

SPLH 462 Principles of Speech Science: Anatomy & Physiology

Fall 2016 Malott 2001 3:00–4:15 (MW)

University of Kansas

Instructor Information

| Instructor | Email | Office Location & Hours |
|--|-----------------|---|
| <u>Jonathan Brumberg, Ph.D.</u> Assistant Professor | brumberg@ku.edu | 3047 Dole, 4-1061, MW 1–2 PM & by appt. |
| <u>Shadi Pirhosseinloo, M.S.</u> Doctoral Student, GTA | s571p882@ku.edu | 3025 Dole, 4-6483, by appt. |
| <u>Kevin Pitt, M.S.</u> Doctoral Student, Directed Teaching | kmp4@ku.edu | 3021 Dole |

General Information

Description

This course will provide a comprehensive overview of the skeletal, muscular, and neurological mechanisms underlying speech motor control. These systems enable vocal human communication by coordinating respiration, phonation and upper vocal tract movements through nervous system control. Both healthy and disordered speech function will be discussed. Students will be introduced to current topics in speech motor control, kinematics and neuroscience research and associated methodological techniques.

Objectives

This course is designed to meet the requirement of ASHA Knowledge Standards (2014) IV-B Normal Processes and IV-C Communication Disorders. After completing this course, students will obtain a basic understanding in:

- The structure (anatomy) and function (physiology) important for respiration, phonation, articulation and swallowing
- The roles of the peripheral and central nervous system in coordinating speech movements
- Distinguishing healthy from disordered speech characteristics in the five categories: respiration, phonation, articulation, swallowing and nervous system.
- By the end of the semester, you will be able to describe all of the motor processes involved in speech production

Course Materials

Recommended Text

Hixon, TJ, Weismer, G, Hoit, JD. (2013). *Preclinical Speech Science*. Second Edition. Plural Publishing, Inc., San Diego, CA.

Requirements

Assessments

This course will be based on 10 weekly at-home post-reading assignments, 3 Blackboard quizzes, 3 topic exams, 2 labs, an optional, cumulative final exam, and a pre- / post-test assignment.

- **Weekly post-reading assignments** are worth five points each, and are designed to help introduce and / or identify key concepts from the readings and lectures as well as prepare students for lecture discussions. Assignments will be available by 10 AM on Monday and are due by the following Sunday at 8 PM. Students

should attempt to complete each assignment without referring to the course book or lecture notes, then verify responses before submitting their responses. There will be no opportunities to make-up weekly assignments for unexcused absences. Weekly assignments will be provided through Blackboard and must represent students own work (i.e. completed individually). The use of a university-supported browser (Firefox) is recommended for all Blackboard assignments.

- **Pre-/post-test assignment** requires students to synthesize their knowledge about each of the subsystems of speech (respiration, phonation and articulation) for describing all of the processes involved in producing the word “Kansas” in different every-day contexts. Completion of the pre- / post-test assignment will earn you 5 points each.
- **Quizzes** will assess student knowledge of key concepts using a mixture of objective (multiple-choice, matching, true/false) and short-answer questions and administered online on Blackboard. Each quiz is worth 20 points and will be announced at least one week in advance (e.g., a quiz on a Wednesday will be announced the previous Wednesday) and must be completed in 35 minutes.
- **Labs** will provide students with hands-on experience collecting biophysiological measurements related to the course topics, including respiration and articulation. Each lab will be worth 20 points.
- **Exams** will be administered in class and will be completed in in a single class period. There will be three topic exams for each of the main areas: respiration, phonation and orofacial (articulation / swallowing). Each exam is worth 100 points will consist of questions in short-answer and objective format (multiple-choice, true/false, matching).
 - **An optional final exam** will be given on Wednesday, December 14, 2016 from 1:30 PM–4:00 PM. The cumulative final exam will also be worth 100 points and will consist of questions in short-answer and objective format. If taken, the optional final exam may be used to replace one of your other exam grades. For instance, if you earn a higher score on the final exam than on one of the three topic exams, the final exam will replace your previous lower exam score. This exam is optional, and is not required if you are satisfied with your prior exam scores.

Grading

Reading assignments are worth 5 points each (10 assignments x 5 points = 50 points total)

Pre-/post-test assignment are worth 5 points each (5 + 5 = 10 points total)

Quizzes are worth 20 points each (3 quizzes x 20 points = 60 points total)

Labs are worth 20 points each (2 labs x 20 points = 40 points total)

Exams are worth 100 points (3 exams x 100 points = 300 points total)

Final grade is out of 460 points

Plus / minus grading will be used according to the following:

| <u>Letter Grade</u> | <u>Percentage Range</u> |
|---------------------|-------------------------|
| A | 92.5 – 100% |
| A- | 90.0 – 92.5% |
| B+ | 87.5 – 90.0% |
| B | 82.5 – 87.5% |
| B- | 80.0 – 82.5% |
| C+ | 77.5 – 80.0% |
| C | 72.5 – 77.5% |
| C- | 70.0 – 72.5% |
| D+ | 67.5 – 70.0% |
| D | 62.5 – 67.5% |
| D- | 60.0 – 62.5% |
| F | below 60.0 |

Additional Information and Resources

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.

