Moravian College
Department of Biological Sciences
Biology 310 – Vertebrate Anatomy
Fall 2014

Instructor: Dr. Fran Irish **Office Phone**: 610-861-1427
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Office hours: Tuesday 9:00 – 11:00 am, Wednesday 1:00 – 3:00 pm, or by appointment
Lecture: Monday, Wednesday, and Friday 7:50 – 8:40 a.m., PPHAC 235
Laboratory: Monday 1:15 p.m. – 4:15 p.m., HOSCI 302

Required Textbook: *Vertebrates: Comparative Anatomy, Function, Evolution*, 7^{th}. *Edition,* by Kenneth V. Kardong, 2015.
Required Lab Manual: *Comparative Vertebrate Anatomy: A Laboratory Dissection Guide, 7^{th}. Edition,* by Kenneth V. Kardong and Edward Zalisko, 2015.
Other required equipment: dissection kit (provided in lab), goggles (bookstore, if you don't have them already), lab coats (provided), loose-leaf binder with lined and unlined paper for lab notebook.

Course Description: An in-depth exploration of the structure and function of vertebrate animals in an evolutionary context. Laboratory exercises examine the structural diversity of vertebrate organ systems through dissection of representative vertebrate classes. This course is designed to provide a strong foundation in anatomy for students going on to a graduate or professional school in the human health or veterinary sciences.
Prerequisites: Biology 112.

Course Objectives: By the end of this course, students should:
1. Know the current views on the origin of vertebrates.
2. Recognize the basic body plan common to all vertebrates due to shared ancestry.
3. Be familiar with the major vertebrate clades and their diverse adaptations.
4. Be able to identify and provide a basic description of how major vertebrate organ systems function.
5. Know basic anatomical terms and descriptors.
6. Attain proficiency in observational skills and the art of dissection.

Blackboard: All information associated with this course will be posted on Blackboard. I recommend that you check the announcements regularly for news about quizzes, review sessions, etc. You must register yourself for this course on Blackboard *as soon as possible*---your opportunity to register will expire on Tuesday, September 2rd. The course ID is BIOL310.FA14 and the enrollment code is "anatomy." If you have difficulty with this, PLEASE E-MAIL ME IMMEDIATELY!

LECTURES: My lectures will be in the form of power point presentations, which will be posted on Blackboard after the previous lecture (two days before each class). It is your responsibility to download the lectures and print them for your use in the classroom so that those of you who are slow note-takers or abysmal artists will not be struggling to keep up, and all of you can attend more carefully to what I say. HOWEVER, the posted lectures will not contain everything I say--- you will have to add the details if you are to have an effective study aid. THUS, tempting though it may be, you cannot sleep in without jeopardizing your grade, either directly (by lowering your class participation grade) or indirectly (by leaving you behind in the dust). And yes, you do need to take notes.
Lecture attendance: I know this is an early class, but I expect you to attend class and *arrive on time*. Students may miss class three times with no penalty (this includes illness, athletic activities, field trips, etc.). If you miss more than three classes, I will deduct 10 participation points for each day missed. If you anticipate missing more than three classes, contact me as soon as possible.
***Socrative*:** This semester, we will be piloting the use of *Socrative*, a free app for any mobile device (laptop, tablet, or cell phone) that allows students to electronically answer questions posed by the instructor during class. Answering questions will be part of your class participation grade. More instructions will follow.
Policy on electronic devices: Cell phones must be on silent mode during lecture, and I ask that you refrain from texting during class. You may bring a laptop or tablet to class to take notes, but if the temptation to

play games, chat with friends, etc., appears to be irresistible, I will ask you to put the device away, as engaging in ancillary activities is distracting to you and those around you and rude to the instructor.
Reading assignments: I expect you to come to class prepared to discuss the assigned material, so please read the relevant chapter from the textbook (listed on the lecture schedule) before each lecture to get a feel for the material I will be covering. After class, use the text to amplify your lecture notes in areas you don't understand. Please note *Appendix C: Greek and Latin combining forms*; this will help make sense of anatomical terminology.
Study questions: I will post study questions after every lecture. Because many of the essay questions on exams are taken from these study questions, *it is in your best interest to write out the answers to these questions* (but do not try to answer them all the night before the exam).
Lecture quizzes: At the beginning of class on most Fridays, there will be a short quiz (10 points) covering the lectures from the previous week. This is not done to make your life miserable, but to encourage you to keep up with the class by reviewing the lectures each week. Quiz days are marked on the lecture schedule. I will announce any changes to the quiz schedule---but when in doubt, assume we are having a quiz. Plan to arrive for class on time, as *late arrivals will not be allowed to take the quiz, and missed quizzes cannot be made up*. You are allowed to miss 2 quizzes without penalty, but you must contact me to explain your absence. One quiz grade will be dropped when computing your final grade.

