**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

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| Date | 26 June 2025 |
| Team ID | LTVIP2025TMID20451 |
| Project Name | EduTutor AI: Personalized Learning with Generative AI and LMS Integration |
| Maximum Marks | 4 Marks |

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| --- | --- | --- |
| FR-1 | User Registration | • Registration via email/password form • Registration via Google OAuth (Classroom SSO) • Registration via LinkedIn OAuth |
| FR-2 | User Confirmation | • Send email confirmation link • Send and validate OTP code via SMS or email |
| FR-3 | Quiz & Assessment Management | • Generate dynamic quizzes using Granite LLM • Create and launch diagnostic tests via IBM Watsonx • Adapt question difficulty based on student score history |
| FR-4 | LMS Integration & Analytics Reporting | • Sync course roster and assignments from Google Classroom API • Compute real-time scoring and feedback • Render educator dashboard with heatmaps & reports |

**Non-functional Requirements:**

Following are the non-functional requirements of the proposed solution.

| **NFR No.** | **Non-Functional Requirement** | **Description** |
| --- | --- | --- |
| NFR-1 | Usability | Intuitive, responsive UI (desktop & mobile); accessible (WCAG 2.1 AA); contextual help tooltips and onboarding wizards |
| NFR-2 | Security | OAuth 2.0 for authentication; TLS 1.2+ for data in transit; AES-256 encryption for data at rest; role-based access controls |
| NFR-3 | Reliability | 99.9% uptime SLA; automated health checks and retries; graceful error handling with user-friendly messages |
| NFR-4 | Performance | Quiz pages load < 500 ms; AI response time < 2 s; dashboard interactive rendering < 1 s per widget |
| NFR-5 | Availability | 24×7 service via multi-region deployment on AWS ECS; automated failover and backup/restore procedures |
| NFR-6 | Scalability | Auto-scaling based on CPU/memory metrics; support for 10,000+ concurrent users; modular microservices architecture for horizontal scaling of quiz, auth, and analytics |