

**SLHS 3116: ANATOMY, PHYSIOLOGY, AND SCIENCE OF SPEECH**  
**Speech-Language Pathology Prerequisites (SLPP) Program**  
**University of Colorado Boulder**

<b>CREDITS</b>	3
----------------	---

**COURSE DESCRIPTION**

Provides a basic understanding of the structural organization (anatomy), function (physiology), and neural controls of the structures used to produce speech, swallowing, respiration, and related behaviors in humans.

**COURSE MODALITY**

SLHS 3116 is a fully online, asynchronous course delivered across the standard academic term. Instruction occurs through structured weekly modules, and students are required to progress according to scheduled release dates and assignment deadlines. Although there are no synchronous class meetings, the course is instructor-paced and follows the university semester calendar. The instructor will hold regular virtual office hours to provide additional support and clarification. Participation is optional, and recordings are made available for students who are unable to attend.

**COURSE LEARNING OBJECTIVES**

SLHS 3116: Anatomy, Physiology, and Science of Speech will provide an introductory understanding of the anatomy and physiology of the systems involved in speech production and swallowing, specifically:

- Identify the major anatomic structures involved in speech and swallowing behaviors in humans.
- Describe the physiology of the speech subsystems based on understanding of their anatomies.
- Connect basic acoustics concepts to the production of speech phonemes.
- Explain the source-filter (acoustic) theory of speech production.
- Explain, in broad terms, which neurological mechanisms underlie specific speech functions & how they operate.

**COURSE ALIGNMENT MAP**

**Teaching Materials:** Slides & Video Lectures, Canvas Resources (course materials and support content), Review Guides (quiz preparation materials), Answer Keys (assignment and lab solutions)

**Formative & Summative Assessments:** Learning Labs, Assignments, Quizzes

<b>MODULES</b>	<b>MODULE DESCRIPTION</b>	<b>MODULE/UNIT OBJECTIVES</b>
Module 1: Anatomy Basics, Basic Acoustics & Nervous System	Module 1 explores foundational principles of anatomy, including anatomical planes and positions, as well as an overview of muscles, joints, and bones and how they work together to produce movement. It also introduces basic concepts in acoustics and provides an overview of the nervous system. This module establishes essential background knowledge that supports the study of speech production. For students with prior coursework in human anatomy or acoustics, this content may serve as a review. For those without that background, it provides the foundation needed for later modules, where we examine specific anatomical structures and how they contribute to movement and the production of speech sounds.	Identify the main functional anatomical components of the systems that produce movement in the body, including muscle types, joint types, nervous system, including lobes of the brain, ventricles, the brainstem sections, the spinal cord, and the cerebellum. Identify the main functional anatomical components of the nervous system and their relationship to the control of muscles for movement of the body structures. Describe what sound is in relationship to vibratory movement and waves of acoustic energy that can be transmitted through the air. Differentiate between simple and complex sound waves. Describe the concept of "resonance" in relationship to vibration (including sound).
Module 2: Respiratory System	Module 2 explores the anatomical structures involved in speech production, with a focus on the respiratory system as the "power source" for speech. It introduces key concepts of air pressure and airflow as they relate to respiration. This module examines the lungs and airways; the bones and membranes of the ribcage; the	Identify the main skeletal, muscular, and joint components of the respiratory system that are used to produce respiration. Identify the peripheral nerves that innervate the muscles of respiration. Explain the physiologic processes involved in inspiration and expiration.

	vertebrae; the pelvic and shoulder girdles; and the muscles and joints that support respiratory movement. It also introduces spirometry as a method for measuring respiratory system function. Finally, Module 2 explores the physiological processes underlying inspiration and expiration, highlighting the differences between breathing for life and breathing for speech.	Explain the relationship between air pressure and air flow with specific reference to respiration. Discuss techniques for measuring respiratory system function. Contrast speech vs life breathing purposes, movements, and physiological processes.
Module 3: Phonatory System	Module 3 explores the anatomy and physiology of voice production, with a focus on the larynx as the primary sound source for voiced phonemes. In addition to its role in phonation, the larynx serves essential biological functions, including airway protection during swallowing. This module examines the intrinsic (internal) and extrinsic (external) laryngeal muscles and their roles in sound production and other critical laryngeal functions. It also introduces the myoelastic-aerodynamic theory of phonation to explain how vocal fold vibration is produced. Finally, Module 3 explores clinical and instrumental techniques used to assess laryngeal function, considering the unique challenges presented by its anatomical location.	Identify the main skeletal, muscular, and joint components of the laryngeal system that are used to produce phonation and biological functions of the larynx. Identify the components of innervation for the muscles of the larynx (intrinsic and extrinsic). Explain the physiologic processes involved in phonation and biological functions related to swallowing. Explain the relationship between air pressure and air flow with specific reference to the myoelastic-aerodynamic theory of phonation. Discuss techniques for measuring laryngeal system function.
Module 4: Articulatory System I	Module 4 integrates foundational concepts to examine how speech is produced. It revisits key principles of acoustics relevant to speech production, including resonance and its relationship to formants, and introduces the source-filter theory of speech production as a framework for understanding both typical and disordered speech. This module examines the skeletal and muscular structures of the head and face involved in speech production, including the muscles of facial expression and the tongue as a muscular hydrostat. Finally, Module 4 explores how the nervous system coordinates the complex musculature of the vocal tract to produce the precise facial gestures and movements required for speech.	Identify the main skeletal, muscular (of the face and tongue), and joint components of the articulatory system that are used to produce speech. Identify the peripheral nerves that innervate the facial and tongue muscles. Explain the physiologic processes involved in speech sound production. Describe the relevant acoustic concepts related to speech production and the source-filter theory.
Module 5: Articulatory System II	Module 5 integrates concepts from previous modules to examine both speech production and swallowing. It continues the exploration of the structures and processes involved in producing phonemes while also introducing the anatomy and physiology of swallowing. This module covers the muscles of the mandible, the velopharynx (soft palate), and the pharynx (throat). Although the focus is on a single bone (the mandible) and one joint (the temporomandibular joint, or TMJ), the module also revisits several skeletal structures discussed in earlier modules to reinforce understanding.	Identify the main skeletal, muscular, and joint components of the articulatory system that are used to produce speech and swallowing. Identify the peripheral nerves that innervate the mandibular, velopharyngeal, and pharyngeal muscles. Contrast the movements of the jaw, soft palate, and pharyngeal structures for speech vs swallowing behaviors. List the anatomical structures involved in both swallowing and speech behaviors. Describe the sequential phases (voluntary and involuntary) of swallowing.

