



Course Information

- Course number and title: ME613 Advanced Engineering Acoustics
- CRN: 67747
- Meeting day(s) and time(s): MWF 12:30 to 13:20 Eastern.
- Instructional Modality: Face-to-face + distance component
- Course credit hours: 3
- Prerequisites: ME513 or equivalent

Instructor Contact Information

- Name of the instructor: J. Stuart Bolton
- Office Location: HLAB 2002
- Office Phone Number: +1-765-494-2139
- Purdue Email Address: bolton@purdue.edu (preferred) Include ME613 in the subject line in all correspondence
- Student Consultation hours, times, and location: Wednesday 3PM to 5PM HLAB

Course Description

An extension to ME513. One-dimensional wave propagation in ducts, including acoustic filters, mufflers and transfer matrix methods. Acoustic Intensity methods, including methods to estimate particle velocity, two-microphone cross-spectral method, applications including noise source identification and sound power estimation. Sound transmission through barrier systems, including modeling of barrier elements including limp and flexurally stiff panels, rigid and limp resistive layers, and perforated screens, transfer matrix method to model layered systems, coincidence effects, system optimization. Higher order wave propagation in ducts, including modal analysis, modal phase speed and impedance, modal superposition.

Course Objective: To extend the basic concepts of acoustical analysis and specifically to study wave propagation, sound radiation, absorption and transmission in a manner directly relevant to noise control practice. Information of this sort is required to design effective noise control treatments.

Learning Resources, Technology & Texts

- Informed Learning resources such as
 - Required texts: Fundamentals of Acoustics, 4th Edition, Kinsler, Frey, Koppens and Sanders, Wiley (2000). ISBN-13: 78-0471847892
 - Brightspace

Learning Outcomes

1. *Extend fundamental concepts of acoustical analysis to engineers with an emphasis on the wave approach.*
2. *Study wave propagation, sound radiation, absorption and transmission.*
3. *Apply fundamental concepts to noise control practice.*

Assignments

Up to five homework problem sets and/or short team projects will be assigned and graded during the course.

Grading Scale

The course grades will be calculated as follows:

- Homework 50%
- Final Exam 50%

Attendance Policy

“The University expects that students will attend classes for which they are registered. At times, however, either anticipated or unanticipated absences can occur. The student bears the responsibility of informing the instructor in a timely fashion, when possible. The instructor bears the responsibility of trying to accommodate the student either by excusing the student or allowing the student to make up work, when possible. The University expects both students and their instructors to approach problems with class attendance in a manner that is reasonable.”

Academic Guidance in the Event a Student is Quarantined/Isolated

A virtual component will allow quarantined/isolated students to attend class virtually if necessary.

Course Schedule

1. Acoustic Intensity methods, theory and application – 11 lectures
2. 1-D propagation in ducts, acoustic filters and silencers – 10 lectures
3. Sound transmission through multi-layer barrier systems - 12 lectures
4. Higher order sound transmission in ducts – 11 lectures

Purdue [Academic Calendar](#)

Classroom Guidance Regarding Protect Purdue

If you must miss class at any point in time during the semester, please reach out to me via email so that we can communicate about how you can maintain your academic progress. If you find yourself too sick to progress in the course, notify your adviser and notify me via email or Brightspace. We will make arrangements based on your particular situation. Please note guidelines outlined in <https://protect.purdue.edu/updates/spring-2022-return-to-campus/>.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace table of contents, under University Policies.

Purdue Honor Pledge: “AS A BOILERMAKER PURSUING ACADEMIC EXCELLENCE, I PLEDGE TO BE HONEST AND TRUE IN ALL THAT I DO. ACCOUNTABLE TOGETHER – WE ARE PURDUE.” <https://www.purdue.edu/odos/osrr/honor-pledge/about.html>

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.

Accessibility

Purdue University is committed to making learning experiences accessible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Mental Health/Wellness Statement

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours.

Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the [Critical Needs Fund](#).

Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.