



*Understanding the auditory processing of both the living and the dead will keep you alive in any type of zombie apocalypse.*

### What will you learn in this class?

A deep understanding of the anatomy and physiology of the auditory and vestibular systems are crucial for correct clinical diagnoses (on both living and dead patients).

At the end of this course, the students should be able to:

- Have knowledge of anatomy and physiology, pathophysiology and embryology, and development of the auditory and vestibular systems.
- Have knowledge of normal aspects of auditory physiology and behavior over the lifespan.
- Be able to fit a hearing aid or cochlear implant on a zombie.
- Make clinical recommendations that best serve the undead.
- Keep yourself alive in any type of zombie apocalypse.

## Who We Are

### About Us

We know it is all a matter of time. So do you. Time to get ready.

### Contact Us

Phone: x5-8852  
Email: [goupell@umd.edu](mailto:goupell@umd.edu)  
Office: 0241 Lefrak (LEF) Hall

The best way to contact me is by email. But responses often take more than 24 hours.

My Office Hours:  
To be decided in class on first day or by appointment.



# ZOMBIE APOCALYPSE SURVIVAL GUIDE

*Hearing and Speech Sciences  
634: Anatomy and Physiology  
of the Auditory and Vestibular  
Systems*



ZOMBIE APOCALYPSE  
SURVIVAL GUIDE



## Why study the dead?

### Early experiments on the human cochlea in cadavers leads the way

Ever since von Bekesy measured the cochlear tuning in human cadavers, it has been highly important to understand how the living and the dead are different in their neural processing of sensory stimuli. Such knowledge will give you the ability to determine whether it is better to hide or run or stand your ground in any given zombie-related emergency. It is well-known that zombies critically rely on their auditory system to find living things to eat. Don't become one of them.

### Textbook

Musiek and Baran (2007). *The Auditory System: Anatomy, Physiology, and Clinical Correlates*.

ISBN-13: 978-0205335534

### Optional Texts:

Pickles (2013). *An Introduction to the Physiology of Hearing*.

ISBN-13: 978-9004243774

Clark and Ohlemiller (2007). *Anatomy and Physiology of Hearing for Audiologists*.

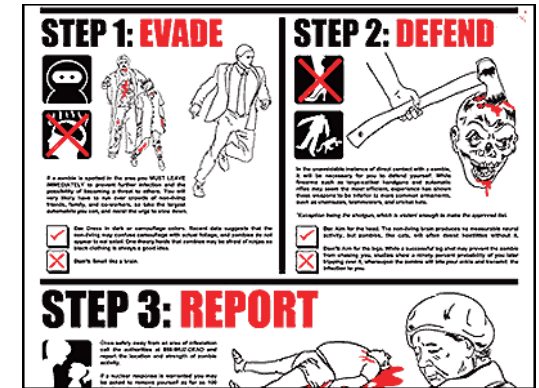
ISBN-13: 978-1401814441

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*“You walk outside, you risk your life. You take a drink of water, you risk your life. Nowadays you breathe and you risk your life. You don’t have a choice. The only thing you can choose is what you’re risking it for. We’re all infected.”*

*“At the CDC, Jenner told me. Whatever it is, we all carry it.”*

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The CDC and NIH, in a joint collaboration, have made undead hearing a major priority. Don't miss out on funding opportunities, or those that will keep you alive.

If you haven't caught yourself up on the most recent zombie-related materials, feel free to watch:

- The Walking Dead
- 28 Days Later, 28 Weeks Later
- Shawn of the Dead
- Dawn of the Dead
- Evil Dead I and II
- Army of Darkness
- Resident Evil
- Black Sheep
- Etc...

