

Advanced Topics in Perception: Auditory System in Cognitive Function [185:417 or 830:411] *Index 04463*

Spring 2023

Class Meeting Times: Tues/Fri 10:20-11:40am at [BECK-221 Livingston Campus](#)

Instructor: Dr. Kasia Bieszczad
Office: Psychology Building Room 327
Email: kasia.bie@rutgers.edu

Office Hours: Wednesday afternoons (12:30-1:30pm) via **ZOOM** or **in-person** meetings

Grading: You will receive a letter grade (worth your 3 credits) based upon assignment and exam evaluations.

I. Rationale:

This highly interactive course investigates the role of the auditory system in cognitive function. A major theme is to appreciate how the function of the auditory system goes far beyond hearing and sound, by considering topics including learning, memory, neuroplasticity, music appreciation, speech comprehension, and clinical strategies involving brain-machine interfaces. Foundation will be provided for students across disciplines from biology, neuroscience, psychology, and cognitive science who wish to broaden their knowledge about hearing and cognition in the auditory brain.

II. Course Aims and Outcomes:

You already have a fundamental understanding of how cognition “works” by taking your prerequisite psychology courses, including 185:201 – *Cognitive Science: A Multidisciplinary Introduction*. This Advanced Topics course takes your existing knowledge to the next level by discussing how our current understanding of how a so-called “sensory” system like the auditory system has many, if not mostly, “cognitive” functions. We will be considering the role of the auditory system in cognition by looking through the lens of auditory neuroscience.

Specific Learning Outcomes:

By the end of this course, you will:

- Learn to understand sound, and basic neural processing from a biological point of view
- Learn to understand listening as a cognitive act
- Investigate the “fuzzy” boundaries between perceptual and cognitive processes
- Appreciate how brain health and disease contribute to auditory cognition
- Read and appreciate and evaluate primary literature
- Learn to write succinctly about an opinion that is supported by evidence from the literature
- Learn to present ideas in a presentation format that resonates with your peer group and reflects an appreciation of science communication

III. Format and Procedures:

Participation (100 pts): Speak up in class! Be active on Canvas! This will enhance your experience and get you towards that “A” for the course. Explained absences will *not* count against your participation grade.

Mid-Term Exam (2 x 200 points each, for a total of 400 points): There will be TWO Mid-Terms, which will test your critical thinking skills – not just the retention of facts, ideas, and controversies discussed in class until this point. Focus will be to test how you think, more than how much information you can regurgitate on an exam. However, you will be expected to support statements with evidence from literature and your research. The format will be mostly short-answer essay Qs so you can practice writing and expressing your thoughts. Each Midterm Exam will be worth 200 points.

Final Exam (200 points): Same format as the midterms, but may include longer essay responses that reflect your broad new knowledge (details to come). The final is worth 200 points.

Opinion paper and presentation (300 points): More information about this assignment and companion presentation (which you will record and post online to Canvas!) will be available during the semester. The main idea of the opinion paper that you write will be presented to the class virtually during the last class meeting of the semester (see Schedule below).

Some other important things to know:

Late assignments: Assignments *not* handed in on the date due (by 11:59pm) are considered LATE – no exceptions! Submitting your work any time after this on the same day will result in a 10% penalty. Each day after will result in a further 20% penalty. All work is to be submitted to CANVAS, unless stated otherwise, which will document your name and the date & time of submission.

Academic Dishonesty: Please don't even try it. You are welcome to discuss ideas and concepts with your peers but each report must be written individually. If there is reason to believe that any part of your work is not your own, you will receive a ZERO for that report. Use of external website resources such as Chegg.com or others to obtain solutions to homework assignments, quizzes, or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions. Posting homework assignments, or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating. Any cheating and plagiarism will not be taken lightly and could even result in automatic failure of the course. All writing assignments WILL be rigorously checked for plagiarism (e.g., TurnItIn.com). Please consult with me directly concerning any questions or concerns.

Academic Integrity: Students are expected to maintain the highest level of academic integrity. You should be familiar with the university [policy on academic integrity](#) (←Click the link). Violations will be reported and enforced according to this policy. Note on academic integrity in the online environment (<https://nbprovost.rutgers.edu/academic-integrity-students>).

Yours and Mine, Intellectual Property: Almost all original work is the intellectual property of its authors. These works may include syllabi, lecture slides, recorded lectures, homework problems, exams, and other materials, in either printed or electronic form. The authors may hold copyrights in these works, which are protected by U.S. statutes. Copying this work or posting it online without the permission of the author may violate the author's rights. More importantly, these works are the product of the author's efforts; respect for these efforts and for the author's intellectual property rights is an important value that members of the university community take seriously.

