

Syllabus – Alt-Summer Session 1, 2022

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Course Title: PHYS1075Q - The Physics of Music

Credits: 4

Format: Online

Prerequisites: Q-Readiness

Professor: Dr. George N. Gibson

Email: george.gibson@uconn.edu.

Generally, use messaging in HuskyCT to contact me. Use this email only for urgent technical problems.

Office Hours/Availability: Thurs 1-2:30pm.

Other office hours can be scheduled as needed. Just send me a message to arrange a time.

All work will be graded before the next assignment of its kind is due. Messages will be answered daily.

Urgent emails, such as technical problems with the labs, will be answered as quickly as necessary.

Course Materials

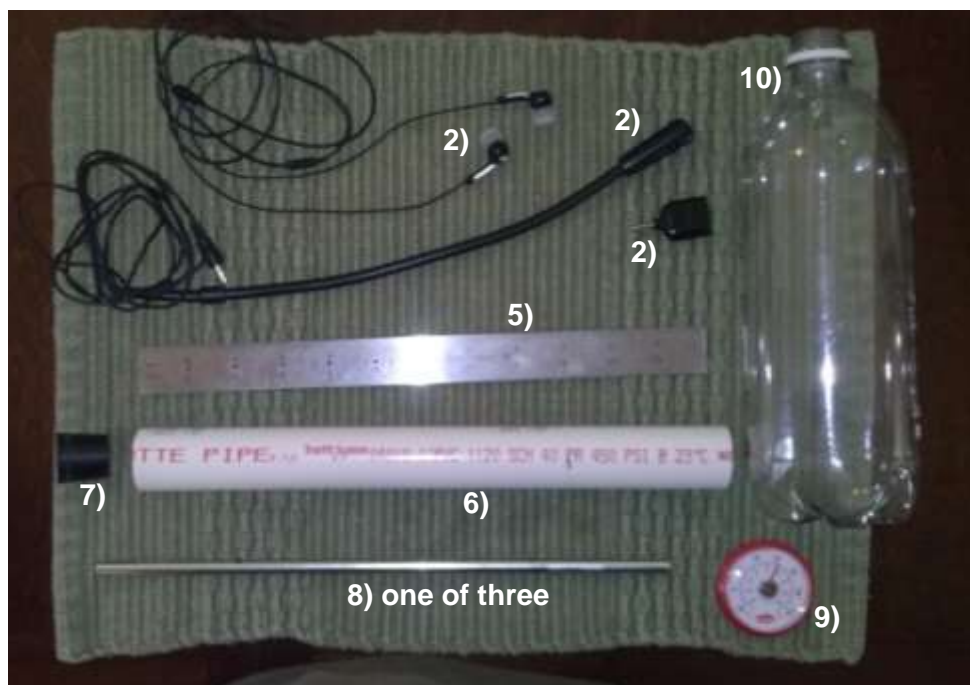
Required course materials should be obtained before the first day of class.

There is no required textbook – readings and videos are provided through HuskyCT.

Required Materials for the lab component:

Items are available at most hardware stores or through Amazon.com.

- 1) Audacity installed on your computer
- 2) **Either:** One pair of ear buds *without a microphone*; one external microphone – it must fit into the 1" PVC tube, item 6. (For example, Cyber Acoustics ACM-51B); and an earbud/microphone to 4 pin connector;
- 3) **Or:** Earbuds with a microphone
- 4) Smart phone.
- 5) One 12" or 25 cm ruler
- 6) One roughly 12" long 1" diameter PVC tube
- 7) Rubber stopper to plug one end of the PVC tube
- 8) One 36" piece of 5/16" steel rod cut into three pieces: 8", 12", and 16" long. (NOT threaded!) 3/8" aluminum also works.
- 9) One thermometer: -30 °C to 50 °C (shown is Cooper-Atkins 535-0-8 Cooler Thermometer at Amazon.com)
- 10) One clear 16 to 32 oz water bottle (empty) with straight sides.
- 11) Calculator with trig functions.



Optional Materials:

While the course is self-contained, if you need or want more information, I highly recommend the book "Measured Tones," by Ian Johnston (CRC Press). It is not required for the course, but it is very informative and easy to read.

