

# **BIOLOGY 3315**

## **COMPARATIVE VERTEBRATE MORPHOLOGY LAB**

### **COURSE INFORMATION**

#### **Instructor**

Shawn Miller, Ph.D.

Office hour: By appointment (smiller@biology.utah.edu).

#### **Expected Learning Outcomes**

In this class students will compare the form and structure of animals in the subphylum vertebrata (craniata), one of 3 subphyla in the phylum chordata. Students will use a variety of materials to examine vertebrate structure and will learn how to explain morphological variations evident from one vertebrate group to the next using the concepts of natural selection, vertebrate embryonic development, and form/function relationships. The materials students will use to accomplish these learning outcomes include whole and partial specimens, microscope slides, and models. Note that we do not have whole specimens for some of the larger vertebrates we will cover (e.g., cetacea, perissodactyla, etc) so for those groups we will use specific materials that are diagnostic or noteworthy.

#### **Course description**

This is a laboratory course that compares vertebrate structure and function and it is a separate class from BIOL 3310, therefore students register for this course independently. Naturally there will be overlap between the material covered in both courses because the topic is the same. However, this class may cover some items in a little more or a little less depth than that which is covered during lecture. For this reason the assignments and exams in this class will reflect the depth of coverage of the material in this class.

#### **Lab format**

Each lab will begin with a brief introduction. A number of stations will be set up in the lab on selected weeks. During the lab you should peruse each station and, using your lab handout, make note of the salient information being presented. Selected labs will also have a question set that you will work on during lab. These question sets are meant to stimulate critical thinking and are due by the end of the lab period. Think of the question sets like pop quizzes, if you are absent when one is handed out you will miss it. Feel free to ask questions and discuss the material during the lab session. I encourage discussion and suggest that you work on your question sets with one or two classmates. Finally, history clearly shows that students who do the best on the assignments and exams are those that use the **full** lab time wisely.

#### **Specimens**

Many of the dry specimens in this lab are fragile and rare. Please treat them carefully. In order to protect the specimens, I will provide wooden pointers for you to use, as I insist that no pencils or pens are used as pointers. Throughout the semester you will also have the opportunity to handle and study wet (preserved/dissected) specimens. Both dry and wet specimens, in addition to other materials used during lab, will be used to make up the practical exams even if they get damaged during lab use, so PLEASE HANDLE ALL MATERIALS WITH CARE!

#### **Lab materials**

We will be doing some dissection this semester so you may want to purchase a simple dissection kit. I will provide some basic tools, gloves, and scalpel blades. On days we dissect I suggest that you wear clothing that is okay to get dirty just in case something gets on them while dissecting. If you wear your hair long you may also want to bring something to pull your hair back.

#### **Food and Drink**

Food is not allowed in the lab at any time. You can bring in water but it has to be in a clear container.

## Coursework

All assignments and exams that will be used to determine grades are listed below:

Chordate review I quiz	10 points
Chordate review II quiz	10 points
Scaling and allometry assignment	20 points
Question sets (~5 sets, 10 points each )	~50 points
Participation points	40 points
Final Practical Exam	70 points
<b>Total Points</b>	<b>200 points</b>

The final practical exam takes a considerable amount of time to set up. Therefore, it must be taken on the day it is scheduled (see schedule of laboratories handout). We are not the only class using the lab so it is not possible to offer alternative times for this exams.

## Grades

The following scale will be used to assign grades for this class:

90.0—100% A	73.0—77.4% C+
88.5—89.9% A-	60.0—72.9% C
86.5—88.4% B+	50.0—59.9% C-
80.0—86.4% B	45.0—49.9% D
77.5—79.9% B-	0.00—44.9% E

All grades are final. There will not be any extra credit opportunities nor will there any opportunities to change your grade after you have completed the course. If you are scheduled to graduate or have been accepted into a professional program and your graduation or entry into the professional program depends on passing this course, then you must earn the necessary grade. Under no condition will make-up work or exam re-takes be given.

## Content Accommodations Policy

I do not grant content accommodation requests as the course content fulfills legitimate pedagogical goals.

## Important Information

**The Americans with Disabilities Act.** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 801-581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

**Addressing Sexual Misconduct.** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

**Names/Pronouns.** Class rosters are provided to the instructor with the student's legal name as well as "Preferred first name" (if previously entered by you in the Student Profile section of your CIS account, which managed can be managed at any time). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class or on assignments. Please advise me of any name or pronoun changes so I can help create a learning environment in which you, your name, and your pronoun are respected. If you need any assistance or support, please reach out to the LGBT Resource Center. [https://lgbt.utah.edu/campus/faculty\\_resources.php](https://lgbt.utah.edu/campus/faculty_resources.php)

**Campus Safety.** The University of Utah values the safety of all campus community members. To report suspicious activity, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit [safeu.utah.edu](http://safeu.utah.edu).

**Wellness Statement.** Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at [www.wellness.utah.edu](http://www.wellness.utah.edu) or 801-581-7776.

**Diversity / Inclusivity Statement.** It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

**Veterans Center.** If you are a student veteran, the U of Utah has a Veterans Support Center located in Room 161 in the Olpin Union Building. Hours: M-F 8-5pm. Please visit their website for more information about what support they offer, a list of ongoing events and links to outside resources: <http://veteranscenter.utah.edu/>. Please also let me know if you need any additional support in this class for any reason.

**English Language Learners.** If you are an English language learner, please be aware of several resources on campus that will support you with your language and writing development. These resources include: the Writing Center (<http://writing-center.utah.edu/>); the Writing Program (<http://writingprogram.utah.edu/>); the English Language Institute (<http://continue.utah.edu/eli/>). Please let me know if there is any additional support you would like to discuss for this class.

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**SCHEDULE OF LABORATORIES**

<b><u>Date</u></b>		<b><u>Topic</u></b>
August	22	Introduction to course
August	29	Chordate Overview, Part 1 - Protochordates and Fishes
September	5	Chordate Overview, Part 2 - Tetrapods <i>Chordate review I quiz - 10 points</i>
September	12	Vertebrate Body, Scaling, Allometry, and Heterochrony <i>Chordate review II quiz – 10 points</i>
September	19	Skeletal Tissues, Teeth and Dentitions
September	26	Integument <i>Scaling and Allometry homework due – 20 points</i>
October	3	Skulls and Visceral Skeletons
<b>October</b>	<b>10</b>	<b>FALL BREAK – NO LABS THIS WEEK</b>
October	17	Body Skeleton
October	24	Muscles - Branchial Arch Muscles
October	31	Muscles - Hypobranchial and Body Wall Muscles
November	7	Muscles - Limb Musculature
November	14	Respiratory and Circulatory Systems
November	21	Digestive and Urogenital Systems
<b>November</b>	<b>28</b>	<b>THANKSGIVING – NO LABS</b>
<b>December</b>	<b>5</b>	<b>FINAL PRACTICAL EXAM - 70 POINTS</b>