For more on copyright protections at Rutgers U., please refer to [Rutgers Libraries](#) (←Click).

IV. My Assumptions:

You are encouraged to ask questions and discuss experiments, ideas and your papers openly among your peers, classmates, and professor. We are all here for you and for each other – so be inquisitive!

It will only make the class that much better. I have essentially one general assumption: that the most important thing we need to do as researchers is IDENTIFY ASSUMPTIONS. We all have deeply engrained ideas about how the world, including the brain, works. Why?

The point of this class is to **ASK “WHY?”**

Please do schedule a time to see me (via ZOOM or in-person Office Hours) if you want to chat about the topics covered in class, or if something didn't make sense in lecture and/or discussion. Your first route for this kind of communication is via your weekly Discussion post. The next best way to contact me is by email: kasia.bie@rutgers.edu to set up an Office Hours appointment on ZOOM or in-person in my office. When coming to office hours, have questions ready for me! It will produce the most efficient use of our time together. If at all possible, email me your questions before hand so I can be better prepared to help out. The more you ask and we discuss, the more the benefit for everyone!

V. Course Requirements:

The tasks and assignments are aligned with the learning outcomes in skills, knowledge, attitudes and values I hope you will leave the course with.

1. Class attendance and participation: Please do everything you can to be “present” this semester. This is truly a discussion-based class, which means that it will be most enjoyable and rewarding if we are all there to discuss the topics and issues covered over the course of the semester.

2. Course readings:

(a) Required text: *Of Sound Mind* by Nina Kraus, PhD

<https://mitpress.mit.edu/9780262545075/of-sound-mind/>

(b) Additional background readings, links to more (text)books of interest, and peer-reviewed papers in auditory neuroscience and psychology will be made available on the CANVAS website.

3. Technology Requirements for Online Learning:

(a) Computer or tablet, internet access, speaker, microphone, and (optional) video camera.

(b) Please visit the Rutgers Student Tech Guide page for resources available to all students. If you do not have the appropriate technology for financial reasons, please email Dean of Students deanofstudents@echo.rutgers.edu for assistance. If you are facing other financial hardships, please visit the Office of Financial Aid at <https://financialaid.rutgers.edu/>.

VI. Grading Procedures:

Grades will be based on:

(a) Participation		[10% or 100 points]
(b) TWO Mid-terms	(each worth 20%)	[40% or 400 points]
(c) Opinion paper	(i.e., written report & presentation)	[30% or 300 points]
(d) Final Exam		[20% or 200 points]
	TOTAL:	100% or 1000 points

Grading Scale: *standard Rutgers Undergraduate

Grade	Range
A	90 – 100

B+	85 – 89.9
B	80 – 84.9
C+	75 – 79.9
C	70 – 74.9
D	60 – 69.9
F	Below 60

VII. Academic Integrity:

Each student in this course is expected to abide by the Rutgers University Code of Student Conduct and Academic Integrity Policy. Any work submitted by a student in this course for academic credit will be the student's own work. For this course, collaboration is allowed in the following instances: *research strategies, peer-review of drafts of writing, peer-review of oral presentation or other instances based upon special requests and my approval.*

Of course, you are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students, even to give ideas of which historical figures to select for your term paper. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, online forums, a diskette, or a hard paper copy. I am an avid fan of TurnItIn.com, so all papers will be uploaded and compared against any existing topic-relevant papers and published reports.

Please ask me if you would like assistance in appropriate ways to cite previously published work. That's one great reason to schedule an office hour appointment with me!

And visit <http://academicintegrity.rutgers.edu/resources-for-students> for info and useful links.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied could both automatically receive a zero for the assignment. Penalty for violation of the University Code of Student Conduct can also be extended to include failure of the course and University disciplinary action. The risk really isn't worth it.

During examinations, you must do your own work. Chatting, texting, or other forms of discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examination will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

VIII. Accommodations for students with disabilities:

In compliance with the Rutgers University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first two weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are encouraged to register with the RU Office of Disability Services to verify their eligibility for appropriate accommodations and provide me with appropriate documentation. We will be able to make arrangements for you, no problem!

IX. Inclusivity Statement:

We understand that our members represent a rich variety of backgrounds and perspectives. The Psychology Department is committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

- share their unique experiences, values and beliefs
- be open to the views of others
- honor the uniqueness of their colleagues
- appreciate the opportunity that we have to learn from each other in this community
- value each other's opinions and communicate in a respectful manner

- use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the Rutgers U. community

X. Spring 2023 Course Schedule

Schedule is subject to change to accommodate any guest presenters & student needs.

