

BIOL 119: General Biology

Diversity, Physiology, and Ecology

Spring 2018, SUNY Geneseo

Professor: Serena Moseman-Valtierra, Ph.D. (valtierrasm@geneseo.edu)

Meeting Times: Mon./Wed./Fri. 1:30p-2:20p Newton 202

Office hours: Wed 11a- 12p Office ISC 139D (please walk in during this time, or schedule an appt if you cannot make it during these hours) [585-245-6483](tel:585-245-6483).

Pre-requisites: None.

Goals: If you are rejoining me from BIOL 117, welcome. I'll be glad to see you again. If you are meeting me for the first time, I look forward to working with you. I am a broadly-trained ecologist and I love teaching biology. What I enjoy most about biology is discovering knowledge that is socially relevant. I hope to share my enthusiasm for biology with you while also helping you to do the following:

- Learn foundational knowledge and skills in biological science that will serve you in future courses and careers.
- Facilitate your own learning or “Learn how to learn” (a.k.a. metacognition).
- Develop skills in working with others as a team in order to more fully understand ideas. You learn things best when you can teach them to others (and yourself). My job is to facilitate this process, inspire your interest, and provide you with resources for learning.

Attendance: Attendance is mandatory and essential for your success. The work we do in the classroom will be crucial to your performance on exams. Your attendance will be evaluated via regular group work (which everyone must contribute to in order to receive credit) and/or in-class individual polls. Peer evaluations will also be used to check for equal and consistent participation in groups. **Attendance is worth 20% of your overall course grade.** Please do not assume that you can simply stay at home and read the text book and perform well. Class time will be used to develop your critical thinking skills and your ability to apply biological knowledge to problem solving.

Hybrid Learning: We run this course using a hybrid approach. I will **NOT** simply lecture to you from a Powerpoint presentation during every class. Many decades of research in science education and common sense indicate that simply paraphrasing the material (that is already available to you in the textbook and online) **is not** the most efficient way for students to learn. Instead, you will prepare assigned readings **BEFORE** coming to class. Class time will be used to teach you how to use the information you garnered from your readings/lectures in order to solve problems on that topic. This will involve a number of group activities, where you will work as a team to answer different types of questions. I will give brief, interrupted lectures in order to support the learning outcomes for each class. The goal of this approach is to help you develop your critical thinking skills, giving you opportunities to practice applying your knowledge. My goal is to let you know whether or not you

understand something BEFORE you see it on an exam. This is hard work but it helps to strengthen your learning and your grade.

Course requirements:

- (1) Biological Science 6/e by Freeman with Modified Mastering biology access code with E-Text 2.0. If you purchased Mastering biology access (with etext) last semester, then you DO NOT need to buy it again.**

If you did not purchase access in the Fall (for BIOL 117), then there are 3 options available to you via the campus bookstore.

(A) Standalone Modified Mastering access code with E-Text

ISBN: 9780134294780 Net \$ 105.41

(B) Loose-leaf print text with Modified Mastering biology access code with E-Text:

ISBN: 9780134528076 Net \$ 148.40

(C) Hardbound print text with Modified Mastering biology access code with E-Text:

ISBN: 9780134577821 Net \$ 206.70

- (2) Electronic device (in class) for logging into Learning Catalytics (learningcatalytics.com)**

This can be a laptop and/or cell phone. First, you must be registered in Mastering Biology. I will give you instructions for this in our first class. Please note that you must **USE THE SAME PASSWORD AND USERNAME AS MASTERING BIOLOGY.**

Course Grading

Your grade is based on the following 500 points:

Exams (75 points each, 4 exams)	300 points	(60% of grade)
Activities in Class and Learning Catalytics	100 points	(20% of grade)
Homework in Mastering Biology	40 points	(8%)
Quizzes in Mastering Biology	60 points	(12% of grade)

Grading Scale for the Course:

>92% = A	90-92% = A-	87-89% = B+	83-86% = B	80-82% = B-
77-79% = C+	73-77% = C	70-72% = C-	60-69% = D	<60% = E.

