

Animal Behavior, BZ 300

Summer 2023

Course Description: Evolutionary and mechanistic approaches to understanding why and how animals behave the way they do. The course will take an integrative approach linking behavior to brain, genes and hormones at the mechanistic level and to ecology to explain its functional and evolutionary basis.

Learning Objectives:

- 1) Evolution: Understand the process of evolution of different behaviors through natural selection, learn how to measure natural selection
- 2) Structure & Function: Understand the relationship between genotype and phenotype,
- 3) Apply the Scientific Process: Learn how to develop hypotheses and test the predictions based on them
- 4) Use Quantitative Reasoning: Learn how to interpret data from tables and graphs, learn how to use statistics to make inferences
- 5) Modeling & Simulation: Learn the utility of developing a model to describe a behavioral/biological process, learn the process of building verbal and quantitative models and the process of numerically evaluating a quantitative model
- 6) Interdisciplinary nature of Science: Learn how ideas from other disciplines contributed to our understanding of animal behavior and how other sciences have benefited from this understanding
- 7) Critical Thinking: Learn how to evaluate different pieces of evidence, quantitative and otherwise, to draw sound conclusions and develop new questions
- 8) Communicating science: Learn how to interpret technical papers and write about them.

Meeting Time and Place: MTWTR 08:00a-10:30a, AZ E112

Suggested Textbook: Animal Behavior by Dustin Rubenstein & John Alcock (11th edition)

Instructors: Dhruba Naug (Biology 334)

Office Hours: Dhruba Naug: By Appointment

Contact: Email on Canvas.

Tentative Schedule of Topics

Week 1: Introduction to Animal Behavior

- Natural selection, Levels of Analysis for a Behavior
- Integrative Study of Behavior
 - Development, Mechanism, Evolution and Adaptive Value
- Development and Genetic Basis of Behavior
 - Behavioral Genetics, Evo-devo of behavior, Genes, Environment and Behavior
- Neural Basis of Behavior
 - Stimulus Response, Decision Making in the Brain

Week 2: Physiological Basis of Behavior

- Biological Rhythms, Hormonal Mechanisms
- Avoiding Predators and Finding Food
 - Defense mechanisms, Game Theory, Optimal Foraging
- Territoriality and Migration

Habitat Selection, Dispersal

Week 3: Communication

Information use, Signals, Biases, Honesty and deceit, Public information, eavesdropping

Reproductive Behavior

Sex Differences and Sexual Selection, Sperm Competition, Mating Tactics, Female Choice, Sexual Conflict

Mating Systems

Monogamy, Polyandry and Polygyny, Promiscuity, Extra-pair paternity

Parental Care

Offspring Value and Parental Investment, Family Conflict, Brood parasitism

Week 4: Social Evolution

Levels of Selection, Altruism, Inclusive Fitness, Relatedness and Kin Selection, Haplodiploidy, Eusociality, Social conflict

Social Behavior

Mutualism, Altruism, Reciprocity, Cooperative Breeding, Reproductive Skew, Interindividual differences and personalities

Human Behavior

Speech, Reproductive behavior, Evolutionary medicine

Evaluation and Grading

4 online exams x (~40 questions x 1 point) = 40 points per exam

3 best scores on the exams = 120 points.

Total = 120 points

Final grades will be allocated according to the scale described in <https://canvas.colostate.edu/grading-schemes/>

<https://catalog.colostate.edu/general-catalog/academic-standards/grading/>

The best 3 scores policy is meant to provide flexibility and account for any missed exam due to illness, injury or some other personal reason, so there are no makeup exams. If you miss an exam, your score of “0” on that exam will count as your lowest score.

Academic Integrity is integral to scholarship and true learning. By signing on for this class you are pledging that you will not receive or give any unauthorized assistance in exams and other assignments. The class will adhere strictly to the university policies about academic integrity described at <https://resolutioncenter.colostate.edu/academic-integrity/>