

## Evolutionary Endocrinology

### Anthrbio 468 / Psych 439

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Classroom: 1567 NUB  
 Class time: TTh 11:30 am -1:00 pm  
 Website: <https://umich.instructure.com>

### COURSE DESCRIPTION

Welcome to Evolutionary Endocrinology! In this course, we will examine the ways in which animals evolve physiological adaptations to the environment in which they live. Hormones coordinate the (co)expression of genes and phenotypes in response to both intrinsic and extrinsic cues. Hormones regulate nearly all aspects of the phenotype and hormone systems are subject to natural selection. Yet, despite the key roles that hormones play in mediating evolutionary phenomena, hormones are rarely integrated into evolutionary models and analyses. Using literature that spans across vertebrate taxa from reptiles to birds to mammals, we will focus on exciting new ideas about the evolutionary significance of hormones in shaping life-history evolution, facilitating or constraining adaptation, and mediating maternal effects. The objectives of this class are (1) to provide an overview to some of the exciting research areas in Evolutionary Endocrinology, and (2) to help bring advanced undergraduates up to graduate level in their reading, understanding, and writing about hormone-related topics. Emphasis will be placed on critical thinking and clear and concise writing.

### COURSE MATERIALS

All course readings in this course will be primary research articles or review articles. This course assumes you already have “textbook” hormone information well under your belt. If you feel you are behind on a particular topic, please find an appropriate chapter in *An Introduction to Behavioral Endocrinology – Fifth Edition*, by Randy Nelson and Lance Kriegsfeld (Sinauer Associates, Inc. Publishers, 2016) to get you up to speed. PDFs for each assigned paper will be available on the Canvas website for this class. Updated versions of this syllabus, all handouts (describing assignments), and all papers will be available on the Canvas website (<https://umich.instructure.com>).

### GRADING

Your grade will be based on daily quizzes and participation, an in-class presentation, 2 in-class exams, and 2 short review papers. At any time during the semester, you may check the Canvas site to retrieve your points towards the categories below. Weighting of grades will be:

Quizzes on reading / participation	= 20%
1 in-class oral presentation	= 20%
2 in-class exams	= 30%
2 review papers (~4-5 single-space pages)	= 30%

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Final grade	=100%
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### **READINGS, QUIZZES, PARTICIPATION**

All readings are to be completed before you come to class on the day listed. Each day might start with a daily quiz on the assigned readings. Quizzes will be easy if you've done the reading. You may drop your 2 lowest quizzes at the end of the semester (this includes all excused and unexcused absences). Participation in class can also help to make up for low quiz grades.

### **ORAL PRESENTATION**

You will be responsible for presenting the results of one empirical paper during the semester. The paper will be one of the already-selected readings for class. You will choose the day/topic that you would like to present (first come, first serve basis, so email me your top 3 topics soon). On the day you are presenting, I will present for the first hour of class. You will then present your paper during the last half hour of class using a brief Powerpoint / Keynote presentation. The day before your presentation, you must email me your presentation by 8:00 pm.

### **EXAMS**

Both exams will be taken during class time. However, the essay questions will be provided to students beforehand for maximum preparation. Questions will draw upon theory and empirical data that students have read and learned about in class.

### **REVIEW PAPERS**

You will write two short papers across the semester (4-5 pp, single-spaced, depending on assignment). Each assignment will be further explained in a handout but will require you to summarize an area of study using original research articles. *All writing assignments are due on the Canvas site by midnight on the due date.* Late assignments will be reduced by 1 point for each day they are late (each short paper is worth 15 points total, so this is almost an entire letter grade for each day late).

### **ACADEMIC MISCONDUCT**

The University of Michigan community functions best when its members treat one another with honesty, fairness, respect, and trust. The college promotes the assumption of personal responsibility and integrity, and prohibits all forms of academic dishonesty and misconduct. All cases of academic misconduct will be referred to the Office of the Assistant Dean for Undergraduate Education. Being found responsible for academic misconduct will usually result in a grade sanction, in addition to any sanction from the college. For more information, including examples of behaviors that are considered academic misconduct and potential sanctions, please see [lsa.umich.edu/lsa/academics/academic-integrity.html](http://lsa.umich.edu/lsa/academics/academic-integrity.html)

