

*Florida International University*  
*Knight Foundation School of Computing and Information Sciences*

Software Engineering Focus

# Final Deliverable

Project Title:  
**Course Companion**

**Team Members:** Jinming Liu, Hermes Bonilla, Elaria Ghobrial

**Product Owner(s):** Elaria Ghobrial

**Mentor(s):** Elaria Ghobrial

**Instructor:** Masoud Sadjadi

The MIT License (MIT)  
Copyright (c) 2016 Florida International University

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

### ***Abstract***

*In the rapidly evolving educational landscape, the need for effective learning aids is more crucial than ever. The Course Companion application, a dynamic web-based platform, is designed to fulfill this need by offering an innovative solution for students across various educational levels. This application leverages modern web technologies to provide a comprehensive suite of tools that enhance learning experiences through interactive content, real-time academic support, and personalized learning pathways.*

*At its core, the Course Companion application integrates key functionalities such as an interactive calendar for tracking assignments and exams, a forum for student and educator interaction, and customizable modules tailored to individual learning preferences and course requirements.*

*This paper presents the design, implementation, and potential impacts of the Course Companion application, emphasizing its role in facilitating a more engaged and personalized learning environment. By combining intuitive design with powerful technology, the application aims to empower students to take control of their educational journeys, increase their academic success, and enhance their overall learning experience.*

## Table of Contents

|                                                                                                                           |           |
|---------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>INTRODUCTION .....</b>                                                                                                 | <b>5</b>  |
| CURRENT SYSTEM .....                                                                                                      | 5         |
| PURPOSE OF NEW SYSTEM .....                                                                                               | 5         |
| <b>USER STORIES</b>                                                                                                       |           |
| IMPLEMENTED USER STORIES .....                                                                                            | 6         |
| PENDING USER STORIES .....                                                                                                | 6         |
| <b>PROJECT PLAN</b>                                                                                                       |           |
| HARDWARE AND SOFTWARE RESOURCES .....                                                                                     | 7         |
| SPRINTS PLAN .....                                                                                                        | 8         |
| <i>Sprint 1</i> .....                                                                                                     | 8         |
| <i>Sprint 2</i> .....                                                                                                     | 8         |
| <i>Sprint 3</i> .....                                                                                                     | 9         |
| <i>Sprint 4</i> .....                                                                                                     | 9         |
| <i>Sprint 5</i> .....                                                                                                     | 10        |
| <i>Sprint 6</i> .....                                                                                                     | 10        |
| <i>Sprint 7</i> .....                                                                                                     | 11        |
| <b>SYSTEM DESIGN</b>                                                                                                      |           |
| ARCHITECTURAL PATTERNS .....                                                                                              | 12        |
| SYSTEM AND SUBSYSTEM DECOMPOSITION .....                                                                                  | 12        |
| DEPLOYMENT DIAGRAM .....                                                                                                  | 13        |
| <b>SYSTEM VALIDATION .....</b>                                                                                            | <b>14</b> |
| <b>GLOSSARY .....</b>                                                                                                     | <b>15</b> |
| <b>APPENDIX .....</b>                                                                                                     | <b>16</b> |
| APPENDIX A - UML DIAGRAMS .....                                                                                           | 16        |
| APPENDIX B - USER INTERFACE DESIGN .....                                                                                  | 17        |
| APPENDIX C - SPRINT REVIEW REPORTS .....                                                                                  | 18        |
| APPENDIX D - USER MANUALS, INSTALLATION/MAINTENANCE DOCUMENT, SHORTCOMINGS/WISHLIST<br>DOCUMENT AND OTHER DOCUMENTS ..... | 24        |
| <b>REFERENCES .....</b>                                                                                                   | <b>30</b> |

## **INTRODUCTION**

In the contemporary educational environment, students face numerous challenges that can impact their learning effectiveness and academic performance. From managing multiple courses and deadlines to adapting to different teaching styles and absorbing vast amounts of information, the demands are substantial. Traditional educational tools and methods, while still useful, often fail to meet the diverse needs of today's learners who seek more flexibility and personalized learning experiences. Recognizing these challenges, the Course Companion application was developed as a comprehensive solution aimed at transforming the way students interact with their educational material and manage their academic lives.

### **Current System**

There is no current system set in place, as this is the first semester of development for CourseCompanion.

### **Purpose of New System**

The primary purpose of this system is to provide a streamlined, user-friendly platform that significantly enhances the efficiency and effectiveness of learning processes. It aims to serve as a comprehensive educational tool, assisting students in managing their coursework and study materials more effectively. By integrating intuitive navigation with advanced functionalities, the system facilitates a more personalized and engaging learning experience, helping students to achieve their academic goals with greater ease and success.