Exams: There will be four exams, each covering roughly one-quarter of the course and consisting of mostly multiple-choice questions (see Schedule below). This course will not have a comprehensive final exam, but the fourth exam is required of all students. PLEASE NOTE THAT THERE ARE **NO RETAKES PERMITTED**. THIS IS DIFFERENT FROM BIOL 116 with me (or Feissner/Lewis) in the Fall.

Failure to complete the final (fourth exam) may constitute an Incomplete grade in the course.

Missed Exams: Except in cases of emergencies or major illness, each student is expected to be present for every exam. Make up exams will be administered only in the event that appropriate documentation (letter from doctor and/or Dean) is provided and that the instructor is notified via email or phone prior to the exam. It is students' responsibility to provide this documentation in a timely manner.

Snow/Emergencies: If class is canceled on an exam day due to a storm or other emergency, the exam will be given during the next class period. Also check the Canvas site for this course for updates in case of snow days.

Re-grading: Your exam grades are not negotiable. However, any math errors in the calculation of grades should be reported and will be corrected immediately. Students must submit a written justification for request for a re-grade along with any relevant supporting material. I reserve the right to either increase or decrease the points earned for a given question for which you have requested a regrade, and, I may re-grade other parts of the exam to assure complete accuracy. Requests for re-grades must be made within 1 week of the time that the grades were released.

Activities in Class- "How will the Group activities be graded?" Show up and work in your group to answer the questions to the best of your ability. One response per group is expected for most activities. Full credit will be given to students who are regularly participating in group activities as determined by a combination of observations by the instructor and peer evaluations. Individual attendance grades will be determined via Learning Catalytics polling- with full credit for effort and completion of all questions.

QUIZZES AND HOMEWORK in Mastering Biology:

1. Each Sunday by midnight (Starting Jan. 21), a reading quiz will be due.

What do they cover? Reading Quizzes cover material that will be addressed the following week (see syllabus, and listen for any changes to the reading schedule in lecture. The title of each quiz in Mastering Biology will also contain the chapter/sections that it covers for additional clarity. These reading quizzes will be subject to time limits and are expected to be done individually. *If you require special accommodations for timed activities, then please contact Prof Moseman-Valtierra ASAP.*

Why do we have them? I will use the results of these pre-class reading quizzes to tailor my lectures to the most challenging part of the material rather than present you with material you can learn by reading it on your own. They also help you to keep on track throughout the course.

How are they graded? When grading quizzes, I will drop your lowest 3 quiz scores for the semester.

Your first quiz in Mastering Biology is due by midnight on Sunday, Jan.21. The assigned sections for sections for this quiz (and all quizzes) will be announced in lecture.

2. Throughout the semester, 4 homework assignments will be due (see schedule).

Homework is intended as a review of material and an opportunity to test your ability to meet learning objectives that are VERY likely to appear in your exams. None of the homework grades will be dropped as there are only 4 of them in total. Because some students find more practice helpful, I will offer additional practice problems prior to assigned homework to help prepare you but they will not be graded for credit.

Academic Integrity: Students are expected to be honest in all academic work. Cheating & plagiarism are not acceptable and will be dealt with according to University guidelines. Any exam or assignment that Instructor has reason to believe is plagiarized *in whole or in part* will receive a zero and the student(s) involved will be reported. Your work must be your own and accomplished without use of items such as

notes or plagiarizing another student's work. We strongly encourage you to study in groups, but examinations, homework, and quizzes are to be completed individually. A student's name on any written work, quiz or exam (including electronic submissions on Mastering Biology from your accounts) shall be regarded as assurance that the work is the result of the student's own independent thought and study. Please consult the undergraduate bulletin for more information regarding the College's academic dishonesty policies.

Tentative Schedule: *Prof MV will indicate specific sections to focus on within each chapter during class.

