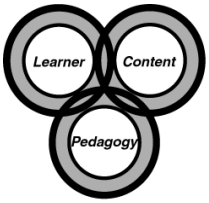
Syllabus
SUNY – Buffalo State College
PHY103: Understanding Sound (CRN=1645)
Spring 2022



Professor and Contact Info:

Dr. David Abbott, Room 361A Science and Math Complex (SAMC)
Email: abbottds@buffalostate.edu (checked at least once daily)
Phone: (716) 812-4038 (Cell)
Office Hours (SAMC361 or 878-5201): Monday 11-11:50, Thursday 11:00-11:50, and by appointment

Course:

This 3 credit hour course (3, 3/0; CM; integrated class and laboratory) is an overview of sound for non-science majors. This course is synchronous and 100% in person. The class meets on Tuesdays and Thursdays from 3:05 to 4:45 pm in SAMC361.

Prerequisites:

None; high school algebra is needed; some background in science and/or music is helpful, but not expected.

Textbook and Materials:

- **Required:**
  - **textbook:** (**free** and **online)**: https://sound.pressbooks.com/. PDF version available on BlackBoard.
  - **online presence:** (all free; see details and instructions for these on BlackBoard)
    - **OHM.lumenlearning.com:** free online homework system; must create account
    - **student.desmos.com** (classroom and homework; if you have a Google account, you already have this)
  - **way to scan and upload written work** (e.g. smart phone, computer with scanner)
  - **way to record and upload video** (e.g. smart phone)
  - **email account**
- Recommended:
  - **smart phone**
  - **printer**
  - **computer** (Mac, PC or Linux),
  - **reliable, high speed internet**
  - **Audacity** (free, open source software for audio recording, editing and analysis on Mac, PC)

Description and objectives:

Course description:

PHY103 is an introduction sound for non-scientists. You will learn about what science is, how it's done and how scientists think and learn about our world. You will learn about what sound is, how it's produced and detected and how it interacts with the acoustic environment. There is no prerequisite for PHY103, but high school algebra is strongly recommended. A musical background is useful, but not required. Hopefully, you will gain some skill and confidence for learning science. Along the way, I hope you enjoy the course and make a few friends.

Student Learning Outcomes

1. **Nature of science:** Describe the scientific process, including hypothesis development and testing, controlled experiments, and interpretation of data. Engage in the scientific process: make, test and revise hypotheses and models; perform experiments, make observations, take data, and make inferences from observations. Construct and evaluate the quality of scientific explanations and models. Discuss the role of discourse and evidence in science.
2. **Physics of Sound:** Define and correctly use wave model vocabulary. Use words, simple arithmetic, and diagrams to explain variety of wave phenomena. Apply wave model to predict and explain behavior of sounds. Use simple arithmetic and diagrams to solve problems.
3. **Applications:** Describe the workings of important acoustical systems, including the ear, speakers, microphones, rooms, and musical instruments. Apply the physics of sound to analyze these systems.

What to expect:

Format: PHY103 will be a ***flipped class***. You will read the material and do assignments on it ***before*** the material is covered in class. Class time will be spent practicing physics, doing labs and discussing ideas with your classmates. There will be very little lecturing.

Schedule/Workload: We will cover roughly 3-4 short chapters every week. In a typical week, you will have ***at least*** one reading log, one online homework assignment, and one short essay to do. In-class activities that are not finished during class time will be completed as homework. In addition, there is a semester-long project (see below).

Budget ***four to eight hours per week outside class for PHY103***.

Groupwork: You will be part of a working group for many in-class activities, some quizzes, and the project.

Math: Can't avoid it, sorry. The good news is that the math for PHY103 is high school algebra.

Lots of learning. Students who work hard in PHY103 learn lots.

What is expected of you?

Attend completely: Come to class every day, on time (in class, ready to learn at 3:05pm). Stay focused and engaged until you are dismissed. Participate regularly in class discussions. Do not multitask.

Engage in the PHY103 community: Be involved every day. Contribute to discussions. Collaborate with your classmates during and outside class. Develop a rapport with the instructor and your classmates. Meet with classmates about PHY103 outside class time. Come to office hours (or make an appointment).

