HEARING SCIENCE
SLHS 30200 - Spring 2015

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COURSE DESCRIPTION

An introduction to the scientific foundations of auditory sensation and perception. The course covers those aspects of acoustics most pertinent to understanding auditory processing of simple and complex sounds (e.g., speech and music), the anatomy and physiology of the peripheral and central auditory systems, and a range of auditory perceptual phenomena and their physiological correlates.

COURSE OBJECTIVES

By the end of the semester you should be able to:

- Define the physical parameters of sound waves and explain how waves propagate through a medium
- Characterize the effects of systems on signals in both the time and frequency domains
- Describe the transmission of sound through the anatomical structures in the peripheral auditory system
- Describe the neural coding of simple and complex sounds
- Describe the fundamental aspects of auditory sensation and perception
- Describe the basic physiological correlates of auditory sensation and perception

RELEVANT TEXTS

TENTATIVE COURSE SCHEDULE

SECTION 1 (Weeks 1-5): Nature of Sound; Signals and Systems Analyses for Hearing and Speech
- The nature of sound (amplitude/intensity, frequency, phase)
- Sound sources, waves, resonance, vibration
- Time and Frequency Characterization of Signals and Systems,
- Filters, Time/Frequency Domain Relations
- Digital Signal Processing Basics

SECTION 2 (Weeks 6-10): Auditory Anatomy and Physiology
- Outer and Middle Ears
- Inner Ear and its Mechanical Response
- Sensory transduction via hair cells
- Auditory Nervous System: Peripheral and Central
- Auditory Neural Coding of intensity and frequency

SECTION 3 (Weeks 11-16): Auditory Perception and Physiological Correlates
- Frequency Selectivity
- Loudness and Intensity Coding
- Pitch and Periodicity Coding
- Spatial Hearing
- Speech and Music Perception
- Hearing Impairment