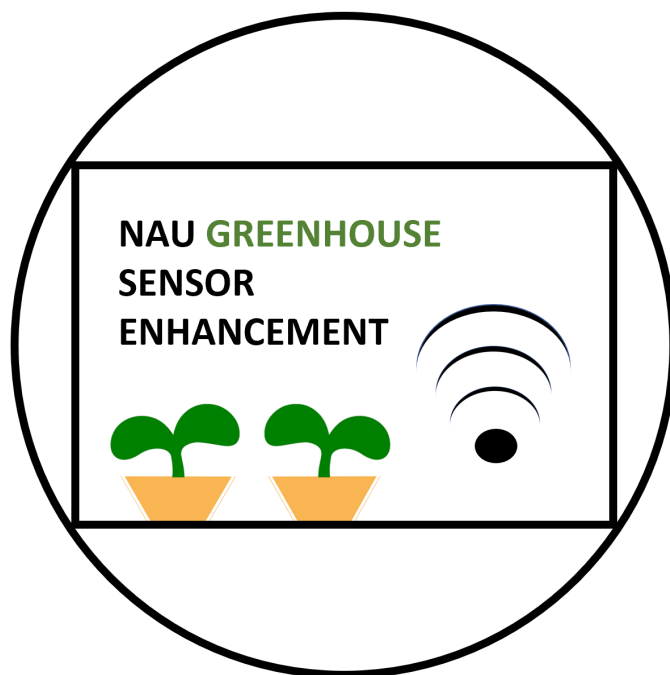# 2021-2022 Capstone in Electrical Engineering: NAU Teaching Greenhouse

STANDARDS

September 24, 2021

Emilia Connelly - econnelly@nau.edu

Ruopeng Jia - rj495@nau.edu

Jiaxin Liu - jl3479@nau.edu

Alexia Risley - acr324@nau.edu

<u>Overview</u>

This document sets out standards for tools and documentation for the Greenhouse capstone team.

<u>Tools</u>

1. Raspberry Pi (or any microcontroller)
    a. We will be using a microcontroller to program, so we can wire the sensors to the microcontroller and send the data collected via the sensors to the client as a notification. We may also need a microcontroller to control the systems that change the temperature and humidity. In order to wire up the microcontroller successfully, we will need necessary peripherals, such as the sensors, breadboard, usb cable, etc…
    b. We anticipate that we will need to research the selected microcontroller, and play around with the microcontroller at first to learn more about how it functions.
2. Humidity and temperature sensors
    a. We will need humidity and temperature sensors to monitor the state that the greenhouse is in.
    b. We expect that may require some testing of the sensors, since they may be faulty and not show the data correctly. We also anticipate that they may not wire/connect correctly to the microcontroller at the first try, so we may have to adjust the connection based on the accuracy of the available readings.
3. Powerpoint
    a. We will use powerpoint to prepare our presentation at the end of the semester on the progress of our capstone project.
    b. We are also aware that we may need to practice our presentation, and make changes to the format of the slideshows depending on the flow of our presentation.
4. Computer language
    a. We will need a computer language in order to program the microcontroller. The microcontroller will be interpreting the collected data via the sensors and sending it as a notification. A computer language will serve as the means to attaining and sending the data.
    b. We anticipate that we will need to research the chosen language more, so we can learn more on how it works. By learning how to use the language, we can be successful in creating the necessary code for analyzing the data.
5. Internet and website creation
    a. We will need the internet to display the data from the sensors, if we choose to use a website to show the data.
    b. We will need to learn how to create a website in order to perform the task of constantly obtaining the data from the sensors. We can look this up on the internet.

6. Version Control
    a. All computer code shall be stored in a Github repository. Each team member shall promptly push their changes to the repository so that others can monitor progress and to prevent loss of work in case a member's computer malfunctions.

Design Files

We will be using Google Docs to manage all of our documents. We have created a shared folder, where we can assess all of our team related documents in that specific folder. While creating a document, we create a rough draft first, and then discuss what we wrote/created with the other team members present. From there, we write up the final draft. We also created a separate document to log the progress of the team. Here, we include the time duration, location, and members present in the record. We also will include an agenda of what we will do, and then a description of what we did. We may or may not include an agenda, depending on if it is necessary. As for documenting code, we will be using GitHub. By using this app, we can display all our code and access what others created. As well, all the changes that were made to the code can be easily read by the rest of the team members, since they are displayed in a list chronologically. We will need to download all relevant code that was made by our team members, and then make our own changes, so we may upload the changes to GitHub. By using GitHub, all of our coding documents can be found at the same location making it easy for us to share, edit, and save code. We can also log our progress via GitHub by looking at the edits made to the document; this way we can see who did what code. There will be no need to log the progress of coding on our record keeping sheet.

Issue Tracking

In order to keep track of the tasks that need to be completed, we will be using a Google document, so we all have fast access to the document. Within the Google document, we will give either a definite or suggested due date for when the task needs to be completed. When we give a suggested date, it means that we have more flexibility in the schedule for a task. When we set a definite time, that means we must have that task done by then. We will also list the urgency of the tasks, so we know what task as a team we have to finish first. If a task is not urgent, we can discuss it at a later date, if we run out of time at our weeking meeting. As for assigning tasks, we will discuss via Discord or in-person who is to do what task. Most likely, we will share the responsibility of the task.

Word Processing and Presentation

Documents and reports shall be created and edited directly in the Google Drive. This allows simultaneous editing by all team members and automatic logging of who made which edits.

Standard deliverable documents shall comply with the following:

- 8.5" by 11" size
- One inch margins on all sides
- 1.15x spacing
- Body text: Times New Roman font, 11 or 12 point, left aligned
- Code reproduced in documents: Courier New font, 10 to 12 point
- Captions and footnotes: Times New Roman font, 10 point
- Page numbers: centered at the bottom of every page except the cover. The first page after the cover shall be page 1.
- Paragraph indentation: none
- Space between paragraphs: one blank line

Composition and Review

We have discussed what time interval that we would like for this editing period, and we decided on 48 hours beforehand. This way, we know that the documents are in on time, and we allow the editors enough time to review the content. The editors will either be Alexia Risley or Emilia Connelly, since we know English as our first language, which helps with our attention to detail in grammar mistakes for example.