

# PHYS 1240: SOUND AND MUSIC

Spring 2022

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<b>Instructor:</b> Tyler McMaken (he/him/his)	<b>Time:</b> TuTh 3:30–4:45pm MT
<b>Email:</b> <a href="mailto:tyler.mcmaken@colorado.edu">tyler.mcmaken@colorado.edu</a>	<b>Location:</b> Duane G1B20
<b>Course Webpage:</b> <a href="https://canvas.colorado.edu/courses/78936">https://canvas.colorado.edu/courses/78936</a>	

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## Course Overview:

Physics 1240: Sound and Music is a 3-credit course designed for non-science students to explore the interrelation between art and science in a way that is both informative and enjoyable. This is a “how things work” course and **not** a “how to” course (how to record a good track, how to play your instrument better, etc.). The goals of the course are to:

1. Gain a physical intuition for how sound works, including how it can be *generated* (instruments, speech, synthesizers, etc.), *transmitted* (wave dynamics, room acoustics, etc.), and *received* (human ears, microphones, psychoacoustics, etc.)
2. Explore how individual sounds can combine to form what we call music
3. Discover the joy in using science to understand how the world works (a.k.a. have fun learning!)

The course is taught by Tyler McMaken (“mick-MACK-en”), a PhD candidate and lecturer in the Department of Physics with past degrees in both physics and music. Each in-person class will follow the schedule below:

- 3:30–4:10pm: Active learning (including clicker questions, in-class tutorials, or demos)
- 4:10–4:15pm: Break
- 4:15–4:45pm: Traditional lecture

## Office Hours:

One-on-one interactions with the instructor or another member of the learning team are essential to learning well. For this course, all office hours will take place in the [Physics Help Room](#), an open room in the Duane Physics building basement (DUAN G2B90) where any student can work on physics assignments with peers, TAs, or professors. Help room hours from this course’s learning team will be posted on the home page of Canvas.

## Textbook & Course Materials:

The recommended text for this course is *Principles of Musical Acoustics* by William Hartmann. The textbook is available online for free via the campus network (if you’re not on campus, you can set up a [VPN connection](#)). Readings corresponding to each lecture are posted on the course calendar. Additional online learning resources are posted on Canvas.

Necessary materials for this course include a calculator capable of computing logarithms, sines, and cosines (most phones nowadays can do this, or if nothing else, Google can), a portable sound recording device (phones or laptop microphones do just fine), and access to [the sound-analyzing software Raven, which can be downloaded for free](#). Additionally, we will be using the [iClicker Student App](#), and all students should make sure they are registered in the app. If you need to add the course manually, the name is “PHYS 1240: Sound and Music (Spring 2022).”

## Prerequisites:

Though no prior college courses are required for enrollment in this course, all students must have two units of high school algebra and one of geometry (in other words, you may not have a math MAPS deficiency). High school math will be used regularly (namely algebra, scientific notation, exponents, and logarithms), but the course will not use or develop any higher mathematics.

**Grading:**

- 30% of your total grade will be determined by participation in **tutorial assignments** and **clicker questions** completed in groups during the active learning portion of each class. We will be using the iClicker Student App (no physical clicker necessary)—be sure to [register your iClicker](#) to your account and [add this course](#). Your 4 lowest graded days for these assignments will be dropped from your final grade.
- 30% of your total grade will come from **biweekly homelabs** due approximately every other Thursday at the beginning of class. These hands-on mini-projects will allow you to engage in the practice of science using sound-analyzing freeware and materials provided in-class.
- 40% of your total grade will come from a **midterm exam** and a **final exam**. More information about these will be posted on Canvas.

Additionally, extra credit opportunities will be available throughout the semester, including the chance for you to play a musical instrument for the class if you so wish.

Assignment	Percentage of final grade	Date
Tutorials & Clickers	30%	in-class
Homelabs	30%	due every other Thurs.
Midterm exam	20%	Thurs. 3/3 (in-class)
Final exam	20%	Mon. 5/2 (1:30–4)

Final letter grades will be assigned using the standard CU grading scheme, though this scheme may be slightly shifted at the instructor's discretion (but such a shift would only make final letter grades more favorable to students, never less favorable).

**Absences & Late policy:**

Any homelab may be submitted for partial credit at any point after its due date until the last day of class. In the case of a late submission, 10% will be deducted for each day that the assignment is late, until 5 days have passed. After 5 days, the maximum score you may receive will remain at 50%. Exceptions may be granted if extenuating circumstances are brought to the instructor *before the assignment is due* (full credit is rarely given for after-the-fact excuses).

Attendance will not be graded except indirectly through your participation in the in-class active learning group activities (tutorials & clicker questions). Due to their nature, these assignments cannot be made up. If you are absent for any reason, there is some leeway—your 4 lowest grades on these assignments will be dropped.

*University Syllabus Statements:***Classroom Behavior:**

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Conduct & Conflict Resolution policies](#).

**Requirements for COVID-19:**

As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to [Student Conduct and Conflict Resolution](#). For more information, see the policy on [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus.

CU Boulder currently requires masks in classrooms and laboratories regardless of vaccination status. This requirement is a precaution to supplement CU Boulder’s COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the [Public Health Office](#) ([contacttracing@colorado.edu](mailto:contacttracing@colorado.edu)). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the [Public Health Office](#) ([contacttracing@colorado.edu](mailto:contacttracing@colorado.edu)). In this course, students should notify the instructor by email if they anticipate excess absences due to illness or quarantine

**Accommodation for Disabilities:**

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to the instructor in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition or injury, see [Temporary Medical Conditions](#) on the Disability Services website.

**Preferred Student Names and Pronouns:**

CU Boulder recognizes that students’ legal information doesn’t always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors’ class rosters. In the absence of such updates, the name that appears on the class roster is the student’s legal name.

**Honor Code:**

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code academic integrity policy. Violations of the Honor Code may include, but are not limited to: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code ([honor@colorado.edu](mailto:honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the [Honor Code website](#).

**Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation:**

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. The university will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by or against members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or email [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about university policies, [reporting options](#), and the support resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about their rights, support resources, and reporting options. To learn more about reporting and support options for a variety of concerns, visit [Don't Ignore It](#).

**Religious Holidays:**

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. If you anticipate a conflict, please contact the instructor within the first two weeks of class so that reasonable accommodations can be arranged. See the [campus policy regarding religious observances](#) for full details.