Contribute to a vibrant, safe learning community: This class relies on atmosphere of trust and curiosity to succeed. Everyone must feel safe enough and valued enough to speak out. Things you learned long ago are a great place to start- take turns, listen carefully, speak thoughtfully, be respectful, be honest and help others. In more legalistic terms:

> *"All students are expected to comport themselves in a manner that does not convey to others in the college community any disrespect, intolerance, or rude behavior based on age, race, religion, color, national origin, gender, sexual orientation, disability, or marital, veteran, or socioeconomic status. All members of the college community are expected to contribute to the college environment to move the college community in the direction of respect for all."*

Collaborate with your classmates: Working with your classmates on homework and in-class activities is strongly encouraged. Done right, collaboration leads to strong learning. Done right, collaborations is not cheating. The key is to make sure the work you turn in represents your own choices of words and representations. That said, I have zero tolerance for verbatim copying, plagiarism and other forms of teaching. Further guidance about the difference between cheating and collaboration appears later in the syllabus. Still not sure? Ask!

Monitor your own progress and seek help in a timely fashion: Physics moves fast and it's easy to fall behind. Some confusion and frustration are natural parts of learning, but you cannot allow either to persist for very long. Seek help from your classmates and/or your instructor immediately if you find yourself struggling with material for more than two class periods. Do not expect to work miracles when the test (or the end of the semester) is looming.

Memorize your buffstate and desmos usernames and passwords. You will often use your BuffState login and desmos credentials on classroom computers to access activities during class. Fumbling through password recovery wastes valuable time.

Schedule:

This schedule is tentative, based on previous experience with the course. I may add a few topics and change the schedule slightly, but pacing and content of the will largely follow this outline.

		PHY103 Spring 2022 Tentative Schedule		
Week	Tuesday	Topics	Chapters	Events
1	2/1	Vibrations	1-4	
2		Sources of sound, time domain graphs	1-4	
3		Perception of sound, more time domain graphs	8-10	
4		Perception, frequency domain graphs	5,6	
5	3/1	(Traveling) waves, model for sound	16-18	Exam 1
6		Traveling waves	19-21	
7		Doppler Effect	22	
8		Standing waves, resonance and frequency response	24-27	
9	3/28	NO CLASSES	27	SPRING BREAK
10	4/5	Standing waves in air columns	28-30	College deadline for W/P/F 4/8
11		Standing waves, Helmholtz	32-36	Exam 2
12		Interference (principle of superposition)	32-36	
13		Applications of interference: beats and standing waves	32-36	
14	5/3	Intensity, amplitude, decibels, and loudness	39-43	
15	5/10	Decibels, etc; Project presentations	39-43	Project Final Presentations
16	5/17	CEP Week (a.k.a. Finals Week)		Exam 3 (Units I -VI; focus on Units V and VI)

Grade information:

Your PHY103 grade is based on the **total number of points** you earn. Here's how it works.

Category	Points available	
Exams (E)	**400**	There will be at three Exams and at least four Quizzes worth a total of at least 400 points. Exams and quizzes focus on class activities and homework, but anything is "fair game." Practice exams will be distributed and assigned for homework before each exam.
Project (P)	**150**	You will do a group project on some aspect of the physics of sound. The project culminates the last week of class. Project grade includes the final presentation as well as several other assignments designed to keep your project on track. Project assignments and due dates will be described in detail on the Bb site.
Assignments (A)	**450**	Expect two to four assignments every week, totaling over 500 points. The first 450 points you earn in this category count toward your grade. You don't need to get perfect scores on homework, but you must attempt a large fraction of the homework to get a good grade. Here are some types of assignments: **Reading Logs (RL):** I expect you to read the book ***before material is covered in class.*** You fill out a Reading Log form as part of each reading assignment. Expect about eight reading logs worth 15 points each. **Online HW:** I assign multiple choice "reading quizzes" and short numerical problem sets on theExpertTA.com. Expect ten to fifteen online HW assignments, worth about 10 points each. **Exam prep:** Right before each exam, I post assignments to help you get ready for the exam. Expect three of these, worth at least 20 points each.. **Weekly Reflections (WR):** These short reflective essays are assigned weekly. In one to two pages, you analyze what you learned from single classroom activity or homework problem. Expect twelve to fourteen ARs, worth up to 15 points each. **In-class Activities, Labs and other assignments**: Points will be awarded for other types of assignments than those listed above, including lab reports and in-class activity (e.g. Demos activities)