Course Description

Course Description from Course Catalog.

Basic principles of physics and scientific reasoning will be taught in the context of the production and perception of music, emphasizing the historic and scientific interplay between physics and music. Basic quantitative laboratories pertaining to sound, music, and waves. No previous knowledge of physics or music is assumed. CA 3-LAB.

Course Objectives

By the end of the semester, students should be able to:

1. list at least three basic properties of waves and explain in a few sentences why these properties are not shared by objects.
2. calculate scales and intervals according to different tuning systems (Pythagorean, Just, Equal temper).
3. categorize instruments as melodic or percussion based on their overtone series.
4. determine whether a given interval will be consonant or dissonant using a standard theory of how sound is perceived by the human ear.
5. apply at least three concepts from sound waves to electromagnetic waves by calculating specific effects for electromagnetic waves, such as the Doppler shift, interference, and resonant frequencies.
6. follow laboratory procedures to construct an experiment to test formulas or concepts pertaining to sound waves.
7. manipulate, analyze, and graph data in such a way as to verify or falsify a relationship between experimentally controlled variables.
8. apply the methods of spectroscopy to measure acoustic properties of a sound cavity.
9. calculate how one variable changes given a change in a related variable, based on a mathematical formula or relationship.
10. determine mathematically how one variable depends on another, given a table of data for the two variables.
11. perform standard algebraic manipulations to solve an equation for a specified variable.

Course Outline (and Calendar if Applicable)

Module 1: Waves and the Language of Physics (3 sections)

Module 2: Melodic Instruments and the Origins of Music and Science (8 sections)

Module 3: Non-Melodic Instruments: Non-Harmonic and 2-D systems (4 sections)

Module 4: Waves and Interference (6 sections)

Module 5: Applications: Feedback and the Doppler Effect (4 sections)

Module 6: Psychoacoustics: Consonance and Dissonance (4 sections)

Roughly one week per module.

Course Requirements and Grading

Summary of Course Grading:

Course Components	Weight
Quizzes	25%
Assignments and discussion posts	25%
Laboratories	25%
Exams	25%

Quizzes

There is one quiz per section and there are 29 sections in the course, so you will be doing about one quiz every day. Each quiz is divided into two parts: C(Calculated) and M(Multiple choice). You will have three attempts at part C and one attempt at part M. They are graded automatically and the highest score for part C is recorded. This is the main way to test your basic understanding of the material.

Assignments and discussion posts

There will be one assignment and one required discussion post for each Module. The assignments are written out

and graded by the instructor.

Aside from the first one, the discussion posts require that you ask a question about the material and respond to other posts. In doing science, it is just as important to ask good questions as to be able to answer them.

Laboratories

This course satisfies the University requirement for one laboratory science course. For this reason, you are required to pass the lab component separately from the course as a whole to pass the course and **you must complete all labs**. If you submit a lab on time, you will have the opportunity to revise and resubmit your lab for full credit. Often there are technical problems the first time around. I want you to make a serious attempt and then we can work together to resolve the problems.

Exams

There will be one midterm and one final. The exams will be online and automatically graded. The questions will be drawn directly from the quizzes, although some numbers may be changed. However, you will only have one attempt at these and there will be a time limit. The final will be proctored through ProctorU. You will also be able to take the final in person at the Storrs campus, if you do not want to use ProctorU.

Approximate Grading Scale:

This scale is just a guideline. A midterm grade will be given. Adjustments to the scale will be made at that time.

Grade	Letter Grade	GPA
90-100	A	4.0
87-89	A-	3.7
84-86	B+	3.3
81-83	B	3.0
78-80	B-	2.7
75-77	C+	2.3
72-74	C	2.0
69-71	C-	1.7
66-68	D+	1.3
63-65	D	1.0
60-62	D-	0.7
<60	F	0.0

Due Dates and Late Policy

Due dates are given for each quiz, assignment, discussion post, and lab. Deadlines are based on Eastern Standard Time; if you are in a different time zone, please adjust your submittal times accordingly. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

All work will be accepted late. *However, late work will only be given half (50%) credit.*

Feedback and Grades

Quizzes are graded immediately. Grades and feedback for all other work will be given before the next similar assignment is due. To keep track of your performance in the course, refer to My Grades in HuskyCT.

