# Acoustics

EEE 5725

***Class Periods:*** MWF 7th period (1:55 - 2:45 p.m.)

***Location:*** CHE 237

***Academic Term:*** Spring 2021

***Instructor:***
Mark Sheplak
sheplak@ufl.edu
215 Larsen Hall
352-392-3983
Office Hours: Zoom meetings via appointment

***Teaching Assistant/Peer Mentor/Supervised Teaching Student: n/a***

***Course Description***
Governing equations for wave theory of sound; Character of plane acoustic waves and 3-D acoustic fields; Sound transmission/reflection at an interface between two media; Waves transmission/attenuation inducts; Low frequency approximations (lumped-element modeling) and transducers; sources of sound.

***Course Pre-Requisites / Co-Requisites:*** EEL 3111C / EEL 3003 (Circuits 1 or equivalent) and MAP 2302 (Elementary Differential Equations or equivalent) or permission of the instructor.

***Course Objectives***
You will develop a working understanding of the basic theory of physical acoustics including wave theory for sound generation/radiation, and propagation.

***Materials and Supply Fees: n/a***

***Required Textbooks and Software***

- **Required Text:** Fundamentals of Physical Acoustics, by David T. Blackstock, Wiley-Interscience, New York, 2000.
- **Recommended Texts:**
  - Electroacoustics, Kleiner, M., CRC Press, N.Y., N.Y., 2013.
  - Acoustics: Sound Fields and Transducers, Beranek, L.L. and Mellow, T.J., Academic Press, N.Y., N.Y., 2012.
- **Student version or standard version of Matlab**

***Online Course Recording***
Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

***F2F Course Policy in Response to COVID-19***

We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms (Click here for guidance from the CDC on symptoms of coronavirus), please use the UF Health screening system and follow the instructions on whether you are able to attend class. Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. Find more information in the university attendance policies.

***Attendance Policy, Class Expectations, and Make-Up Policy***

This class will be presented online using Zoom and requires access to a working webcam and stable internet connection. I prefer that students keep their camera on during the class so that I can see you as I would during normal face-to-face classes. Studies show that if we can see each other's faces then we will have more engagement, more student success, and more faculty success. However, this is not a requirement. I understand if on certain days you can't have your camera on due to internet bandwidth limitations, other family members, health issues, or any other reasons.

It is expected that this course will require at least 12-15 hours of effort per week when you consider time spent for lectures, reading assignments, homework, and re-writing of your class notes. I strongly recommend that you implement the "Five Times Strategy" for learning in this class. This requires that you cover the course material at least 5 times before exams. The first time that you cover the material is when you perform your reading assignment before class. The second time that you cover the material is during lecture. The third time that you cover the material is when you re-write your "lecture set" of notes that includes material from lecture and the reading assignments, including all derivations and your additions. The fourth time that you cover the material is when you do your homework assignments. Finally, the fifth time that you cover the material is when you study for your exams. This technique will help you master the material and also will provide you with a comprehensive set of notes to potentially teach from one day.

The course will be taught from computer using our typeset notes, which will be posted on the website. These notes are meant to accompany the assigned readings from the text and reference books. **They are not to be considered substitutes.** You will be responsible for both the material covered in class and the assigned readings.

F2F students: You are expected to show up on time for class. Please turn off all cell phones prior to the start of class. You are permitted to have a laptop, tablet etc. to take notes with. If you are a distraction in class, you will be asked to leave. Please do not bring food to class.

Re-grading Policy: Any re-grade requests must be submitted in writing within one week after return of the graded paper. The written request must explain in detail what you want the grader to do and where you believe they have made a mistake in grading. The request must have a date on the top of the page, your name, your telephone number(s), and e-mail address.

Miscellaneous Policies: Students will be held responsible for knowledge of all scheduling and policy announcements made in class. **If you send an email please do this via Canvas and also list a phone number where you could be reached. Please use the discussion feature of Canvas as much as possible.**

Make-up Exam/HW Policy: There are no make-up exams and there are no-make up HWs. If you have a valid excused absence, I will not hold the missed exam or HW against you. I will just grade you based on the other exams or HWs.

