

Fall 2016 – Physics of Speech (SPLH/LING 120)

Professor.	Dr. Navin Viswanathan
Office.	Dole 3029
Email.	navin@ku.edu
Class meeting times.	Tue & Thu: 11:00 AM - 12:15 PM
Place.	Dole 2092
Office hours.	Tuesday: 12:15 PM to 1:00 PM Thursday: 10:00 AM to 10:45 AM or by appointment

Please come prepared for office hours

* 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.

Course Description

This course offers an introduction to the acoustic structure of speech intended for non-science majors. Emphasis will be placed on the methods and standards by which scientists measure and evaluate the physical characteristics of speech. Topics will include: simple harmonic motion, the propagation of sound waves, aerodynamic aspects of vocal fold vibration, resonance, digital speech processing, frequency analysis, and speech synthesis. Three class hours and one laboratory per week.

Learning Objectives and Outcomes

- To be able to describe the generation and propagation of simple and complex sound waves
- To be able to perform basic analysis of simple and complex sound waves
- To describe and demonstrate acoustic and articulatory characteristics of consonant and vowels
- To apply basic principles of psychophysics to describe basic speech perception

Required Textbooks and Materials

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.

Any other required material will be shared on Blackboard.

Grading Policy

Grading Scale and Interpretation of Performance Level per University Senate Rules and Regulations

A ~ Outstanding; B ~ High; C ~ Satisfactory; D ~ Minimal; F ~ Inadequate

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

Assignments (See attached schedule and lab syllabus for all due dates)

2 in-class quizzes	30%
10 lab reports	30%
1 midterm exam	20%
1 comprehensive final exam	20%

Studying

Significant learning may start in the classroom but it should continue to grow outside the classroom when students become actively engaged with the material. In this course, you will be actively engaged with the material outside of class through completion of readings, quizzes, and study guides. As stated in the Faculty Senate Rules and Regulations (5.1.1) “One semester hour means course work normally represented by an hour of class instruction and two hours of study a week for one semester, or an equivalent amount of work. The concept may vary according to the level at which instruction is offered.”

In-class quizzes

A total of 2 quizzes will be administered in class. Students are expected to work independently on quizzes. You will be allowed to bring your calculator as well as one sheet of formulas for each quiz. In calculating final grades, each of the 2 quizzes is worth 15% of your grade.

Midterm and Final Exams

Midterm and final exams: The exams will include (1) multiple-choice (2) short-answer numerical and (3) true-or-false questions to assess your knowledge of the course content and ability to apply concepts and formulas learned in class. Questions will include material covered in the readings and in class lectures and discussions. For each of these exams, you will be allowed to bring your calculator as well as one sheet of formulas. Each exam is worth 20% of your grade.

Make up policy for exams/quizzes

In general, there will be no make-up quizzes or exams. Please contact your instructor *before* the quizzes/exams about conflicts or other situations and a decision will be made on a case-by-case basis. Health-related issues will be accommodated, with a note from a medical practitioner, after the exams.

Labs

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. Note that your lab grade will contribute a total of 30% towards your final grade in this course.

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.

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.

Cell Phones

All cell phones and other wireless devices should be turned off in class.

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.

Recording of lectures or labs

All 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 the individual who is making the recording only uses these recordings as a study aid. Also, 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. All 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 strictly prohibited.

Accommodations

The staff of Services for Students with Disabilities (SSD), 135 Strong Hall, (785) 864-2620 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 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.

Attendance

You are expected to attend all the classes and actively take notes during the class. If you miss class, **it is your duty to catch up with the work you missed.** Though you will not be graded on your attendance, missing classes regularly will make it difficult/impossible for you to get a good grade in this class. Each class builds upon the concepts explained in the previous class and attending classes regularly will make it easier to understand the material.

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. A copy of this policy can be found here: <http://www.tinyurl.com/k92te5t>

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.

Course Schedule

Note.

- (1)The dates of quizzes and exams are fixed.
- (2)Schedule of topics may change depending on the pace of learning.
- (3)Please check Blackboard for the most current schedule or use this [self-updating](#) link.

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

Week	Tue	Topic	Thu	Topic
1	Aug 23	Syllabus- Introduction	Aug 25	Background Math, SI Units, Basic Physics etc
2	Aug 30	Math - II	Sep 1	Intro to Waves
3	Sep 6	Waves-continued	Sep 8	Standing Waves
4	Sep 13	Standing Waves - II	Sep 15	Standing Waves - continued + Review
5	Sep 20	Quiz 1	Sep 22	Intensity, Loudness, Sound Pressure - I
6	Sep 27	Intensity, Loudness, Sound Pressure - II	Sep 29	Intensity, Loudness, Sound Pressure - III
7	Oct 4	Some concepts: Complex Waves/ Resonance	Oct 6	Hearing Loss and Problems
8	Oct 11	Fall Break	Oct 13	Wave Fronts/Review for MidTerm
9	Oct 18	Midterm Exam	Oct 20	Wave Analysis / Signal Processing - I
10	Oct 25	Wave Analysis / Signal Processing - II	Oct 27	Wave Analysis / Signal Processing - III
11	Nov 1	Speech Perception - 1	Nov 3	Speech Perception - II
12	Nov 8	Speech Production: Consonants	Nov 10	Speech Production: Vowels and other sounds
13	Nov 15	TBA	Nov 17	Quiz 2
14	Nov 22	Acoustic theory of Speech Production	Nov 24	Thanksgiving
15	Nov 29	Speech Production: Phonation/Air Flow {Flipped Class}	Dec 1	TBA
16	Dec 6	Review	Dec 8	Tutorial -

All information provided in this syllabus is meant to serve as guidance and is subject to change. If any of this information changes, I promise to announce this change in class. It is your responsibility, however, to keep track of these changes (especially if you miss a class).

Have a great semester ahead!