

PHYSIOLOGICAL ECOLOGY OF VERTEBRATES- BIOL 6240

Class Information:

Instructor: Susannah French
Time: Thursdays 12:00-2:30pm
Office Hours: By appointment
Place: BNR 315

The focus of this class will be on “eco-physiology” or the interaction of physiology and behavior nested within an ecological context. Specifically, we will examine how various physiological and behavioral processes (e.g., energy balance, thermoregulation, metamorphosis, immunity, vocal communication, social behavior, chemical signaling, biological timing, stress) interact with one another in a variety of vertebrate species from the perspectives of comparative physiology, endocrinology, neurobiology, ethology and behavioral ecology.

In order to gain a more meaningful, in-depth understanding of some of the important areas within physiological ecology, this course will focus more on depth than breadth. Specifically, we will adopt a “case studies” approach in which we will focus on select research topics that have made important contributions to the development of the field, rather than attempt a broad (but necessarily superficial) survey of the entire field. The class will involve a combination of formats including short lectures to provide introductory background material, student presentations of select topics of interest, and class discussion of some of the key primary literature as well as reviews and/or book chapters. In addition, a conceptual diagram integrating the student’s research with physiology is required at the end of the semester. The objective of this diagram is to present a creative, logical illustration of the student’s research within the context of the class topics (we will discuss this in more detail). Lastly, short “thinkpieces” may be assigned occasionally throughout the semester to stimulate thinking and discussion of the course topics. There will be no formal in-class exams; however, active participation in discussions will be vital and is expected from everyone.

Class Objectives:

- 1) Gain an understanding of the interactions among an organism’s physiology, behavior, and environment.
- 2) Introduction to physiological methods that can be applied in field-based studies.
- 3) Relate important physiological theory to individual research interests.
- 4) Improve student discussion and presentation skills.
- 5) Improve student conceptual and integrative thinking skills.

CLASS SCHEDULE AND ASSIGNMENTS

August 31: Organizational meeting, course introduction, initial topic selection

September 7: Background and introduction to “eco-physiology”

September 14: Review of physiological systems and key concepts

September 21: Responses to stressors in the environment: Vertebrate stress physiology

September 28: Responses to radiant environment: Seasonality/photoperiodism

October 5: Responses to parasitic environment: Ecological immunology

October 12: Responses to a changing environment: Conservation Physiology

October 19: No Class. Friday Class schedule for Fall Break.

October 26: No Class. Bienvenido a Cuba!

November 2: Special Topics – Graduate student presentation (TBA)

November 9: Special Topics – Graduate student presentation (TBA)

November 16: Special Topics – Graduate student presentation (TBA)

November 23: No Class. Thanksgiving.

November 30: Special Topics – Graduate student presentation (TBA)

December 7: Special Topics – Graduate student presentation (TBA)

POTENTIAL TOPICS (examples)

TSD

Chemical ecology

Physiological trade-offs

Salinity and stress

Hibernation/daily torpor

Clinal variation in stress responses

Mechanisms of migration

Temperature-dependent sex determination

Social interactions in subterranean animals

Abyssal environments

Acoustic communication in anurans

Plant compounds and reproduction

Environmental endocrine disruptors

Acoustic communication

Circadian/circannual/circalunar/circatidal rhythms

Reproduction suppression

Adaptations to high altitudes/pressure

Foraging and spatial memory

COURSE STRUCTURE & GRADING:

Class presentations: 40%

Class participation in discussions: 30%

Conceptual Research Diagram: 20%

Miscellaneous assignments (e.g., readings): 10%