

PHYS 4411 - CRN: 33790Introduction to Physical Acoustics
Spring 2024**IF YOU ARE SICK (OR POTENTIALLY SICK) – STAY HOME!
EMAIL ME – DON'T COME TO CAMPUS.**

Dr. William V. Slaton

Office: LSC 015

Telephone: 450-5905

E-mail: wvslaton@uca.edu

Web Page: <http://faculty.uca.edu/wvslaton/>**LECTURE & LAB:** Monday & Wednesday 12:00 – 2:40PM, LSC Annex 104**FINAL EXAM:** Wednesday, May 1st, 2024 from 11:00-1:00 PM, LSC Annex 104**OFFICE HOURS (LSC 015):** 10:00 – 11:00 AM MWF or 1:00 – 1:30 PM TTh or by appointment. Drop-ins are welcome but I can't guarantee that I will have a lot of time due to other commitments, etc. Email me to set up an appointment if these times do not work with your schedule.**GRADES:** A's are 90-100%, B's are 80-89%, C's are 70-79%, etc.

Grades will be based on the following:

| Component | Percentage | Format |
|-----------------------------|------------|----------------------------------|
| Lab Reports & Presentations | 50% | Typed in format given |
| Assignments / Homework | 10% | Neatly written or typed |
| Attendance | 10% | Sign-in sheet |
| Exams | 10% | Take-home and/or lab-based exams |
| Design Project | 20% | Details to be given. |
| Total | 100% | |

Class Schedule: (tentative)

| Date | Activity | Notes |
|-------------------|--|---|
| January 8 - 12: | Introduction & Chapter 1 – Math Review | Classes start Thursday, Jan 11 |
| January 15 - 19: | Chapter 1 cont. | No Class Monday, MLK Holiday |
| January 22 - 26: | Chap 1 cont. & Chapter 2 – Simple Harmonic Oscillation | |
| Jan 29 - Feb 2: | Chap 2 cont. | |
| February 5 - 9: | Chap 2 cont. | |
| February 12 - 16: | Chapter 3 – Waves on Strings | |
| February 19 – 23: | Chapter 7 – Ideal Gas Laws | |
| Feb 26 - March 1: | Chap 7 cont. | |
| March 4 - 8: | Chapter 8 – Lumped Elements | |
| March 11 - 15: | Chap 8 cont. | |
| March 18 - 22: | SPRING BREAK! | No Class |
| March 25 - 29: | Chapter 10 – 1D Propagation | |
| April 1 - 5: | Chap 10 cont. | |
| April 8 - 12: | Chapter 11 – Reflection, Refraction, & Transmission | Monday, April 8th TOTAL SOLAR ECLIPSE!! |
| April 15 - 19: | Chap 11 cont. | |
| April 22 - 26: | Chap 11 cont. | |
| April 29 – May 3: | FINALS WEEK | Project Presentation (Finals Week) |

TEXT: Understanding Acoustics - An Experimentalist's View of Sound and Vibration, 2nd Edition, by S. Garrett, ISBN: 978-3-030-44786-1. The text is open access and available for download here: <https://link.springer.com/book/10.1007/978-3-030-44787-8> Other supplemental texts are in the library or online. Refer to your University Physics textbook for a review of the basics (mass/springs, waves, etc).**SUPPLIES:** Scientific calculator, writing utensils, ruler, protractor, etc. You will need access to a computer lab or your own laptop to solve some problems computationally. **Lab safety glasses are required to be worn when in the lab as appropriate.**

ENGR 4411 – PHYSICAL ACOUSTICS: An elective course for physics or engineering physics majors. This course covers fundamental acoustics topics such as vibrating strings, membranes, structures, acoustic wave generation, propagation and radiation, wave transmission and reflection phenomena, in addition to applications such as bioacoustics, architectural acoustics, and transducers. Prerequisite: PHYS 3341 or consent of instructor.

ATTENDANCE: I expect you to attend all classes and labs; by now you know you cannot fully understand a technical discipline like physics without being present, on-time, and mentally alert in every class and lab. If you are sick, have a family emergency, or university sanctioned event please let me know in advance via email. Documentation for an absence will be necessary. Students who have informed me about an excused absence can make up a course work at my convenience. Late work is not accepted unless for an excused absence.

SOFTWARE: I will be using and demonstrating computational solutions using the Python programming language and Jupyter notebooks. You are free to use whatever programming language you prefer for homework or labs as needed.

HOMEWORK & EXAMS: The homework portion of the course will come from the textbook as well as computational assignments as given. Neatly handwritten homework on non-jagged-edge paper is to be turned in for a grade or typeset using LaTeX or some other typesetting program like MS WORD. To have mastered a concept you need to be able to apply it to some seen-before, similar, and never-seen-before problems to give me an assessment of your understanding.

PROJECT: Students will work in teams or individually depending on enrollment to complete an engineering design project. Details of the project will be given later in the semester.

BUILDING EMERGENCY PLAN: An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

TITLE IX DISCLOSURE: If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to “student-on-student” or “employee-on-student”), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>. **Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.*

ACADEMIC INTEGRITY: The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the Student Handbook (page 37). Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

CODE OF ETHICS: In addition to UCA's Academic Integrity policy we will also be mindful and knowledgeable of the National Society of Professional Engineers Code of Ethics. A copy of the code can be found here: <https://www.nspe.org/resources/ethics/code-ethics>

STUDENT EVALUATIONS: Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. Students may evaluate courses they are taking starting on the Monday of the thirteenth week of instruction through the end of finals week by logging in to myUCA and clicking on the Course Evaluations task.

AMERICANS WITH DISABILITIES ACT: The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Disability Resource Center, 450-3613.

STUDENT HANDBOOK: It is advisable to refer to the Student Handbook for important policies not specifically detailed in the syllabus, for example: Sexual Harassment Policy and other academic policies.

DISCLAIMER: All standard disclaimers apply. The instructor reserves the right to modify the course policies, assignments, due dates, etc. as necessary or appropriate for meeting the goals of the course.