MMI 501: Transducer Theory

Spring 2007

Section O
Tuesday/Thursday 9:30–10:45
Volpe Building, Room 207

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Weeks Building 109
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Office hours: Th 2–3, F 10-12 and by appointment

Course Description
MMI 501 presents the theory of electroacoustics in the context of real-world loudspeaker and microphone design. We will learn how to model acoustical/mechanical systems with equivalent electrical circuits, and you will become familiar with software used for designing and testing transducer enclosures in several laboratory homework exercises. We will also discuss topics such as loudspeaker and microphone arrays, spherical speakers, sound diffusion, and human perceptual localization mechanisms. The course will culminate in a final loudspeaker design project.

Prerequisites
EEN 201, MMI 401, PHY 102, or PHY 205

Course Objectives
Students will learn to engage practically, theoretically, and creatively in analysis and design problems associated with electrical-mechanical-acoustical systems, especially loudspeakers and microphones.

Instructional Methodology Material will be presented each week in the form of standard lectures and occasional overhead presentations and demonstrations.

Materials
Leach, W. M. 2003. *Introduction to Electroacoustics and Audio Amplifier Design*, 3rd edition. Dubuque, Iowa: Kendall/Hunt Publishing Company.

Examinations
Two midterms will be given during the semester.

Grading

Quizzes	15%
Homework	15%
Midterm 1	20%
Midterm 2	20%
Final Design Project	30%

Late Policy
No late assignments will be accepted for any reason.

Cell Phone Policy
If your cell phone rings during class, I will answer it for you.

Course Outline

1. Course Introduction; 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; Sound Localization
7. Closed-Box Loudspeaker Systems
8. Vented-Box Loudspeaker Systems
9. Three-Dimensional Audio Reproduction; Sound Diffusion
10. Crossover Networks
11. Acoustic Horns
12. Experimental Loudspeaker Enclosures
13. Final Project Presentations

Attendance Policy
You must attend class.

Honor Code
Students will be bound by the University of Miami Honor Code. All reports, papers, written assignments, test papers, and examination papers must include a signed honor pledge that states: "On my honor, I have neither given nor received any aid on this assignment." Academic dishonesty may result in a lower grade or a failing grade for the entire course.

Disabilities
Any student with a documented disability (e.g., physical, learning, psychiatric, visual, aural, etc.) who needs to arrange reasonable accommodations must contact the instructor and Disability Services at the beginning of the semester.