Preliminary Course Information


I. Course description, as it will appear in the College Bulletin

W2420y. Animal Behavior
3 pts. S. Woolley. TR 2:40-3:55 Room 614 Schermerhorn Hall
Prerequisites: PSYC W1001 or W1010 or a college-level biology course or instructor permission.
Introduction to behavioral systems, evolution of behavioral traits, and analysis of behavior. Topics include reproductive and social behavior, mating systems, competition, cooperation, communication, learning, development and the interplay of genes and environment.

II. Rationale for giving the course

This undergraduate lecture course will complement our curriculum in a number of important ways. It will introduce students to the concepts and demonstrations of evolution and scientific methods of studying behavior. The study of animal behavior contributes to the general education of a college level student because it provides a framework for observing, understanding and appreciating the natural world and the interactions between human behavior/culture and animals. The course will offer students pursuing careers in psychology and biology a fundamental education in how and why animals behave as they do, from a scientific standpoint. The material covered will prepare students for advanced courses addressing behavior and neuroscience, and for conducting scientific research.

PSYC W2420 will fulfill the following degree requirements:

- For the Psychology major or concentration in the College and in G. S., for the Psychology minor in Engineering, and for the Psychology Post-bac, PSYC W2420 will meet the Group II (Psychobiology and Neuroscience) distribution requirement.
- For the Neuroscience and Behavior joint major, PSYC W2420 will meet the fourth Psychology requirement: “One additional 2000 or 3000 level psychology course from a list approved by the Psychology Departmental advisor to the program.”
- For the science requirements of the College and G. S., PSYC W2420 will count as a single term of the requirement, provided that students who do not have the designated prerequisite obtain instructor permission. Ideally, students will have taken both PSYC W1010 and PSYC W1001 prior to PSYC W2420, and will thereby have fulfilled two terms of the science requirement.

Enrollment will be capped at 95.
III. **A full description of the content of the course**

This course is an introduction to animal behavior, approached at both the ultimate (why) and proximate (how) levels. The study of animal behavior seeks to explain how animals interact with the physical environment and each other in ways that promote fitness (the successful passing of genes to the next generation). It also uses the principles of evolution through natural selection to understand why behaviors such as communication and sexual selection are adaptive, how they may have evolved and how the brain controls them. Although, the study of animal behavior is most closely tied with the fields of behavioral ecology, evolutionary biology, organismal biology, psychology and neuroscience, the understanding of how and why animals behave as they do will benefit any student.

This course will begin with a brief history of animal behavior (ethology) as a scientific discipline. The concepts involved in evolution by natural selection and good scientific methodology will then be covered. Topics such as the development and organization of behavior, communication, reproductive and social behaviors, and their relationships to survival and reproduction will form most of the course and follow the textbook closely. Additional scientific papers as examples of the current work in these areas will be read weekly. Reading scientific papers will give students experience with the format of scientific presentation, critically analyzing experiments and how researchers interpret their data in the context of what is already known/believed. The physiological control of behavior including sensory systems, motor systems and hormonal control of behavior will be stressed throughout the course. Knowledge of biology beyond high school level will be helpful but not required.

IV. **Course requirements**

Grades will depend on three factors: 1) midterm exam 1 (30%); 2) midterm exam 2 (30%); and the final exam (40%). Exams will be short answer format.

V. **Preliminary Course outline**

**Week 1**
- Course introduction, historical overview
  - Origins and principles of ethology
  - Proximate and ultimate causes of behavior

**Week 2**
- Evolution – Principles of Natural Selection
  - Darwin and the theory of natural selection
  - Adaptation - genetic traits – convergence and divergence

**Week 3**
- Scientific Methods in the Analysis of Behavior
  - Hypothesis formation and testing
  - Field and laboratory techniques

**Week 4**
- Instinct and Learning
  - Organization of behavior
  - Costs and benefits of learning

**Week 5**
- Instinct and Learning con’t - review for exam

**MIDTERM 1**

**Week 6**
- Control of Behavior –
  - Sensory structures, the brain, muscles, motor behavior
Hormones and neuromodulators

Week 7
Specialized Traits for Survival
Feeding
Defense – predator-prey interactions

Week 8
Economics of Behavior
Cost-benefit analyses-optimality
Ecology of Behavior
Migration and orientation, territoriality

Week 9
Ecology of Behavior con’t – review for exam

MIDTERM 2

Week 10
Animal Communication
Signal, sender and receiver
Evolution of Communication

Week 11
Reproductive Behavior
Mating strategies and sexual selection
Kin Selection, group selection, altruism, inclusive fitness

Week 12
Reproductive Behavior con’t
Mating systems
Parental investment

Week 13
Social Behavior
Competition and cooperation
Culture and societies

Week 14
Review

Week 15
FINALS WEEK

Preliminary Reading List:
The readings will consist of: 1) the textbook; and 2) additional papers from the scientific literature. The optional readings (designated as such below) are review articles or papers exploring physiological mechanisms. Readings will be available on the web.

Textbook:

The reading list may change slightly.

Week 1
Course introduction, historical overview
Alcock, Chapters 1-2
Snowden, C. T. *Significance of Animal Behavior Research* (pdf)

**Week 2**
Evolution – Principles of Natural Selection
Selected readings from Darwin, C. *On the Origin of Species by Means of Natural Selection* (available on the web through literature.org)

**Week 3**
Scientific Methods in the Analysis of Behavior

**Week 4**
Instinct and Learning
Alcock, Chapters 2 & 3

**Week 5**
No further reading before exam

**Week 6**
Control of Behavior
Alcock, Chapters 4 & 5

**Week 7**
Specialized Traits for Survival
Alcock, Chapters 6 & 7, revisit Chapter 4 section on bats and moths

**Week 8**
Economics and Ecology of Behavior
Alcock, Chapter 8
Moller rebuttal & Evans counter-rebuttal
Week 9
No further reading before exam

Week 10
Animal Communication
Alcock, Chapter 9

Week 11
Reproductive Behavior
Alcock, Chapters 10 & 11

Week 12
Reproductive Behavior con’t
Alcock, Chapter 12

Week 13
Social Behavior
Alcock Chapters 13 & 14

Week 14
No further reading before finals week