

SPLH/LING 120: The Physics of Speech (line #26243/19419)  
Course Syllabus: Fall, 2009

**Times and places**

- Lecture:** TR 11:00 – 12:15 p.m., 2094 Dole  
**Labs:** F 9:00 – 9:50 a.m., 3049 Dole (line #28389/28393)  
F 10:00 – 10:50 a.m., 3049 Dole (line #28391/28395)

**Instructors**

- Instructor: Sarah Hargus Ferguson, Ph.D., CCC-A**  
**Office:** 3027 Dole      **Office Telephone:** 785-864-1116  
**E-mail address:** safergus@ku.edu  
**Instructor office hours:** T 1:30 to 3:30 p.m. or by appointment
- Graduate Teaching Assistant: Erin Munz, B.G.S.**  
**Office:** 3049 or 3048 Dole (during office hours only)  
**E-mail address:** emunz@ku.edu  
**Office hours:** F 11:00-1:00 p.m.

**Some of what you'll learn about in this course:**

- Generation, propagation, and analysis of simple and complex sound waves
- Resonance and filtering
- The acoustic theory of speech production
- Acoustic characteristics of consonant and vowels
- The transmission of sound through the outer, middle, and inner ear

**What you'll read:**

- Mullin, W.J., Gerace, W.J., Mestre, J.P., & Velleman, S.L. (2003) *Fundamentals of Sound with Applications to Speech and Hearing*. Boston: Allyn & Bacon.
- Ladefoged, P. (2000). *Chapter 1: Articulatory Phonetics*. In A Course in Phonetics. Heinle. (will be distributed in class)
- Denes, P.B., & Pinson, E.N. (1993). *Chapter 8: Speech Perception*. In The Speech Chain: The Physics and Biology of Spoken Language, 2<sup>nd</sup> Edition. New York: W.H. Freeman and Company. (will be distributed in class)

**Required supplies:**

- A **calculator** capable of computing logarithms (**not a PDA or cell phone that has a calculator**)
- A pad of **graph paper** to facilitate sketching of figures during class and while completing homework (available at KU Bookstore and elsewhere)

### How grades will be assigned:

Range		Grade	Range		Grade	Range		Grade
92.5	100	A	79.5	82.4	B-	66.5	69.4	D+
89.5	92.4	A-	76.5	79.4	C+	62.5	66.4	D
86.5	89.4	B+	72.5	76.4	C	59.5	62.4	D-
82.5	86.4	B	69.5	72.4	C-	0	59.4	F

### How your grade will be determined:

- 9 **online quizzes** (drop lowest) 16%
- 3 **section exams** 45%
- Cumulative **final exam** 20%
- 9 **lab reports** 13%
- **Homework** 3%
- **Attendance** 3%

### Online quizzes:

- Nine quizzes will be given via Blackboard (see schedule for dates). They'll be up **by noon Friday** and must be **completed by 8 p.m. Monday**. Obviously, the quizzes can be open-book. However, because the time to complete each quiz will be limited, **it will behoove you to have learned the material well** through in-class activities and exercises, reading, and homework.
- **Students are expected to work independently on quizzes.**
- If you have a **computer problem** that prevents you from completing the quiz, **call or email Dr. Ferguson at the time the problem occurs**. If the problem is considered valid, and is verified by the time stamp on the email or voice mail, you may be permitted to take the quiz after the deadline.
- In calculating final grades, the **lowest quiz score will be dropped**. Each of the 8 remaining quizzes are therefore worth **2%** of your grade. If you miss a quiz for **any reason** other than a computer problem, you will receive a 0 for the quiz, and it will be dropped from your final grade. **There will be no make-up quizzes.**

### Section exams:

- The three section exams (on **9/24**, **10/29**, and **11/24**) will include multiple-choice and short-answer questions assessing your **knowledge** of course content and **ability to apply formulas** learned in class.
- For each of these exams you will be allowed to bring your calculator as well as one **handwritten 8½ X 5½ sheet of formulas** or other notes. **Paper for each formula sheet will be provided** by the instructor.

### **Cumulative final exam:**

- The final takes place during finals week, on **Friday, 12/18, at 10:30 AM**. It is worth **20%** of your grade. For the final you will be allowed to bring one handwritten **8½ X 11 sheet of formulas** or other notes and your calculator. **Paper for the formula sheet will be provided** by the instructor. At least one optional **review session** for the final exam will be scheduled.

### **Lab reports:**

- Each of the 9 lab reports is worth approximately **1.5%** of your grade. See the lab syllabus for details about due dates. **Late reports will not be accepted without prior arrangement with the GTA.**
- Most labs will use a software package called *Multispeech*. You will have access to this software during our lab meetings, during GTA office hours, and at the **Ermal Garinger Academic Resource Center (EGARC) Computer Lab**, which is located in **4074 Wescoe**. Open hours for EGARC vary from week to week; call 864-4759 for availability.

