

6.182 Psychoacoustics Project Laboratory

Objectives

Develop the ability to design, conduct, and analyze experiments based on:

- Models of psychoacoustic measurements, including
 - objective and subjective procedures
 - fixed and adaptive procedures

- Listening and teamwork skills required to carry out psychoacoustic measurements.

- Estimating the number of trials required to test hypotheses.

- Statistical analysis of the results of experimental measurements.

Develop an understanding of basic auditory function

- Absolute and masked detection

- Differential sensitivity for amplitude and frequency

- Non-simultaneous masking and pulsation thresholds

- Loudness and Pitch

- Binaural hearing

- Basic Auditory Physiology

Develop skills to present, orally and in writing, both proposals for and the results of experiments.

Outcomes

In support of these objectives, students will do the following

- Conduct and analyze an experiment measuring the masked auditory detection of tones that contrasts four protocols for estimating masked detection thresholds:

- 1) The Method of Limits
- 2) The Levitt Up-Down Adaptive Method
- 3) The Method of Constant Stimuli
- 4) The Variation of Feedback Method.

- Develop software for conducting an adaptive experiment measuring differential thresholds, conduct the experiment, analyze the results statistically, and prepare the results for publication.

- Propose, design, prepare, conduct, analyze, and prepare for publication an original psychoacoustic experiment.

End-of-Term Student Evaluation of Objectives and Outcomes
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Please rate 1-5 for each item below how well each objective or outcome was met for you. If your personal choice largely controlled the indicated outcome, please check the relevant box with + or -; for example, if you chose to skip a topic (-), or chose to work extra hard (+), personal choice was involved. The ratings mean:

- 1 - poorly (F)
- 2 - fairly (D)
- 3 - satisfactorily (C)
- 4 - well (B)
- 5 - extremely well (A)

Objectives -- Students will:	Ratings
1) Understand the major ideas of psychoacoustical experiments:	___
Difference between subjective and objective experiments	___
Difference between fixed level and adaptive experiments	___
Value of using two-alternative forced-choice procedures	___
Variability and statistics of measurement	___
Application of Gaussian models in psychoacoustics	___
Photon behavior	___
2) Understand the major concepts of auditory function:	___
Absolute thresholds for tones	___
Variability of thresholds and the microaudiogram	___
Simultaneous and non-simultaneous masking of tones	___
Resolution for intensity and frequency	___
Loudness	___
Pitch	___
Relevant Auditory physiology	___

Outcomes

Students will propose, execute, analyze, and report the results of a psychoacoustic experiment including:

1) Formulation of hypothesis to be tested	___
2) Presentation of relevant background	___
3) Statement of the method that to be used to test the hypothesis	___
4) A a list of the tests to be performed and the measurements to be made in each experiment	___
5) Estimation of the number of trials required to obtain data	___
6) A description of the results to be analyzed	___
7) Estimating of the times to be spent on the various components of the project	___
8) Oral presentation of the proposed measurements	___
9) Analysis of results including statistical tests	___
10) Oral presentation of the results of measurement	___
11) Written presentation of the results of measurement	___