

Psychoacoustics (Hearing and Speech Sciences 722)

Term: Fall/2025

Professor: Goupell

Pronouns: He/him

Office Phone: x58552

Email: goupell@umd.edu

Office Hours: Tuesdays

Credits: 3

Course Dates: From September 4, 2025 - December 18, 2025

Course Times: Thursdays 3:30-6:00

Classroom: Morrill Hall 1101

Course Description



The auditory system of the brain has evolved to process the world of sounds. It allows us to detect the faint rustling of leaves that might signal the presence of a predator, to follow a friend's conversation in a loud and noisy bar, and to appreciate the subtlest of differences between melodies. Basically, the auditory system will save your life from the psychotic killers out there to get you.

This course will provide you with a solid understanding of auditory processing and psychoacoustics. Building on our knowledge gained in Instrumentation and Anatomy and Physiology, we will review basic acoustics, signals and systems, as well as fundamental knowledge of the auditory system. In the first half of the class, we will learn about the limits of auditory sensitivity and how to measure them. In the second half, we will explore supra-threshold auditory perception: the pitch of simple and complex sounds including speech, sound localization and binaural hearing, elements of speech perception, and auditory scene analysis.

Learning Outcomes

After successfully completing this course you will be able to:

- Apply principles of systems analysis to the auditory system.
- Describe the principles of signal detection theory, and how they are applied to measuring behavioral sensitivity.
- Describe frequency, intensity, and temporal coding by the auditory system, across those with typical hearing, those with hearing loss, and those with cochlear implants.
- Discuss principles of binaural hearing, sound localization, and auditory scene analysis by the auditory system.

Required Resources

- Course Website: elms.umd.edu
- Required Text: Brian C. J. Moore, “An Introduction to the Psychology of Hearing” – 6th Edition
 - Emerald Group Publishing Limited, 2013
 - ISBN-13: 9781780520384
- Optional Text: Brian C. J. Moore, “Cochlear Hearing Loss” – 2nd Edition
- Calculator: A scientific calculator (one that calculates logarithms, sines, cosines, powers, etc.) or smartphone is very helpful for this course.
- Total Estimated costs of required course materials: \$79.99

Course Structure

- This will be a flipped classroom.
- Reading the textbook and papers should be done before class.
- Lectures and recordings will be provided.
- Online quizzes will be provided and attempted before class. They will be due the **Sunday** after the appropriate lecture, so it is up to you to try to do your homework before the deadline.
- The in-class portion will be part discussion (questions about online exercises) and part presentations/discussion about papers from the literature. This portion is aimed to last about 2-2.5 hours, and depends on people’s questions and preparation for class.

Tips for Success in an Online Course OR Tips for Success in this Course

1. **Attendance.** Attendance to class is not required in this class; however, it is highly encouraged because it will help you better understand the material and resolve questions. I am very flexible to accommodate all circumstances (e.g., health issues, family matters, etc.). Just come talk to me and we can discuss adjusting deadlines as necessary.
2. **Participate.** Class participation is highly encouraged. Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to demonstrate civility with one another or me will be subject to referral to the Office of Student Conduct or to the University Campus Police. You are expected to adhere to the Code of Student Conduct.
3. **Manage your time.** Students are often very busy, and I understand that you have obligations outside of this class. However, students do best when they plan adequate time that is devoted to course work. Block your schedule and set aside plenty of time to complete assignments including extra time to handle any technology related problems.
4. **Login regularly.** I recommend that you log in to ELMS-Canvas several times a week to view announcements, discussion posts and replies to your posts. You may need to log in multiple times a day when group submissions are due.

5. **Do not fall behind.** This class moves at a quick pace and each week builds on the previous content. If you feel you are starting to fall behind, check in with the instructor as soon as possible so we can troubleshoot together. It will be hard to keep up with the course content if you fall behind in the pre-work or post-work.
6. **Use ELMS-Canvas notification settings.** Pro tip! Canvas ELMS-Canvas can ensure you receive timely notifications in your email or via text. Be sure to enable announcements to be sent instantly or daily.
7. **Ask for help if needed.** If you need help with ELMS-Canvas or other technology, IT Support. If you are struggling with a course concept, reach out to me and your classmates for support.

