![NJIT Biology logo]

BIOLOGY 383-001 & HM1: NEURAL BASIS OF BEHAVIOR (+HONORS)

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INSTRUCTORS:	Dr. Gal Haspel	**PHONE:**	973-596-8198
OFFICE:	Central King Building 420B	**EMAIL:**	gal.haspel@njit.edu
OFFICE HOURS:	W: 2:00-3:00pm	**COURSE SCHEDULE:**	M,W: 11:30AM – 12:55PM [CKB 212]

COURSE DESCRIPTION: How does the brain control behavior? To answer this rather broad question, we will explore how scientists study and understand behavior and in turn develop hypotheses, predictions and experiments that reveal the neural mechanisms for specific behaviors. We will review and discuss several "model animal systems" in which scientists have had remarkable success in understanding the interplay between neural mechanisms and behavior.

Each subject will be covered in two or three lectures. Usually there will be a short quiz at the beginning of the last lecture of each subject. Between subjects (usually over the weekend), students will submit "tweets" that will summarize another student's presentation, a concept of one of the lectures or the whole subject. The course will conclude with presentations of selected topic by groups of up to three students.

COURSE PREREQUISITES: R120:201/202 and BIOL 205/206.

OPTIONAL TEXTBOOK:

Behavioral Neurobiology: An Integrative Approach, 2nd Edition © 2010, by GKH Zupanc; ISBN-13: 978-0199208302. The course is not following the book chapters. It will clarify or add to the discussion in class if you read the relevant chapters (see table).

LEARNING EXPECTATIONS AND ASSESSMENT: This course is a curiosity-based exploration of the relationships between neural mechanisms and behavior. It does not try to teach specific skills or information that are critical for any specific subsequent career or course – rather, its goal is to satisfy students' inherent curiosity about animal behavior and the neural systems that underlie it.
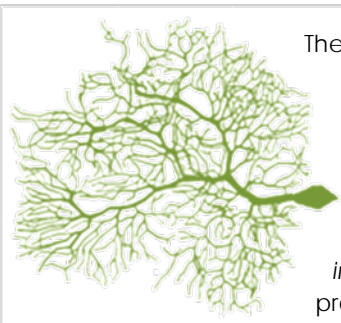
The course has two primary teaching goals. The first goal is to *expose students to some of the best examples of the neuroethological approach to the study of the mechanisms of behavior*. This will be assessed using exams in which students will be asked to explain scientific and biological strategies, conceptual organization, and detailed features of these examples.

The second teaching goal is to *provide students with the tools to explore their own interests in the behavioral neurosciences*. The students, in teams of two or three, and professor will agree on a topic of each student's choosing that will allow them to explore their own interests related to the course. The last few lectures are dedicated to student presentations. Each team of students will present a 20 min talk about their topic. Honor students (and optional for others) will also submit a term paper summarizing their selected topic. Non-honors students are also encouraged to write a paper but a formal paper will not be required. The grade of non-honor students will be averaged with one of the other grade components. Even if these students do not write a paper, they will be required to meet with the professors to discuss readings of their choosing.

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LEARNING EXPECTATIONS AND ASSESSMENT CONT'D:

Improving presentation and writing skills are objectives of the course and students are advised to begin working on a paper and a presentation early. Professional support on writing can also be provided by the NJIT writing center: http://humanities.njit.edu/writingcenter/

<u>Instructions for first written assignment</u>
- About half a page, single space, 12 points Ariel or Times NR.
- Choose an interesting story of animal behavior (from scientific or popular science sources)
- Include four items: a title (what is this about?), observation, hypothesis, and prediction (we will discuss and practice generating these in class. Use those definitions and method).

<u>Instructions for second (topic) paper</u>
- Two pages, single space, 12 points Ariel or Times NR.
- Begin and end with the big picture, tell the specific story in the middle:
  - Introduce the story, why is it interesting, what is the BIG question
  - The specific study: what was the original observation? What is the hypothesis (is there more than one? Is there an explicit hypothesis?)? What were the experiments and predictions? What were the results? Here you need to choose the central and important result and not detail all the controls.
  - Summarize or conclude: what did we learn from this study? How does it connect to the big picture in the introduction?
- Do not copy-paste (from the cited literature or from other sources).
- List your sources in a sources list at the end. Use a format similar to that used by your source. Because it will be based on a few sources, there is no need to cite in-text.
- Choose a topic, find literature and discuss with professor. Submit a first version three weeks after midterm exam, I will return with comments and track changes (know how to use it) and will grade the final version (due by review for final exam).

