GSEM 140g Proposal: Speaking in Tune: Prosody of Language

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## Course description

How does your voice rise and fall when you speak? Why can a single sentence sound like a question just by changing its melody? This course takes you on an interactive journey into the rhythm and music of speech, known as speech prosody, through the combined lenses of phonetics, linguistics, psychology, and neuroscience.

Before diving into prosody, this course begins with the foundations of speech sounds—how your tongue, lips, and voice box shape the basic building blocks of spoken language. From there, we'll move into the rich world of speech prosody, how pitch, timing, and voice quality work together to turn simple sequences of sounds into expressive, meaningful communication. You'll learn how prosody organizes speech into groups and phrases, highlights key words through prominence, and shapes meaning through discourse and speech acts. We'll then examine how pitch, timing, and voice quality work together to turn sequences of words into expressive, meaningful communication.

In this course, you'll learn by engaging directly with the sounds of speech through listening, seeing, speaking, and analyzing. Through hands-on exercises, you'll experiment with your own voice to explore how pitch, timing, voice quality and intensity convey prosodic meanings. You'll record and visualize speech data, gaining deeper scientific insight into both physical and cognitive aspects of speech prosody.

This GE Seminar welcomes students from all majors and backgrounds. No prior experience is required, only a curiosity about how speech prosody works. Whether your passions are linguistics, cognitive science, speech technology, or human health, there's something here for you.

## Syllabus

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| Week 1 | **Introduction**<br>Speech and language; Prosody; Methods in prosodic research |
| Week 2 | **Basics of phonetics and phonology I**<br>Speech Anatomy; Articulatory phonetics; |
| Week 3 | **Basics of phonetics and phonology II**<br>Tour to the sounds of the world's languages; the IPA |
| Week 4 | **Basics of phonetics and phonology III**<br>Acoustic phonetics: waveforms, spectra and spectrograms |
| | **Basics of phonetics and phonology IV**<br>Acoustic phonetics: Source-filter theory; Acoustic features of speech sounds |
| Week 5 | **Introduction to speech prosody I**<br>Definition of speech prosody; Prosodic and syntactic structure |
| Week 6 | **Introduction to speech prosody II**<br>Prosodic prominence and information structure |

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| Week 7 | **Introduction to speech prosody III**<br>Discourse structure; clause types and speech acts |
| Week 8 | **Paper presentation** |
| Week 9 | **Tone and intonation**<br>Lexical tone systems; Intonation system; Pitch analysis |
| Week 10 | **Timing and rhythm**<br>Temporal aspects of speech prosody; Duration and tempo analysis |
| Week 11 | **Voice quality**<br>Linguistic voice quality; Voice quality analysis |
| Week 12 | **Intensity**<br>Speech respiration; Intensity analysis |
| Week 13 | **Music and speech** |
| Week 14 | **Neural bases of speech prosody** |
| Week 15 | **Project presentation** |

## GE-D Life Sciences Course Goals

The goal of this course is to provide students with a comprehensive understanding of human speech prosody through the integrated perspectives of phonetics, linguistics, psychology, and neuroscience. Students will begin by examining the fundamental mechanisms of speech production, including the articulatory, acoustic and perceptual properties of the speech sounds. Building on this foundation, students will explore the organization of prosodic patterns in spoken language, including phrasing, prominence, and the conveyance of meaning through discourse and speech acts and the phonetic correlates of speech prosody, including pitch, timing, intensity and voice quality.

In this course, through assignments, exercises, and group activities, students will have opportunities to analyze speech prosody data and gain hands-on understanding of both its physical and cognitive components. By the end of the course, students will develop fundamental skills in speech analysis, quantitative reasoning, and scientific inquiry, along with experience in collaborative work and critical evaluation of scientific research.