

Comparative Vertebrate Anatomy: BIOE 134/L
Summer 2018

Lecture (70889): Tuesday, Thursday 9:00AM-12:30PM Coastal Biology 115
Lab (70890): Tuesday, Thursday 1:00-4:00PM Coastal Biology 115

Instructors: Dr. Rita S. Mehta
Office Hours: *12-1pm, during labs, or by appointment
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TA: Kristina Akesson (Kakesson@ucsc.edu)
Office Hours: *Kristina will be available during the labs, after labs for about an hour, or by appointment. Kristina's office is in the Mehta Lab, CBB 165.

*To schedule an appointment with any one of us, please try and provide us with at least 24-hrs notice through an email.

Book: Your Inner Fish, by Neil Shubin (Available at the Bay Tree Book Store)

Lecture Material: Much of lecture material comes from select chapters from Comparative Anatomy, Function, Evolution. K. Kardong 7th Edition and original research from the PI's lab or the primary literature for which references or papers will be provided. I tend to not provide power points but you will have access to videos for one of the lectures and we will provide you with notes from the lectures. Our TA will take detailed notes. However, if these notes are abused in any way or are substituted for class attendance, we will reconsider posting notes. I do not allow students to take photos of my slides during lecture.

Course Objectives and Goals:

1. Understand basic concepts of evolutionary biology and classification of vertebrates.
2. Become familiar with form and diversity of the following systems: Skull, axial skeletal, and muscular system
3. Be proficient in anatomical dissection
4. Understand basic principles of functional morphology; in particular, how form contributes to different feeding and locomotor behaviors.

<u>Grading:</u>	<u>Points</u>	<u>Letter Grades (based on %):</u>
Lecture:		
3 Exams: 2 Midterms & 1 Final	(100 pts each)	
4 Quizzes (10 pts each)	40	97-100 = A+ 80-83 = B-
Participation (in class/OH)	10	94-96 = A 77-79 = C+
Fish Skull activity (5 pts)		90-93 = A- 74-76 = C
Vertebral activity (5 pts)		87-89 = B+ 70-73 = C-
<u>Assignments (in/outside lecture)</u>		84-86 = B 60-69 = D
Fish Skull Activity	20	
Design 2 Skulls (each, 10 pts)	20	< 60 = F (no course credit)
Creativity	10	
Sketch Science	30	
Total possible points	430	
Laboratory:		
2 Lab practicals (100 pts each)	200	
2 Mock practicals (10 pts each)	20	
Owl Pellet (pts awarded per region)	50	

Skull (10 pts)	
Axial Skeleton (10 pts)	
Appendicular Skeleton front (10 pts)	
Appendicular Skeleton back (10pts)	
And presentation (10 pts)	
Dissection (5 x 10 pts)	50
Participation in skeletal labs (10 pts each)	20
Total possible points	340

Attendance/Participation: Required for all lectures and laboratories. Students must be punctual to class. Attendance and participation are components in your evaluation. Only rarely are course exams allowed to be made up, and then only with a written medical excuse from your physician. We cannot make up labs in summer session. You are welcome to perform the lab on your own. You will be docked 5 points for each lab and each dissection that is missed.

It is imperative that you come prepared to lecture and laboratory. The laboratory reading assignments should be read **BEFORE** coming to lab. We will be lenient on the first lab if needed. All of these materials will be on Canvas. If you have to miss lab for any reason that is not a medical emergency, we expect that you will make time to conduct your own dissection at home.

Examinations: Students will not be allowed to leave the room during any examination. Please use the restroom ahead of time. No make-up exams will be given with the exception of a legitimate medical excuse (must be doctor's written medical excuse).

Honor Code: There will be zero tolerance on infractions to the honor code. Please refer to <http://deanofstudents.ucsc.edu/pdf/student-handbook.pdf> (Pay special attention to the following sections: 102.011 Cheating, 102.012 Plagiarism, 102.013 **Furnishing false information in the context of an academic assignment**, 102.014 **Creating an improper academic disadvantage to another student or an improper academic advantage to oneself**, 102.015 **Interference with courses of instruction**, and 102.016 **Theft or damage of intellectual property**).

At the end of the course, students with continually improving grades **may** be given **some** additional consideration. An incomplete grade (I) is given only in accordance with university criteria (see <http://registrar.ucsc.edu/navigator/section4/performance/incomplete%20.html>; if criteria are met, a written contract must be signed both by instructor and student, it is not intended as an escape clause for poor performance).

How to learn anatomy:

Comparative Vertebrate Anatomy is not a course that can be easily learned in a few hours a week. The dissections take time and there is nothing that takes the place of spending the necessary time in the lab as allotted every Tuesday and Thursday.

