



Vertebrate Zoology

Zoo 3303

Fall 2017

3 credits



By: Mattie Squire, 2010

Instructor: Dr. Sarah L. Eddy

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Office Hour: Monday 12 – 1 pm,
Tuesday 12 – 1 pm,
Weds 2 – 3 pm,
Friday 9 – 10 am,
By appointment

Office: OE 215

Class:

Day/Time: Monday, Wednesday, Friday
8:00 am – 9:00 am

Location: Chemistry & Physics 197

** I only check my email weekdays between 9:00 am and 5:00 pm.

The Course Overview:

Course Purpose:

This course integrates multiple biological disciplines (including ecology, genetics, developmental biology, evolution, and physiology) to explore the biology and evolutionary history of vertebrates. We will survey the important theories and hypotheses about the biology of vertebrates and examine how these concepts were conceived and tested.

Course Outcomes:

Through this course, assuming you fulfill the expectations in this syllabus, you will be able to:

1. Describe the solutions employed by different groups of vertebrates to shared environmental challenges (i.e., adaptations) and explain how these environmental challenges shaped vertebrate morphology and life history.
2. Interpret phylogenies and describe the relationships between different vertebrate groups.
3. Categorize vertebrates by their morphological novelties.
4. Use vertebrate examples to explain ecological, physiological, developmental and evolutionary concepts.
5. Justify how data from scientific studies on vertebrates supports relevant ecological, physiological, developmental, and evolutionary concepts.

Text:

Pough, Janis and Heiser. 2013. Vertebrate Life. 9th edition. Pearson Prentice Hall Publishing.

How to use the Readings: The structure of the lecture is not paralleled by the book. For each lecture you will be directed to read multiple sections from the text. These sections will cover the day's topic and possibly more, so use the lecture to guide what you focus on in your readings.

Assignments and Assessments:

Point distribution:

Below is the maximum number of points possible in the course. *NOTE:* If changes happens I will make an announcement in class and provide a new grade breakdown on Blackboard.

Knowledge Check Questions: 1 pt x 37 classes =	40 pts (+3 bonus pts)
In-class Problems: 2 pts x 37 classes =	80 pts (+ 6 bonus pts)
Natural History Poster Project:	80 pts
Exam 1:	40 pts
Exam 2 (Cumulative):	80 pts
Exam 3 Cumulative):	80 pts
Exam 4 (Cumulative):	160 pts
Field Notebook (<i>Bonus Assignment</i>)	(+20 bonus pts)
Total Points Possible:	560 points

With these point totals at the end of the term, you will earn no lower than the following grades:

A: 502 or more points	D: 332 – 387 points
B: 446 – 501 points	F: < 332 points
C: 389 - 445 points	

Assignments:

A. Knowledge Check Questions (40 points). Exams in this course are cumulative. To help you review topics, we will start each day with a knowledge check question. These questions will be exam like practice that you will answer on your own without notes or the textbook. These questions are low stakes: 0.75 pts for serious participation (see Rubric below) + 0.25 points for a fully correct answer. You cannot make these points up. Everyone will be given three bonus points on this assignment, which allows you to miss up to three days of class with no penalty.

B. In-class problems (80 points). Each day in pairs, you will work on a series of questions as we progress through new material. One group member will record everyone's name and the group's answers to the in-class discussion questions. This will be turned in daily for up to 2 points each class. To get the points you do not need a correct answer, but rather show that your group attempted to answer the questions thoroughly (see Rubric below). If the sheet is not turned in at the end of class, your group will not get the participation points for that day.

Rubric for Knowledge Checks Questions and In-class Problems:

2 pts	Strong Effort	Students answered questions thoroughly, integrating related concepts/ideas, and/or support claims using evidence and/or carefully considered the question and explained their logic.
1 pt	Intermediate Effort	Students answered all the questions, but were not sufficiently thorough in integration related concepts and ideas, and/or do support claims and/or consideration of the question and explaining their logic.
0.25 pts	Cursory Effort	Students did not answer all the questions and/or those attempted were done at a very cursory level. Engagement with and consideration of the questions is not apparent.

C. Natural History Poster Project (80 points). Scientists use three different mediums to communicate their data and knowledge: writing, oral presentations, and posters. In this course, you will have an opportunity to practice this third method of presenting information. Students will create posters on a topic that interests them about vertebrate biology (including but not limited to animal behavior, adaptations to environment, taxonomy, etc). Partners for this project will be assigned the first week of class. Although some class time will be dedicated to this project, groups are expected to meet outside of class time to complete this assignment.