### **Homework:**

- Homework will be assigned regularly and will be due at the beginning of the next class period. Students will be assigned to **grading groups** of 5-6 students; at each class meeting, homework will be **checked for completion (not accuracy) for two randomly selected grading groups**. It is **your responsibility** to know which grading group you belong to, and to **arrive on time** to class to turn your homework in. Your homework score, which is worth **3%** of your final grade, will be based on the percentage of time your homework was complete when checked.

### **Attendance:**

- Due to the large volume of information in this course and the importance of in-class exercises to learning, attendance at lectures and labs is crucial. Therefore, **attendance will be taken at both lectures and labs**. Your **attendance rate** will be calculated as follows: [# of times attended/(# of lectures and labs minus excused absences)]; it is worth **3%** of your final grade. Absences **may be excused if you contact the instructor before the missed class (or as soon as possible afterward in an emergency)** and offer a **valid reason** for missing class.

### **Homework/Attendance “free passes”:**

- You may “make up” as many as **3** unexcused absences or missed homeworks by going to a talk in **linguistics, child language, gerontology** or **cognitive psychology** that is relevant to speech acoustics or perception. Relevant talks will be announced on Blackboard. You may attend a talk after your absence/missed homework, or you can **go ahead of time**. That is, if you go to a talk at any point in the semester, an otherwise unexcused absence/missed homework at any point in the semester will be excused.

**Extra credit:**

- For all students who complete one of the following extra credit assignments, **3 points will be added to one section exam grade:**
1. Participate in a **research experiment** relevant to speech acoustics and perception.
    - Details will be announced in class. Note that choosing not to participate in the experiment will not negatively affect your grade in class.
  2. Attend a **research lecture** relevant to speech acoustics and perception and **submit a typed 1-page summary** of the lecture.

**OTHER IMPORTANT INFORMATION:****Blackboard:**

- Blackboard will be used extensively in this course. Students should **check the course site frequently** for any announcements. In addition, **all email from instructors to students will be sent through Blackboard**. Please be sure to **check the email account associated with your Blackboard account**. See the instructor if you have any questions.
- Whenever possible, **lecture notes will be posted to Blackboard** no later than 5 pm on the day before class. When this cannot be done, a note to that effect will be posted to Blackboard and handouts will be brought to class. Some handouts may also be posted to Blackboard.

**Tutoring:**

- Tutoring for this course is available through **the Academic Achievement and Access Center**. For more information or to sign up, contact the AAAC at 864-4064 or drop by their office in 22 Strong Hall **prior to Fall Break**.

**Computer support:**

- This course assumes **basic computer skills**, such as creating and saving files. Students who are not confident about their computer skills are urged to seek out workshops offered by Academic Computing Services. See the instructor for more details.

**Students with disabilities:**

- The staff of Services for Students with Disabilities, 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 as soon as possible. Please also see the instructor privately in regard to this course.

### Academic dishonesty:

- Academic dishonesty is a serious ethical violation and will not be tolerated. Cheating on any exam or plagiarism on any written assignment will be rewarded with a **zero** grade on that exam/assignment. **Any exam or assignment that earns a zero due to academic dishonesty will not be dropped from final grade calculations.**
- The College of Liberal Arts and Sciences Academic Misconduct policy may be found at <http://www.clas.ku.edu/faculty/policies/misconduct.pdf>. Note that for a grade change to be carried out (i.e., changing a grade to zero), **paperwork must be filed with the College.** Instructions regarding the level of collaboration permitted on graded activities will be given at the time each activity is assigned.

### Use of lab computers:

- The computers in 3049 Dole are for **academic use only.** **Any unauthorized computer usage** during lab time (e.g., email, Internet, video games, chat, etc.) will result in **expulsion** from the lab and a **zero** for that lab assignment.

### Recording of lectures/labs:

- 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 record lectures, on the condition that these recordings 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.



