Course Assistant & Schedule Optimizer Agent

Background

Oftentimes, as a student, you might have a broad interest you'd like explore by taking a course at your university. University course catalogues are often daunting—filled with hundreds of courses that you couldn't possibly parse through on your own—and courses aren't always organized so straightforwardly by topic. (An introduction to python course might show up in a couple different ways, ie. in a school of business for business applications, in an engineering school for software development, etc.)

An ideal student experience would be that students have access to an on-demand AI chat agent that could help guide the student through the course selection and registration process—all the way from interest to scheduling.

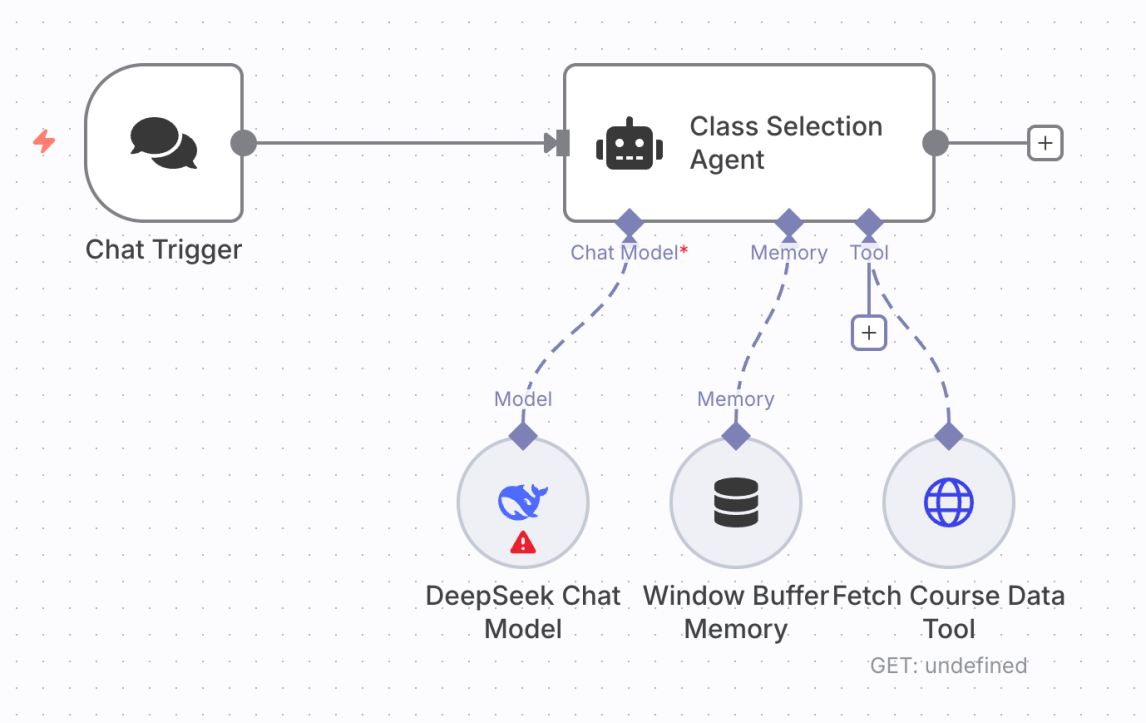
This is how the course assistant agent came to be.

Iteration 1: Minor Setbacks

The agent was built using n8n, an AI workflow automation tool, and uses NYU Shanghai as an example university.

The first attempt at the course assistant agent uses a chat trigger, which allows the user to type to speak to the agent. The class selection agent is tailored to the user's needs and the agent's specific purpose, with the agent instructions being:

> You are an AI agent who's purpose is to help NYU Shanghai students pick classes by interest. You need to find course information only from NYU Shanghai official websites like https://www.nyu.edu/shanghai/academics/courses/fall-20241.html and when available, you should note the semester to the student.