On **November 20th**, your group will present your poster to the class. In addition, this assignment will have benchmark assignments (outlined below) due throughout the term:

- I. Exploring the Primary Literature I** (*Due Friday Sept 8, 2017*). Each person in your group will identify two potential poster topics and read a research article on each, other than a review paper, from the primary literature on this topic. For each research topic, fill out the *Exploring the Primary Literature* worksheet and print out the first page of the article to turn in. *5 points*

- II. Identify Poster Topic** (*Due Friday Sept 21, 2017*). After reviewing each person's poster idea, each group will rank the poster topics their group came up with and turn this ranking in. Only one group can do each topic for the entire class, so you may not get your first choice of topics. *If you want to change your topic after Week 5*, e-mail me and I will let you know if anyone else has chosen your topic already. *5 points*

- III. Exploring the Primary Literature II** (*Due Friday October 20, 2017*). Each person in your group is responsible for reading three additional articles on your poster topic from the primary literature. For each you should fill out the *Exploring the Primary Literature* worksheet and print out the first page of the article to turn in. *15 points*

- IV. Feedback on Poster Outline.** Each group should make an appointment with me during Week 12 (*Nov 6 – Nov 9, 2017*) to go over their ideas for their poster. You should have a rough outline typed out. This can be a Word document outlining the different sections of your poster or a PowerPoint with a rough draft of the poster. Both partners should be present at this meeting. *5 points*

- V. Poster Session and Assessment** (*Monday November 20th, 2017*) You will present your posters in class. One partner will attend the group's poster and answer questions for the first half of class and the second will cover the second half of class. When you are not attending your poster, you will be responsible for assessing three assigned posters using a rubric. You will also identify the poster you think is the best poster and explain why they think it's the best. The best poster will receive +10 bonus points. *15 points*

- VI. Poster Assessment by Instructor.** After the poster session, I will assess your poster based on content and presentation. We will go through guidelines for making posters in class. *35 points*

D. Extra Credit: The Field Notebook (20 pts). One major goal of this course is to give you an appreciation of vertebrates and there are a lot of awesome ones right here in South Florida. To this end we want you to get out in the field to see them living their lives. Therefore, you can earn up to 20 points of extra credit for identifying vertebrates in the field. To earn these points you need to visit two sites and keep a Field Notebook. See Field Notebook handout on Blackboard for details of assignment.

Classroom Etiquette:

The ways in which we treat one another matters. In order to learn, every person must both be and feel safe enough to express themselves. As members of a learning community, we should strive to create a constructive learning environment for the entire class. Specifically, this means members of this class:

- Show respect and consideration for those speaking in class. For instance, avoid talking when an instructor or a classmate is speaking to your group or the class as a whole.
- Be as actively engaged in the class activities and discussions as you can. You can facilitate this by turning all electronic devices to silent or vibrate so they don't distract you or the learners around you. Also avoid accessing materials not related to the course during class time.
- Be prepared to contribute to the learning of your group. Share potential answers or questions you have and solicit questions and potential answers from all your group members, especially from those who are most quiet. If someone is struggling with a concept that you understand, help them. Explaining something to a peer both increases your own ability to remember it into the future (McKeachie and Svinicki 2006) and makes sure that no one remains confused at the end of the activity.

Equity in Learning: This class will be conducted in an environment that is open, welcoming, and safe to all students. The instructor is willing and committed to providing an atmosphere of support and affirmation for all people. **Do not** display disrespectful behavior toward any individual based upon age, ability, race/color/ethnicity, religious/spiritual, political affiliation, socioeconomic, immigration, marital, military/veteran status, gender identity/expressions, sexual/affectional orientations, relationship status, and/or anything that is likely to be perceived as disrespectful to someone's background, culture, or identity. **For instance, some derogatory, but commonly used language includes "that's gay" or "that's retarded."** Unprofessional, derogatory, and/or offensive behavior may result in disciplinary action.

