University of Wisconsin - Madison
College of Engineering [EGR]
Last Offered: 2015-2016 Spring [1164]
Direct Link to this Syllabus :

1. **E C E 401, Electro-Acoustical Engineering**
2. **Credits :** 3  **Contact Hours :** 2.5
3. **Textbook and Materials :** Fundamentals of Acoustics, by Kinsler, Fry, Coppens, Sanders, 1999

a. **Other Supplemental Materials :** None

- **Specific Course Information :**
  a. **Brief description of the content of the course (Course Catalog Description) :** Principles of plane and spherical sound waves; acoustical, mechanical, and electrical analogies; electroacoustic transducer materials and techniques; specific types of transducers such as microphones and loudspeakers.
  b. **Pre-requisites or Co-requisites :** ECE 330
  c. **This is a Elective course.**

- **Specific Goals for the Course :**

  a. **Course Outcomes :**

    1. Students will gain the ability to analyze and design a range of acoustical systems from an engineering perspective (e.g., loudspeakers, microphones, mechanical vibrations, certain classes of musical instruments).

- **ABET Student Learning Outcomes :**

  (a) Ability to apply mathematics, science and engineering principles.
  (b) Ability to design and conduct experiments, analyze and interpret data.
(e) Ability to identify, formulate and solve engineering problems.
(g) Ability to communicate effectively.
(i) Recognition of the need for and an ability to engage in life-long learning.
(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered:**
  1. Terminology (SPL, intensity, impedance)
  2. The wave equation
  3. Electro-mechanical-acoustic analogies (lumped acoustic elements, equivalent circuits)
  4. Sound radiation
  5. Microphones
  6. Loudspeakers (Thiele/Small parameters, closed and ported boxes, horns)
  7. Musical instruments (equivalent circuits, radiation patterns, excitation and impedance considerations)
  8. Perception of Sound