## USER STORIES

The following section provides the detailed user stories that were implemented in this iteration of the CourseCompanion Project. These user stories served as the basis for the implementation of the project's features. This section also shows the user stories that are to be considered for future development.

### Implemented User Stories

- Set up ChatGPT API
- Create mockup design for interface
- Gather information patterns from user
- Organize UI into containers
- Set color theme of webpage
- User input container
- Produced FAQs from students
- Allow user to ask a question again if errors in initial question were made.
- Designed a teacher view webpage
- Course selection sidebar
- Integrate multiple syllabi
- Initial prompt
- Toggle sidebar
- RegEx integration
- Web logo

### Pending User Stories

- Connect to Canvas' API
- Integrate teacher view of webpage
- Develop upload functionality
- Produce prompts from uploaded files
- Universal across different types of devices

## PROJECT PLAN

This section describes the planning that went into the realization of this project. This project incorporated the agile development techniques and as such required the sprints to be planned. These sprint plannings are detailed in the section. This section also describes the components, both software and hardware, chosen for this project.

### Hardware and Software Resources

The following is a list of all hardware and software resources that were used in this project:

- ChatGPT API endpoint
- Node.js
- Axios
- VS-code
- HTML
- CSS
- JavaScript

## Sprints Plan

### *Sprint 1*

| Story Title                                                   | Story Points | Assigned To                                  |
|---------------------------------------------------------------|--------------|----------------------------------------------|
| Research and Set up ChatGPT API                               | 5            | Jinming Liu                                  |
| Design Webpage mockup                                         | 5            | Elaria Ghobrial                              |
| Gather information patterns that students seek                | 5            | Hermes Bonilla                               |
| Discuss basic roadmap of project for duration of the semester | 2            | Hermes Bonilla, Jinming Liu, Elaria Ghobrial |

### *Sprint 2*

| Story Title                     | Story Points | Assigned To     |
|---------------------------------|--------------|-----------------|
| Set up color theme of site      | 5            | Jinming Liu     |
| Organize UI into CSS containers | 5            | Elaria Ghobrial |
| AI response bubble logic        | 5            | Hermes Bonilla  |



***Sprint 3***

| <b>Story Title</b>                                           | <b>Story Points</b> | <b>Assigned To</b>                           |
|--------------------------------------------------------------|---------------------|----------------------------------------------|
| Understand how the chatbot could be manipulated and adaptive | 5                   | Jinming Liu                                  |
| Finalize UI theme and translate it to possible teacher view  | 5                   | Elaria Ghobrial                              |
| Allow user to submit a corrected question                    | 5                   | Hermes Bonilla                               |
| Produce FAQs students ask their professors                   | 2                   | Hermes Bonilla, Jinming Liu, Elaria Ghobrial |

***Sprint 4***

| <b>Story Title</b>                                | <b>Story Points</b> | <b>Assigned To</b> |
|---------------------------------------------------|---------------------|--------------------|
| Match class syllabus to respective prompts        | 5                   | Jinming Liu        |
| Optimize front-end code to be more user friendly  | 1                   | Elaria Ghobrial    |
| Set measurements of user bubbles vs. ai responses | 4                   | Elaria Ghobrial    |
| Produce an initial prompt when site is loaded     | 5                   | Hermes Bonilla     |

***Sprint 5***

| <b>Story Title</b>                                             | <b>Story Points</b> | <b>Assigned To</b> |
|----------------------------------------------------------------|---------------------|--------------------|
| Ensure clear responses are given to user by chatbot            | 5                   | Jinming Liu        |
| Test the user friendliness of color theme                      | 2                   | Elaria Ghobrial    |
| Implement sidebar to display corresponding courses             | 3                   | Elaria Ghobrial    |
| Integrate RegEx' to allow flexibility with the questions asked | 5                   | Hermes Bonilla     |

***Sprint 6***

| <b>Story Title</b>                                                               | <b>Story Points</b> | <b>Assigned To</b> |
|----------------------------------------------------------------------------------|---------------------|--------------------|
| Thoroughly test the chatbot's capabilities                                       | 5                   | Jinming Liu        |
| Fix the hover color and toggle action of the sidebar and it's selection          | 5                   | Elaria Ghobrial    |
| Finalize the prompts for the displayed classes and conduct testing with students | 5                   | Hermes Bonilla     |