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. This section provides a brief overview to important standards, policies and resources.

Student Code

You are responsible for acting in accordance with the [University of Connecticut's Student Code](#). Review and become familiar with these expectations. In particular, make sure you have read the section that applies to you on Academic Integrity:

- [Academic Integrity in Undergraduate Education and Research](#)
- [Academic Integrity in Graduate Education and Research](#)

Cheating and plagiarism are taken very seriously at the University of Connecticut. As a student, it is your responsibility to avoid plagiarism. If you need more information about the subject of plagiarism, use the following resources:

- [Plagiarism: How to Recognize it and How to Avoid It](#)
- [University of Connecticut Libraries' Student Instruction](#) (includes research, citing and writing resources)

Copyright

Copyrighted materials within the course are only for the use of students enrolled in the course for purposes associated with this course and may not be retained or further disseminated.

Netiquette and Communication

At all times, course communication with fellow students and the instructor are to be professional and courteous. It is expected that you proofread all your written communication, including discussion posts, assignment submissions, and mail messages. If you are new to online learning or need a netiquette refresher, please look at this guide titled, [The Core Rules of Netiquette](#).

Adding or Dropping a Course

If you should decide to add or drop a course, there are official procedures to follow:

- Matriculated students should add or drop a course through the [Student Administration System](#).
- Non-degree students should refer to [Non-Degree Add/Drop Information](#) located on the registrar's website.

You must officially drop a course to avoid receiving an "F" on your permanent transcript. Simply discontinuing class or informing the instructor you want to drop does not constitute an official drop of the course. For more information, refer to the:

- [Undergraduate Catalog](#)
- [Graduate Catalog](#)

Academic Calendar

The University's [Academic Calendar](#) contains important semester dates.

Academic Support Resources

[Technology and Academic Help](#) provides a guide to technical and academic assistance.

Students with Disabilities

Students needing special accommodations should work with the University's [Center for Students with Disabilities \(CSD\)](#). You may contact CSD by calling (860) 486-2020 or by emailing csd@uconn.edu. If your request for accommodation is approved, CSD will send an accommodation letter directly to your instructor(s) so that special arrangements can be made. (Note: Student requests for accommodation must be filed each semester.)

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.” (Retrieved March 24, 2013 from [Blackboard's website](#))

Policy against Discrimination, Harassment and Inappropriate Romantic Relationships

The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community – students, employees, or visitors. Academic and professional excellence can flourish only when each member of our community is assured an atmosphere of mutual respect. All members of the University community are responsible for the maintenance of an academic and work environment in which people are free to learn and work without fear of discrimination or discriminatory harassment. In addition, inappropriate Romantic relationships can undermine the University's mission when those in positions of authority abuse or appear to abuse their authority. To that end, and in accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate Romantic relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. Refer to the [Policy against Discrimination, Harassment and Inappropriate Romantic Relationships](#) for more information.

Sexual Assault Reporting Policy

To protect the campus community, all non-confidential University employees (including faculty) are required to report assaults they witness or are told about to the [Office of Diversity & Equity](#) under the [Sexual Assault Response Policy](#). The University takes all reports with the utmost seriousness. Please be aware that while the information you provide will remain private, it will not be confidential and will be shared with University officials who can help. Refer to the [Sexual Assault Reporting Policy](#) for more information.

Software Requirements and Technical Help

The technical requirements for this course include:

- Word processing software
- Excel or similar spreadsheet software
- [Adobe Acrobat Reader](#)
- Internet access

This course is completely facilitated online using the learning management platform, [HuskyCT](#). If you have difficulty accessing HuskyCT, students have access to the in person/live person support options available during regular business hours through [HuskyTech](#). Students also have [24x7 Course Support](#) including access to live chat, phone, and support documents.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics or hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.

University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](#) page for more information.

Evaluation of the Course

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the [Office of Institutional Research and Effectiveness](#) (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.