Project Team Charter

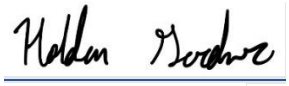
ME476C - Capstone 1 - CWC24

Signature Cover Page

Each team member will copy the following statement in their own handwriting (LEGIBLY) in one of the designated areas below: **I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.**

Print Name: Elizabeth Freeman Signature: 

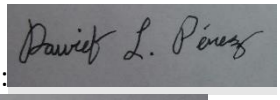
I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

Print Name: Holden Gardner Signature: 

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

Print Name: Alexander Longoria Signature: 

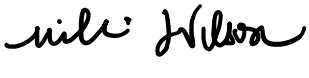
I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

Print Name: David Perez Signature: 

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

Print Name: Samantha Russell Signature: 

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team

Print Name: Niki Wilson Signature: 

I agree to do an amount of work in the team. I understand my grade will reflect my effort in the team.

Print Name: Sergio Zuniga Signature: 

I agree to do an equal amount of work in the team. I understand that my grade will reflect my effort in the team.

1. Team Purpose

This team's purpose is to organize, communicate, and allocate skills and resources necessary for furthering student success in wind energy topics and widening their exposure to renewable energy industry standards. Wind energy topics, within the scope of the current project, include designing, prototyping, and building a functioning small scale wind turbine capable of translating mechanical energy to electrical energy. Alongside this functional design component, the team will form a project development team that focuses on selecting offshore lake land plots that would be suitable for a wind farm. Considerations for this section of the project are a combination of industry-held concepts and unique research driven outlooks which will merge to a practical and original wind farm solution. Although the team is sectioned based on turbine design and project development concepts, the entirety of the team will make it their purpose to practice extensive community outreach throughout the breadth of the project. Outreach will manifest in the combined effort to educate, excite, and spread renewable energy ideas to those that would have not otherwise had access to them.

The stakeholders for this project consist of the US Department of Energy (DOE), Wind Energy Technology Office (WETO), National Renewable Energy Laboratory (NREL), the hosting state of the wind turbine and farm designed by the team, the clients (David Willy and Venkata Yarumasu), and NAU's Mechanical Engineering Department. It is to the team's understanding that they will design, build, test, and present a unique wind-driven power system based on market research with respect to these stakeholders. The end goal for the turbine design team is to test the wind turbine in a scored competition wind tunnel against other universities. Regarding the project development team, they are expected to research wind resource data, transmission infrastructure, and environmental factors to create a site plan and financial analysis for a hypothetical wind farm. All design and project development aspects described thus far will be developed with respect to the team's most compelling adherence to Collegiate Wind Competition (CWC) rules and guidelines.

This team was founded on the members' shared career interests in wind or other renewable energy fields. By utilizing their diverse skillset in different aspects of the project, it will ultimately end with a successful product.

2. Team Goals

The team's ultimate goal, as with other teams involved, is to place first overall in the competition. High expectations can lead to effective results; thus, the team will strive to meet the DOE's deliverables on time and with professional quality. To do so, the team will have all work reviewed ahead of the due dates to ensure its quality and efficacy. This is discussed further in the ground rules section.

The rubric for each deliverable will always be kept in mind to make sure we are working towards receiving the greatest number of points possible. Deliverables include reports, presentations, the mid-year project development submission, connection creation submissions, video submissions, including the 3-minute assembly video which is new in the competition this year, as well as deliverables for our capstone class. Throughout the semester, the team may work with David Willy to exchange capstone class deliverables for client deliverables.

Collectively, the team is aiming to receive an A, at minimum a B, in both the 476C and 486C portions of the project, and to do so we are willing to commit to a high level of performance. The team further has a goal of proceeding in the competition as one of the top twelve teams. Taking courses that relate to our project, such as the wind energy course or the new CENE project development course and having the entire team attempt to attend energy club will facilitate this as it will be easier to fit into our schedules. In the rules it is stated that, "It is more important to demonstrate the Team has started building, assembling, and testing than it is to make the design perfect prior to first prototype assembly"; therefore, committing enough time to make sure tasks are getting started/done early as mentioned before will be one of the top goals.