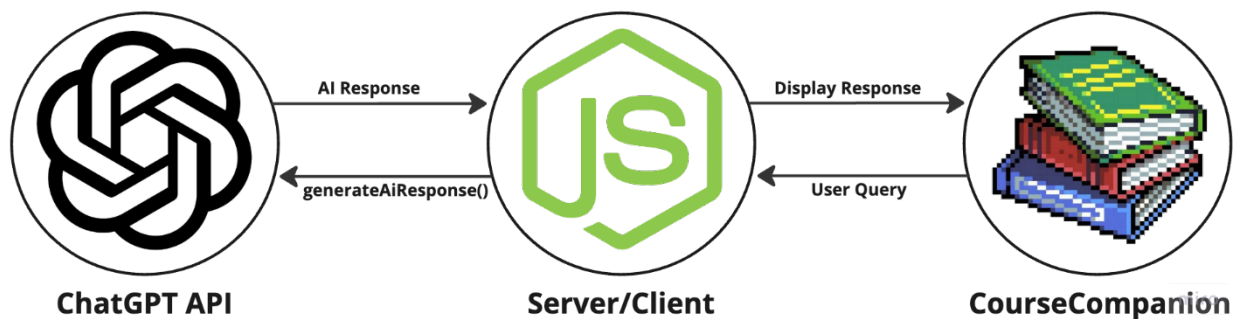
***Sprint 7***

| <b>Story Title</b>                                              | <b>Story Points</b> | <b>Assigned To</b>                           |
|-----------------------------------------------------------------|---------------------|----------------------------------------------|
| Record Final Videos                                             | 3                   | Hermes Bonilla, Jinming Liu, Elaria Ghobrial |
| Complete Documentation and README file                          | 5                   | Jinming Liu                                  |
| Organize and Submit Posters, Google form, and Final Deliverable | 5                   | Elaria Ghobrial                              |
| Edit and Post videos on YouTube                                 | 5                   | Hermes Bonilla                               |

## SYSTEM DESIGN

This section contains information on the design decisions that went into this project. The architecture patterns are outlined and explained. The entire system is shown in a package diagram and the subsystems are explained. Finally, the design patterns used in the project are discussed.

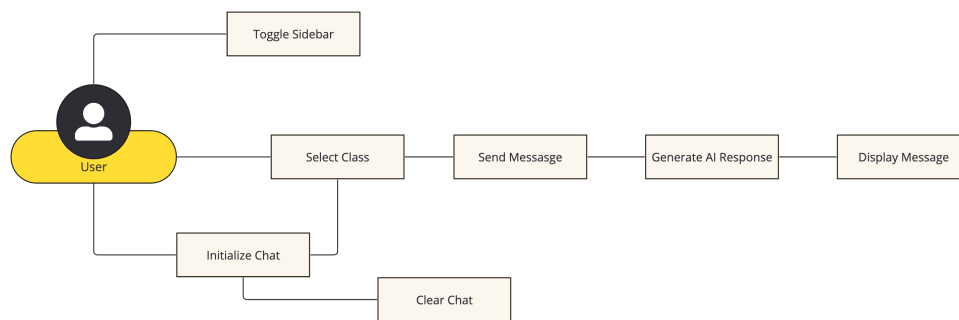
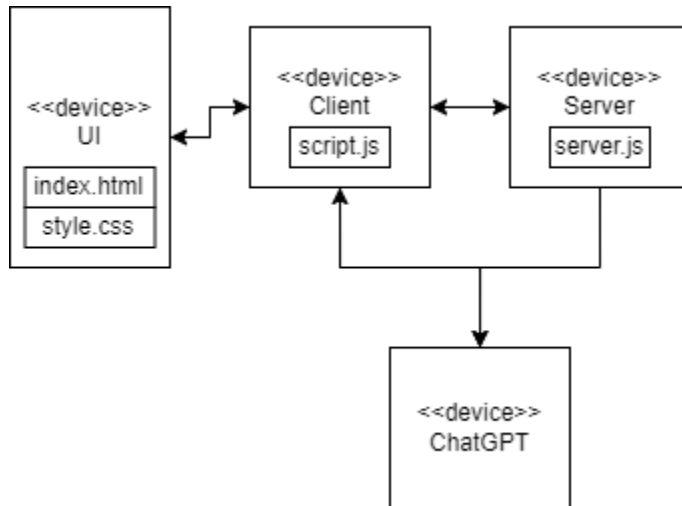
### Architectural Patterns



### System and Subsystem Decomposition

- User interface (CourseCompanion)
- Client side (API calls/front-end interactions)
- Server side (HTTP Server, connection to ChatGPT)

## Deployment Diagram



miro

## SYSTEM VALIDATION

System validation is a critical phase in the development of the Course Companion system. It involves rigorous testing and verification processes to ensure that the system meets all specified requirements and can operate effectively in its intended environment. We confirm that all features work as intended across various scenarios and match the specified requirements.

