

AI Tools Integration: Full-Stack Web Dev Syllabus

Tech Stack

- Next.js 14 + TailwindCSS + Shadcn UI + OpenAI API + Prisma ORM + Supabase/Railway + Zod

Week 1: Frontend + AI Basics

Class 1: Intro to AI-Powered Web Apps

- Next.js App Router deep dive
- Folder structure walkthrough
- TailwindCSS + Shadcn UI setup
- useState, useEffect for form handling
- Create a form to accept user prompt

Homework

- Build a 2-page app: Home + Prompt Input Page
- Create reusable InputForm.tsx with Tailwind
- Research 3 AI APIs (OpenAI, Replicate, Cohere)

Class 2: AI API Integration

- Configure .env for API key storage
- OpenAI Chat Completion API basics
- Create POST API route in /app/api/ai/route.ts
- Call API and display response
- Implement error handling and loading state

Homework

- Call OpenAI API with your prompt
- Create 3 test prompts and display outputs
- Bonus: Add loading spinner and fallback

Week 2: Backend with Prisma + Message Flow

Class 3: Prisma + PostgreSQL Setup

- PostgreSQL via Supabase or Railway
- Install Prisma and initialize project
- Define schema: User, Session, Message
- Run migrations, open Prisma Studio
- Store prompt-response via API

Homework

- Seed User and Message tables
- Store prompt/response in DB

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- View records via Prisma Studio

Class 4: Chat Memory System

- Display chat history in frontend
- Distinguish roles: user, assistant, system
- Build scrollable chat UI with tabs
- Group messages by sessionId in backend

Homework

- Create 2-tab UI: New Session + History
- Fetch and display full sessions from DB
- Add delete session button

Week 3: Advanced AI Integration

Class 5: Structured AI Output with Zod

- What is Zod and how it's used
- `openai.responses.parse()` with `zodTextFormat()`
- Create tools: SummarizeText, Hashtags, WeatherInfo
- Instruct AI to return tool schemas
- Mock tool output and render it

Homework

- Create and integrate 1 tool (e.g., Summarizer)
- Test 3 tool-triggering prompts
- Validate and render output using Zod

Class 6: AI SaaS Techniques + Deployment

- Role logic: Free vs Admin (mock or NextAuth)
- Usage limits per session
- Protect APIs with x-api-key headers
- Deploy frontend on Vercel
- Deploy DB on Supabase or Railway
- Polish UI and handle errors

Homework

- Deploy app from input to tool output
- Share one improvement idea