Course Policies

Late Work Policy: The assignments in this course are intended to reinforce topics we are currently or have just covered, so you will get the most out of the course if you turn work in on time. **Due date extensions require at least two full weekdays advanced approval from your instructors.** For example, if an assignment is due Wednesday you need to e-mail a petition to me Monday before class. If an assignment is due Weds, you need to email a petition to me by

Friday. To apply for an extension, include in your e-mail the following information: (1) The assignment the extension is for, (2) An explanation of why you cannot turn the assignment in on time, and (3) When you will turn the assignment in. We will make a decision on the proposed extension within 24 hours of receiving your e-mail. **Without an extension you will be docked 2 points of your final grade on the assignment each day it is past due.**

Missing an Exam: If you will need to make up an exam you need to send me an email at least two weeks in advance of the exam with an explanation for why you are missing the exams and when you propose to make up the exam. **You can only make-up an exam by taking it early.** After an exam has been given to the entire class, you cannot take it. The most important thing is: if you miss an exam, email me.

Grade Concerns: **I will not be able to address grade concerns during class time.** If you would like to express concerns you have with how an assignment or exam was graded, e-mail me with the following information: (1) The specific question or questions you are concerned about, (2) The answer you gave on the assignment, and (3) Evidence that your answer merits more points than it was given. *Acceptable evidence includes:* passages from the textbook or other books (with citations and page numbers), peer reviewed journal articles (with a citation) and/or your lab manual. The instructors will review your evidence and determine whether you have supported your claim sufficiently well to earn back points.

Academic Honesty: This course is a professional setting and you are expected to conduct yourself in a professional manner. I believe in your ability and your integrity and I will hold you accountable for the highest standards of academic integrity, which you all can achieve:

“Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.”

For specifics, see the Academic Misconduct procedures & sanctions as outlined in the Student Handbook. (<http://academic.fiu.edu/polman/sec2web.htm> - two-forty-four)

Schedule of Topics:

Week	Date	Day	Lecture Class	Readings
Week 1	Aug 21	Mon	Overview of Major Themes and Review of Important Concepts	
	Aug 23	Wed	Overview of Major Themes and Review of Important Concepts	Pgs. 8 -15 (1.3 – 1.5)
	Aug 25	Fri	Overview of Major Themes and Review of Important Concepts	**same as 8/23**
Week 2	Aug 28	Mon	Major Vertebrate Transitions I	Pgs 18 – 27 (2.1 – 2.3, up to Embryonic Development)
	Aug 30	Wed	Major Vertebrate Transitions II	**same as 8/28**
	Sept 1	Fri	Major Vertebrate Transitions III	Pgs. 2 – 6; 30-32 (Mineralized Tissues & Bone); 47 – 66 (3.1 – 3.6)
Week 3	Sept 4	Mon	NO CLASS	NO CLASS
	Sept 6	Wed	Major Vertebrate Transitions IV	Pgs. 3 – 6 (Major Extant Groups of Vertebrates)
	Sept 8	Fri	Feeding Ecology and Morphology I	Pgs. 62 – 66 (3.6: The transition from jawless to jawed vertebrates); 109 - 112 (Jaws, Teeth and Feeding); 127 – 130 (Biology of Early Actinopterygians & Specializations of Teleosts, up to Specializations in Fins)
Week 4	Sept 11	Mon	Feeding Ecology and Morphology II	Pgs. 175 – 178 (8.2: Eating on Land); 205 – 208 (Patterns of Amniote Temporal Fenestration); 214 – 215 (Feeding Specializations of Plethodontid Salamanders); 459 – 462 (Evolution of Jaws and Ears)
	Sept 13	Wed	Feeding Ecology and Morphology III	Pgs. 520 – 527 (21.4: Specialization for Feeding)
	Sept 15	Fri	<i>Catch Up Day</i>	
Week 5	Sept 18	Mon	<i>Review or Catch Up Day</i>	
	Sept 20	Wed	Exam 1	
	Sept 21	Fri	Sensory Systems I	Pgs. 77 – 84 (4.2: Water and the Sensory World of Fishes); 108 - 109 (Sensory Systems and Prey Detection)
Week 6	Sept 25	Mon	Sensory Systems II	Pgs. 182 – 184 (8.6: Sensory Systems in Air); 281 – 282 (11.6: Sensing and Making Sense of the World: Eyes, Ears, Tongues, Noses , and Brains; <i>up to, but not including</i> Brains); 429 – 432 (17.6: Sensory Systems)
	Sept 27	Wed	Sensory Systems III	**Same as 9/25**

