PSU ECE Capstone Team Contract

Contact Information

Team Members

Team Member Name	Phone	Email
Cody Reid	503 734 5042	codreid@pdx.edu
Cuauhtemoc V. Gomez	(541) 646 5947	cuauh@pdx.edu
Daniel Anishchenko*	5035440795	Danish2@pdx.edu
Tyler Tran	9714019842	Tytran@pdx.edu
Fernando Custodio Calderon	(971) 444-2908	Fernan27@pdx.edu

Industry sponsor

Organization and Name	Phone	Email
Edward Ivory	Not Provided	edivory@pdx.edu

Faculty Advisor

Name	Phone	Email
N/A	N/A	N/A

***Faculty Advisor has not been assigned* as of 1/18/2025.**

Project Objective

Our goal is to design a universal battery management system (BMS) that supports multiple chemistries, including sodium-ion, lithium-ion, and nickel-metal-hydride. The system will handle charging, discharging, monitoring, and protection for up to four cells in series, with advanced safety features, real-time health monitoring, and a user-friendly configuration interface. Our focus will be on Sodium Ion as no commercially available BMS solutions currently exist.

We aim to deliver a compact, adaptable solution using Coulomb counting, and thermal management. Accompanied by detailed documentation and a real-world demonstration using sodium-ion batteries.

Beyond meeting the project requirements, we strive to implement:

- *Safe and battery life efficient charging*
- *Develop a small low-power battery management system that can be integrated into other projects quickly and easily*
- *Multi-Cell Charge/Discharge Capability (1s,2s & 4s)*
- *Supports coulomb counting for the State of Charge*

This project will pave the way for innovative and flexible battery management solutions for emerging technologies.

Member Skills, Strengths, and Areas of Practice

This table should be derived from your team canvas and team discussions, and then used throughout the project in determining task ownership, team processes and helping each other develop skills. We don't like "weakness" as much as "areas where one needs practice".

Teammate Name	**Key areas of strength to leverage in the project**	**Key areas of practice and development in the project**
Cody Reid	Coding, Troubleshooting, Embedded Systems, Hardware Interfacing, Time Management, Leadership	PCB and Schematic Design, Microprocessor Interfacing and Integration.
Cuauhtemoc V. Gomez	PCB Design, Analog Circuit Design, Research, Troubleshooting	Embedded Systems, Time Management, Programming
Daniel Anishchenko	PCB Design, Circuit design & debugging, Software programming, Prototyping, System architecture.	Microprocessor interfacing, system design, Prototyping, Software design, System validation

Tyler Tran	3D modeling, Analog Circuits	PCB design, Programming, troubleshooting, embedded systems
Fernando Custodio Calderon	Coding and debugging	Programming, Embedded systems

Meetings

Team Meetings

- Frequency: 2 times a week
- Proposed days and times: Main Meeting: Saturdays 10 am to 1 pm, Standups: Wednesdays 1:45 pm - 2:00 pm
- Platform: Main: Zoom, Standups: In person/ or in zoom
- Expectations: Be on time, if not on time, notify members
- Agenda: Work on deliverables and/or discuss findings and work
- Prep: None
- Attendance: Mandatory
- Participation: Speak up and participate in assignments/deliverables
- Note-taking (minutes): Record important decisions, Record important deliverables and deadlines
- Other expectations: Show up, don't be late, communicate, participate.

Team meeting with Industry Sponsor (Faculty Advisor invited)

- Frequency: Every 1-2 weeks
- Proposed days and times: Mondays or Wednesdays Afternoon
- Platform: In person meetings or Zoom, but in person preferable
- Expectations: Show up and participate. Communicate Design decisions and concerns to Industry Sponsor

Team meeting with Faculty Advisor

- Frequency: N/A
- Proposed days and times: N/A
- Platform: N/A
- Expectations: N/A

NOTE: **A faculty advisor has not been determined for this project yet as of 1/18/2025**

Communications

Preferred Method of Communication

List your communication tools and if there is anything important about how you use them

- Discord is used for quick/urgent updates or questions. It is also helpful for sharing files, links, or messages about ongoing tasks. This is the preferred form of communication and is used for daily communication, since anyone can easily tag someone else if you need them to see something important right away.

- Zoom calls are used for our main meetings and stand up meetings, brainstorming, or resolving other issues. These meetings have clear goals, and everyone is encouraged to participate especially when sharing new ideas or updates that haven't been posted on Discord.

Information Architecture

- *GitHub for revision control and storage*
- *Google Drive for collaborative work sessions*

Team Working Agreements and Expectations

Guiding principles of how we work together

Are there any thoughts or values that guide how your group works together?

Our team values open communication, trust, accountability, and ensuring everyone is responsible for their work. All of us strive towards making a quality product so we all are working towards a common goal.

How we make decisions

How does your group make decisions?

For formal decisions, we will use a decision matrix. For informal purposes, we will reach a consensus.

Approach to Conflict

Consider productive conflict, interpersonal conflict and when to elevate an issue to the Faculty Advisor or to the Capstone Coordinator.

We will elevate an issue when a team member is persistent in not participating and non-communicative on all platforms. If it is a small issue we will meet as a team and discuss our dissatisfactions.

Project Standards

What is a realistic level of quality that the team wants to hold themselves to? Any strategies to fulfil these standards? Also, verbally discuss your grade expectations, but please do not write them down here.

We expect all our team members to be consistent in their communication and hold themselves to a high standard in terms of making their own work. Most importantly, we want to create a product that we are all proud of using all of our collective effort and time. We all want to get an A in this class, and we plan to work hard to get that grade.

How we will hold each other accountable

Regular mechanism for tracking, consider balanced participation, adherence to deadlines, approach to feedback. How you will candidly but kindly deal with team members who aren't fulfilling team expectations.

The way we intend to keep each other accountable is by setting team expectations and communicating throughout them.

How we will give and receive feedback

A high-performance team uses continuous improvement. This takes discussion and feedback on a regular basis. Giving and receiving feedback, aka "coaching", is an important skill to master and use to enhance your capstone experience and performance. This can be difficult. Here are some best practices as a reminder:

- *Create an environment of trust and connection. If trust is not present, consider rebuilding trust prior to giving feedback.*
- *Focus on behaviors and deliverables, not character traits. Give specific examples such as: "Last week when we had a shared deadline. Your portion of the work was not completed." Vs. "You are always slacking off".*
- *Describe the impact and test your assumptions. Ask for the other person's input. Example: "When you don't make shared deadlines, it makes me feel like you may not be as committed to this project. I am not sure, can you tell me how you see it?"*

- *Ask how you can support the other person. Consider an action plan for accountability.*

Team Contract Signatures

By typing in your name, you agree:

a) *I participated in formulating the standards, roles, and procedures as stated in this contract.*
b) *I understand that I am obligated to abide by these terms and conditions.*
c) *I understand that if I do not abide by these terms and conditions, I will suffer the consequences as stated in this contract.*

Team Member Name
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