ECE4445 Course Syllabus

ECE4445

Audio Engineering (3-0-0-3)

CMPE Degree

This course is Elective for the CMPE degree.

EE Degree

This course is Selected Elective for the EE degree. * (Selected Elective means this course is one of a few choices that are required for the degree.)

Lab Hours

0 supervised lab hours and 0 unsupervised lab hours

Course Coordinator

Robinson Jr,Robert Allen

Prerequisites

ECE 3040 [min C]

Corequisites

None

Catalog Description

Concepts of acoustics and electroacoustic modeling for the analysis and design of microphones, loudspeakers, and crossover networks. Methods of analysis and design of audio power amplifiers.

Textbook(s)

Leach, *Introduction to Electroacoustics and Audio Power Amplifier Design* (4th edition), Kendall/Hunt, 2012. ISBN 0757572863, ISBN 9780757572869 (required)

Course Outcomes

Upon successful completion of this course, students should be able to:

1. Create and use electromechanical and electroacoustic models to solve for variables in mechanical and acoustic systems.
2. Relate model parameters to system behavior.
3. Characterize and model moving coil loudspeakers.
4. Design infinite baffle, closed box, and vented box loudspeaker systems.

Student Outcomes

In the parentheses for each Student Outcome:
"P" for primary indicates the outcome is a major focus of the entire course.
“M” for moderate indicates the outcome is the focus of at least one component of the course, but not majority of course material.
“LN” for “little to none” indicates that the course does not contribute significantly to this outcome.

1. (P) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. (LN) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. (LN) An ability to communicate effectively with a range of audiences
4. (LN) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. (LN) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. (LN) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. (P) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline

Basic Principles: Introductory concepts and definitions

Fundamentals of Acoustics: An introduction to the fundamentals of a

Electro Acoustical Analogous Circuits: Development of analogous cir

Electro Mechanical Analogous Circuits: Development of analogous cir

Microphones: Microphone classifications, analogous circuits, pressu

Moving Coil Loudspeaker Drivers: Direct radiator loudspeaker driver

Loudspeaker Driver Parameter Measurements: Methods for the measurem

Closed Box Loudspeaker Systems: The analysis and design of closed-b

Vented Box Loudspeaker Systems: The analaysis and design of vented-

Crossover Networks: Analysis and design of passive and active louds

Acoustic Horns: Solutions to the Webster horn equation. Exponentia

Audio Power Amplifiers: Concepts of feedback amplifier design. Stab