

# Core 103 Syllabus

# Human Speech

unofficial until the start of classes Spring 2022

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courtesy of USC's Dr. Yongwan Lim

[Prof. Dani Byrd](#)

*USC Linguistics Dept.*

*GFS 301*

*office hours: by appt & Tues 1:50-2:45*

*contact is by email at: [dbyrd@usc.edu](mailto:dbyrd@usc.edu)*

*Spoken language is a hallmark capacity of human cognition. This course introduces students to thinking about language as a physical act taking place in a dynamic and social context. We study the astonishing diversity of speech sounds that encode words in the world's languages and learn how these sounds are articulated in the vocal tract. We tackle an elementary understanding of the acoustics of speech and of the physiology of healthy hearing. Students discover fundamental characteristics of human speech perception and consider the amazing process of how babies acquire language. We then turn our attention to bilingualism, second language acquisition, and language diversity and variation. This body of knowledge is ultimately deployed in a consideration of vocal performance and of speech in breakdown—how certain diseases and disorders can affect the ability to speak and hear. We finish by considering implications of what we have learned for speech technologies including cochlear implants, speech synthesis, and automatic speech recognition. Multimodal material is featured throughout the course, including state-of-the-art medical imaging, AV demonstrations, and online videos and resources.*

## Class Meetings Spring 2022

*Lecture:* Th Th 12:30-1:50

*Discussion Sections:* Friday at 9 and at 1

Occasional meetings possible in 'lab' timeslot DAY TIME FORTHCOMING

If we find ourselves needing to be remote, here are Professor Byrd's [Netiquette](#) expectations for the virtual classroom.

*Core 103—The Process of Change in Science—is a science General Education Course in USC's Thematic Option Honors Program examining critical problems in the development of scientific thought, studied as vehicles for understanding the content and structure of the sciences. Specific subject matter in selected scientific disciplines is presented.*

## Course Goals

- To place human language in the context of cognitive science
- To begin to think about spoken language in a dynamic & social context
- To understand how the sounds of the world's languages are articulated and coordinated

- To have an elementary understanding of the acoustics of speech
- To understand fundamental properties of speech perception
- To become familiar with the acquisition of speech and the forms of its breakdown in various speech and hearing disorders
- To see implications of this knowledge for spoken language technologies

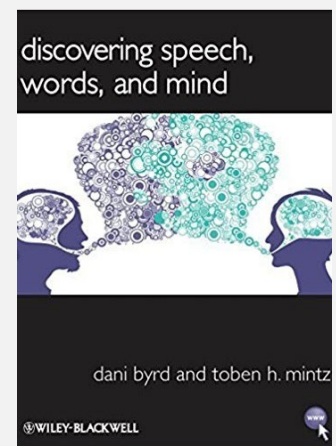
## Learning Objectives

- Demonstrate learning related to course goals through question-answer assessment
- Quantify and analyze original data in mini datasets
- Peruse, assess and select original research articles from library journal collections
- Synthesize accurately primary research literature in speech science
- Explain in written and oral form experimental and/or quantitative data and findings related to human spoken language
- Develop a functional understanding of healthy and disordered language that can be drawn on to make informed life decisions.

## Book

D. Byrd & T. Mintz. (2010) [\*Discovering Speech, Words, and Mind\*](#). Wiley-Blackwell Publishing. (Also available on reserve at Leavey.)

Other readings will be assigned and posted as links or downloadable pdfs.



## Work

- Reading in preparation for class
- Attendance and participation in class and section
- Assigned independent work

- Three tests

## Grades

- Test 1: 20%
- Test 2: 20%
- Test 3: 20% (not cumulative but in the final exam timeslot DAY TIME FORTHCOMING)
- Four homeworks: 18% total (no late assignments accepted)
- Two short papers (a written lab report and a written research synopsis with oral presentation): 22% total (no late assignments accepted)
- Participation: For course grades that are computed to be 'on the bubble,' engagement and participation (including 'TestBank' contributions) may be taken into account in tipping a grade upward or not.

**The course** will be graded on a curve (applied to final grades): *roughly* top 45% As, next 45% Bs, next 10% Cs and below. The curve will not however move grades down.

**Exams** cannot be 'made up' or taken early unless arrangements with the instructor are *made in advance* and are due to documented *unavoidable circumstances* (aka an [emergency](#)).

**Assignments:** Some assignments will involve the use of a computer; some will be writing and/or analysis oriented. Assignments will be released at least one week prior to their due date. [Audacity](#) sound editing software will be used and is downloadable. Phonetics fonts are available from the [International Phonetic Association](#); they are not however required.

**Late assignments are not accepted.**

**All assignments are to be done \*\*independently\*\***, not in teams, not with partners, not in collaboration. Copying *or* collaborating on homework assignments (or exams) will be considered a violation of Academic Integrity and will be reported to the [Office of Student Judicial Affairs and Community Standards](#) and cause [sanctions](#) (SCampus Appendix A) to be imposed.