Topics	Readings	Purpose
Tues. January 17th Orientation to Auditory Cog. Sci.	1. Introduction (pgs. 1-11)	Orientation to the Canvas site, Reviewing the Syllabus, General overview of the purpose of this course, Rutgers Shout-Outs!
Fri. January 20th	2. How Sound Works – Signals Outside the Head (pgs. 15-30)	What is sound?
Tues. January 24th	3. How Sound Works – Signals Inside the Head (pgs. 31-54)	What is neural processing of sound?
Fri. January 27th	4. How Sound Works – Learning (pgs. 55-74)	Sound changes the brain and your behavior!
Tues. January 31st	5. Learning, Memory & Plasticity (suppl. reading)	What is neuroplasticity?
Fri. February 3rd	6. How Sound Works – The Listening Brain (pgs. 75-94)	What processes (biological & cognitive) does “listening” require?
Tues. February 7th	7. Discussion Workshop for Review	
Fri. February 10th	8. Our Sonic Selves – Music is the Jackpot (pgs. 95-108)	What does music do to our auditory system?
Tues. February 14th	9. Music & Emotion (suppl. reading)	Why is music so significant to humans?
Fri. February 17th	10. Our Sonic Selves – Rhythm: Inside & Outside the Head (pgs. 109-126)	Understanding elements of music and elements of neural processing.
Tues. February 21st	MIDTERM EXAM #1 (online via Canvas)	
Fri. February 24th	11. Our Sonic Selves –The Root of Language is Sound (pgs. 127-152)	Understanding how language is complex and dynamic sound.

Tues. February 28th	12. Our Sonic Selves –Music & Language: A Partnership (pgs. 153-172)	How are music & language different and similar?
Fri. March 3rd	13. Auditory Cheesecake or Direct Evolution? (suppl. reading)	Did music ability evolve independently of language?
Tues. February 28th	14. Our Sonic Selves –The Bilingual Brain (pgs. 173-188)	How do multiple languages “get in the brain”? And what do they do there?
Fri. March 3rd	15. Our Sonic Selves – Birdsong (pgs. 189-204)	Animals don’t have language... or do they?
Tues. March 7th *Guest Speaker (TBD)	16. Bird and other animal songs (suppl. reading)	...do they?
Fri. March 10th	17. Our Sonic Selves –Noise: Stop That Racket (pgs. 205-224)	Aberrant sounds and what happens to your auditory brain.
March 11th – March 19th SPRING BREAK		
Tues. March 21st	18.	Discussion Workshop for Review
Fri. March 24th	MIDTERM EXAM #2 (online via Canvas)	
Tues. March 28th *Guest Speaker (TBD)	19. Noise, Hearing Loss & Disorders of Confusion (suppl. reading)	What happens to cognition if you can’t hear?
Fri. March 31st	20. Our Sonic Selves –Aging & The Sound Mind (pgs. 225-238)	Age-related hearing loss will happen to everyone.... IS happening to everyone!
Tues. April 4th	21. Aging, Hearing, and Dementia (suppl. reading)	Surprising relationships between hearing and dementia.
Fri. April 7th	22. Our Sonic Selves –Sound & Brain Health: Spotlight Athletes & Concussion (pgs. 239-244)	Surprising relationships between hearing and sports injury.
Tues. April 11th	23. Sound Brain, Health, Disease and Disorder (suppl. reading)	Surprising relationships between hearing, mind, and brain health.

Fri. April 14th	24. Modern sound prosthetics & limitations (suppl. reading)	Can we "fix" hearing?
Tues. April 18th *Guest Speaker TBD	25. Future sound prosthetics (suppl. reading)	"
Fri. April 21st	26. Our Sonic Selves –Our Sonic Past, Present, and Future (pgs. 255-268)	How do you appreciate your auditory system?
Tues. April 25th	27. Creative workshop	Project preparation time in class.
Fri. April 28th	28. View student peer presentations (online)	Critique and learn from each other! <i>*Details of this exercise are forthcoming.</i>
Tues. May 2nd – Wed. May 3rd		
READING DAYS		
Thurs. May 4th – Wed. May 10th FINAL EXAM WEEK	Date & Time, TBD FINAL EXAM (online via Canvas)	

For further information or to discuss specific questions, please message via the CANVAS website or email me directly. You can always email kasia.bie@rutgers.edu to reserve an Office Hours appointment on Wednesdays (between 12:30-1:30pm) or to plan when to meet at a convenient *ad hoc* time that fits your schedule.

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Note: This syllabus is our contract, student-to-teacher and teacher-to-student, that you and I will commit to this course with integrity, honesty, enthusiasm and an open mind to new ideas and various points of view. We will treat each other and our classmates with respect and patience and remember to listen as much as we speak.

Signed, KMB 01/01/2023 Signed (by you), _____