

## Our mission statement

I will not waste your time regurgitating the textbook for you as a “sage on the stage.”

The course will be broken up into two sections, separated by the midterm:

- 1) Physical properties of sound, anatomy, and physiology
- 2) Psychological acoustics

We will try to keep to the course schedule, but we will stay flexible.

Class participation is highly encouraged (e.g., perform ungraded writing, interact with other students and discuss ideas, speak to the entire class, etc.). Classes will be recorded and attendance is not mandatory.

Readings should be done before coming to class. A graded clicker quiz on the daily reading will occur for each class. Lectures slides will be posted on ELMS before the lecture.

I highly encourage you to attempt the ungraded exercises by yourself at first, but do not spend an inordinate amount of time on exercises that you cannot do. Go get help. However, you should attempt the exercises again at a later time to see if you can do them. Practices makes perfect. Solutions will be posted sometime after the material is covered for a given chapter.

Ideally, I expect students to be spending two or more hours for every hour spent in class.

### Goupell Nova Scotia Nature and Herring Tours

Dr. Matthew Goupell  
goupell@umd.edu  
0119E Lefrak Hall

HESP407: Bases of Herring Science Student  
Spring 2015

Lefrak 2166, 3:45 – 5 PM  
College Park, MD 20742

## Travel to Nova Scotia for the wonderful world of Herring Science!

What did you say? You study herring science?





"After a long, rocky relationship, math and I have reconciled... I was secretly excited that I was going to be able to apply my newfound math skills, rather than panicking like I undoubtedly would have before taking your class."

- **Very smart HESP407 student**

"Your class is the greatest. I can't imagine anyone living without knowing this material."

- **Another very smart HESP407 student**

## Trip Details

Herring (*Clupea harengus harengus*) have evolved to process the world around them, allowing them to detect the faintest of noises from a predator, to follow a friend's conversation in a loud and noisy sushi bar, and to appreciate the subtlest of differences between melodies at King Triton's celebration for his daughter's birthday.

At the end of this course, students will:

1. Know the physical, temporal, and spectral properties of acoustic signals (tones, noise, and other complex sounds, including speech signals).
2. Understand basic concepts of signals and systems.
3. Understand basics of sound processing by the auditory system.
4. Be familiar with psychophysical methods used to examine human hearing in the laboratory.
5. Be familiar with the elements of auditory psychophysics, such as auditory sensitivity and discrimination, masking, loudness, pitch, sound localization, auditory scene analysis, and their applications to everyday listening situations.

Our 4-month boat cruise through the wilds of Nova Scotia will allow us to fully examine the importance of the truly amazing herring. Nova Scotia is an unadulterated wildness, untouched by the logarithm industry. The full cost of the trip will be 50 dB (re: \$1). See the insert for the full schedule of the trip, including important details.

## What You'll Need for the Trip

**Text:** William A. Yost, "Fundamentals of Hearing: An Introduction" – 5th Edition Academic Press, 2007  
ISBN-13: 978-0-12-370473  
ISBN-10: 0-12-370473-1

**Calculator:** A scientific calculator (one that calculates logarithms, sines, cosines, powers, etc.)

**Clicker:** We will be using clickers in class and points will be given for correct answers and participation. Please obtain one from the bookstore or download an app for your smartphone or laptop to fully participate in class. Also, please register your clicker. Information can be found at: <http://www.clickers.umd.edu>.

## Special Accommodations

Accommodations for registered disabilities at the DSS office, religious observances, and participating in athletic events need to be brought to my attention **before February 6, 2015**.

## Grading

Your course grade will depend upon clicker quizzes (4 pts/day), weekly quizzes (20 pts/week), a midterm and final exam (400 pts each). Students will be able to drop their lowest three weekly quiz scores. Grades will be on an absolute scale for the follow percentages:

A+: 100-97	A: 93-96	A-: 90-92
B+: 90-87	B: 83-86	B-: 80-82
C+: 80-77	C: 73-76	C-: 70-72
D+: 70-67	D: 63-66	D-: 60-62
F: 59 or less		

## Contact Us

### Goupell Nova Scotia Nature and Herring Tours

Dr. Matthew Goupell  
goupell@umd.edu  
0119E Lefrak Hall

My office is in a hallway which is normally locked. Please knock at the door closest to LEF0123.  
Office Hours: Tuesdays 2:30 – 4:30 PM or by appointment

Brianna Bednarz  
Herring Science and Boat Operating Assistant  
bbednarz@terpmail.umd.edu  
TBA  
Review Session Hours: Tuesdays 6 – 8 PM

