

Physics 521, AcousticsCross listed as **Engr 515**

MW 1:00 – 2:15 pm

NCPA 1128

Prof. Joel Mobley

Office: NCPA, Room 1034 – ph:915-6937

NCPA is the **Jamie Whitten National Center for Physical Acoustics**

It is near the roundabout at Chucky Mullins and Hill Dr. See the campus map.

My office is at the extreme southern end of the building near the end of the first corridor.

jmobley@olemiss.edu (E-mail is the best way to communicate with me.)Office Hours Monday and Wednesday 3-5 **NCPA 1034**Other times by appointment at NCPA on MWF. I am glad to meet with you outside of class so do not hesitate to make an appointment outside regular office hours. Always contact me by email before you come to NCPA during or outside of office hours.**NCPA is the **Jamie Whitten National Center for Physical Acoustics** and is located near the traffic circle at Chucky Mullins Dr. and Hill Dr. (see the campus map). Email me if you plan to come to NCPA to make sure I'll be in my office. I have research labs at NCPA, and I am often in other parts of the building.****Grading**

Homework/Class participation	25 %
Midterm Exams (2)	25 %
Final Exam	25 %

Grading Scale

<i>Letter Grade</i>	<i>Minimum Score</i>
A	92
A-	87
B+	83
B	79
B-	74
C+	70
C	66
C-	60
D	50
F	0

The Final Exam is Wednesday, May 7th at 12 pm. The final is comprehensive.

Homework Rules

- Homework sets will be assigned and must be turned in at the beginning of class on the due date. No late homework will be accepted.
- Students will be asked to present solutions to homework problems on the board in class.
- Homework solutions must be presented according to the homework rubric. Homework that differs from the rubric in presentation will not be graded.
- Some homework will be project-based.

Textbook – Fundamentals of Acoustics, 4th edition, by Kinsler, Frey, Coppens and Sanders
ISBN-13: 978-0471847892

Course Description – This course is an introduction to sound, oscillatory motion, waves and vibrations. Waves in 1, 2 and 3 dimensions will be studied with emphasis on sound waves. Only linear acoustics will be covered. Knowledge of undergraduate physics (mechanics, oscillations, waves, etc ...) and math (calculus/differential equations/complex numbers) is assumed.

Learning Objectives

On completion of this course, students should be able to do the following.

- *Basic vibration and acoustics calculations and derivations.* Solve vibration and wave problems in 1, 2 and 3 dimensions. Derive the acoustic wave equation. Calculate impedances, sound levels, reflection and transmission coefficients.
- *Conceptual and qualitative descriptions of acoustic phenomena.* Explain what sound is and how it propagates. Explain how sound can be generated and detected. Describe the pressure field of simple sound sources. Explain differences between wave propagation in condensed matter and gases.
- *Applications.* Use basic principles of wave mechanics to explain acoustic phenomena.

Attendance Policy

Students are allowed three unexcused absences. For each subsequent absence, 2 points will be deducted from your overall grade. If you will be absent for any reason, I expect you to notify me beforehand.

Homework Rubric

- Homework must be done in ink or a dark pencil. Only use on side of the paper. Multipart problems must be done on a separate sheet of paper. Do not do more than three problems on a single page. Use an adequate amount paper to write out your solution so that it is easy to read. Do not cram the solution into a small space.
- If you submit homework by email, it must be a pdf in document format. I will not accept photos or photos in pdf form. Use a scanner or an app that can convert photos into pdf documents.
- If using notebook pages, ensure that all pages are neatly torn out with no ragged edges.
- Write out every equation used and label them (e.g., “2nd law” or “wave equation”).
- Show all work. Put a box around your final answer.
- Graphs should be plotted with graphing software except where a sketch is asked for. You may use whatever graphing software you prefer. The university provides students with free access to MATLAB Online. Excel or Mathematica are also fine.
Remember to:
 - Label the axes with the quantity and the units.
 - Title the graph.
 - If several plots are in one figure, include a legend which says which plot is which or directly label the plots.
 - Graphs should be large and numbers, labels and titles easy to read.

Anyone with a senior-level undergraduate knowledge of physics should be able to understand your solution without great difficulty. This rubric must be followed to obtain full credit. Any written homework that differs too much from this rubric will either not be graded and a zero assigned, or the student may be asked to rewrite it.

See the next page for instructions on accessing MATLAB Online.

Getting started with MATLAB Online:

- Go to the MATLAB Online link: <https://www.mathworks.com/products/matlab-online.html>
- Click “Start Using MATLAB Online”.
- It will then take you to a page to sign in or create a Mathworks account. Choose “Create Account”
- In the email address box, type in your go.olemiss email address. Fill in the other information and it will send an email to your go account to verify the address. Choose Student if it asks.
- Go to your inbox. Click the link to verify your email.
- It will take you to a link where you can then use your account to create a password. It will know that this is an olemiss account and associate it with the proper license.
- Log in to MATLAB Online. You will now be able to use MATLAB as needed.

Academic Integrity

Every student of the University of Mississippi, by virtue of choosing to be part of the university community agrees to abide by the University of Mississippi Creed and the UM Academic Integrity Policy which covers academic integrity. Cheating on any assignment is forbidden and, in this course, will result in a zero grade on the given assignment. If a second case of cheating occurs, this will result in an F for the entire course. Please consult the M-Book, Academic Integrity document for details on university policy and the academic creed.

UM Creed

The University of Mississippi is a community of learning dedicated to nurturing excellence in intellectual inquiry and personal character in an open and diverse environment. As a voluntary member of this community:

- I believe in respect for the dignity of each person
- I believe in fairness and civility
- I believe in personal and professional integrity
- I believe in academic honesty
- I believe in academic freedom
- I believe in good stewardship of our resources
- I pledge to uphold these values and encourage others to follow my example

Class Materials Policy

All materials distributed electronically and in hard copy in this class are protected under intellectual copyright. Any attempt to upload these documents onto the Internet (or to distribute them by some other means) or to profit from the distribution (by Internet or other means) of these documents constitutes theft and will be in violation of intellectual property law and the UM Academic Conduct Code unless expressly permitted for by the instructor. Accessing such materials for your own use is also in violation of the UM Academic Conduct Code. Additionally, the distribution of your own class notes via the Internet or other means, or access of such materials, encourages absence from class and is highly discouraged except for occasional loaning of notes to students concurrently enrolled in the class.

University of Mississippi Access and Inclusion

The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content or the use of non-captioned or non-transcribed video and audio files. Students must also contact Student Disability Services at 662-915-7128 so that office can 1) provide you with an Instructor Notification form, 2) facilitate the removal of barriers and 3) ensure you have equal access to the same opportunities for success that are available to all students.

Audio and video recording

Audio and/or video recording of class lectures is not allowed unless explicit permission is given by the instructor. Permission will only be given if the student has a Student Disability Services request. In such cases, recordings may only be used by the student to whom permission is given and all recordings must be deleted at the end of the semester. Recordings may not be distributed online or elsewhere.