LING 2250
LING 5250

Computational Analysis and Modeling of Biological Signals and Systems

Or in simpler words: **Digital Signal Processing for Everyone!**

Today, the applications of Digital Signal Processing (DSP) are everywhere in science and engineering: phonetics and speech processing, neuroscience, computer vision, computer music, biology, and any other discipline concerned with the production, perception or interpretation of physical signals by living creatures.

And DSP is basically a simple topic, whose fundamentals are easier for most people to understand than first-year college calculus is. However, DSP is usually taught to electrical engineers after three or four semesters of prerequisites; and then an EE DSP course usually includes some things that are not crucial for a more general audience, while leaving out other things that are.

A properly designed one-semester lab course can give a wide range of interested students the foundation needed to understand and use DSP concepts and techniques in a wide range of applications. This course is designed to be accessible to students with less background, while still challenging students with more extensive knowledge and skills. In the past, participants who have found the course worthwhile had backgrounds ranging from an MS in math to "nothing past high school algebra." Thus the homework exercises have items of increasing difficulty, and students are encouraged to go as high up the difficulty scale as they easily can, with grading based on their progress. This approach was developed in the mid 1990's by Mark Liberman and Eero Simoncelli, and the course is now co-taught by Mark Liberman and Stephen Isard.

There will be two meetings a week, including lecture/discussion sessions covering assigned readings and lab sessions going over homework assignments and student projects. The homework assignments all use the computer language Octave (or equivalently Matlab), but no previous familiarity with these languages (or with any programming languages) is assumed. A term project can be a summary of existing methods and results in some area of interest to you, or can be new work of your own. Grading will be based on the homework (40%), the term project (50%), and the class participation (10%) – and again, students will be evaluated on their progress, not on how much background they come in with.

All course materials will be on line – no purchases of texts, instruments, or software will be required.