

ASME HPVC Team Charter
ME476C: Capstone I
ASME HPVC

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: Martin Dorantes

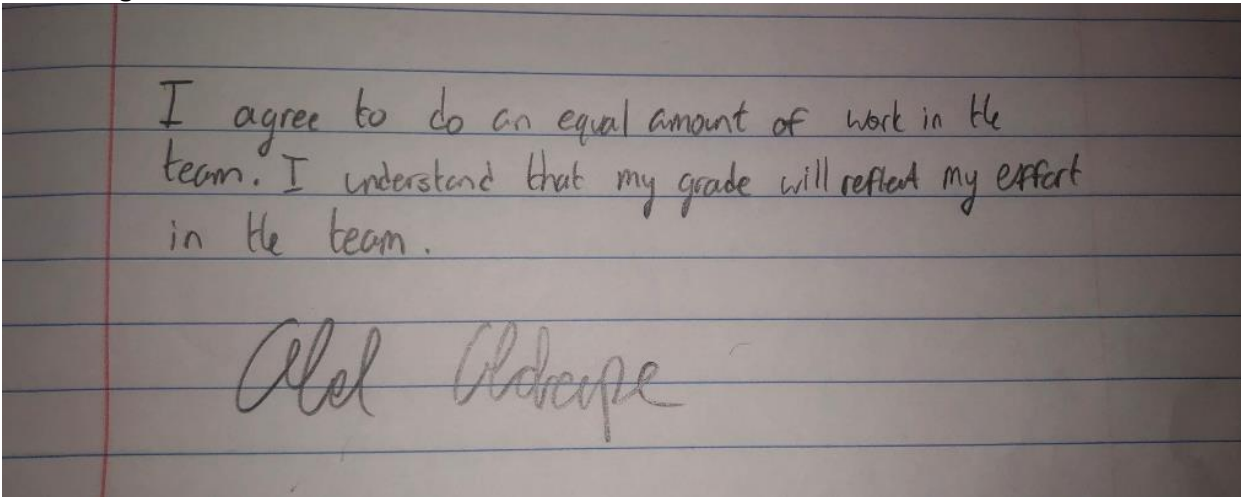
Signature:



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: Abel Aldape

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.

Abel Aldape

Print Name: Preston Berchtold

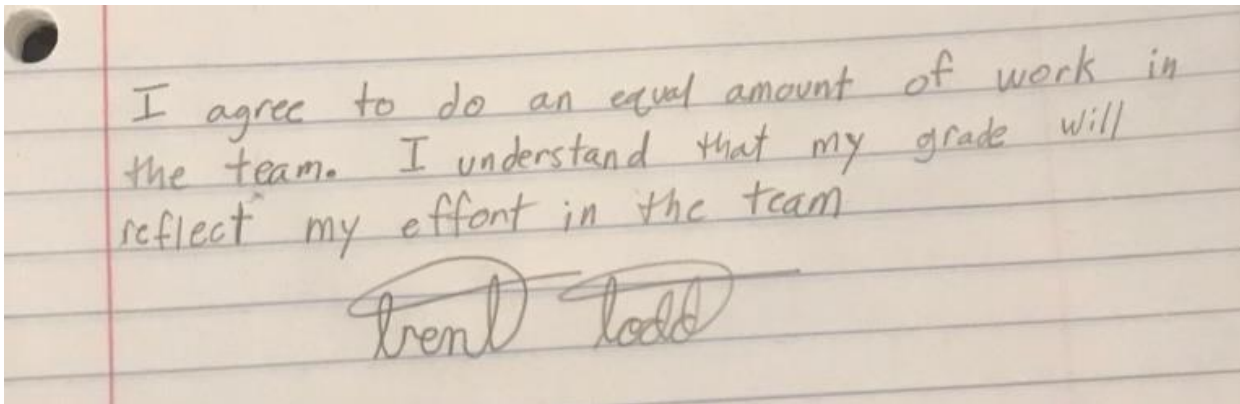
Signature:

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

P Berchtold

Print Name: Trent Todd

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

Trent Todd

Contents

Bibliography7

Project Team Charter

Senior Capstone Design

1. Team Purpose:

The ASME Human Powered Vehicle Competition requires a team of students to manufacture and test a recumbent bike for their senior level design project. The team's purpose is [1]to effectively communicate with our client, Perry Wood, and use the skills and techniques taught to us over the past four years to design and innovate a competitive recumbent vehicle. [2]

The stakeholders in this project include the ASME, our professor David Willy, and the NAU academic community. The project is sponsored and put on by ASME, so they want all their competitors to perform well and to bring innovating ideas to the table. As our capstone professor, Professor Willy would also benefit from seeing a team under his supervision excel in their design project. Finally, if our team does compete in next year's competition, we would be representing the NAU community and would be expected to perform well. We would also like to mention the team's primary client Perry Wood. Professor Wood is a veteran instructor at Northern Arizona University, has years of professional engineering experience, and is the faculty advisor for the HPVC competition.

2. Team Goals:

The big picture of the ASME HPVC project is to design an efficient and robust human powered vehicle according to the 2020-2021 guidelines given from the ASME Committee. As a team in the 2021 capstone year, we will be determining the shortcomings of the previous year's design, and design a more robust, safe, and effective vehicle to potentially compete in 2022.