Excused absences must be in compliance with university policies in the Graduate Catalog (http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance) and require appropriate documentation.

***Evaluation of Grades***

| **Assignment** | **Total Points** | **Percentage of Final Grade** |
|---|---|---|
| Homework Sets | 100 each | 10% |
| Exam 1* (2/10/21) | 100 | 10-50% |
| Exam 2* (3/17/21) | 100 | 10-50% |
| Exam 3* (4/21/21) | 100 | 10-50% |
| **total** | | **100%** |
| *Note: 3 exams combined will account for 90%. The highest score will be 50%, the 2nd highest 30% and the lowest 10%. | | |

Note: This course is co-listed with the undergraduate class EEE 4720. The HW portion of EEE 5725 will involve additional work and more advanced concepts with respect to EEE 4720. The exams will also involve more advanced concepts with respect to EEE 4720.

***Grading Policy***

| **Percent** | **Grade** | **Grade Points** |
|---|---|---|
| 90.0 - 100.0 | A | 4.00 |
| 87.0 - 89.9 | A- | 3.67 |
| 84.0 - 86.9 | B+ | 3.33 |
| 81.0 – 83.9 | B | 3.00 |
| 78.0 - 80.9 | B- | 2.67 |
| 75.0 - 79.9 | C+ | 2.33 |
| 72.0 – 74.9 | C | 2.00 |
| 69.0 - 71.9 | C- | 1.67 |
| 66.0 - 68.9 | D+ | 1.33 |
| 63.0 - 65.9 | D | 1.00 |
| 60.0 - 62.9 | D- | 0.67 |
| 0 - 59.9 | E | 0.00 |

More information on UF grading policy may be found at:
http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades

***Homework***

No late homework accepted. Homework is via Canvas. Working in groups is permitted. However, copying homework is NOT permitted. Use of solutions manuals or online sites like Course Hero, Chegg, etc. to complete homework is considered cheating and a violation of the honor policy, and will be fully enforced. Please adhere to the following format otherwise it will not be graded and you will be given a zero: Use 8.5" x 11" paper and write on one side. GIVEN: After carefully reading the problem, state briefly and concisely what is known. Do not repeat the problem statement. FIND: State briefly and concisely what must be found. SCEMATIC: Draw a schematic and free body diagram of the problem. Include coordinate axes when appropriate, and label relevant dimensions and velocities. BASIC EQUATIONS: Provide the appropriate assumptions and mathematical formulation for the basic laws that you consider necessary to solve the problem. SOLUTION: Provide full details of the analysis in a logical manner. Develop the analysis as far as possible before substituting numerical values. Give the answer algebraically before computing the final numerical result (if required). Clearly indicate your final answer. Attach a listing of any computer program(s) used in the solution.

Homework will be graded 'lightly' -- each problem will be scanned for relevance and reasonableness and given a grade.

Homework in this class is VERY IMPORTANT. The homework is not just considered an aid to help you prepare for tests. The problem-solving skills you develop in doing the homework are skills that are difficult to test in an exam. They are much more like the skills you will need in the real world than those you develop in preparing to take an exam. Also, communication skills are important in the real world, not just answers. Your graders have been instructed to look for explanations, not just answers.

***Students Requiring Accommodations***

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

***University Honesty Policy***

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

***Software Use***
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

***Student Privacy***
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

***Campus Resources:***

*Health and Wellness*

**U Matter, We Care:**
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Sexual Discrimination, Harassment, Assault, or Violence**
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

**Sexual Assault Recovery Services (SARS)**
Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

*Academic Resources*

**E-learning technical suppor***t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

**Library Support**, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

**Student Complaints Campus***:* https://care.dso.ufl.edu.

**On-Line Students Complaints***:* http://www.distance.ufl.edu/student-complaint-process.