Accomodations

The Academic Achievement and Access Center (AAAC) coordinates academic accommodations and services for all eligible KU students with disabilities. If you have a disability for which you wish to request accommodations and have not contacted the AAAC, please do so as soon as possible. They are located in 22 Strong Hall and can be reached at 785-864-4064 (V/TTY). Information about their services can be found at <http://www.disability.ku.edu>. Please contact me privately in regard to your needs in this course within one week of receiving this syllabus so that appropriate accommodations for this course can be discussed.

If a scheduled requirement 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.

Health Policy

Health: KU Pandemic Response Plan (<http://www.pandemic.ku.edu/>) and the “Personal Guide to Protect Against Flu” (<http://www.pandemic.ku.edu/pdf/tipSheet.pdf>)

Blackboard

Blackboard will be used extensively in this course for announcements, lecture note archives and assignment administration. Students should check the course site frequently for any announcements, additional course documents and lecture notes. 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.

Course Schedule (subject to change)

Introduction

| Date | Topic | Lecture | Assignments |
|--------------------|---|-------------------------------------|---------------------------------------|
| Week 1 8/22– 24 | Syllabus & course intro, Speech Science: subsystems & levels of observation | Syllabus, Learning Module Week 1 | Journal entry: course goals, Pre-test |

Topic 1: Breathing - respiration, chestwall and breathing apparatus

| Date | Topic | Lecture | Assignments |
|----------------------------|--|------------------------|---|
| Week 2 8/29– 31 | Respiration, skeletal structure, pulmonary apparatus | Learning Module Week 2 | Assignment #1: Due 8/28 by 8pm |
| Week 3 9/7 | Kinematics, forces, pleura & disease | Learning Module Week 3 | Assignment #2: Due 9/6 by 8pm |
| Week 4 9/12– 14 | Muscles: diaphragm, rib cage, abdomen | Learning Module Week 4 | Assignment #3: Due 9/11 by 8pm; Quiz #1 Due 9/15 by 8pm |
| Week 5 9/19– 21 | Respiration measurement variables; speech breathing | Learning Module Week 5 | Assignment #4: Due 9/18 by 8pm |
| Week 6 9/26 9/28 | Neural control of breathing; Breathing disorders | Learning Module Week 6 | Assignment #5: Due 9/25 by 8pm Exam 1: Breathing |

Topic 2: Larynx, phonation

| Date | Topic | Lecture | Assignments |
|----------------------|---|-------------------------|---|
| Week 7 10/3– 5 | Laryngeal structure | Learning Module Week 7 | Vibrating larynx & stroboscopy videos |
| Week 8 10/12 | Laryngeal musculature | Learning Module Week 8 | Assignment #6 Due 10/9 by 8pm; Quiz #2 Due by 10/13 by 8pm |
| Week 9 10/17– 19 | Laryngeal & vocal fold movements; Airflow & fundamental frequency | Learning Module Week 9 | Assignment #7 Due 10/16 by 8pm |
| Week 10 10/24– 26 | Larynx pathology & stroboscopy | Learning Module Week 10 | Assignment #8 Due 10/23 by 8pm |
| Week 11 10/31 | | Exam 2: Larynx | |

Topic 3: Orofacial, pharyngeal, swallowing

| Date | Topic | Lecture | Assignments |
|-----------------------------------|--|-------------------------|--|
| Week 11 11/2 | Velopharynx structure & musculature | Learning Module Week 11 | |
| Week 12 11/7– 9 | Oropharynx structure & musculature | Learning Module Week 12 | Assignment #9 Due 11/6 by 8pm; Quiz #3: Due 11/10 by 8pm |
| Week 13 11/14– 16 | Articulation: tongue muscles, acoustics & articulatory phonetics | Learning Module Week 13 | Assignment #10 Due 11/13 by 8pm |
| Week 14 11/21 | Swallowing | Learning Module Week 14 | post-test Due 11/20 by 8pm |
| Week 15 11/28– 30 11/30 | Review & catch-up | | Exam 3: Orofacial, pharyngeal, swallowing |

Speech neuroscience & technology

| Date | Topic | Lecture | Assignments |
|-------------------|----------------------------------|----------------|--------------------|
| Week 16 12/5-7 | Speech neuroscience & technology | | |
| 12/9 | Stop Day | | |
| 12/14 | Final Exam | | |

Exam Schedule

| Date | Subject |
|-------------------|---|
| 10/03/2016 | Exam 1: Breathing |
| 10/31/2016 | Exam 2: Larynx / Phonation |
| 11/30/2016 | Exam 3: Orofacial / articulation / swallowing |
| 12/14/2016 | Final Exam: Cumulative @ 1:30 PM |