

SPEECH SCIENCE

SPCH 70500 / LING 79100 | Spring 2022 | Thursdays 11.45am-1.45pm | GC7102

Instructor: Dr. Suzanne van der Feest

svanderfeest@gc.cuny.edu

Office Hours: Thursdays 10:45am-11.45am, or on Zoom by appointment

COURSE DESCRIPTION

This course presents basic knowledge about speech acoustics, production, and perception in a combined lecture/laboratory format. Laboratories are to be completed outside of class (approximately 2 hrs/week on average). This is good preparation for the Speech Science First Exam, phonetics-related Qualifying Papers, or for courses in phonology. Students will write several short papers on various topics in speech science and acoustic phonetics (e.g., source-filter theory; myoelastic/aerodynamic theory of phonation, speech sound sources, among others), acoustic cues for vowels and for consonant manner, place, and voicing; perceptual processes.

COURSE LEARNING GOALS

Students in this course will gain specialized knowledge related to the study of speech production, including source-filter theory and the acoustic analysis of vowels and constants. Students will also learn to communicate experimental designs and results in a concise (but informative) way, in both written and oral forms.

TEXTS

Please purchase the first two books. I will provide you with the necessary readings from the other texts, (as well as listed articles) although you may want to own them in the long run.

1. Kent, R.D., & Read, C. (2002, 2nd edition). The Acoustic Analysis of Speech. San Diego: CA: Singular. (ISBN 0-7693-0112-6).
2. Raphael, L. J., Borden, G. J. & Harris, K. S. [4th,5th, or 6th Ed.] Speech Science Primer: Physiology, Acoustics, and Perception of Speech. Baltimore, MD: Lippincott Williams and Wilkins.
3. Pickett, J. M. (1999) The Acoustics of Speech Communication: Fundamentals, Speech Perception Theory and Technology. Needham Heights, MA: Allen & Bacon (ISBN 0-205-19887-2).
4. Baken, R. J. & Orlikoff, R. F. (2000). Clinical Measurement of Speech and Voice. San Diego, CA: Singular. (ISBN 1-5659-3869-0)
5. Ladefoged, P. (2006) A Course in Phonetics (Fifth Edition). Fort Worth, TX: Harcourt. (ISBN 0-15-507319-2). (Other editions are fine, although the ones co-authored by Keith Johnson are considerably different than the ones prior to that).
6. Gick, B., Wilson, I., & Derrick, D. (2013). *Articulatory phonetics*. Chichester, UK: Wiley-Blackwell.

IPA SITES

You are expected to know, or learn, the International Phonetic Alphabet (IPA). If you don't know it already, please begin learning it. These are some interactive sites for hearing examples of the sounds of the IPA:

<http://www.phonetics.ucla.edu/course/chapter1/chapter1.html>

<http://www.yorku.ca/earmstro/ipa/>

<https://tanakayu.doshisha.ac.jp/teaching.html>

The following site has the sounds along with either ultrasound or MRI images of the tongue:

<http://www.seeingspeech.arts.gla.ac.uk/display.php?chart=1&datatype=2&speaker=4>

You can download an app here:

<https://www.uvic.ca/humanities/linguistics/resources/software/ipaphonetics/index.php>

BASIS FOR EVALUATION OF STUDENTS

Your grade will be based on performance on papers, laboratory reports and a take-home final. Half the grade will come from the average of papers, half from lab reports. You will have one opportunity to rewrite one paper that got less than a B for an increase in the grade. The take-home final will be equivalent in weight to a paper, and will be included in that portion of the grade. Grades will be on an A-F scale (A = 4; B = 3, etc). Late papers and reports receive a one-grade point deduction.