3. Team Member Personalities, Roles, and Responsibilities

Ellie Freeman: As the manufacturing engineer, I can use my skills in manufacturing that I got from taking the ME286L lab and work with the people in the machine shop to get our parts manufactured. I hope to get advanced training at the shop so I will be able to build our team's parts and if it is too complex then work with the people at the machine shop to get parts built.

Holden Gardner: I believe that while I like to see humor and fun in as many places as I can, including engineering topics, I maintain an organized and regimented school and work schedule. I feel confident to take on the role as project manager because of how focused I can become on each group member's individuality while maintaining a broad perspective on the project. The balance I've developed between college social life and my meticulous approach towards school speaks to my desire to maximize group efficiency and thus pay close attention to each team member's strengths, for the sake of the group's success as well as their personal cohesion. This meticulous approach also supports my role as the CWC rule manager, where I will be able to navigate and communicate the complex rules and guidelines provided by WETO.

Alexander Longoria: As the test engineer, I can utilize my networking skills to contact engineering students that I have worked with in the past that attend Embry-Riddle Aeronautical University and see if they will allow us to use their wind tunnels and other testing equipment. My experiences and relations acquired in the power plant industry will aid me and the project development team overcome obstacles and challenges we may face.

I am a diligent worker that takes pride in my work and often asks others if they need any help or constructive criticism.

David Perez: I'm mostly interested in taking on new roles and learning new ways to build confidence in my work and deliver correct work to others. I mostly spend researching before building new products and get feel in what I can improve. A role I can focus on is building 3D models through SOLIDWORKS which can generate greater ideas to finalize a product at hand. Spending some time on the computer also led me to develop programming skills in MATLAB to further expand solutions in developing a product.

Sam Russell: I feel confident in my role as logistics manager. As a person, I enjoy organization and spreadsheets. In my job in the IDEA Lab, I have worked hard to improve my professional communication and have become accustomed to communicating client expectations to my team in that setting. Regarding personality style, I enjoy a mix of fun and hard work, and have am conflict avoidant – though I have been working on this. I look forward to working with a team that is committed to work we can all be proud of and are passionate about.

Niki Wilson: I have a strong aptitude in organization and strategic problem solving, which will serve me well as financial manager as well as a team player. I feel as if I have a knack for budgeting. I am intrinsically motivated and hold myself to quite a high standard; thus, I am committed to the ultimate success of this project and its members. I understand the importance of collaboration in the engineering

industry, so I have always made it a priority to build a great team. I am very easy-going and love to joke around in addition to having a good work ethic. Most importantly, I am passionate about wind energy and look forward to a finished product that we are all proud of.

Sergio Zuniga: My personality is mostly outgoing and joking, but I do pay close attention to things when need be. I have a good amount of experience in design using SOLIDWORKS and 3D printing using different printers (Ender, Mark Forged) due to my time working in Dr. Lerner's lab, where I have also acquired soldering and some machining skills, so I believe being on the turbine team is the best fit for me. I have had experience making mockup websites with html a while ago in middle school, however I also brushed off those skills for my ENG 101 class here at NAU, so I am confident I will be fine in being the website developer. Making sure we are producing quality work has always been at the top of my list in my design classes, and that will continue throughout this capstone project.