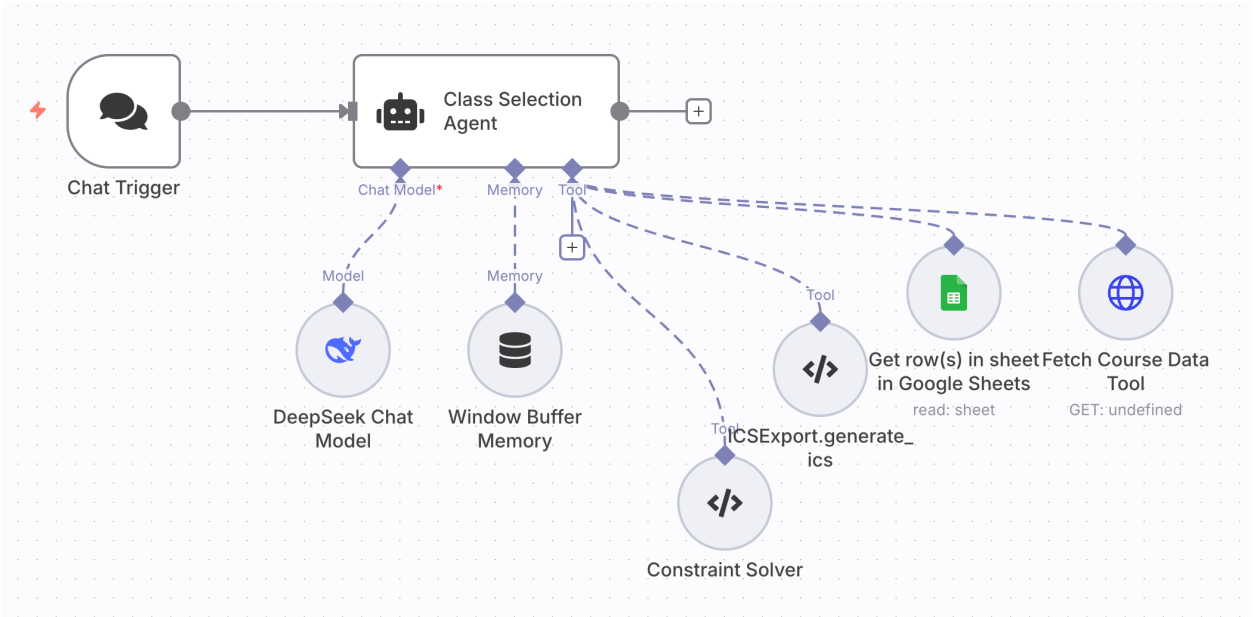


The agent then uses DeepSeek to parse the user request, and then searches for publicly available information on the internet using the GET tool to find information to fulfill said request. Per the agent instructions, the agent also prioritizes information from the student's official school website over other sources that may be out of date or unreliable.

Unfortunately, for our example school I found that NYU Shanghai blocks bots from accessing its website data with captcha, so this version of the model was unable to consistently deliver reliable and up-to-date course data. Because of this blocker, I had to find a workaround for this demo project.

Iteration 2: The Success Story

The second version of the course selection agent uses sample NYU Shanghai data scraped from the university's publicly available websites to a Google Spreadsheet. We are then able to retrieve information from the Google Spreadsheet by connecting it to the agent through n8n's Google Sheets tool. For the purposes of this demo agent, we decided to overcome the blocker by using a sample set of data. However, should a university decide they would like to integrate this agent into their own student tools, the university could just as easily replace our sample data with a connection to their own course database.



In this version of the agent, the user first enters a prompt. The user can choose to describe their interests or give the agent some insight into their scheduling availability. For example, a user could say "I'm interested in finance and am free Tuesday and Wednesday evenings". The agent will then consult with DeepSeek to process the user's query and scour the dataset to gather information about existing courses. It will

then consult DeepSeek again to understand which courses may be relevant to the user's interests and narrow down courses to align with what the user may be interested in taking. After identifying these interests, the agent will then examine the dataset again to see, of the relevant courses, which times match the user's given availability. Lastly, the agent will sort the courses in order of which best match the given criteria. Should there be conflicts with the course content or course times, the agent will note said conflicts to the user, and the user can choose to proceed with whichever option best fits what they want.

