

Spring 2023 ECE 445 Team Contract

Instructions: The content of this document should be specific to your goals and needs. Ideas for the content of each section are provided as suggestions.

Project No. and Name	Team 44 Head-Controlled Mouse
Member Name, netID	Amanda Favila, afavila2
Member Name, netID	Asher Mai, hanlinm2
Member Name, netID	Lauren Wilcox, lwilcox4

ECE 445 is a project-based course. The course includes both team and individual grades. Project teammates generally all get the same grade for team assignments based on the expectation that all team members do their fair share of the work involved. The purpose of this contract is to lay out the tasks needed for the successful completion of the project and distribute them in a fair and efficient way to the team members. It will also discuss how the teammates will work together during the project and address any issues that come up. A contract that promotes good teamwork that leads to a successful project should:

- Acknowledge that each team member has commitments and responsibilities outside of ECE 445
- Encourage open communication about challenges that team members are facing, both in and out of ECE 445
- Give team members the benefit of the doubt and the opportunity to explain themselves when something goes wrong and resist jumping to judgment

Project Description: *Short Description of your project*

There are many reasons why someone would want to use a head-controlled mouse. Some people want to increase the rate at which they can move their mouse across the screen. Others may frequently switch between clicking and typing, and not having to take their hands off of the keyboard will save them time. Disabilities in particular can make using the standard computer mouse or trackpad difficult.

Our solution is to create a device that will process the user's head motions to control the cursor on whichever device they are using. This device will be attached to a hat, which is more comfortable for the user than the typical headband, is quicker and more convenient to put on and take off, and can balance the weight of the device and its battery more evenly. After calibration, this device will track when the user turns their head up, down, left, and right to move the cursor on their screen accordingly, and then use a specific head tilt to click.

More specifically, the head motions will be tracked on the hat using a combination of gyroscopes and accelerometers, such as the SCC1300-D02 gyroscope and the ADXL335 accelerometer. The hat will be powered with a standard battery pack, which will be separate from the hat and attached via wires in order to reduce the weight of the hat. The hat will also contain a microcontroller that processes the head movements and will send signals to the wireless USB dongle which will then move the mouse accordingly. We will utilize a voltage regulator as well on our PCB to step the voltage down depending on the needs of our components.

Project Goals: *If the team is successful in its purpose, what hardware and software achievements will attest to this?*

The device must have a successful calibration sequence that calculates appropriate distances and speeds for the cursor to move based on the user's specific head movements.

The device must be able to accurately move and click the mouse cursor based on the user's head movements. This means that when the user moves their head up, down, left, and right, the mouse cursor will move up, down, left, and right, respectively.

The device must be able to be used on both Macs and PCs.

The device must utilize user adjustable sensitivity that can map different cursor speed to the same head rotation speed.

Expectations (ground rules) for each member: *Try to list six or more minimum expectations. Consider aspects such as preparation, participation, feedback,*

responsiveness, etc. Try to explicitly list anything that could potentially turn into a problem. Find ways to encourage everyone to communicate (this may also fall under “tasks”).

1. Responsiveness: Members are expected to respond to group messages regarding the project within 5 hours.
2. Participation: Members are expected to show up to at least 1-2 weekly meetings with the other team members, whether it is in person or over Zoom.
3. Feedback: Members are expected to address any concerns that arise as soon as possible.
4. Feedback: Members are expected to show their work to other team members with enough time for the other members to give feedback to their work.
5. Preparation: Members are expected to have their individual work assigned at a meeting done by the next time we meet, unless otherwise specified.
6. Participation: Members are all expected to attend all of the weekly TA meetings.

Roles: *Do you see this team performing well because everyone works together and contributes equally? Are there certain aspects of the project that some teammates excel at? Can tasks be spread among individuals to optimize progress toward the final product?*

This team will be successful with Lauren excelling in the hardware aspects of the project, and Amanda and Asher prioritizing the software portions. Specifically, Lauren can individually handle aspects such as PCB design, soldering, and hardware components, while Amanda and Asher will work on code, data processing, and wireless communications aspects of the project. Tasks and concepts that are new to all of the team members will be split evenly or can be collaborated on by all group members. All members will work together on the documentation assignments.

Project Meeting Time(s): *The team will meet at the scheduled team meeting with TA each week. Can you also preset an ideal time for team meetings in the lab (your team may need to sign up for lab bench access)? Is your team interested in meeting to work on other aspects of the course together such as project research?*

- TA meetings: 5:30pm every Wednesday
- Team meetings in the lab: 4pm on Thursdays
- Extra meetings as necessary: 4pm on Tuesdays

Agenda: *Who will set the agenda? Beyond the weekly meetings with the TA, what will the team do to ensure that it stays on track during the semester? When a decision needs to be made, will it be approved by consensus or majority vote? Will a team member be appointed to keep records?*

The agenda will be mutually agreed upon by all 3 group members. The team will ensure that we stay on track during the semester by completing all assignments on time. We will also stick to the timeline created in the Design Document, and if we end up accomplishing tasks at a different rate than expected by the timeline, we will meet and adjust the timeline accordingly. When decisions need to be made, they will be made by majority vote. No one team member will be appointed to keep records. We are all required to keep up with our lab notebooks, and we have a shared drive to organize all of our digital files. This will be effective in keeping all of our records up to date and organized.

Process and penalties for dealing with team issues: *What happens when ground rules are broken? Who intervenes? What happens if the situation escalates? Always remember not to jump to judgment. Give group members the benefit of the doubt and the opportunity to explain themselves when something first goes wrong. TAs and instructors are available to help resolve issues.*

If ground rules are broken, a team meeting will be held to discuss the issue. The team will operate based on open communication and willingness to give support to teammates who need more help. If no productive solution can be found, we will schedule a meeting with a TA to mediate the situation and figure out what productive steps can be taken moving forward.

End-of-term agreement on using final peer assessment for grade adjustment: *Do you believe that this contract should hold your team accountable to its contents or that it may hold little value? There will be two formal peer assessments this semester. The first is used only to provide honest, constructive feedback to each team member. The second peer assessment affects a teammate's grade. Without accountability, many promises go by the wayside*

Team members are expected to be held accountable to the contents of this contract and will be a basis for the peer assessments.

Signatures: Iterate on this document until everyone is comfortable with its contents and signs (it is okay to type your printed name as your digital signature).

I affirm that I participated in generating this team charter and that I will abide by its contents to the best of my ability. Furthermore, I understand that failure to meet the expectations expressed here can lead to the stated consequences.

netID: hanlinm2

Signature: Asher Mai

Date: 2/16/2023

netID: lwilcox4

Signature: Lauren Wilcox

Date: 2/16/2023

netID: afavila2

Signature: Amanda Favila

Date: 2/16/2023