**Linguistics 450-2** **Acoustic Phonetics and Speech Perception**

**Class time:** T, Th 9:30 a.m. -10:50 a.m., Cresap 101

**Professor:** Ann Bradlow
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**Office hours:** by appointment

**COURSE DESCRIPTION:** This course covers topics in acoustic phonetics and speech perception. In the first half of the course, the acoustic theory of speech production is introduced and the acoustic correlates of speech sounds are presented. We also cover acoustic-phonetic features of connected speech. In the second half of the course, we turn our attention to the perception of speech signals. We address such topics as phonetic categorization, speech perception and linguistic experience, and the role of speech perception in phonology.

**PREREQUISITES**: Linguistics 350 and 450-1, or permission of the instructor.

**READING:** Johnson, Keith (1997) *Acoustic and Auditory Phonetics,2nd Edition.* Blackwell Publishers. Supplemental readings to be made available as needed.

**COURSE REQUIREMENTS AND GRADING:**

| | |
|---|---|
| Class participation/presentations | 5% |
| 4 Lab Assignments (10% each) | 40% |
| 2 Homework Assignments (5% each) | 10% |
| Quizzes (2 x 15% each) | 30% |
| Final paper | 15% |

**Additional text book resources for acoustic and auditory phonetics:**

- Ladefoged, Peter (1996) *Elements of Acoustic Phonetics*. 2nd Edition. The University of Chicago Press.
- Rosen, Stuart and Howell, Peter (1991) *Signals and Systems for Speech and Hearing*. Academic Press.
- Stevens, Kenneth (1998) *Acoustic Phonetics*. MIT Press
- Moore, Brian C. J. (1989) *An Introduction to the Psychology of Hearing*. 5th Edition. Elsevier Press

**Tentative list of supplemental readings (may change as we go along…):**

Vowel spaces:

1. Peterson, G. E. & Barney, H.L. (1952). Control methods used in a study of the vowels. *Journal of the Acoustical Society of America*, 24, 175-184.
2. Jessica F. Hay, Momoko Sato, Amy E. Coren, Cheryl L. Moran, and Randy L. Diehl (2006). Enhanced contrast for vowels in utterance focus: A cross-language study. *J. Acoust. Soc. Am.* 119 3022.
3. Harlan Lane, Margaret Denny, Frank H. Guenther, Melanie L. Matthies, Lucie Menard, Joseph S. Perkell, Ellen Stockmann, Mark Tiede, Jennell Vick, and Majid Zandipour. (2005). Effects of bite blocks and hearing status on vowel production. *J. Acoust. Soc. Am.* 118 1636.

Voicing categories:

4. Lisker, L. and Abramson, A. (1964). A cross-language study of voicing in initial stops: Acoustical measurements. *Word*, 20**,** 384-422.

5. Cho, T. and Ladefoged, P. (1999). Variation and universals in VOT: Evidence from 18 languages. *Journal of Phonetics*, 27, 207-229.
6. Kang, K-H, and Guion, S. (2006). Phonological systems in bilinguals: Age of learning effects on the stop consonant systems of Korean-English bilinguals. *Journal of the Acoustical Society of America*, 119 (3), 1672-1683.

Connected speech/Coarticulation:

7. Stevens, K. & House, A. (1963). Perturbation of vowel articulations by consonantal context: An acoustical study. *Journal of Speech and Hearing Research 6*, 111-128.
8. Johnson, Keith. (2003). Massive reduction in conversational American English. Proceedings of the Workshop on Spontaneous Speech: Data and Analysis. August, 2002. Tokyo, JP.
9. Alan Bell, Jason Brenier, Michelle Gregory, Cynthia Girand, and Dan Jurafsky. (2009). Predictability Effects on Durations of Content and Function Words in Conversational English. *Journal of Memory and Language* 60:1, 92-111.

Categorization/Categorical Perception:

10. Liberman, A.M., Harris, K. S., Hoffman, H.S. & Griffith, B. C. (1957). The discrimination of speech sounds within and across phoneme boundaries. *Journal of Experimental Psychology,* **54**, 358-368.
11. Ganong, W.F. (1980). Phonetic categorization in auditory word perception. *Journal of Experimental Psychology: Human Perception and Performance*, **6**, 110-125.
12. Kraljic, T. & Samuel, A.G. (2006). Generalization in perceptual learning for speech. *Psychonomic Bulletin and Review, 13*(2), 262-268.

Speech Perception Development:

13. Werker, J. F. and Tees, R. C. (1984) Cross-language speech perception: Evidence from perceptual reorganization during the first year of life. *Infant Behavior and Development*, **7**, 49-63.
14. Polka, L., Colantonio, C. & Sundara, M. (2001). "A cross-language comparison of /d/ -/ð/ perception: Evidence for a new developmental pattern." *Journal of Acoustical Society of America*, 109, 2190-2220.
15. Jessica Maye & Daniel Weiss (2003). Statistical cues facilitate infants' discrimination of difficult phonetic contrasts. *Proceedings of the 27th Annual Boston University Conference on Language Development*: 508-518.

Speech Perception: Variation in Linguistic Experience

16. Stevens, K. N., Libermann, A. M., Studdert-Kennedy, M., and Öhman, S. E. G. (1969) Cross language study of vowel perception, *Language & Speech*, 12, 1, 1-23.
17. Wagner A, and Ernestus M. (2008) Identification of phonemes: Differences between phoneme classes and the effect of class size. *Phonetica*, 65, 106-127.
18. Sabrina K. Sidaras, Jessica E. D. Alexander, and Lynne C. Nygaard (2009) Perceptual learning of systematic variation in Spanish-accented speech, *J. Acoust. Soc. Am.* 125 (5), 3306-3316.

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**Tentative Course Outline**

| Week | Date | Topic | Work Due | Reading |
|---|---|---|---|---|
| 1 | 3/31 | Introduction | | |
| | 4/2 | Basics (acoustics, filters, audition) | | Johnson, chaps 1, 3 |
| 2 | 4/7 | Digital Signal Processing | Lab 1: Recording Speech | Johnson, chap 2 |
| | 4/9 | | | |
| 3 | 4/14 | Acoustic Theory of Speech Production | | Johnson, chap 5 |
| | 4/16 | Vowels | HW 1: Basic Acoustics | Johnson, chap 6 |
| 4 | 4/21 | | | Articles 1, 2, 3 |
| | 4/23 | Consonants | Lab 2: Vowel Spaces | Johnson, chaps 7, 8, 9 |
| 5 | 4/28 | | | |
| | 4/30 | Voicing and VOT | HW 2: Acoustic Theory of Speech Production | Articles 4, 5, 6 |
| 6 | 5/5 | Connected Speech | Lab 3: Voicing Categories | Articles 7, 8, 9 |
| | 5/7 | Quiz 1: Acoustic Phonetics | | |
| 7 | 5/12 | Categorization/Categorical Perception | | Articles 10, 11, 12 |
| | 5/14 | | | |
| 8 | 5/19 | Speech Perception & Linguistic Experience | Lab 4: Categorization | Articles 13, 14, 15 |
| | 5/21 | | (I will hand out Quiz 2 questions and final paper assignment.) | Articles 16, 17, 18 |
| 9 | 5/26 | Conclusions | Final paper: 1 page abstract/plan | |
| | 5/28 | Quiz 2: Speech Perception | | |
| 10 | | Reading Period | Final paper due – June 4 | |