Policies and Resources for Graduate Courses

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please see the University's website for graduate course-related policies at: [Course Related Policies | The Graduate School](#)

Special Accommodations and Religious Inclusiveness

I will make every effort to accommodate students who are registered with the Disability Support Service (DSS) Office and who provide me with a University of Maryland DSS Accommodation form. Only written DSS documentation of the accommodation will be considered. This form must be presented to me no later than **the Drop/Add date for the semester**. I am not able to accommodate students who are not registered with DSS or who provide me with documentation which has not been reviewed and approved by UM's DSS Office after **the Drop/Add date for the semester**.

It is the policy of the UM – College Park to not schedule exams on religious holidays. If I have accidentally scheduled an exam on a religious holiday that you observe, please let me know no later than **the Drop/Add date for the semester**. I will reschedule the exam for the entire class to a more appropriate date.

Course Guidelines

Names/Pronouns and Self-Identifications:

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to in this class, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). Keep in mind that the pronouns someone uses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, it is your choice whether to disclose how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Communication with Instructor:

Email: If you need to reach out and communicate with me, please email me at xxxxxxxxx@umd.edu. Please DO NOT email me with questions that are easily found in the syllabus or on ELMS (i.e. When is this assignment due? How much is it worth? etc.) but please DO reach out about personal, academic, and intellectual concerns/questions. While I will do my best to respond to emails within 24 hours, you will more likely receive email responses from me on Mondays, Wednesdays and Fridays from 8:00am-10:00am EST

ELMS: I will send IMPORTANT announcements via ELMS messaging. You must make sure that your email & announcement notifications (including changes in assignments and/or due dates) are enabled in ELMS so you do not miss any messages. You are responsible for checking your email and Canvas/ELMS inbox with regular frequency.

Communication with Peers:

With a diversity of perspectives and experience, we may find ourselves in disagreement and/or debate with one another. As such, it is important that we agree to conduct ourselves in a professional manner and that we work together to foster and preserve a virtual classroom environment in which we can respectfully discuss and deliberate controversial questions. I encourage you to confidently exercise your right to free speech—bearing in mind, of course, that you will be expected to craft and defend arguments that support your position. Keep in mind, that free speech has its limit and this course is NOT the space for hate speech, harassment, and derogatory language. I will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued.

Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert me immediately if you feel threatened, dismissed, or silenced at any point during our semester together and/or if your engagement in discussion has been in some way hindered by the learning environment.

Major Assignments

Online ELMS Quizzes

- There will be short online quizzes over each topic we cover for each chapter. Typically, they will be just a few points (~5-15) per topic. Online exercises can be redone as many times as you want, the last grade being kept.

Paper Discussion Board Posts

- Each student must post a question to the discussion board about each article by Wednesday at 11:59 pm (i.e., the day before class so I have time to respond).
- 3 pts each

In-Class Exercises about Papers

- Each paper will require you to answer some online questions. These will typically require greater depth, thought, and effort than the online exercises. There are usually two papers to read per class: one typical hearing paper, one hearing-impaired / cochlear-implant paper.
- 10-20 pts each

Exams

- A midterm and a final will be given.
- 200 pts each

Grading Structure

Assignment	Approximate Percentage %
Online ELMS Quizzes	45%
Discussion Board Posts	5%
In-Class Exercises about Papers	10%
Midterm	20%
Final Exam	20%
Total	100%

Academic Integrity







For this course, some of your assignments will be collected via Turnitin on our course ELMS page. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit [Turnitin Originality Checker for Students](#).

