



# Biology 160 – Animal Biology

## University of Wisconsin Stevens Point at Wausau

### Spring 2022

- Instructor** Paul Whitaker, Rm 285C, [pwhitake@uwsp.edu](mailto:pwhitake@uwsp.edu), 715-261-6284
- Lectures** Tuesdays, Thursdays, Fridays, 9:00-9:50 AM in WAUS Room 180
- Labs** Mondays, 8:00-10:50 AM in WAUS Room 271.
- Office hours** Fridays, 8:00-8:50 AM and 10-10:50 AM. If you'd like to meet at another time, either in person or via Zoom, please ask. Office hours are time for you to ask questions, get study suggestions, review lab materials and activities, offer kudos or complaints, or just chat.
- Required text** Hillis, Price, Hill, Hall, & Laskowski. 2019. Principles of Life, 3rd edition, Oxford University Press. This book is available through UWSP's text rental program. **In all course materials, the textbook is abbreviated as PoL.** There is no separate laboratory textbook.

**Electronic course materials** All course materials other than the textbook, (lecture notes, PowerPoints, lab handouts, lecture recordings, etc.) will be made available in Canvas. If you would like a hard copy of any of these, you will need to print them out for yourself.

**Course overview** The UWSP Catalog states that BIOL 160 covers "Anatomy, physiology, adaptation, and classification of animals; morphology and anatomy of various types of animals." The UWSP Biology department has established these learning outcomes (things you should be able to do by the end of the course):

1. Explain how scientific inquiry is different than other intellectual endeavors.
2. Recognize cell theory, inheritance, evolution, and developmental biology as the foundations of zoology.
3. Integrate various levels of biological organization and their emergent properties.
4. Compare and contrast animal body-plans and physiological processes in animals from different phyla.
5. Apply principles of zoology to broader personal and societal issues.

UWSP's Associate Degree Assessment Program has these learning objectives for this class:

- NW LO1: Describe and evaluate existing knowledge of the natural world;
- NW LO2: Interpret, analyze and communicate data, results, and conclusions; and/or
- NW LO3: Apply concepts across disciplines.
- LS LO1: Use scientific methods and tools for investigation, experimentation, and/or observation; and/or
- LS LO2: Analyze and interpret data, using scientific/quantitative methods to solve a problem or answer a question, and draw appropriate conclusions.

UWSP's General Education Program (GEP) has these learning objectives for this class:

- NSC LO1: Interpret information, solve problems, and make decisions by applying natural science concepts, methods, and quantitative techniques;
- NSC LO2: Explain major concepts, methods, or theories used in the natural sciences to investigate the physical world;
- NSC LO3: Describe the relevance of some aspect of the natural science to your life and society.

You will demonstrate your achievements of these learning outcomes through quizzes, exams, and other assignments. Selected work will be used to assess the LS outcomes this semester as part of ongoing Associate degree assessment.

**Assignments & grading** The course schedule lists topics for each class period. More details will be posted in Canvas modules, including due dates for lecture and lab assignments/quizzes, which will always be at least a week after something is assigned. For each lecture, look on Canvas for a PowerPoint file and an outline that includes reading assignment, suggested online activities, term list, and learning objectives. An audio recording will be posted after each lecture. Appropriate materials will be posted for labs. Graded work will consist of the following, for a total of ~800 pts.

<i>Exams</i>	300 pts	4 at 75 pts each; will cover material from both lectures and labs.
<i>"Final" exam</i>	125 pts	Last regular exam (75 pts) and a semi-cumulative final exam.
<i>Lecture-related work</i>	~175 pts	Lecture-related quizzes &/or assignments; may be in- or out-of-class.
<i>Lab-related work</i>	~200 pts	Lab-related quizzes &/or assignments.

Course grades will most likely be determined using the following scale:

A, ≥92.0%	B, 82.0-87.9%	C, 72.0-77.9%	D, 60.0-67.9%
A-, 90.0-91.9 %	B-, 80.0-81.9%	C-, 70.0-71.9%	F, <60.0%
B+, 88.0-89.9%	C+, 78.0-79.9%	D+, 68.0-69.9%	

