**Application Logic-2**	Logic for audio-to-text conversion for the travel scenario.	Image-to-Text (STT) Library
4.	**Application Logic-3**	Specialized logic for preserving academic citations and professional tone.	Python (Regex/Formatting scripts)
5.	**Database**	Storage for user session history and frequent translation pairs.	SQLite / PostgreSQL
6.	**Cloud Database**	Persistent storage for user profiles and saved translations on the cloud.	Google Cloud SQL / AWS RDS

7.	**File Storage**	Temporary storage for uploaded research papers and business documents.	Local Filesystem / Google Cloud Storage
8.	**External API-1**	Primary Large Language Model for multi-language translation.	Google Generative AI (Gemini) API
9.	**External API-2**	Logic for document structure analysis and OCR for signs/menus.	Google Cloud Vision (OCR) API
10.	**Machine Learning Model**	Fine-tuned instructions for context-aware translation logic.	Google Gemini 2.5 flash

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
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1.	**Open-Source Frameworks**	Utilizes open-source libraries for rapid deployment and UI rendering.	Streamlit, Pandas, NumPy
2.	**Security Implementations**	Implemented API key rotation and secure document handling protocols.	SHA-256 Encryption, IAM Controls
3.	**Scalable Architecture**	3-Tier architecture separating UI, Logic, and AI Services.	Micro-services via API calls
4.	**Availability**	Distributed cloud hosting to ensure the tool is available for global users.	Load Balancers (GCP/AWS)
5.	**Performance**	Asynchronous API calls to ensure translation returns within 2-5 seconds.	Cache mechanisms / Asyncio