# The Itinerary

Date	Class Number	Topic	Quiz	Course Readings
1/26/2015	1	Class orientation, requirements, and overview of course	1	pp. 1-7
1/28/2015	2	Algebra and Sinusoids		App. A&B, pp. 11-19
1/30-31/2015		Cochlear Implant MASH Conference - SQH 1120		
2/2/2015	3	Sinusoids (+ Spectrum and Spectrogram)		pp. 37-39, 217
2/4/2015	4	Sound transmission and propagation	2	pp. 21-27
2/6/2015		<b>Last day to drop/add</b>		
2/9/2015	5	Sound transmission and propagation		pp. 27-33
2/11/2015	6	Complex sounds	3	pp. 37-41
2/16/2015	7	Complex sounds		pp. 41-47
2/18/2015	8	Complex sounds (+ speech)	4	pp. 47-52, 215-219
2/23/2015	9	Sound analysis		pp. 53-58
2/25/2015	10	Sound analysis	5	pp. 59-63
3/2/2015	11	The Ear (Outer, Middle, Inner)		pp. 67-8, 71-3, 75-8
3/4/2015	12	Mechanical Properties of the Inner Ear	6	pp. 90-101
3/9/2015	13	Neural Responses and Tuning Curves		pp. 121-131
3/11/2015	14	Catch Up Day	7	
3/16-23/2015		<b>Spring Break</b>		
3/23/2015	15	Review		
3/25/2015	16	<b>Midterm Exam</b>		
3/30/2015	17	Psychophysics		App. D
4/1/2015	18	Sensitivity	8	pp. 143-150
4/6/2015	19	Sensitivity		pp. 150-154
4/8/2015	20	Masking	9	pp. 159-165
4/13/2015	21	Masking		pp. 165-171
4/15/2015	22	Loudness	10	pp. 189-191
4/20/2015	23	Pitch		pp. 191-197
4/22/2015	24	Localization and Binaural Hearing	11	pp. 173-180
4/27/2015	25	Localization and Binaural Hearing		pp. 180-186
4/29/2015	26	Auditory Perception	12	pp. 203-212
5/4/2015	27	Auditory Perception		pp. 212-220
5/6/2015	28	Abnormal Auditory System	13	pp. 249-259
5/8/2015	29	Cochlear Implants or Catch Up		
5/10/2015	30	Review		
5/14-20/2015		<b>Final Exams</b>		

## The Fine Print

### Attendance:

- Attendance to class is not required in this class; however, it is highly encouraged. Note that I will provide podcasts of each lecture on ELMS.
- Missed weekly quizzes will receive a score of zero (note that three can be dropped without penalty).
- Make-up exams will not be provided.
- Midterm and final exams will not be provided to students who are more than fifteen minutes late for the start of the exam.
- Please inform me ahead of time about excused absences for missing class/quizzes/exams due to illness, family emergencies, religious observances, inclement weather, etc. so that I can try to accommodate your situation.
- In the extreme circumstance that you cannot inform me that you will miss an exam before it occurs, contact me as soon as you can so that **I can try** to accommodate your situation.

### Other Electronic Devices:

- Cell phones and similar communication devices should be silenced before class time. If a cell phone or similar device audibly disrupts class, I will subtract three points from that person's final grade. If no one admits to forgetting to turn off their cell phone, I will subtract three points from the grade of everyone in the class. Alternatively, if I forget to turn off my cell phone, I will add six points to everyone's grade.
- Laptop computers and smartphones are allowed to be used as clickers. However, they cannot be used as your calculator during quizzes and exams.
- No pictures or videos during lectures please – I'm famous enough already.

### University Emergency Closing:

In the event that the University is closed for an emergency or extended period of time, I will communicate to you via email to indicate schedule adjustments, including rescheduling of examinations and assignments due to inclement weather and campus emergencies. Official closures and delays are announced on the campus website <http://www.umd.edu>. The snow phone line is 301-405-SNOW, as well as local radio and TV stations.

### Academic Integrity:

It is the responsibility of all students to read and understand the misconduct guidelines of UM – College Park (<http://www.testudo.umd.edu/soc/dishonesty.html>). Any suspicion of academic dishonesty will result in a report filed with the Student Honor Council. Any of the following acts, when committed by a student, shall constitute academic dishonesty:

- CHEATING: intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.
- FABRICATION: intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- FACILITATING ACADEMIC DISHONESTY: intentionally or knowingly helping or attempting to help another to violate any provision of this Code.
- PLAGIARISM: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

LEARNING OBJECTIVES AND OUTCOMES  
HESP 407: BASES OF HEARING SCIENCE

STUDENT NAME:

SEMESTER COMPLETED: Spring 2015

LEARNING OUTCOMES:

1. Know the physical properties of various acoustic signals, such as pure tones, noise, and other complex sounds, including speech signals, in the time and frequency domains.
2. Understand basic concepts of signals and systems.
3. Understand basics of sound processing by the auditory system.
4. Be familiar with psychophysical methods used to examine human hearing in the laboratory.
5. Be familiar with the elements of auditory psychophysics, such as auditory sensitivity and discrimination, masking, loudness, pitch, binaural hearing, sound localization, auditory scene analysis, and their applications to everyday listening situations.
6. Understand the basic consequences of hearing loss, and the extent to which hearing aids and cochlear implants can help those with hearing impairment.

These outcomes translate to the Knowledge and Skills Acquisition (KASA) areas of:

A3. Normal aspects of auditory physiology and behavior over the life span.

A11. Principles, methods, and applications of psychometrics.

A12. Principles, methods, and applications of psychoacoustics.

A23. Principles, methods, and applications of acoustics (e.g., basic parameters of sound, principles of acoustics as related to speech sounds, sound/noise measurement and analysis, and calibration of audiometric equipment), as applicable to: a. Occupational and industrial environments, b. Community noise, c. Classroom and other educational environments, d. Workplace environments

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

Date:

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Matthew Goupell, Ph.D.  
Faculty instructor