## What these grades mean

- A: You have demonstrated overall excellence, with no significant weaknesses. Typical of students who have devoted themselves to learning and understanding the course material, who have an enthusiasm for learning, see the relevance of the course for their education and lives, are driven to do high-quality work, ask questions in and outside of class, and/or are able to communicate effectively both in writing and speaking.
- B: You have demonstrated more strengths than weaknesses, and are fairly consistent in high-level performance. Typical of students who are dedicated to doing well in all courses, are self-disciplined, and/or consistently spend several hours outside of class reviewing the course materials and creating quality lab work.
- C: You have demonstrated some level of skill, but are inconsistent, with weaknesses as well as strengths. You may be trying to force your way through the course by memorizing individual facts and definitions rather than trying to understand concepts. Typical of students who are inconsistent in their study, spend insufficient time on the requirements of the course, and/or have weak reasoning and problem-solving skills.
- D: You have demonstrated only a minimal level of understanding and skill in thinking about course material. Typical of students who spend more time working than studying, miss multiple classes during the semester, have little self-discipline and/or really are unmotivated to learn.
- F: You have demonstrated a pattern of unscientific thinking and/or failed to master the required work for the course. Typical of students who have missed many classes, have work commitments too great for their course load, and/or choose not to take and study good lecture notes, do not contribute to class discussions or study groups, and do not read and understand the course readings thoroughly.

**Behavioral expectations:** In order to keep the course running smoothly, and to ensure that all students have a good learning environment, I have the following expectations of students in this course:

1. Arrive on time, take your assigned seat promptly, and wear a mask correctly at all times.
2. If you have a question, please ask it! Feel free to raise your hand or just shut out to me if I do not see you.
3. Silence your phone, though you may use it to take pictures. Use of headphones or earbuds during class time is not allowed.
4. If you are disruptive, I may ask you to leave the class. Students with a pattern of disruptive behavior may be referred to the Dean of Students.
5. Pay attention to the course calendar in Canvas. All important course-related dates will appear there, and due dates are firm, unless you have made prior arrangements. The late penalty is 10% per day, beginning when work is collected.
6. Check your campus e-mail regularly; all important course related announcements will be sent via the Canvas "Inbox" and posted as Announcements in Canvas.
7. Please use the Canvas Inbox to communicate any questions, concerns, suggestions, or planned absences.
8. For labs, dress appropriately. This means closed-toe shoes, long pants, and shirts with some type of sleeve. If you arrive in inappropriate attire, you may not be allowed in lab. Other lab safety precautions will be discussed in lab.

**Attendance, makeups, and late assignments** Due to the possible need for contact tracing due to COVID-19, I will take attendance in both lecture and in lab, but this is not for a grade. If you cannot attend a lab and if you notify me in at least an hour in advance with a valid excuse (I may ask you to provide convincing written verification), you may either be permitted to make up the assignment or be assigned an alternate activity which could involve more work than the original assignment. Failure to make prior arrangements for a missed class will almost always result in a zero on any assignments, quizzes or exams associated with that class session, unless you can provide convincing evidence to justify your absence and why you could not provide advance notice.

Late assignments will be penalized 10% (approx. 1 letter grade) per calendar day late, up to a maximum penalty of 50%. I will not accept late submissions after I have graded that assignment and given feedback to other students.

**COVID considerations** This class is scheduled to be entirely in-person. The following practices will help us keep it that way. I will enforce the chancellor's mandate in all class meetings - a well-fitting mask that covers your mouth and nose is required. I expect that you'll follow the testing protocol flowchart posted at the UWSP COVID website: <https://www.uwsp.edu/coronavirus/Pages/default.aspx>. I will ask you to sit in the same seat during each lecture and lab, as I will use a seating chart to take attendance at each class meeting, in the event that contact tracing becomes necessary. Finally, as much as I would love to see you in person at each class meeting, I hope you will stay home if you're sick with COVID-like symptoms or if you need to quarantine.

If you DO need to be absent for quarantine, illness, or another reason, please let me know by a Canvas Inbox message in advance. All lecture materials (outlines, PowerPoints, audio recordings) will be available on Canvas, so you should be able to keep up with lecture fairly well during your absence, though you'll miss my board work. Labs exams are much harder to translate to on-line, so please make every effort to attend exam days and labs in person, unless you are sick or quarantining. If you DO need to miss lab or an exam, again, please let me know in advance, and I will determine how to accommodate your absence. Finally, if I become sick or need to isolate, or, if 50% of students are missing from class, I may need to shift to on-line instruction for up to two weeks.