My philosophy about homework:

- Physics isn't easy- so there's lots of homework. It's how you learn.
- I expect you to try ***all*** the HW in a ***timely fashion***
- I don't expect perfection on HW. The point of HW is learning.
- Turn in an honest effort on 90%+ of class assignments and you can expect to earn all the available Assignment points.

Grade Breakpoints: These breakpoints may be moved slightly; if the breakpoints move, it will be in the student's favor.

Total points	Letter Grade
900 and up	At least an A-
800 and up	At least a B-
700 and up	At least a C-
600 and up	At least a D

Plagiarism/Cheating and Collaboration:

I encourage collaboration among peers, ***but*** I have absolutely no patience with trying to pass off someone else's work as your own. There's a difference between collaboration and cheating. Here are some ways to tell whether it's cheating or collaboration:

It's probably cheating if…	**It's probably collaboration if…**
You copy verbatim (even if you helped write it!) or you take credit for something without contributing anything.	You write out something new after working with other people.
You cannot explain the thinking behind the work on the paper.	You can explain the thinking behind the work on the paper.
You work together to get ***more*** work done that you could alone.	You work together to produce ***better quality*** work than you could do alone.

Anyone caught cheating or directly copying may receive a failing grade in the course. While working with other people on homework and in-class activities is strongly encouraged, ***the work you submit must reflect your own words, interpretations and understanding.***

Free Tutoring

Buffalo State offers a wide array of FREE tutoring services: Math Center, Writing Center, Other Subject Tutoring Center, STAR-NY online tutoring and EOP/ACE. Most tutoring is face to face in the Academic Commons area of Butler Library. For details check out the tutoring website: https://academicsuccess.buffalostate.edu/tutoring.

*Questions about BSC tutoring services? Email Lauren Copeland, Coordinator of Tutoring Services, at copelala@buffalostate.edu

StarNY online tutoring (free): Monday, Tuesday, and Thursday 7pm-midnight. Info at https://www.starny.org/tutoring_schedule

Reasonable Accommodation

Any student eligible for and needing academic adjustments or accommodations because of a documented disability should consult with the course instructors. If you qualify for accommodations because of a disability, please submit a letter from Disability Services to the instructors in a timely manner so that your needs may be addressed. For additional information contact: 878-4500 or disabilityserv@buffalostate.edu.

Religious Observance

If you have any conflicts regarding religious observances please talk to the instructors as soon as possible and they will attempt to accommodate scheduling conflicts.

Classroom Behavior and College Policies

Students and faculty each have a responsibility for maintaining an appropriate learning environment. 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 differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Buffalo State's policies regarding such matters can be found at http://www.buffalostate.edu/equity/x750.xml.

A Plethora of Campus Services

The **Dean of Students Office** helps students navigate the college experience, particularly during difficult situations such as personal, financial, medical, and/or family crises. If you or someone you know is in need of support, services are available. For a list of support services and information, please visit http://deanofstudents.buffalostate.edu/, 716-878-4618 or stop by 311 Campbell Student Union during business hours.

Returning this semester is the **Emergency Relief grant program for students**. More information on parameters of the grant and application requirements can be found online. Please share this information with matriculated undergraduate and graduate students who need emergency funding.

The **Students of Concern Care Team** meets regularly throughout the semester to provide support for students who raise concern about their potential for harm to themselves or others. The Care Team will assess the potential risk to personal and campus safety that might result from the actions of individual students, will connect students in need with appropriate resources and will monitor compliance with required support plans. To report a concern you have please go to the following website:

https://pavesuite.com/BuffaloState/PublicPortal/ConcerningIncident If you have any questions feel free to outreach to me at (716) 878-4618 or at youngsm@buffalostate.edu. In early fall semester the Care Team will be moving under the supervision of Rock Doyle. If you would like to outreach to Dr. Doyle you can email him at doylerd@buffalostate.edu or, call him at (716) 878-6711.