Role Title	Name	Role Description
Project Manager	Holden Gardner	Manages tasks, develops overall schedule, runs meetings, reviews individual contributions, provides safe and welcoming team environment, does NOT make all decisions (rather facilitates discussion of the team to arrive at team decisions)
Logistics Manager	Sam Russell	Manages internal and external communication (point of contact for client), documents meeting minutes, manages facility and resource usage
Financial Manager	Niki Wilson	Oversees all purchases, main contact with Front office for budget management, monitors and records all purchases for budget tracking, updates Bill of Materials
Data Validation Engineer	Alex Longoria	Ensure that Project Development utilizes reputable data.
Test Engineer	Niki Wilson	Oversees experimental design and testing, plans testing procedures and locations, acquires necessary equipment for testing, runs all tests for team
Manufacturing Engineer	Ellie Freeman	Coordinates fabrication of design (does NOT do all manufacturing themselves), reviews design at all steps, ensures design can be manufactured, finds outsourcing opportunities when manufacturing can't be done in-house, develops schedule of manufacturing
CAD Engineer	David Perez & Holden	Coordinates and oversees CAD development throughout project, creates protocol for revision management, manages CAD files, ensures CAD model matches physical design, does NOT do entire CAD package themselves
Website Developer	Sergio Zuniga	Responsible for creating and updating the website

Connection Creation Manager	Sergio Zuniga	Oversees connection creation opportunities/activities
Rule Specialist	Ellie + Sam	Responsible for understanding and following the rules for the competition

4. Ground Rules

The ground rules that this team has produced are listed below. All team members are expected to communicate when they cannot attend a meeting before it takes place. Communication will be key to finishing all assignments on time and efficiently, so all team members are expected to communicate with each other if they need help completing an assignment. Another rule the team has agreed to is that the team will turn in all assignments to Professor Willy one week before the due date to get it reviewed before finalizing and submitting the deliverable. Something that will hold all the members of the team accountable is the peer review that we individually must fill out in the semester. The peer review is a way for the team members to mention how well the members are working together and if everyone is contributing to the project. The team commits to writing honest reviews with the goal of holding each other accountable.

The team has voted that meetings will take place online via Microsoft Teams and in-person in or out of the allotted class time. The days which the team will meet vary week to week to accommodate unforeseen schedule changes. However, the team has set a requirement of two meetings per week to ensure early submissions. If there are dissenting views then the team will vote on what to do, with the majority vote deciding. If the team can't come to a concession, then the team will ask Professor Willy for his advice on that particular issue in order to make the best decision for the team and project.

Per Northern Arizona University course guidelines, it is recommended that each team member will dedicate 9 hours a week to this course. However, the team has already established themselves as highly motivated and competitive individuals who will exceed this baseline set by the university, making this project a top priority. Everyone is expected to contribute to the assignments and participate in all team activities and meetings. The peer review that will be completed every few weeks will keep everyone accountable for this project and how much they participate.

5. Potential Barriers and Coping Strategies

Certain barriers that the team will consider taking note of are asserting reports to be reviewed one week before final documentation completion by an instructor. This task is necessary for every document that is to be reported to ensure all information being relayed to the client is clear and concise. A reviewed report can further prevent misinformation and improve detailed descriptions of what is not being covered in the project. This has the potential to be both a barrier and a coping strategy. As a barrier, it moves up deadlines and means the team must work at a faster pace. As a coping strategy, it means the team is submitting the best possible work and creates “wiggle-room” with assignment deadlines for finer details.

The team is also aware that as the semester progresses, and all team members being seniors, that workloads for both capstone and other classes may become overbearing. To ensure that the team’s goals are reached, the team will strive to complete deliverables well before the due date to ensure there is maneuverability. The team will also work together on all segments of all deliverables such that we can support each other. The team has committed to full transparency, which will help with planning when such workloads begin to pile up.

Another potential barrier can be seen in the stagnation of assigned roles. It is possible that some team members may find that they struggle more in their role than expected. To this end, the team will be open to the negotiation of exchanging, sharing, and creating roles. This will assist in organization and allow team members to rise to their fullest potential. Team members are also not excluded from the responsibilities associated with their role and are expected to contribute ideas and assistance to all sections of the project, adding diverse thoughts to improve the final product.

The team will ultimately test several prototypes for safety and tolerance levels in order to accurately ascertain potential causes of failure. Although necessary to the overall efficacy of the final turbine, this has potential to be a barrier as previous work may be scrapped. Each team member must be realistic to the demands of the engineering design cycle and focus on the bigger picture.

As a unified team, it is the hope that each member will be a source of support for the others through the thick of this competitive project and beyond.