**Academic integrity - cheating, copying, plagiarism** ALL suspected incidents of academic misconduct will be addressed in accordance with Chapter 14 of the UW Administrative Code, which states that academic misconduct includes but is not limited to: cheating on an examination; collaborating with others in work to be presented as solely your own and contrary to the stated rules of the course; submitting a paper or assignment as one's own work when a part or all of the paper or assignment is the work of another; tampering with the laboratory experiment or data of another student; and representing plagiarized work as your own. For more on this UW System policy, see:

<https://www.uwsp.edu/dos/Documents/UWS%2014-1.pdf>

Plagiarism is the use of someone else's wording or ideas and representing them as your own, intentionally or not, and is a serious violation of UW standards of academic conduct. All assignments will be examined to ensure that the submitted work is solely the work of the student(s) whose name(s) is/are on it, and action WILL be taken against students who commit plagiarism. You may find it easy to plagiarize (copy, cut-and-paste, or minimally paraphrase) even if you don't mean to do so. However, plagiarism in any form is entirely unacceptable. To avoid plagiarism:

1. You must write up your work in your own words and using your own organization of ideas (not those of your friend, a textbook, a website, etc.). The best way to avoid plagiarism is to read whatever source you are using until you understand it, put it aside, then write the ideas in your own words without referring back to the source. Or, if working with another student, discuss the answer, then write it up in your own words later, from memory.
2. You must list your collaborators and sources (sources include people, printed matter, websites, etc.). Direct quotations are almost never appropriate in science writing, so put things in your own words (paraphrase). Even so, anything you paraphrase needs to be cited because the information and ideas are not your own.

The first time I identify academic misconduct in work you submit, I will discuss it with you to make sure you understand how what you submitted represents academic misconduct, then ask you to re-do the assignment on very short notice; these actions are penalties in Group A in the previous URL. If your academic misconduct appears for the first time on an exam or in a second assignment, I follow the more formal process outlined by the Office of the Dean of Students: <https://www.uwsp.edu/dos/Documents/UWSPCh.14ProcedureGuide.pdf>, which include formally notifying that office of the alleged misconduct. So please, PLEASE, PLEASE don't plagiarize or cheat in any way. If you are not clear on these expectations regarding academic misconduct, please ask for clarification.

### Options for academic support

The **Tutoring-Learning Center (TLC)** is here to help you succeed! All TLC services are free to currently enrolled UWSP-Wausau students! In-person and virtual options are available. Our peer tutors and writing consultants can help you prepare for exams, write or revise papers, work through homework problems, develop effective study strategies, understand course concepts, and more! or schedule an appointment by contacting Lori Randall at (715) 261-6148 or [wautlc@uwsp.edu](mailto:wautlc@uwsp.edu). Tutoring is available in **math, chemistry, and writing**. We can connect you with tutors in **additional subjects upon request**. Our academic coach, Lori Randall, can also help you set and achieve your academic and professional goals, develop good time management or study strategies, create a daily routine for reducing stress, and more! Schedule an appointment for academic coaching or any other services by contacting Lori Randall at (715) 261-6148 or [wautlc@uwsp.edu](mailto:wautlc@uwsp.edu), or simply stop by during our drop-in hours, which are posted at <https://www.uwsp.edu/wausau/tlc/Pages/default.aspx>. The TLC is located in the southwest corner of the library.

**The DUO Center**, located in room 224 on the Wausau campus, is open to first-generation students, Pell Grant-eligible students, and students with disabilities on this campus. It provides students with access to professional tutors in math and writing. DUO staff meet one-on-one with students to answer questions, prepare for assignments/exams/papers, and simply as a resource to students. Students can meet with the tutor/s regularly or on an as-needed basis – in other words, they support individual students in individualized ways. To learn more about DUO, contact your adviser or stop by the DUO Center in Room 224.

**Students with disabilities** The University has a legal responsibility to provide accommodations and program access as mandated by Section 54 and the Americans with Disabilities Act (ADA). The university's philosophy is to not only provide what is mandated but also convey its genuine concern for one's total well-being. If accommodations are needed, please contact the instructor as well as the Disability and Assistive Technology Center (DATC), located on the Stevens Point campus. Students can also pick up an application for accommodations packet in the Solution Center. DATC contact information: 715-346-3365 (Voice), 715-346-3362 (TDD only), or email at [datctr@uwsp.edu](mailto:datctr@uwsp.edu)

### Technology support

Contact the IT Service Desk at 715-346-4357, <https://www.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx>, or email them at [techhelp@uwsp.edu](mailto:techhelp@uwsp.edu). If you want help learning how to use Canvas more effectively, you can self-enroll in this self-paced Canvas course, <https://uws.instructure.com/enroll/FNRAL8>

**Suggestions to enhance your success** You may find this course to be challenging. The main problem for students is it covers a five-credit course's worth of content at a pace that might be faster than you are used to. I do have high expectations, but I am also very willing to help any student who is willing to put in the required effort and asks for help as soon as problems are detected. Many students have told me that my introductory biology courses have prepared them extremely well for

course work at other UW campuses.