- Ensure the system performs efficiently under expected loads, maintaining responsiveness and stability.
- Assess the ease of use and intuitiveness of the user interface, ensuring that users can navigate and utilize the system without difficulties. This was verified by testing the webpage with students on campus.
- Test the system across multiple devices, operating systems, and browsers to ensure consistent behavior and appearance.

## GLOSSARY

### **Header Container:**

Contains the FIU logo and sidebar button that allows the user to navigate to different versions of the AI prompt.

### **Sidebar:**

Includes functionality to be opened and closed by the user and displays a list of buttons the user can navigate through.

### **Chatbox Container:**

The main container that displays the dialog between the user and AI response.

### **Input Container:**

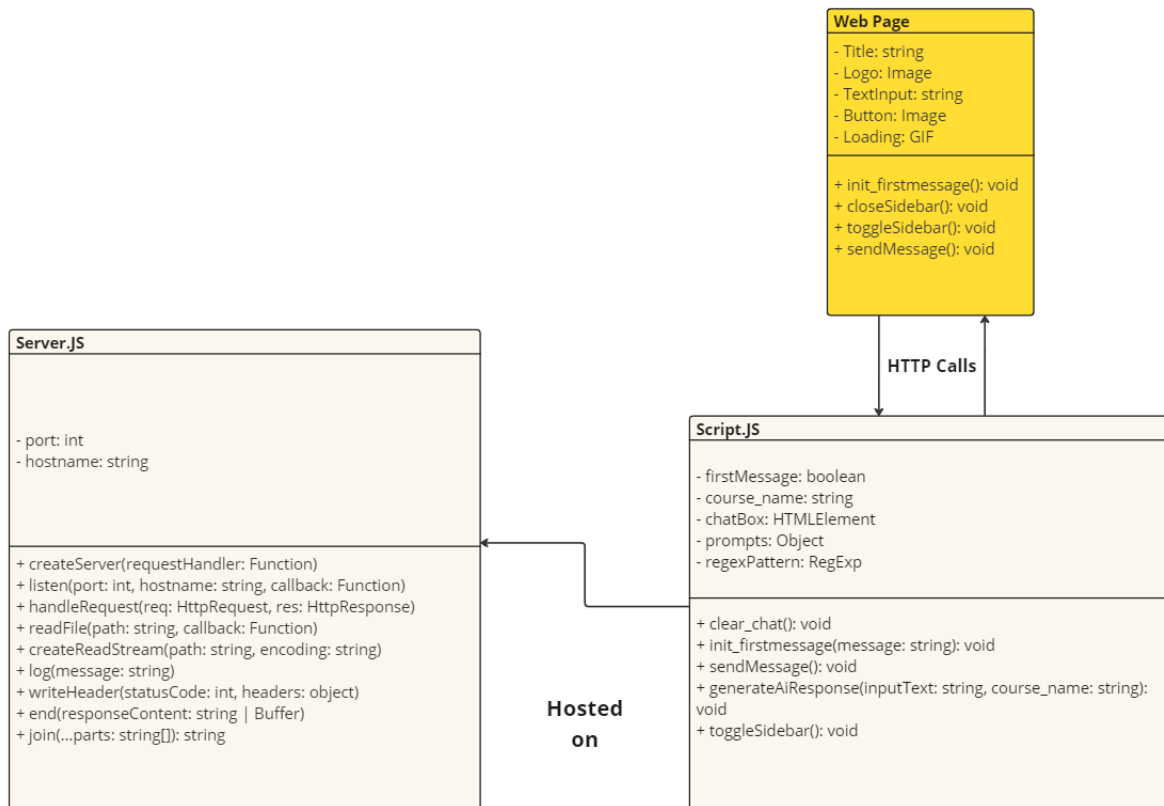
Located at the bottom of the page, this is where the user can input their questions. The right of the input has a send button where the user can send their inquiries.

### **ChatGPT API:**

Data that encompasses text conversations, user inputs, responses generated by the AI model, and associated metadata exchanged during interactions with the API.

