

SPLH/LING 120 – Physics of Speech Fall 2017 Syllabus

Class Meetings	Tuesday/Thursday; 11:00am-12:15pm Dole 2092
Class Instructor	Aryn Kamerer; akamerer@kumc.edu
Office	Dole 3001
Office Hours	Tuesday 12:15-1:00pm Thursday 10:00-11:00am or by appointment

* Please refer to your lab syllabus for Grad TA information and meeting times.

Course pre-requisites, co-requisites and other restrictions

Pre-requisites: MATH 101 or 104 or equivalent. PHSX 111 is recommended for students with no background of basic physics.

Purpose of the Course

The purpose of this course is two-fold: 1) to provide students with the theories underlying basic principles of acoustics that link the communication cycle between speech and hearing, and 2) to develop basic science and problem-solving skills.

Many students are eager to jump into the clinic and are frustrated that this course seems disconnected to their future careers as speech-language pathologists and clinical audiologists, however, courses like these are what makes you an expert SLP or AuD to your patients and colleagues. In order to become good clinicians, you must follow evidence-based practice. In order to follow evidence-based practice, you must know how to read scientific papers and understand a scientific presentation. The intention of this course is to give you some of the basic knowledge and skills to become respected clinicians in the field.

This course is mathematically based. Yes, every day we will be solving equations, word problems, and even doing some proofs. I understand that some of you have not had a math class in years or think you are bad at math, but fear not! This course requires only basic algebra skills to succeed *and* the first several lessons are devoted to a review of the mathematics necessary to do well in the course. That being said, every lesson builds on the material from the

previous lessons so if you feel like you don't understand something or need extra practice, please reach out to me or your peers ASAP.

My educational intentions with this course are to release students from the unease of mathematics and to foster logical thinking and problem-solving skills. The principles discovered in this course are essential to a deeper learning of diagnosing and treating speech and hearing disorders.

Intended Learning Outcomes

1. Describe the generation and propagation of simple and complex sound waves
2. Perform basic analysis of simple and complex sound waves
3. Develop skills and confidence in the mathematics necessary for clinical speech-pathology or audiology and evidence-based practice
4. Relate basic acoustic principles to the practice of SLP and Audiology
5. Develop problem-solving skills necessary for the fields of clinical practice and science

Course Management

Required Course Materials:

1. Mullin, W.J., Gerace, W.J., Mestre, J.P., and Velleman, S.L. (2003). Fundamentals of sound with applications to speech and hearing. Boston: Allyn & Bacon.
2. Scientific (or graphing) calculator
3. Microsoft Excel (equivalent programs are okay, but Excel-specific syntax will be taught in lecture for making graphs on homework assignments)

All other content of the course (besides the Haughton text) will be organized and available on the Blackboard® learning management website (<https://courseware.ku.edu/>). Descriptions of the features and use of this platform can be obtained at the following sites:

Blackboard Learn

<https://www.youtube.com/playlist?list=PLontYaReEU1seUE3ACG3sEc3zR7Br7URU>

Should you encounter problems with logging on to Blackboard, please contact the Educational Technology Support Center in Budig 4: itedtech@ku.edu

Organization of the course

1. *In-class time*

The design of this course promotes active learning, meaning the in-class time will consist of a range of activities from problem-based learning and lab-like research experiments

to lectures and collaborative group activities. As the course is math-heavy and I don't believe math is easily learned via powerpoint slides, every day will likely consist of some amount of time where I will be guiding you through the mathematics on the whiteboard, thus you must rely on your own notes (i.e. it will not be posted on blackboard). In addition to however you prefer to take notes, you also **must bring your calculator, pencil/pen, and paper to class, as you will be calculating and graphing every day.**

You may notice that there is no attendance policy, however, missing classes will make it difficult, if not impossible, to do well in this class. Each class builds on the concepts of the previous and most of lecturing and group work done in class will *not* be available on blackboard. If you miss class, it is your responsibility to catch up on the material you missed.