I urge you to read an article (“Learning: Your First Job”) on Canvas, even today if possible. It will give you suggestions and motivation for getting a strong start in this course. In the meantime, based on past experience, please seriously consider the following suggestions:

- 1) This is a five-credit course, so if you want to do well, you should expect to spend up to 10 hours per week (yes, really!) outside of class reading, studying, or working on course assignments.
- 2) Make every effort to read the relevant readings BEFORE that material is covered in lecture or lab.
- 3) If you have questions, don’t be embarrassed to ask them right away, in lab, during office hours, or via a Canvas Inbox message. Most likely, others have the same question. They will be glad you asked, so they didn’t have to!
- 4) Bring your textbook and relevant handouts to lab, and be willing to take notes directly in them.
- 5) Take notes on loose-leaf paper, not a bound notebook, and use a three-ring binder to integrate handouts with your notes. This will let you keep all your course materials well-organized and easy to study from.
- 6) Take lecture notes on only one face of a sheet of paper (the right side as you look at the paper as it would be in a binder). Use the facing sheet (the left side, in a binder) to add notes gleaned from lab or readings.
- 7) DO NOT study by “reading over your notes.” Study actively in a way that you have to recreate the material verbally or visually. “Study actively” means: draw and label your own figures; make tables to compare, contrast, or summarize information; construct concept maps; study in a group and quiz each other; read the text or your notes, then try to write or talk through your own summary from memory.
- 8) Schedule time daily, or at every other day, to study and learn the material as we cover it. Many units are cumulative, so new material will only make sense if you’ve already learned what was covered in the previous class session. Starting a new lecture or lab without having mastered what’s come before is setting yourself up to fail.
- 9) Cramming does not work for this course - there are too many terms and concepts that build on prior material.
- 10) Do not leave lab before the scheduled ending time. If you finish early, pretend that you must take an exit quiz covering the current day’s material and all previous material before leaving lab, or work with someone else to quiz each other.
- 11) Please ask for help before you are totally lost. Do NOT wait until right before an exam before you come for help. Get help early and often. Don’t be embarrassed or shy about asking questions – I am here to help you to learn, to do well, and to enjoy the course.

And just because I have some space on this page, here is a poem about animals, which my department chair shared with me. It’s called “Trophic Cascade” by Camille T. Dungy. I hope you enjoy it!

After the reintroduction of gray wolves  
to Yellowstone and, as anticipated, their culling  
of deer, trees grew beyond the deer stunt  
of the midcentury. In their up reach  
songbirds nested, who scattered  
seed for underbrush, and in that cover  
warrened snowshoe hare. Weasel and water shrew  
returned, also vole, and so came soon hawk  
and falcon, bald eagle, kestrel, and with them  
hawk shadow, falcon shadow. Eagle shade  
and kestrel shade haunted newly berried  
runnels where deer no longer rummaged, cautious  
as they were, now, of being surprised by wolves.  
Berries brought bear, while undergrowth and willows,  
growing now right down to the river, brought beavers,  
who dam. Muskrats came to the dams, and tadpoles.  
Came, too, the night song of the fathers  
of tadpoles. With water striders, the dark

gray American dipper bobbed in fresh pools  
of the river, and fish stayed, and the bear, who  
fished, also culled deer fawns and to their kill scraps  
came vulture and coyote, long gone in the region  
until now, and their scat scattered seed, and more  
trees, brush, and berries grew up along the river  
that had run straight and so flooded but thus dammed,  
compelled to meander, is less prone to overrun. Don’t  
you tell me this is not the same as my story. All this  
life born from one hungry animal, this whole,  
new landscape, the course of the river changed,  
I know this. I reintroduced myself to myself, this time  
a mother. After which, nothing was ever the same.