The information returned will include:

- Course Title
- Course Number
- Course time(s)
- Number of credits
- Semester
- Number of available spots
- Availability score that is calculated according to the number of remaining seats ratio
- Course location (In-person, hybrid, or online)

The information returned is split into three sections: Courses Available, Related Courses, and Recommended Schedule, which are organized according to relevancy to the user's interests and availability.

Because there are no courses that are an 100% match for our example "finance interest" and "Tuesday/Wednesday evening availability", the first and most relevant course returned on the list below is a Corporate Finance course on Tuesday and Thursday mornings. The agent makes sure to denote that this course is not in the evening—like the user requested—and returns all other relevant information for this course.

The "Related Courses" section proposes a few other courses that aren't strictly finance, but that the user may have some interest in, and also orders these courses by relevance to the user prompt ("Entrepreneurship Lab", which matches the user's availability, is shown first).

The "Recommended Schedule" section tells the user, of the courses that the agent returned, which course(s) best match the user's availability and interests. Since there was no direct match for a finance course during this user's availability, the agent proposes the Entrepreneurship Lab, which matches the user's availability and has relation to their finance interest, as the best option.

I'm interested in finance and am free tuesday and wednesday evenings

Based on your interest in finance and availability on Tuesday and Wednesday evenings, I found several finance-related courses that fit your schedule. Let me analyze the available finance courses:

Finance Courses Available:

Corporate Finance (FINA 119)

- **Days**: Tue/Thu 8:30-10:00 (morning, not evening)
- **Credits**: 2
- **Term**: Fall 2025
- **Availability**: 20 seats available (47.4% availability score)
- **Mode**: In-person

Investment Analysis (FINA 109)

- **Days**: Thu 17:00-18:30 (Thursday evening)
- **Credits**: 3
- **Term**: Summer 2026
- **Availability**: 15 seats available (22.9% availability score)
- **Mode**: In-person

Behavioral Finance (FINA 129)

- **Days**: Sat 13:40-15:10 (Saturday afternoon)
- **Credits**: 2
- **Term**: Summer 2026
- **Availability**: 3 seats available (5% availability score)
- **Mode**: Hybrid

Financial Modeling (FINA 149)

- **Days**: Mon/Wed 8:30-10:00 (morning, not evening)
- **Credits**: 2
- **Term**: Fall 2025
- **Availability**: 14 seats available (20.7% availability score)
- **Mode**: Hybrid

Related Business/Finance Courses:

Entrepreneurship Lab (BUS 95)

- **Days**: Wed 17:00-18:30 (Wednesday evening - perfect fit!)
- **Credits**: 3
- **Term**: Spring 2026
- **Availability**: 20 seats available (48.8% availability score)
- **Mode**: Online

Behavioral Economics (ECON 102)

- **Days**: Mon 18:40-20:10 (Monday evening)
- **Credits**: 2
- **Term**: Fall 2025
- **Availability**: 23 seats available (67% availability score)
- **Mode**: Online

Recommended Schedule:

Since you specifically mentioned Tuesday and Wednesday evenings, the **Entrepreneurship Lab (BUS 95)** on Wednesday evenings is a perfect fit! For Tuesday evenings, there aren't any finance-specific courses, but you could consider:

- **Linear Algebra** (MATH 141) - Tue/Thu 18:40-20:10 (Summer 2026)
- **Philosophy of Mind** (PHIL 124) - Tue 18:40-20:10 (Spring 2026)

Would you like me to help you build a draft schedule with these courses, or would you prefer to explore other related courses that might fit your Tuesday/Wednesday evening availability?

Application