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BIOE 403.01: Functional Vertebrate Morphology

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Biology (BIOE) 403: Functional Vertebrate Morphology Spring 2016 Lab Syllabus

Thursday 2:10-5:00 pm, Friday 2:10 – 5:00 pm, HS 102

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Office Hours will be during open lab and by appointment.

Text: Homberger and Walker, *Vertebrate Dissection*

There are also numerous websites, alternate dissection guides, and study guides that may help in the study of comparative anatomy.

Lab handouts will be available on moodle in advance of lab at <http://umonline.umn.edu>

It is your responsibility to print out handouts and finish all of the reading and pre-lab work *prior* to coming to the lab.

Friday sessions will generally be held at the Field Research Station at Fort Missoula. These sessions provide time in an active biomechanics and functional anatomy lab for **group research projects** on novel scientific questions. Thus the exact time and dates that you will be required to attend will depend on your project. Project assignments will be made in the first two weeks. At the end of the semester, you will write your own scientific manuscript, and perform a professional group presentation of the results of your research. Times of meetings will be announced, due dates are on the attached handout.

Homework/Quizzes: each lab (11 labs total) will have homework questions to be completed before lab and a quiz questions during lab (5 points total for each lab). Your lowest quiz/homework score will be dropped. Quizzes will provide examples of the types of questions on the **practical exams**.

Exams will consist of practical questions about structures, functions, and comparisons of anatomy. There will be *no* makeup quizzes or exams, period.

Lab Points:

Quizzes, Homework	50
1st lab practical	50
2nd lab practical	50
Group project	50
Participation/Preparation (20 pts)	
Group Evaluation (10 pts)	
Group Presentation (20 pts)	
	200 points

Schedule (subject to revision)

<u>Month</u>	<u>Date</u>	<u>Day</u>	<u>Lab and assignments</u>
January	26	Thurs	Diversity (specimens, gathering morpho data)
	27	Fri	Diversity (continued; suppl.) HW/Q #1 – Taxonomy Questions. Due start of lab next week
February	2	Thurs	Phylogenetic Analysis
	3	Fri	No Lab, continue Phylogenetic Analysis HW/Q #2 – Lab Handouts week 1 and 2. Due start of lab next week
	9	Thurs	Biomechanics Lab Field Station; Biomechanical techniques: sonomicrometry and strain gauges
	10	Fri	Initial Meetings, All Groups, Field Station HW/Q #3 – Construct an Evogram. Due start of lab next week
	16	Thurs	Lab 1a: Introduction to anatomy and chordates; post-cranial skeleton of cat
	17	Fri	Lab 1b: Comparative post-cranial skeleton. HW/Q #4 – QUIZ on Friday, start of lab.
	23	Thur	First Draft of Proposal Due (Introduction) Lab 2: Cranial skeleton anatomy and Comparative skulls: evolution/migration of inner ear ossicles HW/Q #5 – QUIZ on Thursday, start of lab.
	24	Fri	First Group Experiment Field Station
March	2	Thurs	Lab 3: Muscle dissection: proximal-appendicular, and major axial Muscles HW/Q #6 – QUIZ on Thursday, start of lab.
	3	Fri	Second Group Experiment Field Station
	9	Thurs	Lab 4: Muscle dissection: distal forelimb and cranial musculature HW/Q #7 – QUIZ on Thursday, start of lab.
	10	Fri	Third Group Experiment Field Station
	16	Thurs	Lab 5: Comparative Muscle Dissections HW/Q #8 – QUIZ on Thursday, start of lab.
	17	Fri	Final Draft of Proposal Due (Intro and Methods) Finish Dissections, Lab Study, Prosections,
	23	Thurs	Spring Break
	24	Fri	Spring Break
April	30	Thurs	Practical Exam I
	31	Fri	Lab 6: Nervous System Brain and Eye HW/Q #9 – In-class activity.
	6	Thurs	Lab 7: Circulatory system I dissection: the heart, arteries, and veins.
	7	Fri	Lab 8: Circulatory system II HW/Q #10 – In-class activity.
	13	Thurs	Lab 9: Respiration, Vocalization, Digestion HW/Q #11 – QUIZ on Thursday, start of lab.
	14	Fri	Open lab; Experiments or Analysis time

	20	Thurs	Experiments or Analysis time
	21	Fri	Review for Lab Practical 2
	27	Thurs	Lab Practical 2
	28	Fri	Experiments or Analysis time
May	4	Thurs	Work on Presentations
	5	Fri	Symposium at Field Station
	11	Thurs	Final Paper Due

BIOE 403 2013 Research Projects

Initial meetings: Each group will meet at the designated times to discuss the rationale behind the project. Literature will be distributed at this time to aid in a more detailed literature search in preparation for writing the proposals.

Proposals: Must be submitted by noon on the date specified. They must be submitted electronically (as a MS Word attachment) via email. Receipt will be confirmed by email. Editing suggestions will be made, and the rewrites will be due before starting the experiment. No late proposals will be accepted. Each person must write their own proposal.

Experiments: All group members are required to attend all parts of the experiment. Some may have both morning and afternoon times. The total amount of time for the experiment will be at least five hours.

Manuscripts: Must be submitted by noon on 11 December. They must be submitted electronically (as a MS Word attachment) via email. Receipt will be confirmed by email. Format should follow the *Journal of Experimental Biology* (<http://jeb.biologists.org>) . No late manuscripts will be accepted. Each person must write their own manuscript.

Presentations: There is a 30 minute slot for each presentation. Please allow 5 – 10 minutes for a question-and-answer session within that slot. Presentations must be made using MS Powerpoint and brought to the session (Field Station) via CD or USB key to upload to the presentation computer at least 15 minutes before the start of the session. All group members should play equal parts in the presentation. Details on format for proposals, manuscripts, and presentations will follow.

Learning Outcomes

1. Students will be able to discuss and write syntheses of the major themes in the evolution of vertebrate form and function.
2. Students will be able to graph, problem-solve, and interpret figures describing patterns and processes in functional morphology, comparative biomechanics and physiology.
3. Students will be able to conduct all aspects of an original, guided research project within a small group, with products including a research paper and a public presentation both summarizing the experiment and results.
4. Students will be able to identify anatomical traits and functions in all chordates.
5. Students will be able to dissect and identify anatomical traits and functions in a representative mammal specimen.

Course and University Policy:

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and /or a disciplinary sanction by the University

All students need to be familiar with the [Student Conduct Code](#).

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