2. *Pre- and post-class assignments (25% of total grade)*

Any short pre-class assignments are meant to prepare you for the upcoming lesson and post-class assignments are meant to provide you ample practice with the mathematics involved in the material and questions will be similar to those asked on the exams. Pre-class assignments should be completed independently, and will be submitted on Blackboard.

Post-class assignments can be neatly hand-written or typed, but graphs must be done in Excel (or equivalent program) unless otherwise stated. Showing work is not required but partial credit and feedback for incorrect answers can only be given if work is shown. You are absolutely allowed to work together on post-class assignments. Just remember that you are responsible for your mastery of the concepts and math involved in the exams.

All assignments will be posted on Blackboard when they are assigned and students will be given ample notification in the form of a reminder in class and via email.

3. *Labs (30% of total grade)*

There will be approximately 10 lab sessions in this course. The labs in this course are interdisciplinary and are designed to let students put to use the theory learned in class. Please consult the lab syllabus and contact your Grad TA for details regarding the laboratory portion of this course.

4. *Exams (15% x 3 exams = 45% of total grade)*

Three in-class exams are scheduled for XXX dates. These exams will evaluate the key terms and concepts taught in the lecture. While the exams are technically not cumulative, concepts learned in this course build on each other so material learned even in the first few weeks are necessary to understand the more complex material taught in the second half of the course. You will **need to bring a calculator on exam days**. Scratch paper will be provided and you are allowed one 3x5 index card (front and back) for formulas to aid with each exam.

Course Calendar

Note.

- (1) The dates of exams are fixed.
- (2) Schedule of topics may change depending on the pace of learning.
- (3) Please check Blackboard for the most current schedule

(Check Blackboard for updated schedule; this schedule may be outdated)

Day/Week	Topic	Supplemental Reading
8/22	Syllabus, pre-course survey, and linear equations and functions	
8/24	Trigonometric functions <i>radians, degrees</i>	
8/28	functions, <i>cont.</i>	
8/31	Sinusoidal signals, Excel <i>frequency, period, amplitude, phase, DC shift</i>	Ch 1
9/5	Sinusoidal signals, <i>cont.</i>	Ch 1
9/7	Tube acoustics <i>standing waves, resonance frequency</i>	Ch. 3 & 4
9/12	Tube acoustics, <i>cont.</i>	Ch. 3 & 4
9/14	Fourier series <i>spectrum, domain</i>	Ch. 7
9/19	Fourier series, <i>cont.</i>	Ch. 7
9/21	TBD/Review	
9/26	Exam I	

9/28	Pressure & intensity <i>Force, power</i>	Ch. 11
10/3	The mighty decibel <i>dB, dBSPL, dBIL</i>	Ch. 11
10/5	The mighty decibel, <i>cont.</i>	Ch. 6
10/10	Complex signals <i>square, sawtooth, click, noise, AM, FM, toneburst, pulse-train</i>	
10/12	<i>Fall Break – no class</i>	Ch. 6
10/17	Complex signals, <i>cont.</i>	
10/19	Systems: Filters <i>slope, cutoff</i>	
10/24	Systems: Transfer functions	
10/26	Systems: Gain	
10/31	TBD/Review	
11/2	Exam II	
11/7	Aryn gone - <i>no class</i>	
11/9	Aryn gone –Guest Lecturer: Hearing <i>threshold, range</i>	Ch. 12
11/14	Hearing loss <i>audiogram, dBHL</i>	
11/16	Microphones	
11/21	Hearing aids	
11/23	<i>Thanksgiving – no class</i>	
11/28	Speech production	Ch. 8
11/30	Acoustics of consonants	Ch. 9
12/5	Acoustics of vowels	Ch. 9
12/7	TBD/Review/Spectrogram fun	
Finals Week	Exam III	Good Luck!

Audio- or Video-Taping Lecture

Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor are the property of the instructor. Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. On request, the instructor will usually grant permission for students to audio tape lectures, on the condition that these audio tapes are only used as a study aid by the individual making the recording. Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.