**Slack** will be used for information sharing about interesting media, news and

current events, to reiterate in-class announcements, or for class-relevant conversation.

## Detailed Course Schedule

with Readings and Assignments by Week (under development for Spring 22)

<https://sites.google.com/view/danibyrd-home/core-103-syllabus/core-103-weekly-schedule>

(under development for Spring 22)

### Topic Outline

	Introduction and Course Overview The Speech Chain; Vocal Tract Anatomy English Sounds
Week 1	Transcription Speech Acoustics: Waveforms
Week 2	Speech Acoustics: Source Filter Theory Formants and Vowels
Week 3	Spectrograms; Sounds of the World's Languages: Consonants and Vowels Sounds of the World's Languages: Airstream Mechanisms
Week 4	Sounds of the World's Languages: Phonation Type & Tone Varieties of English
Week 5	Test 1 (material weeks 1-5.1) Qualities of the Speech Signal: Lack of Invariance & Lack of Segmentability
Week 6	Sine Wave Speech, McGurk Effect, and Word Segmentation Speech Perception: Categorical Perception
Week 7	Speech Perception (cont.): Categorical Perception and Infant Language Acquisition Duplex Perception and Theories of Speech Perception
Week 8	Test 2 (material weeks 6-9) Guest Speaker--Heritage Languages
Week 9	Bilingualism
Week 10	Hearing and Deafness Guest Speaker--Signed Languages
Week 11	Hearing Loss and Hearing Technologies Guest Speaker --Vocal Performance and Singing
Week 12	Speech and Voice Disorders Speech Technologies: Speech Synthesis

Week 13	Oral presentations
Week 14	Speech Technologies: Speech Recognition; Class Conclusion
Week 15	Test 3 (material weeks 10-15)
Final Exam Slot (Test 3)	

## Communication and Policy Information

In addition to the utility of Blackboard, it would be useful if we can communicate with each other **using email**. In this way, you can be advised of changes, and I can be advised of any problems that you encounter. Please know that for this class *I will expect you to check your email*. In case you are unfamiliar with email, communications should be respectful and grammatical.

**Statement on Academic Conduct**—"Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on [Research and Scholarship Misconduct](#)." Provided by the Center for Excellence in Teaching

I expect that all students will uphold the [USC Student Conduct Code](#). Because violations of the code harm every other student in the class, the instructor will aggressively prosecute any student who cheats on an exam or homework or who allows others to cheat on an exam or homework.

Please also note: [SCampus under Academic Policies](#): "Notes or recordings made by students based on a university class or lecture may only be made for purposes of individual or group study, or for other usual non-commercial purposes that reasonably arise from the student's membership in the class or attendance at the university. This restriction also applies to any information distributed, disseminated or in any way displayed for use in relationship to the class, whether obtained in class, via email or otherwise on the internet, or via any other medium. Actions in violation of this policy constitute a violation of the Student Conduct Code, and may subject an individual or entity to university discipline and/or legal proceedings."

**Students with Disabilities**—"USC welcomes students with disabilities into all of the University's educational programs. The [Office of Student Accessibility Services \(OSAS\)](#) is responsible for the determination of appropriate

accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](https://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu)." Provided by the Center for Excellence in Teaching. OSAS is located in GFS 120 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number for OSAS is (213) 740-0776. (213) 740-6948 (TDD only), [SASfrntd@usc.edu](mailto:SASfrntd@usc.edu).

**Final Exam Notice**—Note that [USC requires](#) that: “No deviations from the published examination period are permitted for courses scheduled in a standard session during the fall and spring semesters, unless faculty have authorization in advance from the Committee on Academic Policies and Procedures (CAPP). CAPP will not consider any faculty request for rescheduling a final examination without unanimous written consent of all students in the class... No student is permitted to omit or take early a final examination and no instructor is authorized to permit a student to do so.”

**Learning Experience Evaluations** —“Learning Experience Evaluations will be conducted on [or near the last day of class]. This will be your opportunity to provide feedback about your learning experience in the class. This feedback helps the instructor determine whether students are having the intended learning experiences for the class. It is important to remember that the learning process is collaborative and requires significant effort from the instructor, individual students, and the class as a whole. Students should provide a thoughtful assessment of their experience, as well as of their own effort, with comments focused on specific aspects of instruction or the course. Comments on personal characteristics of the instructor are not appropriate and will not be considered. For this feedback to be as comprehensive as possible, all students should complete the evaluation.”

**Emergency Preparedness/Course Continuity in a Crisis**—Please ensure that you are signed up with TrojanAlerts. “In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies. See the university’s site on [Campus Safety and Emergency Preparedness](#).”

## [USC and Related Support Resources](#)

[Date Last Modified: Oct, 2021 \[currently under development for Spring 2022\] Web Art Credit: Lena Foellmer](#)