

# **Vertical Farming**

**Summer 2020**

Team Number: 20su

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## **476C Postmortem Analysis**

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## **Introduction**

During the first semester of Capstone a design and project plan were developed. In the coming semester a prototype will be built and improved until a final design is produced. Collaboration and communication during first semester were difficult due to the online nature of the class but the team adapted and is ready to build the first prototype. This assignment discusses how the first semester of capstone went.

## **Team Charter Guidance**

At the beginning of the semester a Team charter was created to clarify the focus of the project and the roles and responsibilities of the team members. In the team charter it was stated that the team's purpose and goal was to reduce the land area needed to plant, raise, and harvest crops. This purpose was fulfilled by designing a compact user friendly expandable vertical farm that could be placed in a home or office setting. Other goals mentioned in the team charter were collaborating efficiently, increasing our knowledge of soilless cultivation, and keeping cost to a minimum. Efficient collaboration was achieved using Microsoft teams and WhatsApp group conversations. Team meetings in addition to the weekly staff meetings were scheduled on Microsoft teams to complete assignments. Group conversations were used keep everyone up to date and on the same page. Increasing our knowledge of soilless cultivation was achieved by assigning team members different soilless cultivation techniques to research and sharing what they learned with everyone. The team is currently analyzing different material options to reduce cost in order to meet the minimum cost goal.

The team charter also established several ground rules which were all followed and worked well. The most effective rule was meeting on Wednesdays to prepare for the Thursday staff meeting. Another ground rule that worked well was having all communication go through the WhatsApp group conversation or Microsoft teams. This reduced redundant conversations between team members. These two rules made up our coping strategy for not being able to meet face to face and having team members in separate time zones. The team did create a rule regarding conflicting ideas that never needed to be enforced.

## **Project Performance**

Throughout the first phase of the project, our project was beneficial most in designing a small footprint vertical farming system. After numerous group ideas and iterations, the final concept seeks to fit in any household with a minimal footprint able to fit in any modern-day household. Another benefit was our team's ability to successfully include multiple sub-systems within our design. This allows any customer to experience numerous farming techniques within one setup to include a terrace farming sub-design, a vertical cabinet sub-design, and a topside vertical planting sub-system which are all looped together by the aquaponics system.

On the other hand of project performance, there is still one area our team would like to revisit this semester. Cost was an issue in our design as we struggled to come up with a cost effective, yet durable design. Currently it would still be cheaper to purchase a product already in circulation over our own. Though the individual cost of parts is small, building the entire unit out of Unistrut turned out to be more expensive than anticipated. However, our team will seek

to redesign the structure of the project to better suit the budget of the typical consumer while maintaining a safe and durable product.

## **Areas for Improvement**

While the team did work well together, there were some areas that could benefit from some improvement. Some problems the team encountered largely revolved around having a full team during meetings as well as having conflicting methodologies between members. Generally, there were 3 out of the 5 members attending meetings and assigning sections or making decisions. The team would like to see all members attend meetings so that every opinion and research can be heard. As for the conflicting methodologies, I think it is important for the team to sit down and decide on goals and paths to reach these goals.

As for technical lessons, the team struggled with condensing and sharing the weekly research reports and existing knowledge. Certain design considerations and limits were not widely known in the group and due to this, some designs were considered that did not adhere to these restrictions. To improve this, the team will make a running list of design limits and restrictions going forward to minimize wasted time spent on considering designs that do not pass these base criteria. The team has also struggled with deciding on what is a customer requirement and a customer “want”. As one of the team's goals is for the design to be budget friendly, we need to make clear distinctions between what must be on the project and what “could be” on the project.

Moving forward, the team will continue to have weekly meetings between group members to attempt to reduce any confusion within the group and make decisions about designs. This should allow our weekly meetings with the professor to be smoother and contain less nonessential decision making and planning.

## **Conclusion**

In conclusion the first semester of Capstone was a success. The team fulfilled its purpose and created a design to meet goal, a CAD model, and a project plan. This assignment has helped the team constructively analyze its performance and identify areas that need improvement in the second semester of capstone.