BIOE 406 - Behavior & Evolution

Course Information:

Instructor: Douglas Emlen
Teaching Assistant: Romain Boisseau
Term: Fall 2019
Credits: 3
Location & Time: HS 207 TR 11:10 – 12:30

Course Description:

This course will introduce students to the diversity of behavior exhibited by animals. Ecological factors including competition, resource distribution, predation and the physical environment all affect how animals should balance their investment in growth, survival and reproduction. This course uses evolutionary theory as an explicit and rigorous framework for studying behavior in its natural ecological contexts. The behavior expressed by an individual in a particular ecological situation is considered to influence the relative success of that individual in contributing offspring to subsequent generations (the 'fitness' of that individual). Natural selection, by favoring those individuals whose behavior causes them to maximize their fitness, can lead to evolutionary changes in behavior. Consequently, this course explores *why* animals behave the way they do by integrating information from evolution, ecology and ethology. Areas of emphasis include the genetics of behavior, predator avoidance, sexual selection, sperm competition, parental care, social & eusocial behavior, and speciation. Course outcomes include providing students with an introduction to the theory and methods of the study of animal behavioral ecology.

Assessment:

Students will be assessed based on two in-class exams and a final exam.

Grading Rubric:

Exams:

Exam I	30%
Exam II	30%
Final	40%

Learning Outcomes:

- Students will be fluent with core principles of evolutionary biology, including concepts of variation and selection.
- Students will have a rigorous and modern grasp of how complex traits like animal behaviors are inherited, including an appreciation for modern genetic and genomic approaches to studying the genetics of behavior.
- Students will understand the basis for sexual selection, and how this process drives spectacular diversity in animal morphology and behavior.
- Students will understand the logic behind why and when animals form cooperative groups, including the most extreme animal societies, the eusocial species.

- Students will have an appreciation for current understandings of the process of speciation, including especially the crucial role so often played by sexual selection and animal behavior.
- Students will have an appreciation for how evolution helps us understand modern public health issues, such as the origin and spread of pandemic influenza.

BEHAVIOR AND EVOLUTION
Fall 2019

Format	Date	Topic
lecture 1	Aug 29	Background + History
lecture 2	Sept 3	Experimental study of adaptation
lecture 3	Sept 5	Evolution of Sensory & Nervous Systems
lecture 4	Sept 10	Genetics of Behavior 1
lecture 5	Sept 12	Genetics of Behavior 2
lecture 6	Sept 17	Genetics of Behavior 3
lecture 7	Sept 19	Wallace, Bates & mimicry
lecture 8	Sept 24	Avoiding Being Eaten
lecture 9	Sept 26	Avoiding Harsh Conditions
Exam	**Oct 1**	**First Exam**
lecture 10	Oct 3	Anisogamy and Sexual Selection
lecture 11	Oct 8	Female Choice
lecture 12	Oct 10	Male Competition
lecture 13	Oct 15	Sperm Competition
	Oct 17 -- no class!	
lecture 14	Oct 22	Alternative Tactics
lecture 15	Oct 24	Mating Systems Overview
lecture 16	Oct 29	Parental Care / Kin Selection
lecture 17	Oct 31	Parental Care contd., & role reversal
	Nov 5 -- no class!	
lecture 18	Nov 7	Group Living: Why Be Social?
lecture 19	Nov 12	Cooperation
Exam	**Nov 14**	**Second Exam**

lecture 20	Nov 19	Eusociality
Lecture 21	Nov 21	Eusociality II
	Nov 26 & 28	-- no class – Thanksgiving!
Lecture 22	Dec 3	Evolution of Human Behavior
Lecture 23	Dec 5	Evolution of Extreme Weapons (**Pick up take-home final exam)**

BIOE 409 - Behavior & Evolution Discussion

Course Information:

Instructor: Douglas Emlen
Teaching Assistant: Romain Boisseau
Term: Fall 2019
Credits: 1
Location & Time: TBA

Course Description:

This course will complement BIOE406, introducing students to primary literature related to the general topic of behavior and evolution, and provide them with constructive feedback on writing skills. Course outcomes include providing students with an introduction to the literature and methods of the study of animal behavioral ecology and meaningful feedback on the art of effective written communication.

Assessment:

Students will participate in a weekly discussion section of supplemental readings, and complete a written assignment. The written assignment consists of a topic chosen by the student and approved by the instructor, and involves a research paper of 2 – 3 pages in length. Emphasis for grading will be on the quality of the writing, including organization, grammar, polish and style, and students are expected to show drafts of their paper to others for comments prior to turning the paper in to me. Students will revise and continue to polish their paper for two additional rounds, for a total of three times graded (once by the TA and twice by the instructor).

Grading Rubric:

Written Assignment:	
Outline	20%
First version	20%
Final version	30%
Discussion Participation:	30%

Learning Outcomes:

- At the end of this course students should be comfortable reading, evaluating, and discussing current and classic literature in the fields of Animal Behavior and Evolutionary Biology.
- Students will have honed their writing skills, writing, and then repeatedly revising a term paper to improve their fluency, grammatical accuracy, and style.
- Students will be comfortable writing effective thesis statements, designing an effective paper structure, using effective transition sentences to connect topics in adjacent paragraphs, and crafting sentences with elegance and style.
- At the end of this semester students will have an essay that is polished and professional, perfect for inclusion in job or other applications.