

Neuroethology: Complex Animal Behaviors and Brains.

IB C147/PsychC115

Instructor(s).

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GSI. TBA.

Course Description.

Neuroethologists study neural systems by combining behavior and neuroscience to understand the neural mechanism that have evolved in various animals to solve particular problems encountered in their environmental niches. This comparative approach that emphasizes how information is processed and transformed by the brain is particularly powerful for understanding neural systems. In this course, you will learn important concepts in ethology, sensory systems, motor systems and neural plasticity and development by studying the behavior and brains of animals such as crickets, lobsters, barn-owls, honey-bees, echolocating bats, electric fishes and songbirds.

Course Logistics, Assignments, Tests and Grading.

The course will meet weekly for two 1.5 hours lectures that will be complemented by one 1 hour discussion section. Each discussion sections will focus on the weekly reading assignment and a series of questions that will constitute the weekly homework assignment. Homework must be handed in on the day due either at your discussion section or in your TAs mailbox by xxx. The final course grade will be based on a total of 500 points: 200 points from the 2 midterms (100 points each), 200 points from a cumulative final, and 80 points from weekly homework assignments and 20 points for a single in section oral presentation. The ‘final’ exam is cumulative but will emphasize the material taught in the third section of the course. The following grading scheme will be used.

A+	100%	to 99.9%
A	< 99.9%	to 95%
A-	< 95%	to 90%
B+	< 90%	to 87%
B	< 87%	to 83%
B-	< 83%	to 80%
C+	< 80%	to 77%
C	< 77%	to 73%
C-	< 73%	to 70%
D+	< 70%	to 67%
D	< 67%	to 63%
D-	< 63%	to 60%
F	< 60%	to 0%

Prerequisites.

Biological and Neuropsychology lower division requirements for Psych students (<https://psychology.berkeley.edu/students/undergraduate-program/tier-i-prerequisites-freshmen-admitted-fall-2018-or-later-and>) or Integrative Biology lower division requirements (Bio 1A-1B) for IB students or Equivalent.

Textbook and Readings.

Behavioral Neurobiology: An Integrative Approach. Zupanc. Oxford University Press. Third Edition (2018). Additional reading (peer-reviewed papers) will be assigned for more specialized coverage of certain topics.

Schedule of classes and reading

lecture #	topic	reading
1	Organization/Section assignments	
2	Basic Concepts in Ethology I	Ch 1 and 3

3	Basic Concepts in Ethology II	Ch 3.
4	Basic Concepts in Neuroscience	Ch 2.
5	Basic Concepts of Sensory Systems	p. 91 & 133-140
6	Feature Detection in Frogs	p. 140-149
7	Barn Owl Sound Localization I	p. 149-169
8	Barn Owl Sound Localization II	
9	Bat Echolocation I	p. 93-111
10	Vocal Communication in Birds and Primates	tba
11	Olfactory Processing (moths, locusts, rats)	tba
	First Midterm	
12	Basic Concepts of Motor Systems and SMI	p. 114-119
13	Escape Swimming in Tadpoles	p. 119-129
14	Feeding in Lobsters	tba
15	Primate Reaching	tba
16	Cricket Song	p. 263-281
17	Song Production in Oscines	p. 281-54 + tba
18	Electric Fish	p. 181-187 + tba
19	Electric Fish	
	Spring Break (around here)	
20	Second Midterm	
21	Basic Concepts of Learning and Memory	p. 298-301
22	Simple Learning in Aplysia	p. 301-308
23	Spatial Memory in Mammals and Birds	p. 308-322
24	Bird Song Imitation - Behavior	p. 281-292 + tba
25	Bird Song Imitation – Neural Mechanisms	
26	Honeybee Foraging	tba
27	Neurogenetics of Learning in Drosophila	tba
28	Large scale navigation	p. 225-245

FINAL EXAM

Academic Integrity

You are a member of an academic community at one of the world's leading research universities. Universities like Berkeley create knowledge that has a lasting impact in the world of ideas and on the lives of others; such knowledge can come from an undergraduate paper as well as the lab of an internationally known professor. One of the most important values of an academic community is the balance between the free flow of ideas and the respect for the intellectual property of others. Researchers don't use one another's research without permission; scholars and students always use proper citations in papers; professors may not circulate or publish student papers without the writer's permission; and students may not circulate or post materials (handouts, exams, syllabi--any class materials) from their classes without the written permission of the instructor.

Any test or homework submitted by you and that bears your name is presumed to be your own original work that has not previously been submitted for credit in another course unless you obtain prior written approval to do so from your instructor. In all of your assignments, including your homework, you may use words or ideas written by other individuals in publications, web sites, or other sources, but only with proper attribution. If you are not clear about the expectations for completing an assignment or taking a test or examination, be sure to seek clarification from your instructor or GSI beforehand. Finally, you should keep in mind that as a member of the campus community, you are expected to demonstrate integrity in all of your academic endeavors and will be evaluated on your own merits. The consequences of cheating and academic dishonesty—including a formal discipline file, possible loss of future internship, scholarship, or employment opportunities, and denial of admission to graduate school—are simply not worth it.

Collaboration and Independence: Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do together with one's fellow students. We recommend this. You are also encouraged to work with fellow students to formulate answers for your homework questions. However, the homework written assignments should be completed independently.

Cheating: Anyone caught cheating on a quiz or exam will receive a failing grade and will also be reported to the University Office of Student Conduct. In order to guarantee that you are not suspected of cheating, please keep your eyes on your own materials and do not converse with others during the quizzes and exams.

Academic Integrity and Ethics: Cheating on exams and plagiarism are examples of violations in the realm of ethics and integrity. Honesty, integrity, and ethical behavior are of great importance in all facets of life. They are so important that it is generally assumed that one has learned and internalized these qualities at an early age. As a result, these issues rarely get explicitly addressed by the time one gets to be a university student. However, it cannot be overstated just how important honesty is to the academic enterprise.

Accommodations for Students with Disabilities

Please see me as soon as possible if you need particular accommodations, and we will work out the necessary arrangements.

Scheduling Conflicts

Please notify me in writing by the second week of the term about any known or potential extracurricular conflicts (such as religious observances, graduate or medical school interviews, or team activities). I will try my best to help you with making accommodations but cannot promise them in all cases. In the event there is no mutually workable solution, you may be dropped from the class.