

Functional Requirement Specification (FRS)

System: AI-based Assessment Generation using LangChain & LangGraph

1. System Modules Overview

Module ID	Module Name	Description	Actors	Technology
M1	User Interface	Web interface for students and teachers	Student, Teacher	React / Web App
M2	Authentication	Login, registration, role management	Student, Teacher, Admin	OAuth / JWT
M3	Planner Agent	Creates assessment blueprint	Teacher	LangGraph
M4	Content Generator	Generates questions	System	LangChain + LLM
M5	Quality Control Agent	Validates difficulty and correctness	System	LangChain Evaluators
M6	Database	Stores users, questions, results	System	PostgreSQL / MongoDB
M7	Scheduler	Schedules tests and notifications	System	LangGraph Workflows

2. Functional Requirements

FR ID	Function	Description	Input	Process	Output
FR-1	User Registration	Allow users to register	User details	Validate and store	User account created
FR-2	User Login	Authenticate users	Credentials	Verify against DB	User session
FR-3	Assessment Planning	Create assessment plan	Syllabus, difficulty	LangGraph planning	Question blueprint
FR-4	Question Generation	Generate questions	Blueprint	LangChain LLM chain	Draft questions
FR-5	Quality Validation	Check correctness & difficulty	Draft questions	Evaluation chain	Approved questions
FR-6	Assessment Scheduling	Schedule exam	Date & time	Workflow trigger	Scheduled assessment
FR-7	Assessment Delivery	Send to students	Approved questions	Email / portal publish	Assessment link
FR-8	Result Storage	Store results	Student answers	Auto-evaluation	Scores in DB

3. Non-Functional Requirements

NFR ID	Category	Requirement
NFR-1	Performance	System shall generate an assessment within 10 seconds.
NFR-2	Scalability	Support at least 10,000 concurrent students.
NFR-3	Security	All user data must be encrypted at rest and in transit.
NFR-4	Availability	System uptime shall be 99.9%.
NFR-5	Usability	UI must be accessible on desktop and mobile.