AI Study Companion

# Introduction

The **AI Study Companion** is a digital learning assistant that helps students study more efficiently by automatically creating summaries, flashcards, and quizzes from their lecture materials. It allows students to upload files such as PDFs, slides, or text documents and instantly turn them into interactive learning tools.

The system supports self-directed learning using open-source natural language processing (NLP) models, ensuring that students can use it freely without external costs. It provides features like progress tracking, exam and interactive study modes, and secure user accounts.

The AI Study Companion saves time, increases motivation, and helps students focus on understanding rather than just organizing their study material.

# Positioning

## Problem Statement

|  |  |
| --- | --- |
| The problem of | Manually creating study materials from lecture content |
| affects | Students who wish to learn from large numbers of course materials efficiently. |
| the impact of which is | Students spend extra time manually preparing study resources instead of learning; they usually lack consistency and motivation, resulting in poor exam performance. |
| a successful solution would be | a tool that automatically generates summaries, flashcards and quiz questions from the uploaded lecture material, helping students track their progress and save time. |

## Product Position Statement

|  |  |
| --- | --- |
| For | University students engaged in self-learning |
| Who | Need a faster and efficient way to convert lecture materials into learning aids |
| The AI Study Companion | is an AI-powered web application |
| That | Automatically summarizes lecture contents and generates flashcards and quizzes for efficient studying |
| Unlike | Traditional study methods or commercial AI tools |
| Our product | Uses open-source NLP models to provide free and customizable study support while tracking user progress. |

# Stakeholder Descriptions

## Stakeholder Summary

| **Name** | **Description** | **Responsibilities** |
| --- | --- | --- |
| Students | Primary users of the system | Upload lecture materials, use generated learning aids, provide feedback on usability. |
| Admin | Provides hosting or integration with university systems. | Maintain servers, ensure data privacy and legal compliance (GDPR). |
| Marketplace Users | Could contribute plugins or custom learning modules. | Develop and share extensions within the system. |
| Development Team | Project team designing and implementing the system. | Build core functionality, ensure maintainability, follow OpenUP/Scrum. |
| Professors / Instructors | May recommend or use the system for course material review. | Validate accuracy of generated summaries/quizzes, ensure alignment with curriculum. |

## User Environment

Number of users: Initially small (student testers), can be scaled to university-wide deployment.

Usage context: Students use it via a web interface, often on laptops, in study environments like libraries or at home.

Task cycle:

1. Upload lecture material (PDF, DOCX, plain text)
2. Wait for the automatic generation of contents (flashcards, quiz, summary)
3. Study using the generated contents
4. Track progress over multiple sessions

Platforms: Web (React or similar frontend), backend with Python, NLP models using open-source frameworks, database (postgresql, ChromaDB for AI)

Integrations: Possible integration with student login systems or cloud storage (Google Drive or OneDrive) in future releases.

Constraints:

* Must run on open source or free infrastructure
* Must preserve data privacy (no external API calls)
* Should support moderate documents (around 30 pages)

# Product Overview

## Needs and Features

|  |  |  |  |
| --- | --- | --- | --- |
| **Need** | **Priority** | **Features** | **Planned Release** |
| Upload lecture materials | High | File Upload | INCR1 |
| Text preprocessing | High | Text cleaning, segmentation | INCR1 |
| Generate summary | High | NLP-based summarization using open-source models | INCR1 |
| Generate flashcards | High | Automated key-term extraction | INCR1 |
| Generate quiz | High | Multiple-choice question generation | INCR1 |
| Interactive mode | Medium | Flashcard/Quiz interface with scoring | INCR2 |
| Tracking progress | Medium | Store history, completion rates, performance stats | INCR2 |
| User accounts | Medium | Simple authentication, session saving | INCR3 |
| Multi-Language Support | Medium | Translate UI and study materials | INCR3 |
| Plugin system | Low | Allow extensions | INCR3 |
| Export features | Low | Export flashcards/quizzes as PDF or JSON | INCR3 |
| Chat interface | Low | Conversational learning assistant | INCR3 |
| Usability and accessibility | High | Clear UI | All |
| Scalability and maintainability | Medium | Modular architecture, open-source models | Continuous |

# Other Product Requirements

|  |  |  |
| --- | --- | --- |
| **Requirement** | **Priority** | **Planned Release** |
| Platform: Web-based | High | INCR1 |
| Performance: Should process a 10-page lecture note within 30 seconds | Medium | INCR2 |
| Robustness: Must handle corrupted uploads gracefully | Medium | INCR1 |
| Usability: Simple, minimal UI suitable for students with no training. | High | INCR1 |
| **Security:** SSL encryption, secure file upload, input sanitation | High | INCR1 |
| Documentation: User manual and developer documentation | High | Final release |
| Assumptions: Access to pre-trained open-source NLP models | High | Ongoing |
| Dependencies: Python 3.x, Web framework | High | INCR1 |
| **Exportability:** PDF, JSON, or plugin-based export | Medium | INCR3 |
| **Storage:** Local + cloud options, scalable database | Medium | INCR2 |
| **Privacy:** GDPR compliance, AI data isolation | High | Continuous |