Academic Misconduct

Students are expected to observe all University guidelines pertaining to academic misconduct. As stated in the University Senate Rules and Regulations (2.6.1): “Academic misconduct by a student shall include, but not be limited to, disruption of classes; threatening an instructor or fellow student in an academic setting; giving or receiving of unauthorized aid on examinations or in the preparation of notebooks, themes, reports or other assignments; knowingly misrepresenting the source of any academic work; unauthorized changing of grades; unauthorized use of University approvals or forging of signatures; falsification of research results; plagiarizing of another’s work; violation of regulations or ethical codes for treatment of human and animal subjects; or otherwise acting dishonestly in research.” Academic misconduct will not be tolerated and will be dealt with in accordance with all University rules and regulations.

Non-Academic Misconduct

The scope and content of the material included in this course are defined by the instructor in consultation with the responsible academic unit. While the orderly exchange of ideas, including questions and discussions prompted by lectures, discussion sessions and laboratories, is viewed as a normal part of the educational environment, the instructor has the right to limit the scope and duration of these interactions. Students who engage in disruptive behavior, including persistent refusal to observe boundaries defined by the instructor regarding inappropriate talking, discussions, and questions in the classroom or laboratory may be subject to discipline for non-academic misconduct for disruption of teaching or academic misconduct, as defined in the Code of Student Rights and Responsibilities (CSRR), Article 22, Section C, and the University Senate Rules and Regulations, Section 2.4.6. Article 22 of CSRR also defines potential sanctions for these types of infractions.

Course Evaluations

Course evaluations are part of our continuing process to improve course delivery. Student feedback is very helpful in this process; therefore, your participation is very important. Course evaluations will be distributed the week prior to finals week via email, and should be completed by the last day of class. Participation is tracked; however, your responses are anonymous and will only be presented as aggregate data.

Accommodations

The staff of Services for Students with Disabilities (SSD), 135 Strong, 785-864-2620 (v/tty), coordinates accommodations and services for KU courses. If you have a disability for which you may request accommodation in KU classes and have not contacted them, please do so as soon as possible. Please also notify the instructor in writing (e-mail is acceptable) within one week of receiving this syllabus so that appropriate accommodations for this course can be discussed. If a scheduled exam or lab exercise is in conflict with a mandated religious observance, you must notify the instructor in writing (e-mail is acceptable) within one week of receiving this syllabus so that an alternative arrangement can be made in advance of the scheduled requirement.

Lab computers

The computers in 3049 Dole are for academic use only. Any unauthorized computer usage during lab time will result in expulsion from the lab and a zero for that lab assignment.

Grading

The University has prescribed definitions for grades. The University Senate Rules and Regulations define grades in the following way:

- 1.2.1.1 The grade of A will be reported for achievement of outstanding quality
- 1.2.1.2 The grade of B will be reported for achievement of high quality
- 1.2.1.3 The grade of C will be reported for achievement of acceptable quality
- 1.2.1.4 The grade of D will be reported for achievement that is minimally passing but at less than acceptable quality

In this course, quality of achievement will be evaluated through points earned on pre- and post-class assignments, lab work, and exams. Points assigned for each requirement will be in-line with the above described scale. The relationship between percentage and quality of achievement as indicated by letter grade is as follows:

A: 94 +	B-: 80 ~ 84	D+: 67 ~ 69
A- : 90 ~ 93	C+: 77 ~ 79	D: 64 ~ 66
B+: 87 ~ 89	C: 74 ~ 76	D- : 60 ~ 64
B: 84 ~ 86	C- : 70 ~ 74	F: < 60

If your level of achievement during this course is falling short of your goal, you are strongly encouraged to consult with the instructor during office hours or by appointment to improve the quality of your learning of course material.

Concealed carry

Individuals who choose to carry concealed handguns are **solely responsible to do so in a safe and secure manner in strict conformity with [state and federal laws](#) and [KU weapons policy](#).**

Safety measures outlined in the KU weapons policy specify that a concealed handgun:

- Must be under the constant control of the carrier.
- Must be out of view, concealed either on the body of the carrier, or backpack, purse, or bag that remains under the carrier's custody and control.
- Must be in a holster that covers the trigger area and secures any external hammer in an un-cocked position
- Must have the safety on, and have no round in the chamber.