For a brief (< 5 minutes) video version of the ideas in this poem: [https://www.youtube.com/watch?v=ysa5OBhXz-Q&feature=emb\\_logo](https://www.youtube.com/watch?v=ysa5OBhXz-Q&feature=emb_logo)

**Disclaimer** Aspects of the syllabus may change during the semester.  
Changes will be announced via Canvas announcements and Inbox messages

## BIOL 160 – Tentative Calendar – Spring 2022

M 1/24	Lab: Course introduction, lab safety, Evolution of coat color in rock pocket mice
T 1/25	PoL Ch. 13 – Processes of evolution
R 1/27	PoL Ch. 14 – Reconstructing and using phylogenies
F 1/28	PoL Ch. 16 – Speciation

M 1/31	Lab: Working with phylogenies – evolutionary family trees
T 2/1	PoL Ch. 39 – Populations
R 2/3	PoL Ch. 40 – Interactions within and among species
F 2/4	PoL Ch. 40 (cont)
M 2/7	Lab: Microscopy and observations of protozoa
T 2/8	PoL Ch. 2.1-2.4 – Life’s chemistry
R 2/10	PoL Ch. 2.5 – Water and its properties
F 2/11	PoL Ch. 3.1, 4.1, 4.2, 4.3 – Lipids and biological membranes
M 2/14	Lab: Investigating diffusion and osmosis
T 2/15	<b>Exam 1</b>
R 2/17	PoL Ch. 3.2, 3.3, 3.4, 3.5 – Other macromolecules: carbohydrates, proteins, and nucleic acids
F 2/18	PoL Ch. 4.4, 4.5 – Cells
M 2/21	Lab: Investigating enzyme activity
T 2/22	PoL Ch. 5.1, 5.2, 5.3, 5.4 – Cell metabolism
R 2/24	PoL Ch. 5.1, 5.2, 5.3, 5.4 (cont)
F 2/25	PoL Ch. 28 – Animal nutrition and metabolism
M 2/28	Lab: Animal cells and tissues
T 3/1	PoL Ch. 28 (cont)
R 3/3	PoL Ch. 29 – Animals in their environments
F 3/4	PoL Ch. 29 (cont)
M 3/7	Lab: Energetics of hibernation and effects of white-nose syndrome in bats
T 3/8	<b>Exam 2</b>
R 3/10	PoL Ch. 7 – Cell cycle and cell division: mitosis and meiosis
F 3/11	PoL Ch. 7 (cont)
M 3/14	Lab: Mendelian genetics (PoL Ch 8)
T 3/15	PoL Ch. 9 – DNA: structure, function, replication, and mutations
R 3/17	PoL Ch. 9 (cont)
F 3/18	PoL Ch. 10 – FromDNA to protein: gene expression
M 3/28	Lab: Molecular mechanisms of evolution of mouse coat color
T 3/29	PoL Ch. 10 (cont)
R 3/31	PoL Ch. 22.1, 22.2 – Animal body plans, animal origins, early phyla (sponges, cnidarians...)
F 4/1	PoL Ch. 22.3 – Lophotrochozoans (flatworms, rotifers, annelids, molluscs...)
M 4/4	Lab: Animal diversity I – sponges through molluscs
T 4/5	<b>Exam 3</b>
R 4/7	PoL Ch. 22.4 – Ecdysozoans (nematodes, tardigrades, arthropods)
F 4/8	PoL Ch. 22.5 – Deuterostomes I, invertebrates (echinoderms, lancelets, tunicates...)
M 4/11	Lab: Animal diversity II – nematodes, arthropods, and tardigrades
T 4/12	PoL Ch. 22.5, 22.6 – Deuterostomes II, vertebrates
R 4/14	PoL Ch. 35 – Animal development
F 4/15	PoL Ch. 35 (cont)
M 4/18	Lab: Animal diversity III – deuterostomes, and animal development
T 4/19	PoL Ch. 34 – Animal reproduction
R 4/21	PoL Ch. 34 (cont)
F 4/22	PoL Ch. 30.1, 30.2, 30.3 – Gas exchange (“breathing”)
M 4/25	Lab: Mammalian digestive, respiratory, and reproductive systems
T 4/26	<b>Exam 4</b>
R 4/28	PoL Ch. 30.4, 30.5, 30.6 – Circulation
F 4/29	PoL Ch. 31.1, 31.2, 31.3 – Nervous system (glia, neurons, signaling)
M 5/2	Lab: Mammalian circulatory and nervous systems
T 5/3	PoL Ch. 31.4, 31.5 – Nervous system (sensory processes and nervous systems)
R 5/5	PoL Ch. 33 – Muscle and movement
F 5/6	PoL Ch. 33 (cont)
M 5/9	Lab: Animal behavior
T 5/10	PoL Ch. 37 – Animal behavior
R 5/12	Course wrap-up – bringing it all together
F 5/13	Course wrap-up – bringing it all together
Final exam	<b>Exam 5 + semi-cumulative final exam</b>