The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the University of Maryland does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the University of Maryland.**

It is important to note that course assistance websites, such as CourseHero, or AI-generated content are not permitted sources unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might be inaccurate or biased and most importantly, relying on restricted sources will hamper your learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, students may naturally choose to use online forums for course-wide discussions (e.g., Group lists or chats) to discuss concepts in the course. However, collaboration on graded assignments is strictly prohibited unless otherwise stated. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, etc. Please visit the [Office of Undergraduate Studies' full list of campus-wide policies](#) and reach out if you have questions.

Finally, on each exam or assignment you must write out and sign the following pledge: ***"I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment."*** If you ever feel pressured to comply with someone else's academic integrity violation, please reach out to me straight away. Also, ***if you are ever unclear*** about acceptable levels of collaboration, ***please ask!*** To help you avoid unintentional violations, ***the following table*** lists levels of collaboration that are acceptable for each graded exercise. Each assignment will contain more specific information regarding acceptable levels of collaboration.

	 OPEN NOTES	 USE BOOK	 LEARN ONLINE	 GATHER CONTENT With AI	 ASK FRIENDS	 WORK IN GROUPS
Online ELMS Quizzes	✓	✓	✓	---	✓	✓
Discussion Board Posts	✓	✓	✓	---	---	---
In Class Paper Questions	✓	✓	✓	---	✓	✓
Midterm and Final Exam	---	---	---	---	---	---

Grades

Campus Policy dictates that you must specify:

- How final letter grades will be determined. This should include a breakdown of all graded assessments, their weight in the course, and whether final grades will include +/- descriptors.
- How students will have access to their grades throughout the semester, and how they can review their work (including the final exam).

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet and discuss.

Late work will not be accepted for course credit so please plan to have it submitted well before the scheduled deadline. I am happy to discuss any of your grades with you, and if I have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same as making the cut (89.99 \neq 90.00). It would be unethical to make exceptions for some and not others.

A table of the assessments and point values can be a concise way to convey all of the graded elements and their relative weight in the course. If you are using weighted percentages (e.g., exams = 30%, paper = 20%) be sure to clarify the number of assessments within each category... is there one exam worth 30% or are there three exams that are each worth 10.

It is essential that you articulate in your syllabus how final letter grades will be assigned. There is no campus policy on percentages and letter grades, nor is there a requirement that you utilize a points-based scheme. Here is one sample, which you are welcome to use or edit to reflect your grading policies:

Final Grade Cutoffs									
+	100.00%	+	87.00%	+	77.00%	+	67.00%	+	
A	93.00%	B	83.00%	C	73.00%	D	64.00%	F	<60.0%
-	90.00%	-	80.00%	-	70.00%	-	60.00%	-	

Course Outline

The format of this section will vary based on the design of your course and the semester, but our guidance is to aim for a clear and concise table that maps out all of the assignment assessments and deadlines and gives students a sense of the course's organization.

Date	Class Number	Topics Covered	Chapter	Textbook Readings (for this class)	Guest Lecturer
September 4, 2025	1	Review of Syllabus, Class Overview			
September 11, 2025	2	Signals Review + CI signals, Psychophysical Methods, Signal Detection Theory	1	Ch 1, pp. 127-131	
September 18, 2025	3	Thresholds and Temporal Integration	2	Ch 2	
September 25, 2025	4	Frequency Selectivity, Masking, and the Critical Band Part 1	3	Ch 3	
October 2, 2025	5	Frequency Selectivity, Masking, and the Critical Band Part 2	3	Ch 3	
October 9, 2025	6	Loudness	4	Ch 4	
October 16, 2025	7	Midterm			
October 23, 2025	8	Temporal Processing	5	Ch 5	
October 30, 2025	9	Pitch	6	Ch 6	
November 6, 2025	10	Spatial Hearing (Sound Localization)	7	Ch 7	AlQasem
November 13, 2025	11	Spatial Hearing (Speech in Noise)	7	Ch 7	
November 20, 2025	12	Speech Perception, Listening Effort			
November 27, 2025		<i>No Class, Thanksgiving</i>			
December 4, 2025	13	Pattern and Object Perception, Central Auditory Processing Disorder	8	Ch 8	Anderson, Jenkins
December 11, 2025	14	Questions and Review	9	Ch 9	
December 18, 2025	15	Final Exam			