**STUDENT SEXUAL MISCONDUCT POLICY**

Title IX prohibits discrimination on the basis of sex, which includes sexual misconduct — including harassment, domestic and dating violence, sexual assault, and stalking. We understand that sexual violence can undermine students' academic success and we encourage anyone dealing with sexual misconduct to talk to someone about their experience, so they can get the support they need. Confidential support and academic advocacy can be found with the Sexual Assault Prevention and Awareness Center (SAPAC) on their 24-hour crisis line, 734.936.3333 and at [sapac.umich.edu](http://sapac.umich.edu). Alleged violations can be non-confidentially reported to the Office for Institutional Equity (OIE) at [institutional.equity@umich.edu](mailto:institutional.equity@umich.edu). You may find alternate syllabus statements and more information at [sapac.umich.edu/article/faculty-resources-sample-syllabus-language](http://sapac.umich.edu/article/faculty-resources-sample-syllabus-language)

**RELIGIOUS (OR OTHER ACCEPTABLE) CONFLICTS WITH ASSIGNMENTS**

If your ability to complete an assignment on time will be affected by your observance of religious holidays or practices, or because of a disability, please let me know well in advance (at least 2 weeks) so that I may arrange reasonable and fair accommodations.

**STUDENTS WITH DISABILITIES**

If you think you may need an accommodation for a disability, please let me know at the beginning of the term. Next, you should contact the Services for Students with Disabilities (SSD) office. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation (VISA) form and we can arrange for your accommodation. Any information you provide is private and confidential and will be treated as such. If you already have a VISA form from SSD, please present this form to me at the beginning of the term, but no later than at least two weeks prior to the need for the accommodation so that there is enough time for the appropriate arrangements to be made. You may find alternate syllabus statements and more information at [ssd.umich.edu/article/syllabus-statement](http://ssd.umich.edu/article/syllabus-statement)

**STUDENT MENTAL HEALTH AND WELL-BEING**

The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at 734.764.8312 and [caps.umich.edu](http://caps.umich.edu) during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at 734.764.8320 and [uhs.umich.edu/mentalhealthsvcs](http://uhs.umich.edu/mentalhealthsvcs), or for alcohol or drug concerns, see [uhs.umich.edu/aodresources](http://uhs.umich.edu/aodresources). For a listing of other mental health resources available on and off campus, visit [umich.edu/~mhealth/](http://umich.edu/~mhealth/)

**THIS IS AN INCLUSIVE CLASSROOM**

This is a lecture-based course and most of the content comes from review articles. This class is less subject to the types of conversations that make students feel more or less included. Nevertheless, I welcome viewpoints from all perspectives, and encourage students to make me aware of any oversight exhibited by me or another student that makes the classroom feel less inclusive or disadvantages a student in any way.

**COURSE OUTLINE**

Sep 04	(Tu)	What is evolutionary endocrinology?
Sep 06	(Th)	Overview of evolutionary principles
Sep 11	(Tu)	Overview of hormone systems
Sep 13	(Th)	Overview of hormone signaling pathways
Sep 18	(Tu)	Methods in evolutionary endocrinology
Sep 20	(Th)	Organization vs activation, sex differentiation
Sep 25	(Tu)	Species variability, Individual variability, phenotypic plasticity
Sep 27	(Th)	Hormones, genetics, epigenetics
Oct 02	(Tu)	Life history evolution - Overview, physiological constraints, tradeoffs
Oct 04	(Th)	Life-history evolution - Growth and maturation
Oct 09	(Tu)	Life-history evolution – Reproductive tradeoffs
Oct 11	(Th)	<b><i>In-class exam</i></b>
<b>Oct 16</b>	<b>(Tu)</b>	<b><i>Fall Break – no class</i></b>
Oct 18	(Th)	Writing tutorial / Library help
Oct 23	(Tu)	Male reproduction - Competition, aggression, Challenge Hypothesis
Oct 25	(Th)	Male reproduction - Signaling, Immunocompetence Handicap Hypothesis
Oct 30	(Tu)	Male reproduction - Paternal care, monogamy
Nov 01	(Th)	Stress – Overview <b><i>*Short paper 1 due*</i></b>
Nov 06	(Tu)	Stress - Adaptive vs non-adaptive stress
Nov 08	(Th)	Stress - Developmental constraints vs. predictive adaptive responses
Nov 13	(Tu)	Social relationships - Within-group
<b>Nov 15</b>	<b>(Th)</b>	<b><i>Conference - no class</i></b>
Nov 20	(Tu)	Environmental endocrinology: global change and conservation
<b>Nov 22</b>	<b>(Th)</b>	<b><i>Thanksgiving Break – no class</i></b>
Nov 27	(Tu)	Social relationships - Between-group
Nov 29	(Th)	Female reproduction – Signaling, mate choice
Dec 04	(Tu)	Female reproduction - Maternal care <b><i>*Short paper 2 due*</i></b>
Dec 06	(Th)	Female reproduction - Reproductive suppression
<b>Dec 11</b>	<b>(Tu)</b>	<b><i>In-class exam</i></b>