To successfully learn the principles examined in this course, we encourage you to come to lectures, review your notes, and practice new terminology. In addition, study groups with your fellow students will allow you to further explore the material by teaching each other. Learning biology does not involve osmosis-rather, you must actively review the material from the textbook, lecture, and laboratory. We are also available if you have any questions, concerns, or comments. If you are still unsure on how to study, feel free to contact us. Please refer to the syllabus for our availability.

What is conceptual about anatomy? Understanding muscle attachment, origin and insertions, how contraction works is all conceptual. Spatial orientation should be somewhat intuitive and will help you

understand how movement occurs through contraction of different muscles. **Terminology is absolutely not conceptual. Terminology is memorization. Terminology is how we will communicate so please learn your terminology.**

Use of Animals

In this class we will be **dissecting** a number of different animals including a **lamprey, fish, frog, and rat**. We expect that all animals will be dissected properly and respect be given to the animals. We use real animals for dissection because it provides greater learning than models or computer programs. To learn anatomy effectively, you must get your hands dirty (figuratively, we have gloves to keep your hands clean). If you have concerns with the dissections, please come to see me so we can discuss your concerns. Dissection is required and learning this subject matter will be much easier if you work in teams of 2 but make yourself accountable for learning all of the material. **Please do not take photos of the dissections and share them on Facebook, Instagram, Snapchat, or any other social medias.**

Accessibility:

Students with disabilities are encouraged to speak to Professor, Rita, and TA, Kristina, about accommodations they may need to produce an accessible learning environment.

Syllabus for Comparative Vertebrate Anatomy Lecture and Lab

Week	Date	Lecture (9:00 AM – 12:00PM)	Lab (1PM – 4PM)	Readings & Home work
	Tuesday 7/31	Syllabus Activity: Sketch / note taking (Katherine Dale, Mehta Lab Doctoral Student) Lecture: Origin of Chordates In Class Reading: Lab I: Lamprey Dissection	Lab I: Lamprey Dissection Activity: Clean Owl Pellets	-Geological Time Periods - Review Lecture Notes -Read Chapters 1-2 of <u>Inner Fish</u> -Read up on the lab for 8/2
	Thurs 8/2	Quiz I: Chapters 1-2 of <u>Your Inner Fish</u> Quick Discussion: Chapters 1-2, <u>Inner Fish</u> Lecture: Survey of Vertebrates Diversity Activity: Building Phylogenies	Lab II: Fish Morphology & Musculature Activity: Mock Practical with Lamprey Lab III: Begin Frog Dissection	-Chapters 3-5 of <u>Inner Fish</u>
2	Tues 8/7	Midterm I: Material from week 1+ <u>Your Inner Fish</u> 1-5 Lecture: Skull Diversity & Feeding Activity: Build a Fish Skull	Lab III: Frog Dissection Activity: Review Lamprey, Fish, Frog	-Chapters 6-7 of <u>Inner Fish</u>

	Thurs 8/9	Quiz 2: Chs 6-7 of <u>Your Inner Fish</u> Lecture: Skull Diversity & Feeding Take-Home Assignment: Build 2 skulls Lecture: Bone & Scaling	First Lab Practical <i>Lamprey</i> <i>Fish,</i> <i>Frog</i>	-Chapters 8-9 of <u>Inner Fish</u> -Build 2 skulls
3	Tues 8/14	Midterm II (Lectures- Skull Diversity + Bone and Scaling + <u>Your Inner Fish</u> Chs 6-9) Activity: Assign Functional Morphology Paper	Lab IV: Skull Diversity + Tooth Diversity	-Chapters 10-11 of <u>Your Inner Fish</u> - -Build 2 skulls (Due 8/16) -Watch Axial skeleton video & take notes
	Thurs 8/16	Assignment of Build a Vertebrate Skull is due! - 20 points Quiz 3: Chs 10-11 of <u>Your Inner Fish</u> Activity: Vertebral Building	Lab V: Axial Diversity Activity: Owl Pellet identification Take home owl pellet and finish on own	-Owl Pellet Activity Due on 8/23 in lab -Begin Reading Functional Morphology Paper/ Meet with Group -Read Standen et al. 2014 for Tuesday's Quiz
4	Tues 8/21	Quiz 4: Standen et al. 2014 Lecture: Water to Land Transition	Lab VI: Rat Activity: Mock Practical	-Owl Pellet Activity Due on 8/23 in lab -Review Functional Morphology Paper for Lecture - Study for final exam
	Thursday 8/23	Activity: Sketch Science → alternative mode of communication	Lab VII: Rat OWL PELLET DUE	
5	Tues 8/28	Lecture Final Exam	Open Lab (Rat)	
	8/30	Office hours for Rita & Kristina (Beginning at 10:00 am)	Final Practical	