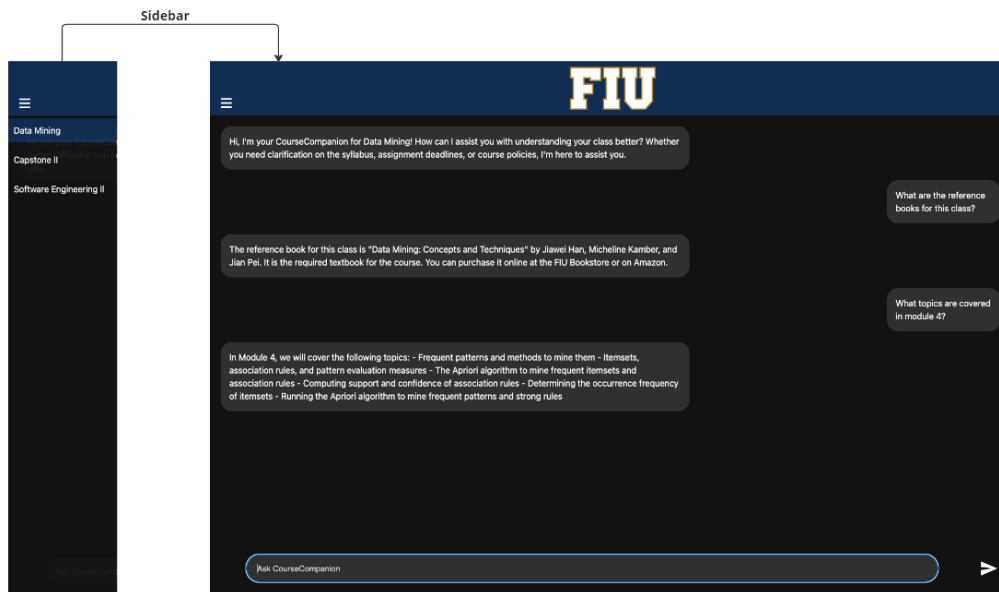
## APPENDIX

### Appendix A - UML Diagrams





## Appendix B - User Interface Design



## Appendix C - Sprint Review Reports

### Sprint 1:

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.
- Did we do a good job estimating the points (time required) for each user story?
  - Yes, we did a great job estimating the time we need for each user story, we realized that it takes us a little longer for our user story because of the intense research and different subtasks that are required to do for the user stories but we managed to get at least one done per sprint. Which was what we expected for this two week sprint.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint, for Jinming's end he had a blocker waiting for response from a different team which requires a change process within the organization, but overall it went good. Hermes was able to collect a sample of student FAQs to map common questions we need to account for, categorize the list, and set up ChatGPT keys for initial testing. Elaria began designing the wireframe for the chatbot. Jinming were able to configure chatgpt's api and engineered a prompt for the teacher's side

How to address the issues in the next sprint?

- How to improve the process?
  - We are on track on what we are doing, we just need to maintain this velocity moving forward.
- How to improve the product?
  - We will continue with our user stories that was in backlog/planning in this sprint carrying forward to the next sprint.

### Sprint 2:

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.
- Did we do a good job estimating the points (time required) for each user story?

- Yes, we did a great job estimating the time we need for each user story, we realized that it takes us a little longer for our user story because of the intense research and different subtasks that are required to do for the user stories but we managed to get at least one done per sprint. Which was what we expected for this two week sprint.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint. We planned new features to add to the chatbot, such as the teacher view. Elaria finished the design of each UI and collaborated with the group to decide on the best mockup. Jinming was able to design a layout for users to better access. Hermes was able to get some simple mockups showing how users can type in real-time.

How to address the issues in the next sprint?

- How to improve the process?
  - We are on track on what we are doing, we just need to maintain this velocity moving forward.
- How to improve the product?
  - We will continue with our user stories that was in backlog/planning in this sprint carrying forward to the next sprint.

### **Sprint 3:**

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.
- Did we do a good job estimating the points (time required) for each user story?
  - Yes, we did a great job estimating the time we need for each user story, we realized that it takes us a little longer for our user story because of the intense research and different subtasks that are required to do for the user stories but we managed to get at least one done per sprint. Which was what we expected for this two week sprint.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint. We planned new features to add to the chatbot, such as the teacher view. Elaria finished the design of each UI and collaborated with the group to decide on the best mockup. Jinming was able to create an AI version that can be easily manipulated to be used by different professors. Hermes was able to get some simple mockups showing how users can type in real-time.

How to address the issues in the next sprint?

- How to improve the process?
  - We are on track on what we are doing, we just need to maintain this velocity moving forward.
- How to improve the product?
  - We will continue with our user stories that was in backlog/planning in this sprint carrying forward to the next sprint.

#### **Sprint 4:**

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.
- Did we do a good job estimating the points (time required) for each user story?
  - Yes, we did a great job estimating the time we need for each user story, we realized that it takes us a little longer for our user story because of the intense research and different subtasks that are required to do for the user stories but we managed to get at least one done per sprint. Which was what we expected for this two week sprint.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint. We planned new features to add to the chatbot, such as the teacher view. Elaria optimized the code for the frontend and plans to test it out for the next sprint. Jinming was able to map out the different section of the syllabus for different classes. Hermes was able to get the prompt history API to accept requests.

