Instructor: Alexander (Sasha) Kitaysky 413 Irving I 474-5179
e-mail: ffask@uaf.edu
office hours: by appointment.

Lectures: Tuesdays, Thursdays 11:30 – 13:00 pm, Bunnell 408.

Final Exam: Tuesday, December 18, 11:30 – 13:00 pm, Bunnell 408.

General Course Goals: The lectures and assigned readings are intended to introduce the student to the field of endocrinology in the vertebrate classes. The emphases are on hormonal facilitation of free-living animals’ behavioral and physiological traits. The course is organized into three parts:

1. General principles of endocrinology (i.e. functions of the endocrine system, hormone structure, synthesis, secretion, action, and basic analytical techniques) will be surveyed.
2. Physiology of the endocrine system, environmental and comparative aspects.
3. Introduction to behavioral/reproductive endocrinology.

Texts: The primary recommended textbook for Biology 458 (WLF 458) is:


Other recommended books:


Tentative course outline. Readings (mostly original research papers & lecture notes) are assigned for each lecture. During the second & third parts of course, a discussion group (seminar) with student oral presentations of recent papers in the field of behavioral endocrinology will follow short lectures. Copies of these papers will be posted on the Blackboard and also will be available in Prof. Kitaysky's office for students to sign out, copy themselves and return.
Biology 458 (WLF 458): VERTEBRATE ENDOCRINOLOGY, Fall 2007

PART ONE: Introduction and Basic Principles of Endocrinology. **September 6 – October 18**
(Recommended reading: Norris chapters 1-5; handouts will be available to supplement the lecture notes).

Sept 6, 11:
Vertebrates. Why hormones?
Neuroendocrine-endocrine secretions; autocrine, paracrine secretions.
Functions of hormones. Survey of the endocrine systems. Feedback loops; neuroendocrine reflexes.

Sept 13, 17, 20:
Hypothalamo-pituitary systems; pituitary hormones; catecholamine and peptidergic control; median eminence and portal system; comparative aspects of the system.
Links between external and internal environment; homeostasis, growth and development.

Sept 24, Sept 27:
Types of hormones and their structure; synthesis.
Control of secretion.
Mechanisms of hormone action - receptors, second messengers, conversion to active forms.

Oct 2, Oct 4, Oct 9:
Metabolism and deactivation of hormones.
Autocrine and paracrine hormones.
Hormones of the immune system.
Atrial natriuretic factor, and other miscellaneous peptides.

Oct 11: Adrenal medulla and adrenergic receptors.
(Recommended reading assignment for this lecture: Norris chapter 9).

Oct 15, Oct 18:
Basic methods and techniques in endocrinology.
(Recommended reading assignment for this lecture: Norris chapter 3).

PART TWO: Biology of the Endocrine Systems.

**October 25 – November 26**

Handouts will be available to supplement the lecture notes.

Neurohypophysis.

*(Recommended: Norris chapters 4, 5, 6).*

Pars distalis, prolactin.

*(Recommended: Norris chapters 4 and 5).*

Pars distalis, growth hormone and growth factors.

*(Recommended: Norris chapters 4 and 5).*

Pars distalis, pars intermedia melanocyte stimulating hormone.

*(Recommended: Norris chapters 4 and 5).*

Pars distalis, adrenocorticopin and adrenal cortex. Aldosterone-renin-angiotensin,

*(Recommended: Norris chapters 4, 5, 9 and 10).*

Pars distalis, thyroid, metabolism, thermogenesis, metamorphosis.

*(Recommended: Norris chapters 7, 8 and 14).*

Parathyroids, ultimobranchials, vitamin D.

*(Recommended: Norris chapter 15).*

Gastro-intestinal hormones.

*(Recommended: Norris chapters 13 and 14).*

Pancreatic hormones.

*(Recommended: Norris chapters 13 and 14).*

**November 29:**

**Midterm exam 2**
PART THREE: INTRODUCTION TO REPRODUCTIVE ENDOCRINOLOGY.

December 4 – December 13

Recommended: Norris chapters 11-12, handouts will be available to supplement the lecture notes.