# COURSE SCHEDULE

Date	Lecture Number	Topics Covered	Required M&B Chapter(s)	Optional Pickles Reading
July 22, 2019	1	Introduction, Outer Ear, Middle Ear	1-3	2
July 23, 2019	2	Middle Ear & Anatomy of the Inner Ear	3, 4	3
July 24, 2019	3	Cochlear Mechanics	5	3
July 25, 2019	4	Intro to Cell Biology, Cochlear Electrophysiology	6	5
July 26, 2019	5	Cochlear Electrophysiology	6	5
July 29, 2019	6	Intro to Neurons, Auditory Nerve	7	4A
July 30, 2019	7	Auditory Nerve	7	4B
July 31, 2019	8	Auditory Nerve	7	4B
August 1, 2019	9	Cochlear Nucleus	8	6A-B
August 2, 2019	10	Superior Olivary Complex	9	6C
August 5, 2019	11	LL, IC, MGB, Thalamus, Cortex	10-13	6D-I, 7
August 6, 2019	12	Efferent System	15	8
August 7, 2019	13	Peripheral Vestibular System		
August 8, 2019	14	Review		
August 9, 2019	15	Final Exam, Sign KASA Forms		

## Course Highlights, Outline, and Daily Preparation:

- We will cover approximately a chapter of Musiek and Baran per day.
- Our goal is to understand how zombies hear, in case of the zombie apocalypse.
- A 10- to 15-minute mid-class break to perform zombie behavior occur every day.
- Anatomy and Physiology that is relevant to hearing loss and cochlear implants will also be discussed.
- Broader (non-auditory) aspects of neuroscience will be covered in order to better understand the important role of hearing in surviving zombie attacks.
- We will try to keep to the course schedule, but we will stay flexible depending on whether some material takes more or less time than planned.
- Daily readings shown on the schedule should be done before coming to class. I highly encourage reading the weeks material again after class (I know, I know, that is a lot of reading!). Lectures as .pdfs will be uploaded to the ELMS site before the lecture (although I suppose sometimes corrections to the lectures will be made). Supplementary material such as figures, exercises, and other things will also be uploaded to the course website from time to time.

## Homework and Exams:

- Nightly homework (approximately 20 pts each): We will have homework each night that includes 1 signals problem (a review from instrumentation) and several anatomy and physiology. They are due the next day. We will review them the day after.
- Final exam (200 pts): On the last day of class we will have a cumulative final.

## Grading:

Your course grade will depend upon four exams.

A+: 100    A: 93-99    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

## Attendance:

- Attendance to class is not required in this class; however, it is highly encouraged.
- 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.

### **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.

### **Class Participation:**

Class participation is highly encouraged. Students are expected in class to perform ungraded writing, interact with other students and discuss ideas, speak to the entire class, etc. I will not waste your time regurgitating the textbook for you as a “sage on the stage.” The discussions are intended to find areas that the class do not understand and collectively address that deficiency. I will often wander about the room during our discussions to ask individuals questions. Thus, the course is not designed well for people who only like copying notes and not interacting.

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, the teaching assistants, 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.

### **Other Electronic Devices:**

- Cell phones and similar communication devices should be silenced before class time.
- Laptop computers and smartphones are allowed.
- No pictures or videos during lectures please – I’m famous enough already.

### **Copywrite:**

Class lectures and other materials are copywritten and may not be reproduced for anything other than personal use without written permission from me. Lectures, materials, quizzes, and tests may not be sold to other parties.

### **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.

### **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.

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 by the end of the second week of class. I will reschedule the exam for the entire class to a more appropriate date.

LEARNING OBJECTIVES AND OUTCOMES

HESP 634: ANATOMY AND PHYSIOLOGY OF THE AUDITORY AND VESTIBULAR SYSTEMS

STUDENT NAME:

SEMESTER COMPLETED: Summer 2019

Title	Exam/quiz Questions	Achieved
<b>3.1.2A FOUNDATIONS OF AUDIOLOGY PRACTICE</b>		
Embryology, anatomy, and physiology of the auditory, vestibular, and related body systems	*	
Effects and role of genetics in auditory function, diagnosis, and management of hearing loss	*	
Effects and role of genetics in vestibular function, diagnosis, and management of vestibular disorders	*	
Effects of pathophysiology on the auditory, vestibular, and related body systems	*	
Medical and surgical interventions that may be used to treat the results of pathophysiology in these systems	*	

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.

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Matthew Goupell, Ph.D.  
Faculty instructor

Date: