

**ECE 4446**  
**Audio Engineering Laboratory**  
**Fall 2026**

**Catalog Description** A companion laboratory to ECE 4445. Design, analysis, construction, modeling, and testing of circuits and systems pertaining to audio engineering.

**Course Outcomes** Upon successful completion of this course, students should be able to

1. design and implement circuits and systems related to sound generation and modification.
2. develop evaluation methods for these circuits and systems and interpret the resulting data.
3. write laboratory reports and documentation conforming to technical writing standards.
4. identify components of a complex impedance from measured data.
5. determine equivalent circuit models for various acoustical, mechanical, and electrical systems from measured data.
6. use circuit models to make predictions about systems containing the modeled components.
7. use laboratory instrumentation to measure data generated by various structures/systems/circuits.
8. relate time domain, frequency domain, and audible characteristics of signals.
9. identify non-ideal characteristics of passive circuit elements. create and use electromechanical and electroacoustic models to solve for variables in mechanical and acoustic systems.

**Required Textbook** W. Marshall Leach, Jr., *Introduction to Electroacoustics and Audio Amplifier Design*, 4th Edition, Kendall/Hunt

**Grading** The course grade will be based on lab reports. The final lab report may be due during the final instructional class days. These will count toward the grade as follows:

Lab Reports: 100%

**Lab Reports** The reports are formal reports that explain and document your laboratory procedures. A detailed report format will be distributed at the first lab meeting.

**Attendance** You are expected to attend all course meetings. Any class absence that would result in a missed assignment must be approved by the instructor in advance.

**Experiments** Experiments are performed in collaboration with a lab partner. The experiments cover a range of topics including

1. Basic Principles of Sound
2. Fundamentals of Acoustics
3. Analogous Circuits of Acoustical Systems
4. Analogous Circuits of Mechanical Systems
5. Microphones
6. Moving-Coil Loudspeakers
7. Closed-Box Loudspeaker Systems
8. Vented-Box Loudspeaker Systems
9. Crossover Networks
10. Acoustic Horns
11. Audio Power Amplifiers

**Classroom Decorum** Please be considerate of the other students in the class. Arrive for class and be seated before the bell. If you must enter or leave the classroom during the lecture, do not let the door slam. Do not talk in class. Turn your cell phones off before class begins. Do not use a cell phone in class. School policies prohibit the consumption of food and beverages in the classroom.

**Use of Old Course Material** Use of course materials from a previous semester as a study aid is allowed. While this material may serve as examples for you, it is not necessarily representative of any course work that may be assigned during this semester.

**Academic Honor Code Issues** Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code (<https://catalog.gatech.edu/policies/honor-code/>) and the student Code of Conduct (<https://catalog.gatech.edu/rules/18/>). Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations. Plagiarizing is defined by Webster's dictionary as to steal and pass off the ideas or words of another as one's own, to use another's production without crediting the source, to commit literary theft, to present as new and original an idea or product derived from an existing source.

**Student-Faculty Expectations Agreement** At Georgia Tech, it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <https://catalog.gatech.edu/rules/22/> for an articulation of some basic expectations that you can have of me and that I can have of you. Respect for knowledge, hard work, and cordial interactions will help achieve this atmosphere. You are encouraged to remain committed to the ideals of Georgia Tech while in this class.

**Accommodations for Students with Disabilities** If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <https://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.