	Sept 29	Fri	Environmental Physiology I	Pgs 73 – 74 (Obtaining Oxygen in Water and Obtaining Oxygen from Air); 178 (8.4: Breathing Air); 239 – 241 (Cutaneous Respiration); 255 – 265 (11.1: Taking Advantage of the Opportunity for Sustained Locomotion & 11.2: Increasing Gas Exchange: The Trachea and Lungs)
Week 7	Oct 2	Mon	Environmental Physiology II	Pgs. 84 – 90 (4.4: Exchange of Water and Ions); 238 – 255 (10.4: Exchange of Water and Gases)
	Oct 4	Wed	Environmental Physiology III	Pgs. 84 – 90 (4.4: Exchange of Water and Ions); 271 – 280 (11.5: Getting Rid of Waste: The Kidneys and Bladder)
	Oct 6	Fri	Endothermy and Ectothermy I	Pgs. 90 – 94 (4.5: Responses to Temperature); 184 – 187 (8.8: Controlling Body Temperature in a Changing Environment); 266 – 271 (11.4: Taking Advantage of Wasted Energy: Endothermy); 360 – 365 (13.5: Behavioral Control of Body Temperatures by Ectothermy); 580 – 583 (22.1: Endothermic Regulation)
Week 8	Oct 9	Mon	Endothermy and Ectothermy II	**Same as 10/6 readings**
	Oct 11	Wed	<i>Catch Up Day</i>	
	Oct 13	Fri	<i>Review or Catch Up Day</i>	
Week 9	Oct 16	Mon	Exam 2	
	Oct 18	Wed	Locomotion I	61 – 62 (Origin of Fins); 130 – 131 (Specialization of the Fins); 137 – 141 (6.4: Locomotion in Water)
	Oct 20	Fri	Locomotion II	Pgs. 167 – 171 (8.1: Support and Locomotion on Land <i>up to</i> Appendicular Skeleton); 217 – 220 (Frogs and Toads – Anura); 255 – 274 (11.1: Taking Advantage of the Opportunity for Sustained Locomotion); 458 – 459 (#7- 10); 491 – 493 (Postcranial Features); 527 – 530 (21.5: Locomotor Specializations)
Week 10	Oct 23	Mon	Locomotion III	Pgs. 401 – 403 (16.9: The Second Evolution of Flight: Birds); 410 – 422 (17.2: The Structure of Birds & 17.3: Wings and Flight)
	Oct 25	Wed	Reproduction I	Pgs. 113 – 114 (Reproduction); 145 – 146 (6.5: Actinopterygian Reproduction); 204 – 205 (Structure of the Amniotic Egg & Origin of the Amniotic Egg); 222 – 237 (10.2: Diversity of Life Histories of Amphibians); 299 – 300 (Social Behavior and Courtship); 335 – 336 (Reproduction, Parthenogenesis); 338 (Parental Care); 432 – 440 (17.7: Social Behavior, 17.8: Mating Systems, 17.9: Oviparity, 17.10: Nests); 489-490 (Lactation); 553- 561 (21.1: Mammalian Reproduction, 21.2: Some Extreme Placental Mammal Reproductive Specializations, 21.3: Are

				Placental Mammals Reproductively Superior to Marsupials)
	Oct 27	Fri	Reproduction II	**Same as 10/25 readings**
Week 11	Oct 30	Mon	Reproduction III	**Same as 10/25 readings**
	Nov 1	Wed	Life History Strategies I: Sex Determination	Pgs. 301 -302 (Temperature-Dependent Sex Determination); 436-437 (Sex Determination); 499 (Sex Determination & Sex Chromosomes)
	Nov 3	Fri	Life History Strategies II: Migration	Pgs. 317 (Temperature Regulation and Body Size in Turtles); 322 – 325 (Navigation and Migration); 371 – 384 (Sections 14.2 – 14.3); 479 – 483 (Section 17.8); 588 – 595 (Section 22.3 and 22.4)
Week 12	Nov 6	Mon	<i>Catch Up Day</i>	
	Nov 8	Wed	<i>Catch Up Day or Review</i>	
	Nov 10	Fri	NO CLASS	NO CLASS
Week 13	Nov 13	Mon	Exam 3	
	Nov 15	Wed	<i>Topic: Student Choice</i>	
	Nov 17	Fri	<i>Topic: Student Choice</i>	
Week 14	Nov 20	Mon	POSTER SESSION	
	Nov 22	Wed	NO CLASS	NO CLASS
	Nov 24	Fri	NO CLASS	NO CLASS
Week 15	Nov 27	Mon	<i>Topic: Student Choice</i>	
	Nov 29	Wed	<i>Topic: Student Choice</i>	
	Dec 1	Fri	Review	
Finals Week	Dec 6	Wed	Final Exam: 7:30 am – 9:30 am	Chem & Physics 197