The Physics of Speech: Lecture, Lab and Reading Schedule (p. 1)		
Session	Topic	Reading
R 8/20/09	<ul style="list-style-type: none"> <li>Getting to know each other</li> <li>Why acoustics?</li> <li>Course overview</li> </ul>	
F 8/21/09	⇒ Lab orientation (mandatory)	
<b>PRACTICE QUIZ DUE at 8 p.m. on MONDAY 8/24/09</b>		
T 8/25/09	<ul style="list-style-type: none"> <li>Introduction to waves, part 1</li> </ul>	<ul style="list-style-type: none"> <li>Mullin <i>et al.</i>, Ch. 1</li> </ul>
R 8/27/09	<ul style="list-style-type: none"> <li>Introduction to waves, part 2</li> </ul>	
F 8/28/09	⇒ Lab 1: Generating and measuring sine waves	
<b>QUIZ 1 DUE at 8 p.m. on MONDAY 8/31/09</b>		
T 9/1/09	<ul style="list-style-type: none"> <li>Introduction to waves, part 3</li> </ul>	
R 9/3/09	<ul style="list-style-type: none"> <li>Standing waves on strings, part 1</li> </ul>	<ul style="list-style-type: none"> <li>Mullin <i>et al.</i>, Ch. 2</li> </ul>
F 9/4/09	⇒ Lab 2: Pitch and frequency	
<b>QUIZ 2 DUE at 8 p.m. on MONDAY 9/7/09</b>		
T 9/8/09	<ul style="list-style-type: none"> <li>Standing waves on strings, part 2</li> </ul>	
R 9/10/09 F 9/11/09	⇒ <b>Academy of Rehabilitative Audiology Institute – no class or lab, and no quiz due on 9/14</b>	
T 9/15/09	<ul style="list-style-type: none"> <li>Standing waves on strings, part 3</li> </ul>	
R 9/17/09	<ul style="list-style-type: none"> <li>Standing waves in tubes, part 1</li> </ul>	<ul style="list-style-type: none"> <li>Mullin <i>et al.</i>, Ch. 3</li> </ul>
F 9/18/09	⇒ Lab 3: Loudness and intensity	
<b>QUIZ 3 DUE at 8 p.m. on MONDAY 9/21/09</b>		
T 9/22/09	<ul style="list-style-type: none"> <li>Standing waves in tubes, part 2</li> </ul>	
R 9/24/09	<b>EXAM 1</b>	
F 9/25/09	⇒ <i>No lab meeting (also no quiz due Monday 9/28)</i>	

The Physics of Speech: Lecture, Lab and Reading Schedule (p. 2)		
Session	Topic	Reading
T 9/29/09	• Complex waves, part 1	• Mullin <i>et al.</i> , Ch. 6
R 10/1/09	• Complex waves, part 2	
F 10/2/09	⇒ Lab 4: Complex waves	
<b>QUIZ 4 DUE at 8 p.m. on MONDAY 10/5/09</b>		
T 10/6/09	• Resonance and filters	• Mullin <i>et al.</i> , Ch. 4
R 10/8/09	• Wave fronts (intensity & distance)	• Mullin <i>et al.</i> , Ch. 5
F 10/9/09	⇒ Lab 5: Filters	
<b>QUIZ 5 DUE at 8 p.m. on MONDAY 10/12/09</b>		
T 10/13/09	⇒ <b>Aging and Speech Communication Meeting - no class</b>	
R 10/15/09, F 10/16/09	<b>FALL BREAK (no class or lab and no quiz due on Monday 10/19)</b>	
T 10/20/09	• A little bit of articulatory phonetics	• Ladefoged, Ch. 1*
R 10/22/09	• Source-filter theory of speech	• Mullin <i>et al.</i> , Ch. 8
F 10/23/09	⇒ Lab 6: Speech perception	
<b>QUIZ 6 DUE at 8 p.m. on MONDAY 10/26/09</b>		
T 10/27/09	• Spectrograms • Speech acoustics and perception	• Denes & Pinson, Ch. 8*
R 10/29/09	<b>EXAM 2</b>	
F 10/30/09	⇒ <i>No lab meeting (also no quiz due Monday 11/2)</i>	
T 11/3/09	• Vowels, Part 1	• Mullin <i>et al.</i> , Ch. 9
R 11/5/09	• Vowels, Part 2 • Consonants, Part 1	
F 11/6/09	⇒ Lab 7: Vowel spaces	

The Physics of Speech: Lecture, Lab and Reading Schedule (p. 3)		
Session	Topic	Reading
<b>QUIZ 7 DUE at 8 p.m. on MONDAY 11/9/09</b>		
T 11/10/09	• Consonants, Part 2	
R 11/12/09	• The mighty decibel, Part 1	• Mullin <i>et al.</i> , Ch. 11
F 11/13/09	⇒ Lab 8: Robovoice	
<b>QUIZ 8 DUE at 8 p.m. on MONDAY 11/16/09</b>		
T 11/17/09	• The mighty decibel, Part 2	
R 11/19/09, F 11/20/09	⇒ <b>ASHA Convention – no class or lab, and no quiz due on Monday 11/23</b>	
T 11/24/09	<b>EXAM 3</b>	
R 11/26/09, F 11/27/09	<b>THANKSGIVING BREAK</b> ⇒ <b>(no class or lab and no quiz due on Monday 11/30)</b>	
T 12/1/09	• The mighty decibel, Part 3	
R 12/3/09	• The physics of hearing: How well we hear	• Mullin <i>et al.</i> , Ch. 12
F 12/4/09	⇒ Lab 9: Noise and hearing loss	
<b>QUIZ 9 DUE at 8 p.m. on MONDAY 12/7/09</b>		
T 12/8/09	• The physics of hearing: How we hear so well (outer & middle ears)	
R 12/10/09	• The physics of hearing: How we hear so well (inner ear)	
F 12/11/09	<b>Stop Day: No lab</b>	
<b>Friday 12/18/09</b>	<b>FINAL EXAM</b>	<b>10:30 A.M. to 1:00 P.M.</b>