As representatives of NAU and the Mechanical Engineering department, the team is collectively striving for the most efficient design possible. The team has agreed upon creating an innovative design by keeping the foundation pillars of safety, innovation, speed, and endurance in mind. We will operate as a team that dwells on solutions, not problems. The team has agreed upon approaching problems as an opportunity to find more solutions that will lead to a better design. When problems arise, it is critical that the team acknowledges and solves it immediately to avoid future conflict within the team and the project.

This is a professional engineering project, and the team has agreed to treat it as such. This is our capstone design, and the team has collectively stated to aim for the highest level of

professionalism and achievement for the project, NAU, and the ASME Committee. The team has stated no course grade below a B would be acceptable, however, an A during both semesters is the team's ambition.

$$(x + a)^n = \sum_{k=0}^{13} \binom{n}{k} x^k a^{n-k} \tag{1}$$

3. Team member Strengths/Roles/Responsibilities:

Abel - Team Leadership, CAD modeling, Physics and Mathematical computations, Brainstorming and Concept Generation.

Role(s) and Responsibilities: Project Manager, CAD Engineer

Martin – Strengths in coding languages (useful for website building), effective communication, team efficiency, and materials selection.

Role(s) and Responsibilities: Test Engineer, Logistics Manager

Preston- Machine Design, effective organization and formatting skills, and material selection

Role(s) and Responsibilities: Financial Management

Trent- Proficient understanding of physics and mathematics, problem-solving, conflict resolution, organization, and design skills.

Role(s) and Responsibilities: Manufacturing Engineer

Role Title	Responsibilities
Project Manager	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	Manages internal and external communication (point of contact for client), documents

	meeting minutes, manages facility and resource usage
Financial Manager	Oversees all purchases, main contact with Front office for budget management, monitors and records all purchases for budget tracking, updates Bill of Materials
Test Engineer	Oversees experimental design and testing, plans testing procedures, acquires necessary equipment for testing, runs all tests for team
Manufacturing Engineer	Coordinates fabrication of design (does NOT do all manufacturing themselves), reviews design at all steps, ensures design can be manufactured, finds outsourcing opportunities manufacturing can't be done in-house, develops schedule of manufacturing
CAD Engineer	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

Disclaimer: At this moment, the group has yet to meet with our client, and we reserve the right to come back later and add additional roles to ensure a successful design project.

4. Ground Rules:

Based off the group's schedules, the primary meeting time will be every Wednesday starting at 4:00 pm and will be held on Microsoft Teams. More meeting times and locations will be introduced during the course to accommodate for work schedules and design requirements. Ideally, when hands on testing is necessary, the group will meet in person to effectively implement and resolve problems and solutions. The group has also made it clear that due to COVID-19 related issues, the team must safely and responsibly handle all in person interactions during this course.

The group has agreed that the general goal of the meetings should be to receive input from all members and ensure inclusiveness to all first-time ideas and suggestions. Discussions will be an open forum with encouragement to share all ideas. Team members should be aware that although all ideas should be shared, the team will ultimately base decisions off quantitative analysis, including decision matrices, Pugh charts, and the QFD. On decisions that cannot be made quantitatively, or have a tied numerical value, a majority vote of the group can be used to make decisive action. In the event of a tie between the group, a Pro's and Con's list will be constructed for each suggestion, and then quantitatively assessed to determine the optimal choice.

Accountability will be a mutual group effort. Every member is responsible for holding each other member accountable for their assignments and work ethic. The team has agreed to conduct this senior design project at a high professional level, and anything falling short of that will be recognized and critiqued by the other members of the group. We recognize that unexpected life events happen, which the team has agreed to keep open communication about when certain members' tasks cannot be completed on time. Collectively, a 48-hour notification period has been agreed upon in the case that a task cannot be completed by a team member, giving the rest of the team time to help the struggling member hit their deliverable deadline on time. Failure to perform at this level could require the other group members to give the individual a lower score on Peer Reviews, which will drastically hurt the grade of that teammate. In the event of an extreme case, our capstone Professor, David Willy, may be contacted for advice and strategies to mediate the situation.

Each member will be expected to perform to the best of their abilities and fully participate in the assignments/tasks given to them, based off their roles and responsibilities. Team members should notify the team for assistance if they feel their quality of work does not meet professionalism or team requirements. Any members work that is assessed to be of lower quality than required, may need to redo the assignment under supervision of other members or Professor Willy.

5. Potential Barriers and Coping Strategies

Barriers will typically arise due to difference in scheduling, communication, or disagreement of ideas. These barriers may come from personal obligations or time differences within the group and therefore, should be discussed with the group prior to foreseeable conflicts. Scheduling group meetings should be discussed and approved by all members of the team; individuals within the team should verify the meeting time with personal obligations and ensure time can be made for the project meetings. All members that approve and verify the meeting time, location, and date should attend the meeting and participate within discussions, notetaking, researching, etc.

To overcome barriers that have materialized, group members will need to communicate in a timely manner to achieve a solution through compromise or mediation. Within the team, team members will need to ensure time schedules are kept, documents are submitted, and goals are being met. Therefore, team members that fail to communicate within the group will be subject to more supervision and a potential deduction in points per Peer Reviews.

Every group member with the team is obligated to their opinion and/or ideas. Therefore, group members should understand there are many potential solutions to the problem and all ideas and thoughts, within the group, should be heard. On the counter, team members who bring ideas to the group are subject to critiques from the group and should not be offended or upset by changes made to ideas. The team should work as one; building, fixing, and adjusting ideas is part of the design process.

Bibliography

[1] yolo, ballsack, mge, 2018.

[2] W. G. Nickels, J. M. McHugh and S. M. McHugh, Understanding Business, New York: NY, 2022.