

2. New preparations and redesign of courses (syllabi attached in support material)

CSDI 8011 Advanced Acoustics (redesign)

I redesigned CSDI 8011 to ensure that the various classical theories of acoustics are included, such as Fourier theorem, resonance, etc, while incorporating three lectures on the applications of the acoustic theories for speech production and linear and nonlinear auditory systems. Therefore, students could relate acoustic theories to their applications in speech and hearing sciences. I used a textbook written by an engineer but worked in the field of Auditory Science for the past few decades. The textbook was orientated toward the background and need of the SLP and AUD students. I anticipated that students would have a hard time grasping concepts that are technical and involve more advanced mathematics. Therefore, I gave timely homework upon the completion of all lectures related a big topic. The students are also given in-class quizzes to ease them from the undergraduate learning style to the more independent self-driven graduate learning style. These quizzes and homework were designed using real world problems that the students can related to, which motivated students to learn science that they always complain that they do not need. I received positive comments from students that these were very helpful for understanding “where the numbers actually came from.”

CSDI 8015 Instrumentation and Calibration (redesign)

Before taking on CSDI 8015, the class heavily focused on mathematics. I redesigned CSDI 8015 to include more hands-on activities in addition to lectures on audio equipment and calibration. These activities include MATLAB labs where students learnt basic matrix operations, how to construct various acoustic signals and manipulate speech materials. They were also provided with activities to check integrity of cables, equipment, and exercises with audiometer calibration. The decisions that I made in terms of course materials were based on what a student would need to know in order to build his/her own audiology research lab.

CSDI 8031 Auditory perception of speech stimuli (New)

CSDI 8031 was a brand new course that was added in the science core of the AUD curriculum in 2015. I prepared this new course to include materials that focus on the physiological representation and psychophysical processing of speech stimuli in the auditory systems. The class, offered in the third year of the curriculum, integrates knowledge on what the students would have already had in

Acoustics, Psychoacoustics, and Neurophysiology. The class puts the pieces together and students often comment: “now everything makes more sense when they come together to form a big picture.” This class also offers an opportunity for students to learn information that is sometimes missed in the courses taught early in the curriculum, for example, structures higher in the auditory pathway, and how their functions differ from those in the auditory periphery and why this difference is important in the processing of speech stimuli. Speech is just an acoustic signal, but it is also very unique. We use speech stimuli to talk about how the left and right hemisphere each is good at processing different kind of acoustic signals and why speech perception predominately occurs in the left auditory cortex. Seven specific topics were introduced to the students. For each topic, I would give a few lectures. In the meanwhile, students would read more advanced articles on the topic and give a presentation. My approach is to give the students the classic comprehensive review on the topic. The students then have the opportunity to read more in depth what they did not quite understand in the lectures or more advanced research that is beyond the classics I had covered.

CSDI 8033 Cochlear Implant Technology and Research (New)

I am in the process of designing a new course CSDI 8033, namely, Cochlear Implant Technology and Research. The curriculum does already offer a cochlear implant class, CSDI 8027, which was taught by clinicians in the past with a focus of device fitting, candidates and rehabilitation. The focus of the new course will be neurophysiology, engineering, and the latest research related to the CI technology. This is a very much needed course because it would offer a theoretical and scientific foundation for the more clinically oriented CSDI 8027. The students would understand the “whys” in this class, and learn the “hows” in CSDI 8027. My physiology is that, although the majority of the class will become clinicians in the future, the science foundation will be what makes a good clinician stand out. In this class, students will understand what it really means to stimulate the auditory nerve with electrical pulses and how the brain responds to it. Then in clinical practice, they will understand, why we’d choose certain stimulation rate, shape of pulse trains, width of pulses, the timing, the spatial relationship of stimulation between electrodes and so on. The class will offer hands on activities as well, which allow students to SEE the pulses going in the internal device on a scope, and familiarize them with the various fitting software.