Life history patterns and reproduction.
Female and male reproductive behavior
**Oral presentations/ discussion of the papers/ field studies of reproductive endocrinology**

Endocrine regulation in females
Endocrine regulation/correlates of Parental behavior.
**Oral presentations/ discussion of the papers/ organization and activation of offspring phenotype**

Endocrine regulation in males
Endocrine regulation/correlates of Social behavior
**Oral presentations/ discussion of the papers/ active vs. inactive forms, conversion of hormones; territorial behavior etc.**

Seasonality, Hormones and Behavior
**Oral presentations/ discussion of the papers/ seasonal reproduction, migratory behavior**
**Oral presentations/ discussion of the papers/ homeostasis and stress physiology**

Final exam. December 18, 11:30 – 13:00 pm, Bunnell 408.

Note: If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, (2nd fl. Whitaker) fydso@uaf.edu, 474-7043. If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to us so we can discuss the accommodations you might need for class.
Tentative COURSE EVALUATION

You will be evaluated on the basis of your performance in:

I. **Three exams**

Exams will test factual knowledge as well as an ability to synthesize and integrate information. The exams will consist of short answers (one to a few sentences). Examples of each exam (questions with answers) will be discussed before the midterms and final.

Midterm 1 (100 points): Covers **PART 1** of the course
Midterm 2 (100 points): Covers **PART 2** of the course
Final exam* (125 points): Focus primarily on **PART 3**, but will also include basic principles of the entire course (which you’ll have to know to understand Part 3)

*Note: the final exam might be substituted by a written review of paper, which addresses any subject in the field of behavioral/reproductive endocrinology

II. **Oral paper presentation** (50 points). Additional handout will be provided with exact instructions on what is expected.

III. **Participation in discussions following** oral paper presentations (125 points). Additional handout will be provided with exact instructions on what is expected.

Grades: 90-100% = A; 80-89% = B; 70-79% = C; 60-69% = D; F<60%

UAF Honor Code – everybody should be in good standing
ENDOCRINOLOGY JOURNALS

Below are lists of scientific journals that publish research articles and reviews in endocrinology. The first list includes the primary journals and the second list includes those journals that are not specifically endocrine in scope but do publish endocrine articles from time to time.

Primary Journals in Endocrinology:


Secondary Journals in Endocrinology: More general journals that frequently publish articles in endocrinology.


CLASSIFICATION OF THE VERTEBRATES

PHYLUM: CHORDATA

Subphylum: Hemichordata (acorn worms)
Subphylum: Urochordata (tunicates or sea squirts)
Subphylum: Cephalochordata (amphioxus)

Subphylum: Vertebrata
Superclass: Agnatha
Class: Cephalaspidomorphi (lampreys)
Class: Pteraspidomorphi (hagfishes)

Superclass: Gnathostomata
Class: Chondrichthyes (cartilaginous fish or Selachii)
  Subclass: Elasmobranchii (sharks, rays, skates)
  Subclass: Holocephali (ratfishes, chimaeras)

Class: Osteichthyes (bony fish)
  Subclass: Actinopterigii (ray-finned fish)
    Polypteri (bichir, reedfish)
    Chondrostei (sturgeons, paddlefish)
    Holostei (bowfin, garfish)
    Teleostei (e.g. perch, salmon, herring, flounder)
  Subclass: Sarcopterigii (flesh-finned fish)
    Crossopterigii (coelacanth)
    Dipnoi (lungfish)

Class: Amphibia
  Urodela (newts and salamanders)
  Apoda (caecilians)
  Anura (frogs and toads)

Class: Reptilia
  Chelonia (turtles)
  Squamata (snakes and lizards)
<table>
<thead>
<tr>
<th>Class</th>
<th>Orders</th>
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<tbody>
<tr>
<td>Rhynchocephalia</td>
<td>Tuatara</td>
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<tr>
<td>Crocodilia</td>
<td>Alligators and crocodiles</td>
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<tr>
<td>Class: Aves</td>
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<tr>
<td>Ratitae</td>
<td>Flightless birds with no keel, ostriches</td>
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<tr>
<td>Dromogнатhæ</td>
<td>Tinamous</td>
</tr>
<tr>
<td>Carinatae</td>
<td>Keel present, most can fly</td>
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<tr>
<td>Class: Mammalia</td>
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<tr>
<td>Prototheria</td>
<td>Monotremes</td>
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<tr>
<td>Metatheria</td>
<td>Marsupials</td>
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<td>Eutheria</td>
<td>Placentals</td>
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