How to address the issues in the next sprint?

- How to improve the process?

- We are on track on what we are doing, we just need to maintain this velocity moving forward.
- How to improve the product?
  - We will continue with our user stories that was in backlog/planning in this sprint carrying forward to the next sprint.

**Sprint 5:**

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.
- Did we do a good job estimating the points (time required) for each user story?
  - Yes, we did a great job estimating the time we need for each user story, we realized that it takes us a little longer for our user story because of the intense research and different subtasks that are required to do for the user stories but we managed to get at least one done per sprint. Which was what we expected for this two week sprint.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint. We planned new features to add to the chatbot, such as the teacher view. Elaria optimized the usability of the frontend aspect of the chatbot. Jinming was able to test out the generated responses from the AI. Hermes was able to get debugging prompts for developers and complete the prompt/history log completed.

How to address the issues in the next sprint?

- How to improve the process?
  - We are on track on what we are doing, we just need to maintain this velocity moving forward.
- How to improve the product?
  - We will continue with our user stories that was in backlog/planning in this sprint carrying forward to the next sprint.

**Sprint 6:**

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.

- Did we do a good job estimating the points (time required) for each user story?
  - Yes, we did a great job estimating the time we need for each user story, we realized that it takes us a little longer for our user story because of the intense research and different subtasks that are required to do for the user stories but we managed to get at least one done per sprint. Which was what we expected for this two week sprint.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint. We planned new features to add to the chatbot, such as the teacher view. Elaria optimized the usability of the sidebar and UI layout of the input container. Jinming was able to restrict what type of questions are being asked. Hermes was able to complete the capstone poster and run through a random peer to get a test of how our functionalities are being adopted by users.

How to address the issues in the next sprint?

- How to improve the process?
  - We are on track on what we are doing, we just need to maintain this velocity moving forward.
- How to improve the product?
  - We will continue with our user stories that was in backlog/planning in this sprint carrying forward to the next sprint.

### **Sprint 7:**

What went wrong?

- Did we do a good job estimating our team's velocity?
  - As a team, we concluded that we were moving a really good velocity for this sprint.
- Did we do a good job estimating the points (time required) for each user story?
  - Yes, we did a great job estimating the time we need for each user story.
- Did each team member work as scheduled?
  - Yes.

What went right?

- As a collective, we thought we did a really good job for this sprint by preparing all the requirements for the final zip file. Elaria delegated the work that was left and has been putting together the final deliverable. Jinming worked on a lot of documentations and

installation video. Hermes was able to put together the videos we filmed into a playlist and has been helping to put the final deliverable together as well.

How to address the issues in the next sprint?

- How to improve the process?
  - We've maintained a good velocity throughout this semester.
- How to improve the product?
  - The product is complete for this semester and is hoped to be worked on by future teams.