Other important dates

Mon-Wed., Sept. 22-24	Rosh Hashanah
Wed-Thur, Oct. 1-2	Yom Kippur
Mon-Mon, Oct. 6-13	Sukkot
Sat-Tues, Oct. 11-14	Fall Break
Mon-Wed, Oct. 13-15	Simchat Torah
Thur, Oct 2	Electrophysiology Midterm
Wed, Oct 29	Pediatrics Midterm
Sun-Mon, Dec 14-22	Chanukah

Note: This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

Resources & Accommodations

Accessibility and Disability Services

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The [Accessibility & Disability Service \(ADS\)](#) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu.

Emergency Preparedness

Emergencies on campus can happen at any time. To prepare, visit prepare.umd.edu or use the emergency symbol in the UMD App to review information. Resources for persons with disabilities are available on the [emergency preparedness page of the ADA Coordinator's website](#).

Student Resources and Services

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit [UMD's Student Academic Support Services website](#) to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their communication skills (and improving their grade) by visiting [UMD's Writing Center](#) and schedule an appointment with the campus Writing Center.

You should also know there are a wide range of resources to support you with whatever you might need ([UMD's Student Resources and Services website](#) may help). If you feel it would be helpful to have someone to talk to, visit [UMD's Counseling Center](#) or [one of the many other mental health resources on campus](#).

Notice of Mandatory Reporting

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible University Employee," and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD's confidential resources, such as [CARE to Stop Violence](#) (located on the Ground Floor of the Health Center) at 301-741-3442 or the [Counseling Center](#) (located at the Shoemaker Building) at 301-314-7651.

You may also seek assistance or supportive measures from UMD's Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing titleIXcoordinator@umd.edu.

To view further information on the above, please visit the [Office of Civil Rights and Sexual Misconduct's](#) website at ocrsm.umd.edu.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit [UMD's Division of Student Affairs website](#) for information about resources the campus offers you and let me know if I can help in any way.

Veteran Resources

UMD provides some additional supports to our student veterans. You can access those resources at the office of [Veteran Student life](#) and the [Counseling Center](#). Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.

Netiquette Policy

Netiquette is the social code of online classes. Students share a responsibility for the course's learning environment. Creating a cohesive online learning community requires learners to support and assist each other. To craft an open and interactive online learning environment, communication has to be conducted in a professional and courteous manner at all times, guided by common sense, collegiality and basic rules of etiquette.

Participation

- Given the interactive style of this class, attendance will be crucial to note-taking and thus your performance in this class. Attendance is particularly important also because class discussion will be a critical component for your learning.
- Each student is expected to make substantive contributions to the learning experience, and attendance is expected for every session.
- Students with a legitimate reason to miss a live session should communicate in advance with the instructor, except in the case of an emergency.
- Students who miss a live session are responsible for learning what they miss from that session.
- Additionally, students must complete all readings and assignments in a timely manner in order to fully participate in class.

Course Evaluation

Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the [Student Feedback on Course Experiences](#) to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

Copyright Notice

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LEARNING OBJECTIVES AND OUTCOMES
HESP 722: PSYCHOACOUSTICS

STUDENT NAME:

SEMESTER COMPLETED: Fall 2025

Title	Exam/quiz/homework Questions	Achieved
A1. Genetics, embryology and development of the auditory and vestibular systems, anatomy and physiology, neuroanatomy and neurophysiology, and pathophysiology of hearing and balance over the life span	*	
A4. Principles, methods, and applications of acoustics, psychoacoustics, and speech perception, with a focus on how each is impacted by hearing impairment throughout the life span	*	

Method of assessment denoted by (*).

Verification of assessment denoted by checkmark.

The above-named student has successfully demonstrated mastery of these learning outcomes, through class lectures and discussion, in-class examinations, and homework assignments.

Matthew Goupell, Ph.D.
Faculty instructor

Date: