UICourseAI Project Overview

■ Goal
Create an AI-powered chatbot that helps UIC students choose the right courses and professors using UIC grade distribution data and RateMyProfessor insights.
The system provides personalized, data-driven advice with features like grade prediction and schedule optimization.

■■ High-Level Flow
User Input → NLP Understanding → Data Fusion Layer → Recommendation Engine → Response Generator → Frontend Chat Display

■ System Components

1. Chat Interface (Frontend)
- Tech: React / Next.js
- Interactive chat window with charts, quick queries, and optional login for user profiles.

2. NLP & Query Understanding
- Tech: OpenAI API or Llama 3, LangChain
- Maps user text to structured actions like course comparison, GPA prediction, etc.

3. Data Layer
- Sources: UIC Grade Distribution + RateMyProfessor
- Stores structured data, computes difficulty index, and analyzes professor sentiment.

4. Recommendation Engine
- Course Ranking: combines difficulty & rating
- Professor Match Index: matches learning style & sentiment
- Predict My Grade: regression-based grade predictor
- Schedule Optimizer: balances GPA gain & course load

5. Response Generation
- Combines data with LLM to provide explainable, human-like responses.
- Includes visuals (charts, trends).

6. Backend Infrastructure
- Tech: Node.js / Flask
- Handles chat requests, APIs, and LLM integration.

7. Database
- MongoDB or PostgreSQL for storing courses, professors, users, and analysis results.

■ Development Roadmap
Phase 1: Data Collection
Phase 2: Database Setup
Phase 3: Core Logic
Phase 4: Frontend Chat UI
Phase 5: LLM Integration
Phase 6: Personalization & Optimization

■ Key Learning Outcomes
- Data scraping and preprocessing
- AI recommendation systems
- NLP and prompt engineering
- Full-stack AI app development
- Explainable AI concepts