The **Milligan's Food Pantry** provides students who are food insecure with the opportunity to get non-perishable food from a campus source. Our Student Resource Coordinator, Kristen Helling, can respond to questions regarding Milligan's or the Emergency Relief Fund and is available at catalakj@buffalostate.edu or at 716-878-3069.

For other resources to share with students:

- Student Conduct and Community Standards Office: Phone: (716) 878-3051
- Weigel Health Center: Phone: (716) 878 – 6711
- Weigel Health Promotions: Phone: (716) 878-6711, Health Promotions also provides in class presentations. You can find out more at: http://weigel.buffalostate.edu/node/254
- The Counseling Center: Phone: (716) 878-4436
- Student Resources Page: http://deanofstudents.buffalostate.edu/resources-students
- Sexual Violence Prevention information and resources: https://deanofstudents.buffalostate.edu/sexual-violence-prevention, Sexual Violence Prevention also provides in class presentations. You can contact Nina Pierino for more information, pierinng@buffalostate.edu or, at (716) 878-3069

Lumen OHM

Lumen OHM is the ***required*** online homework system for PHY103. Lumen OHM is ***free***. To enroll:

1. Go to https://ohm.lumenlearning.com/. (Link opens in new tab/window).
2. Click the "Enroll in a New Course" button.
3. Enter the course ID and enrollment key (see below) and click Enroll.
    a. Course ID: **60668**
    b. Enrollment Key: Spring22
4. Check to make sure the Teacher and Course Name are correct then click Enroll (again).
5. Sign up for an account by filling out the right side of the screen. If you already have an OHM account, skip this step.

You need an OHM account to use OHM. You create the account right after enrolling in the OHM PHY103 course.

Academic Integrity and online homework

- ***Doing homework is how you learn the material.*** Getting guidance from friends is OK, provided your friends make you do all the "heavy lifting." (Giving answers is not the same thing as helping). Copying is not acceptable.
- ***Posting content from the online homework service in any public space is unacceptable***- it's a form of cheating ***and*** may also be an explicit violation of terms of service and/or copyright law.

Student.desmos.com

Student.desmos,com is a **free** service designed for math students (though it works for physics, too). It is ***required***. You will use student.desmos.com frequently for in-class activities. The class code for PHY103 Spring 2022 is S3JWNX. To get started, visit https://student.desmos.com/?prepopulateCode=s3jwnx. You can create an account to use desmos, but you don't have to. BTW, if you enjoy math, check out desmos.com.

Audacity

Audacity is a **free**, open-source program for recording, editing, and analyzing sound. It runs on both Mac and PC. It is ***optional***. You will use it in the classroom for at least two labs. For installation instructions, visit https://www.audacityteam.org/download/.

Discussion Guidelines

During classroom discussions, it's important to maintain a respectful and productive atmosphere.

Be kind: It's essential that our classroom discussions feel safe to all students. Be positive whenever possible. Be helpful and respectful when offering constructive criticism.

Be helpful: ***The point of class conversations is to help the class learn the material***, not to satisfy the egos of individuals. Listen carefully and contribute thoughtfully.

Be focused: Avoid comments and questions that distract from the central focus of the conversation.

Say your fair share: We want to hear from everyone.

- If you are quiet, make it a point to contribute regularly to the conversation.
- If you contribute a lot, make it a point to listen more. Give others space to participate.

Be professional: Critique the work- not the people.

Be Scientific: Use the scientific vocabulary we have defined in class whenever possible. If you are unsure of a term used in conversation, ask for clarification.

Be specific: Avoid generic comments like "It's good" or "It's wrong." Follow up with details.

Conversation starters

Soliciting a response	What about …? Have you considered …? What do you think about …? What answer did you get?
Asking for clarification	Would it be correct to say …? What do you mean by …? Can you explain why …?
Disagreeing	I don't agree with that because … I got a different answer because … I see it different- what I think is …
Paraphrasing	So you are saying that … What I hear you saying is …
Acknowledging	My idea is similar to yours in that … I agree with (Person X) because … My idea builds on (Person X's) idea …