GRADING POLICY & SCALE:

ASSIGNMENT	PERCENTAGE
Tweets (A short message of max 140 characters, including spaces, submitted at the end of each subject. #likethisexample #118char)	10%
Midterm Exam	20%
Presentation / Paper / Discussion with Professors	30%
Final Exam	40%
TOTAL	**100%**

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GRADING SCALE			
A	90-100	C	70-74
B+	85-89	D	60-69
B	80-84	F	0-59
C+	75-79		

CLASS POLICIES:

⊛ **Cell Phones and social media:** Please leave the classroom if an emergency phone call or update of social media is required. The use of cell phones during quiz or exam times is prohibited.

⊛ **Makeup Exam Policy:** There will be no makeup exams, except in rare situations where the student has a legitimate reason for missing an exam, including illness, death in the family, accident, requirement to appear in court, etc. The student must notify the Biological Sciences office and the Instructor that they will miss an exam. In all cases, the student must present proof for missing the exam TO THE DEAN OF STUDENTS OFFICE, e.g., a doctor's note, police report, court notice, etc., clearly stating the date and times.

⊛ **Academic Integrity:** Students are reminded of the Honor Code each one has agreed to abide by (at Rutgers or NJIT). Violations of Academic Integrity will be dealt with according to the guidelines indicated in the NJIT Academic Honor Code (http://integrity.njit.edu/index.html). Please re-read Article III of the Honor Code (page 4), which describes conducts that are considered unacceptable (cheating, violating the US Copyright law, etc.). Rutgers has similar rules (http://www.ncas.rutgers.edu/oas/ai). All submitted material will be scanned for plagiarism by Turnitin.

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COURSE OUTLINE:

DATES	TOPICS	TEXT	NOTES
W Sept. 7	Introduction		
M Sept. 12	Review of neurophysiology and analysis of behavior	Ch. 2	
W Sept. 14	Skills: The Scientific Method		
M Sept. 19	Motor control: reflexes, Oscillators		
W Sept. 21	Motor control: CPG, Locomotion		
M Sept. 26	Motor control: Locomotion	Dickinson 2000, Grillner 2003	
W Sept. 28	Sensory modalities: Lateral Line		
M Oct. 3	Sensory modalities: Hearing and Echolocation	Ch. 5	
W Oct. 5	Sensory modalities: Vision		
M Oct. 10	Startle and Escape Response: Introduction and C-Startle in Fish	Ch. 6	
W Oct. 12	Startle and Escape Response: Squid Cockroach Fly		
M Oct. 17	Sensory Processing: Barn Owl	Ch. 7	
W Oct. 19	Sensory processing: Toad		
M Oct. 24	**MIDTERM EXAM**		
W Oct. 26	Sensorimotor: Electric Fish	Ch. 8	
M Oct. 31	Sensorimotor: Electric fish		
W Nov. 2	Clocks and Rhythms	Ch. 10	
M Nov. 7	Navigation and migration	Ch. 11	
W Nov. 9	Navigation and migration and Skills: Presentation		
M Nov. 14	Communication and song: cricket and others	Ch. 12	SfN
W Nov. 16	Communication and song: songbirds		SfN
M Nov. 21	Neuromodulation and hormones	Ch.9	
W Nov. 23	Classes Follow a **Friday** Schedule – NO Class		
M Nov. 28	Learning and memory	Ch. 13	
W Nov 30	**STUDENT PRESENTATIONS**		
M Dec. 5	**STUDENT PRESENTATIONS**		
W Dec. 7	**STUDENT PRESENTATIONS**		
M Dec. 12	**STUDENT PRESENTATIONS**		
W Dec. 14	(Last day of classes): Review for exam		
FINALS	**FINAL EXAM WEEK: DECEMBER 16-22, 2016**		