## **Appendix D - User Manuals, Installation/Maintenance Document, Shortcomings/Wishlist Document**

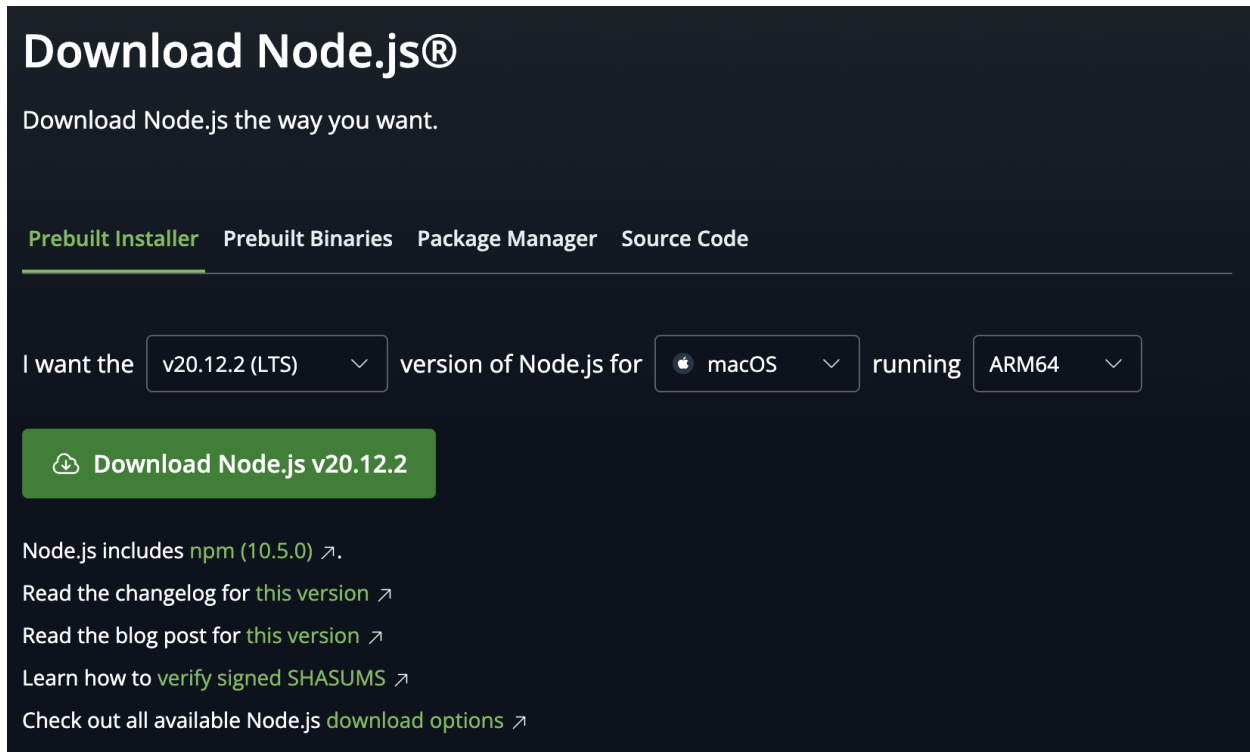
### **CourseCompanion User Manual**

1. Once you have your website running on the localhost, the chatbot will prompt you with a welcome message informing you of what class is selected.
2. Type in a message in the input container located in the bottom of the page that is related to the selected class.
3. While a response is loading, you will see a loading gif until the response is delivered to the user. If the question is out of scope, the chatbot will respond with an error message.
4. If you want to ask a question regarding a different class, navigate to the sidebar on the top left corner of the screen and click on a different class.
5. If you would like to navigate to the FIU website, click on the FIU logo located at the top/center of the page.



# CourseCompanion Installation Guide

1. Download Node.js on your computer for appropriate OS system ⇔  
<https://nodejs.org/en/download>



**Download Node.js®**

Download Node.js the way you want.

**Prebuilt Installer** Prebuilt Binaries Package Manager Source Code

I want the **v20.12.2 (LTS)** version of Node.js for **macOS** running **ARM64**

[Download Node.js v20.12.2](#)

Node.js includes [npm \(10.5.0\)](#).

Read the changelog for [this version](#).

Read the blog post for [this version](#).

Learn how to [verify signed SHASUMS](#).

Check out all available Node.js [download options](#).

2. Open your preferred IDE to run the project. We recommend VS Code as it is user-friendly.
3. In your IDE, open a new terminal and make sure you are in the `openai-axios` folder to do this run the following commands in your terminal:

```
? ls
? cd CourseCompanion/
? cd openai-axios/
```
4. Once you are in the `openai-axios` folder you will run the following commands to use the axios library:

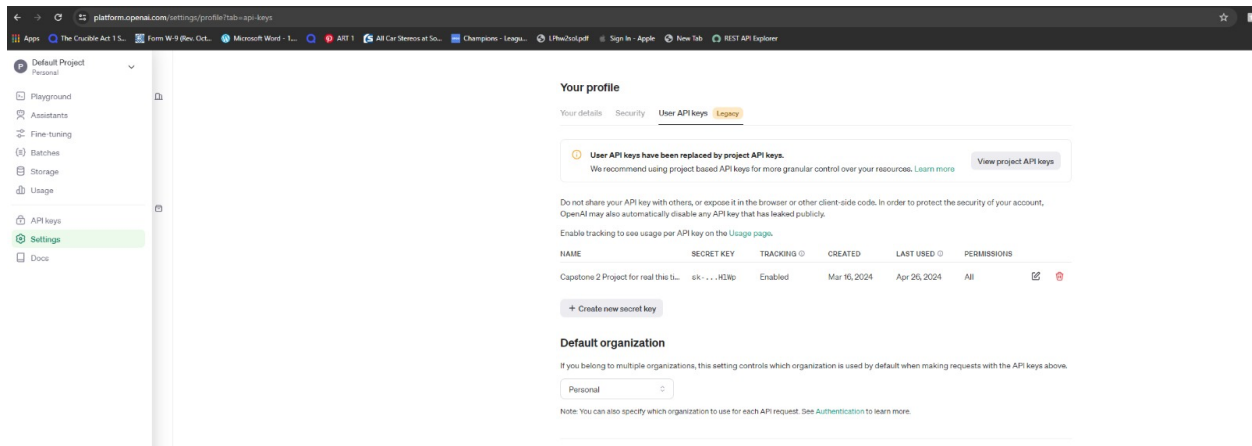
```
? npm init -y
```

- ? npm install dotenv axios
- 5. To run the website on the localhost you must run the server.js file.  
? node server.js
- 6. Open the localhost site when prompted with: Server running at  
http://127.0.0.1:3000/.