PRESENTATION AND PAPER: Readings of current original research papers in the field of functional or evolutionary vertebrate anatomy will supplement the lecture material. *Working in pairs*, you will select a topic and give an oral presentation of a journal paper on that topic to the class during the first 15 minutes of the assigned lecture day. The paper must be selected from recent issues (1990 to the present) of a peer-reviewed journal and must be on functional or evolutionary vertebrate anatomy. I must approve the paper and you must provide me with a pdf or copy (electronic is fine) at least one week prior to your presentation. You will be graded on your oral presentation and a single spaced, typed summary/critique (3 page limit) of your chosen article to be turned in at the class following the oral presentation (electronic submission is fine).

LABS: You are expected to read the assigned lab exercises BEFORE coming to lab (this includes both the assigned sections of the lab manual and the lab handouts, which will be distributed in class on the Friday before the lab and posted on Blackboard). Labs are designed to fill the 3-hour lab period, so please do not plan on leaving early. If you do not finish the required exercises, it is your responsibility to come in and finish the lab at another time. Please bring your lab manual, handouts, and lab notebook to every lab.
Lab attendance: Don't even consider missing a lab unless you are ill or have some other emergency. IT IS THE STUDENT'S RESPONSIBILITY to arrange to make up a missed lab before the next lab quiz or practical. Be aware that I may not be available to guide you as I would during the scheduled lab period. Make-up labs will be offered at the discretion of the instructor.
Lab notebook: Critical observation is absolutely essential to science. Therefore, I ask that you bring a loose-leaf binder to lab (I will provide unlined paper for drawings). This binder will hold all lab handouts, plus your notes, drawings, and any written work assigned for the labs. The goal of the notebook is to hone your powers of observation and provide you with a useful study tool. The lab handouts will tell you what information must be included in your lab notebook. Each exercise will be graded in lab; if you are running behind, you may have until the next lab period (one week) to complete all required exercises.
Lab quizzes: We will not have regular lab quizzes, but I may give a quiz if I think it would further your learning. All quizzes will be announced.

EXAMS: Please see the lecture and lab calendars below for the exam schedule. Make-up exams will be given at the discretion of the instructor. It is the student's responsibility to contact the instructor BEFORE the missed exam, provide an appropriate excuse, and make arrangements to take the exam at another time. LAB PRACTICALS CANNOT BE MADE UP. If your absence is not excused, you will receive a 0 for the missed exam. ***Absolutely no activated electronic devices will be allowed during exams (this includes cell phones and ipods)***. If you are seen using one of these devices for any reason during an exam, you will receive a "0."

GRADING: Your scores for all assignments and exams will be posted on Blackboard, so you can see how you are doing at any time. The grading scale will be posted following the first lecture exam. There will be no extra credit options beyond the occasional extra question on exams, so please focus your energy on what we are doing in class and lab.

3 lecture exams (80 points each)	240 points	
Final lecture exam	160 points	
Lecture quizzes/homework (10 points each)	100 points	
Presentation and research paper	50 points	LECTURE: 550 points
2 lab practicals (100 points each)	200 points	
Muscle quiz (40 points)	40 points	
Laboratory notebook	110 points	
Quality and thoroughness of dissections	50 points	LAB: 400 points
Class participation*	50 points	
Final grade	**1000 points**	

*Class participation includes attendance, preparation for class and lab, participation in discussions, and completion of all assignments. Please note that the instructor may exercise qualitative judgment in determining your final grade.

Disability support: Students who wish to request accommodations in this class for a disability must contact Ms. Elaine Mara, assistant director of academic support services for academic and disability support, at the lower level of Monocacy Hall, or by calling 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

Policy on honesty: Students are expected to abide by the college policy on intellectual honesty (see Student Handbook).

TIPS FOR DOING WELL IN THIS COURSE: If you find yourself falling behind, or you are struggling to learn the material, *please contact me right away*. I am here to help you!

Lecture exams:

1. ***Come to class ON TIME***
2. Do not fall behind---review and annotate your lecture notes, using the text to clarify things you do not understand. If the text cannot help you, please ask me. My opinion of you will not plummet if you ask a question, so don't be shy.
3. Review for each Friday quiz.
4. *Write out* the answers to the study questions posted after each lecture. *Think* about these questions as you answer them.
5. You are responsible for knowing the material I present *in lecture*---I encourage you to read relevant sections of the textbook, but *do not try to memorize the textbook*.

Lab quizzes and practicals:

1. Attend all labs.
2. *Prepare* for each lab by reading the lab exercise *before* you walk into the lab.
3. Do not try to race through the lab exercises---be sure you understand what you are supposed to see, and be sure you actually see it before you leave. If you are confused, ask questions---I am there to help you!
4. Put care and effort into your lab notebook. You may find the lab practicals challenging, but the notebook grade is directly under your control.
5. Come to the "open lab" review sessions before the lab practicals, and prepare by making a list of the things you need to review. Listen to the other students---they may ask things you didn't think about.

