# **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.

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| **Project No. and Name** | **Automatic Guitar Tuner** |
| Member Name, netID | Nathan Kim, nrkim2 |
| Member Name, netID | Ethan Lin, ethanl7 |

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 judgement

Project Description: *Short description of project*

This project aims to design and build an automatic guitar tuner that attaches to all six tuning pegs of a guitar and tunes each string to the standard tuning (EADGBE). A piezo disc transducer will detect string frequencies, and a microcontroller will process the signals using DFT/FFT techniques to determine tuning adjustments. Motors will then rotate the tuning pegs accordingly to within 12 cents of the desired frequency per string.

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

If successful, the project will achieve the following:

* A system capable of accurately tuning all six strings within ±12 cents of the correct pitch
* Real-time frequency detection and processing of each of the strings using FFT algorithms
* A motor control system that can adjust tuning pegs without damaging the guitar
* Completion of the tuning process within one minute after activation

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. **Attendance & Participation:** Attend all scheduled meetings, participate in discussions, and provide thoughtful input
2. **Communication:** Keep an open line of communication via text and email
3. **Task Ownership:** Complete assigned tasks on time and communicate difficulties early
4. **Responsiveness:** Respond to messages and requests for feedback within 24 hours
5. **Documentation:** Keep track of work progress and update shared documents and Lab Notebooks in GitHub accordingly
6. **Respect & Collaboration:** Treat each team member’s input with respect and make decisions collaboratively

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?*

* **Nathan Kim (nrkim2):** Software development, microcontroller programming, frequency analysis (FFT implementation)\*
* **Ethan Lin (ethanl7):** Hardware design, motor control, circuit design (piezo amplifier, power regulation)\*
* **Shared Tasks:** System integration, testing, debugging, and final documentation
* \*We will split working on FFT implementation and circuit design based on real-time difficulties or challenges encountered along the way as they both are core parts of the project

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?*

* Weekly TA meetings (as scheduled by our TA Shengyang Liu)
* Regular team meetings: To be scheduled based on mutual availability (at least twice per week)
* Lab work sessions: TBD based on lab bench availability

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?*

* Agenda for meetings will be set by the team member leading the discussion which will rotate weekly
* Key project decisions will be made by consensus, with majority vote utilizing the TA if needed
* One team member will be assigned as the note-taker for each meeting to ensure tracking of progress which will also rotate weekly (these notes will later be shared with the other team member to ensure both Lab Notebooks are being regularly updated)

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 judgement. 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 a member is unable to meet a deadline, they must notify the team at least 24 hours in advance
* If further issues arise, they should be addressed in a team discussion before escalating to the TA or course staff
* Repeated unresponsiveness or failure to contribute may result in reporting the issue to the course staff for mediation

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.

We agree that the peer assessment will be used to ensure fairness in grading based on individual contributions. Each member will be held accountable to the expectations outlined in this contract

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: nrkim2\_\_\_\_\_\_\_\_\_\_\_\_ (digital) Signature: Nathan Kim\_\_\_\_\_\_\_\_\_\_ Date: 2/14/2025

netID: ethanl7\_\_\_\_\_\_\_\_\_\_\_\_ (digital) Signature: Ethan Lin \_\_\_\_\_\_\_\_\_\_\_\_ Date: 2/14/2025