### ASHA 2020 CERTIFICATION STANDARDS ADDRESSED IN THIS COURSE

This upper-division course provides foundational knowledge aligned with the American Speech-Language-Hearing Association (ASHA) 2020 KASA Standards, including:

- Standard IV-B: Biological, neurological, acoustic, psychological, developmental, linguistic, and cultural bases of human communication and swallowing across the lifespan.

## COURSE REQUIREMENTS

There will be a total of 375 points available in this course.

Assessments	Possible Points
Quiz 1 – Anatomy Basics, Basic Acoustics & Nervous System	50
Quiz 2 – Respiratory System	50
Quiz 3 – Phonatory System	50
Quiz 4 – Articulatory System I	50
Final Quiz – Articulatory System II & <i>Comprehensive</i>	75
Learning Assignments (4@25 points each)	100
<b>Total Points:</b>	<b>375</b>

## GRADING SCALE

Grades are assigned based on the percentage of the total points earned and calculated using the following scale.

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Percentage Grade *	93+ -100	90- <93	87- <90	83- <87	80- <83	77- <80	73- <77	70- <73	67- <70	63- <67	60- <63	<60

\*< indicates less than

## SUBMISSION POLICIES

Assignments and quizzes are submitted in Canvas and due on the date posted in Canvas. Late submissions will be reduced by 25% of the total possible points per day late (i.e., on the 4th day late, the submission is worth 0 points).

## COURSE PLAGIARISM POLICY

Students should submit their own work. Review Honor Code and Student Conduct for University policies.

## GENERATIVE ARTIFICIAL INTELLIGENCE (AI) COURSE POLICY

Students should not use AI tools during quizzes. Students should give credit to AI tools when used on assignments.

## INCLUSIVITY

This course is committed to creating a learning environment where everyone feels respected, valued, and supported. Diverse perspectives, identities, and experiences strengthen our learning community, and all students are encouraged to participate fully. We strive to maintain a classroom culture that is accessible, inclusive, and free from discrimination. If you encounter barriers to your learning or have needs that are not being met, please reach out so we can work together to ensure your success.

## ONLINE COMMUNICATION GUIDELINES

1. Be respectful and professional in all posts and messages.
2. Keep communication clear, concise, and on topic.
3. Use a friendly, neutral tone—online messages can be easily misunderstood.
4. Engage regularly and contribute constructively to discussions.
5. Respect privacy: do not share classmates' information or course materials outside the class.
6. Use official university channels for course communication and check the syllabus/announcements before emailing questions.
7. Support an inclusive environment by honoring others' names, pronouns, and perspectives.

## UNIVERSITY POLICIES

### Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without

permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code. All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: [StudentConduct@colorado.edu](mailto:StudentConduct@colorado.edu). Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will be subject to academic sanctions from the faculty member. Visit [Honor Code](#) for more information on the academic integrity policy.

### **Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation**

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [DSinfo@colorado.edu](mailto:DSinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website. If you have a temporary illness, injury or required medical isolation for which you require adjustment, please contact the instructor as soon as possible.

### **Accommodation for Religious Obligations**

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please communicate the need for a religious accommodation in a timely manner. See the [campus policy regarding religious observances](#) for full details.

### **Preferred Student Names and Pronouns**

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns appear on your instructors' class rosters and in Canvas, visit the [Registrar's website](#) for instructions on how to change your personal information in university systems.

### **Classroom Behavior**

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure 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 race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy. Additional classroom behavior information

- [Student Classroom and Course-Related Behavior Policy.](#)
- [Student Code of Conduct.](#)
- [Office of Institutional Equity and Compliance.](#)
- [Student Code of Conduct.](#)
- [Office of Institutional Equity and Compliance.](#)

### **Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation**

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits [protected-class](#) discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email [OIEC@colorado.edu](mailto:OIEC@colorado.edu). Information about university policies, [reporting options](#), and [OIEC support resources](#) including confidential services can be found on the [OIEC website](#). Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support a variety of concerns, visit the [Don't Ignore It page](#).

**Mental Health and Wellness**

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact [Counseling and Psychiatric Services \(CAPS\)](#), located in C4C, or call (303) 492-2277, 24/7.