Vocabulary:

1. The single greatest barrier to learning anatomy is the vocabulary. Do whatever you need to do to learn the terminology----flashcards, glossaries, diagrams, study groups, etc.

LECTURE SCHEDULE

Week		Lecture topic	Text reading
August 25	M	1. Protochordates	Chapter 2
	W	2. Chordate origins	Chapter 2
quiz	F	3. Vertebrate origins	Chapter 3
September 1	M	4. Ontogeny	Chapter 5
	W	5. Ontogeny	Chapter 5
quiz	F	6. Integument	Chapter 5-6
September 8	M	7. Integument	Chapter 6
	W	8. Integument	Chapter 6, Ch. 1, p. 20-29
quiz	F	9. Systematics & Geological Time Scale	
September 15	M	**LECTURE EXAM 1** (80 points)	
	W	10. The skull	Chapter 7
	F	11. Skull & teeth	Ch. 7, 13, p. 506-516
September 22	M	12. Axial skeleton	Chapter 8
	W	13. Axial & Appendicular skeletons	Chapter 8, 9
quiz	F	14. Appendicular skeleton	Chapter 9
September 29*	M	15. Vertebrate diversity: Fish to tetrapods	Chapter 3
	W	16. Vertebrate diversity: Amphibians to lizards	Chapter 3
quiz	F	17. Vertebrate diversity: amniotes	Chapter 3
October 6	M	18. Vertebrate diversity: synapsids	Chapter 3
	W	19. Introduction to muscle systems	Chapter 10
	F	**LECTURE EXAM 2** (80 points)	
October 13	M	***FALL BREAK--- NO LECTURE OR LAB***	
	W	20**.** Muscle systems, continued	Chapter 10
quiz	F	21. Digestive systems	Chapter 13
October 20	M	22. Digestive systems, continued	Chapter 13
	W	23. Digestive & respiratory systems	Chapter 13, 11
quiz	F	24. Respiratory systems	Chapter 11
October 27*	M	25. Circulatory systems	Chapter 12
	W	26. Circulatory systems	Chapter 12
quiz	F	27. Urogenital systems	Chapter 14
November 3	M	28. Urogenital system	Chapter 14
	W	29. Reproductive systems	Chapter 14
quiz	F	30. Introduction to the nervous system	Chapter 16
November 10	M	**LECTURE EXAM 3** (80 points)	
	W	31. Central nervous system	Chapter 16
	F	32. Peripheral nervous system	Chapter 16
November 17	M	33. Autonomic nervous system	Chapter 16
	W	34. Sensory organs	Chapter 17
quiz	F	35. Sensory organs, cont'd.	Chapter 17

November 24*	M	36. Sensory organs, cont'd	Chapter 17
	W-F	***NO LECTURES---THANKSGIVING***	
December 1	M	37. Endocrine system	Chapter 15
	W	38. Endocrine system, cont'd	Chapter 15
	F	39. Endocrine system, cont'd	Chapter 15

* lab practical week

THURSDAY, DECEMBER 11TH, 8:30 AM—FINAL LECTURE EXAM (160 points)

EXAM SCHEDULE

September 15: **Lecture exam 1** (80 points)

September 29: ***Lab practical*** 1 (100 points)

October 10: **Lecture exam 2** (80 points)

October 27: ***Muscle quiz*** (40 points)

November 10: **Lecture exam 3** (80 points)

November 24: ***Final lab practical*** (100 points)

December 11: **Final lecture exam** (160 points)

LABORATORY SCHEDULE

Week	Laboratory topic	Exercise in lab manual
August 25	***NO LAB***	
September 1	Lab 1: Protochordates and lamprey	Exercise 1
September 8	Lab 2: The vertebrate integument	Exercise 4
September 15	Lab 3: Skull & teeth	Exercise 5
September 22	Lab 4: Axial & appendicular skeleton,	Exercise 5
September 29	**LAB PRACTICAL** (100 points) Lab 5: Connective & muscle tissues	 Exercise 5, 6
October 6	***NO LAB---FALL BREAK***	
October 13	Lab 6: Muscles of the cat (forequarters)	Exercise 6
October 20	Lab 7: Muscles of the cat (hindquarters)	Exercise 6
October 27	**MUSCLE QUIZ** (40 points) Lab 8: Digestive systems	 Exercise 7
November 3	Lab 9: Circulatory systems & heart, Respiratory systems	Exercise 8
November 10	Lab 10: Urogenital systems	Exercise 9
November 17	Lab 11: Brain & cranial nerves	Exercise 10
November 24	**FINAL LAB PRACTICAL** (100 points)	
December 1	***NO LAB***	

Please note: this syllabus acquaints you with the topics I hope to cover in the order I hope to cover them, but I may make changes as we progress through the semester.