(TENTATIVE) SCHEDULE *

**These are my current plans and objectives (Jan 2022). As we go through the semester, these plans may need to change to enhance learning opportunities for the class. Such changes, communicated clearly, are not unusual and should be expected.*

Week	Class Date	Topic	Assignments due start of each class.
1	3 Feb	Introduction and overview (and assessment of everyone's previous work in phonetics). Review of articulatory phonetics and the IPA, phonetic inventory	
2	10 Feb	Source-Filter Theory of Speech Production, sound sources & resonators, quasi-periodic sources, quarter-wave resonators and 2-tube models	Lab 1: Praat Exercise (<i>no report required</i>)
3	17 Feb	(More) Source-Filter Theory; Vowel Acoustics/Articulation; (More) speaker differences, temporal characteristics	Lab 2: Analysis of vowels I
4	24 Feb	Generation of Sound Sources: Respiration & Phonation Speech breathing & laryngeal control, speaker differences	Paper 1: Source-Filter Theory of Vowel Production
5	3 March	Modulation of the laryngeal source: Lexical stress and intonation, f ₀ and amplitude control; segmental durations in relation to prosodic structure	Lab 3: Analysis of vowels II
6	10 March	Consonant Acoustics/Articulation: Voicing in fricatives and stops, spectral and temporal cues; phonotactic variation, VOT, closure cues, preceding vowel duration	Lab 4: Voicing in fricatives and stops
7	17 March	Consonant Acoustics/Articulation: Manner of articulation, noise duration, silence, nasal murmur, transition and closure duration	Paper 2: The voice source
8	24 March	Consonant Acoustics/Articulation: Place in approximants, formant transitions & loci	Paper 3: Prosody
9	31 March	Consonant Acoustics/Articulation: Place in fricatives, noise spectra, spectral peaks, coarticulatory variations	Lab 5: Place of articulation in consonants
10	7 April	(More, round up) Consonant Acoustics/Articulation	Paper 4: Place of articulation in consonants
11	14 April	Perception of Vowels and Consonants	
X	21 April	<i>Spring Break (no class)</i>	
12	28 April	Speech Science in Clinical Practice	Papers / labs / data discussion
13	5 May	Child Language Acquisition Issues	Papers / labs / data discussion
14	12 May	Round up & discussion	Prepare for Finals
15	19 May	<i>Exam Week (Details TBA)</i>	

READING ASSIGNMENTS

I will provide you with pdfs of all listed research articles and copies of readings from the optional books

Week 2: Complex Sounds and Visual Representations

1. Kent & Read: Ch 1-2
2. Clopper & Smiljanic (2011) (& 2015, *optional*)
3. Ladefoged: Ch 1-4 (for background in phonetics if you don't have it)

Week 3: Source-Filter Theory of Speech (Vowel) Production

1. Kent & Read: Ch 3-4
2. Raphael et al.: Ch 3 & 6

Week 4-5: Speech Sound Source: Respiration & Phonation, Prosodic Variations

1. Raphael et al.: Ch 4-5
2. Baken & Orlikoff: Ch 6 & 10 (Vocal Fundamental Frequency, Laryngeal Function)
3. Jacewicz, Fox & Wei (2010)
4. Fikkert, Dresher, Lahiri, Van Kemenade, & Los (2006, *optional*)
5. Turk, Nakai, & Sugahara (2006, *optional*)

Week 6: Consonant Acoustics and Articulation: Manner of articulation

1. Kent & Read: Ch 5
2. Baken & Orlikoff Ch 7: pp 266-274
3. Pickett: Ch 6-7

Week 7: Consonant Acoustics and Articulation: Voicing

1. Pickett Ch 8
2. Baken & Orlikoff, Ch 7 pp 274-277
3. Kent & Read, Ch 5
4. Cho, Whalen, Docherty (2019, *optional*)

Week 8-10: Consonant Acoustics and Articulation: Place of Articulation

1. Raphael et al. Ch 7
2. Pickett, Ch 9-10
3. (suggested rereading: Kent & Read, Ch 5)

Week 11-12: Perception of Vowels and Consonants: Issues and Theories

1. Pickett, Ch 11, 12 & 14
2. Raphael et al, Ch 10-11
3. Dupoux, Kakehi, Hirose, Pallier, & Mehler (1999)
4. Davidson & Shaw (2012)

Week 12: Speech Science in Clinical Practice

Reading TBA

Week 13: Acquisition

Reading TBA

Week 14: *No reading*