## File/Project Modifications

Before working on this project, make sure you change the API key that was used in the `script.js` file (line 258). To do this follow the steps below.

1. Create an account with ChatGPT and access the settings in your profile.
2. Navigate to the 'User API keys' tab and create a new secret key. **MAKE SURE YOU COPY THIS KEY AND PASTE IT IN THE CODEBASE** [`script.js` file, line 258].



```
257 // Construct parameters for ChatGPT API
258 const apiKey = "API KEY GOES HERE";
```

3. Once your API key is created, navigate to your personal settings, and click on the 'Billing' tab. Here you will need to pay for credits to use in this project. (You don't need to pay a large amount just test it with \$2 and it should work.)

**README:**

-----

Project Title: CourseCompanion Web Application

Directory Structure:

-----

/ - Root directory

|               |                                                                                                                 |
|---------------|-----------------------------------------------------------------------------------------------------------------|
| __ index.html | # Main HTML file for the CourseCompanion application                                                            |
| __ style.css  | # Stylesheet for the CourseCompanion application                                                                |
| __ script.js  | # JavaScript file containing dynamic behaviors for the application                                              |
| __ server.js  | # JavaScript create an endpoint that receives requests from the client and sends them to OpenAI for processing. |
| __ images/    | # Directory containing images used in the application                                                           |

Description:

-----

The CourseCompanion Web Application is designed to assist students with course-related inquiries. It includes a chat interface, a sidebar for navigation between different course topics, and dynamically loads content based on user interactions.

Key Components:

-----

1. index.html:

- This file contains the HTML structure of the application.
- It includes references to external libraries such as Axios for HTTP requests and Bootstrap for responsive design.
- JavaScript and CSS are organized in both external files and inline for specific features.
- The body onload event triggers initialization of the chat.

2. style.css:

- Defines the visual style of the web application including grid layout for the header, chat boxes, input areas, and sidebar.
- Styling specifics for scrollbars, buttons, and text input fields are included to enhance the user interface.

3. script.js:

- Handles dynamic behavior of the application such as message sending/receiving, sidebar toggling, and input field interactions.

- This file should include all the JavaScript code that is commented in the index.html for a cleaner HTML file.

#### 4. server.js:

- Create an endpoint that receives requests from the client and sends them to OpenAI for processing.

- This file should include all the JavaScript code that is commented in the index.html for a cleaner HTML file.

#### 5. images/:

- Contains image files used within the application, currently includes the FIU logo and loading gifs.

#### Usage:

-----

- The main interface is loaded via index.html in a web browser.

- Users can interact with the chat interface to receive course-related assistance.

- The sidebar provides quick navigation between different educational topics.

#### Note:

-----

- Ensure that your web server serves the images/ directory correctly for the image assets to load.

- JavaScript files such as script.js and external libraries must be correctly linked in your HTML file.

#### Dependencies:

-----

- Bootstrap 4.6.0

- Axios

- jQuery 3.6.0

- Font Awesome 6.3.0

- Google Fonts - Material Icons

This README file should be updated as the project evolves to reflect changes in the structure and functionality.

**Shortcomings:**

- The user interface does not fully adapt to various mobile devices, which may hinder user experience on smartphones and tablets.
- The current infrastructure may not adequately handle a significant increase in user numbers or data volume.
- Users have limited ability to customize their learning environments and dashboard layouts.
- The system currently offers basic analytics. More in-depth insights into user performance and learning patterns are needed.

**Wishlist:**

- Develop a fully responsive design or a dedicated mobile application.
- Allow users to personalize more aspects of their learning environment.
- Incorporate machine learning to provide deeper insights into user behavior and learning outcomes.
- Develop APIs for integration with popular educational tools and platforms.

## REFERENCES

- ChatGPT API Documentation:
  - <https://platform.openai.com/docs/introduction>
- Axios API Documentation:
  - <https://axios-http.com/docs/intro>
- VS Code:
  - <https://code.visualstudio.com/>
- Node.js:
  - <https://nodejs.org/en>