Week	Unit	Topic (<i>See also Learning objectives for each Topic</i>)	Assignments
1: Jan 17,19	1: Biodiversity overview	Microbial diversity	**Quizzes due every Sunday beginning Jan 21. HW due Feb. 2 Exam 1 Feb 9
2: Jan 22,24,26		Protists Green Algae, Land Plants	
3: Jan 29,31, Feb 2		Intro to Animals, Protostome Animals	
4: Feb 5,7,9		Deuterostome Animals	
5: Feb 12,14,16	2: Plant Physiology	Plant Form and Function Water and Sugar Transport	 HW due Mar. 2 Exam 2 Mar. 9
6: Feb 19,21,23		Water and Sugar Transport, Plant Nutrition	
7: Feb 26,28,Mar 2		Plant Reproduction	
8: Mar 5,7,9		Plant Sensory systems	
Spring Break: March 12-16			
9: Mar 19,21,23	3: Animal Physiology	Animal Form and Function	 HW due April 6 Exam 3 April 13
10: Mar 26,28,30		Water and Electrolyte Balance in Animals	
11: Apr 2,4,6			
12: Apr 9,11,13		Nervous Systems	
13: Apr 16,18,20	4: Ecology	Population Ecology	 HW due April 30
14: Apr 23,25,27		Community Ecology	
15: Apr 30		Ecosystem Ecology, Biodiversity and Conservation	
	Final exam is:	Tuesday, May 8 12 noon	

Course Learning Objectives

Unit	Learning objectives (tentative)
Biodiversity	<p>General Goals for the unit</p> <ul style="list-style-type: none"> Identify characteristics that unify major microbial, plant, and animal taxa. Use phylogenies to recognizing the evolutionary relationships among major taxa. <p>Bacteria and Archaea (26)</p> <ul style="list-style-type: none"> Recall modes of gene transfer among microbes and evaluate their influence on genetic diversity Describe morphological diversity of micro-organisms. Recognize common electron acceptors and donors used by microbial organisms for energy Contrast respiration in humans with microbial respiration <p>Protists (27)</p> <ul style="list-style-type: none"> Recall examples of ecologically significant protists. Distinguish between primary and secondary endosymbiosis Use a phylogeny to evaluate how eukaryotes gained mitochondria and chloroplasts. <p>Land Plants and Green Algae (28)</p> <ul style="list-style-type: none"> Recall characteristics that distinguish land plants from algae. Explain how multicellularity conferred an advantage for the first plants to colonize land Relate plant diversity to differences in reproductive strategies. <p>Intro to Animals (30)</p> <ul style="list-style-type: none"> Recall defining characteristics of an animal (30.1) Use a phylogeny to interpret the series of evolutionary innovations that led to animal diversity. (30.2) <p>Protostomes (31)</p> <ul style="list-style-type: none"> Define protostome and deuterostomes and recall major examples of each kind of animal. Recall the structure and function of a coelom. Distinguish between lophotrochozoa and ecdysozoa (protostomes) <p>Deuterostomes (32)</p> <ul style="list-style-type: none"> Define Urochordata and describe their relationship to humans (deuterostomes). Explain adaptive significance of key vertebrate characteristics and recall their evolutionary origin. (32.4)
Plant Physiology	<p>General Goal for the unit</p> <ul style="list-style-type: none"> Explain how specialized cells and tissues interact to maintain the life of a plant. <p>Plant Form and Function (34)</p> <ul style="list-style-type: none"> Recall the components of a general plant cell. Describe how specialized plant cells differ from each other and how their form relates to their function. <p>Water and Sugar Transport (35)</p> <ul style="list-style-type: none"> Define water potential (35.1) Recall how plants use a water potential gradient to acquire water from the environment Describe how different specialized plant cells interact to produce and transport water and sugar throughout a plant's body. Define the cohesion-tension theory. <p>Plant Nutrition (36)</p> <ul style="list-style-type: none"> Recall the basic nutritional needs of plants. Identify diverse ways that these nutritional needs are met by plants through interactions with their environment. Draw and explain the nitrogen cycle including nitrogen fixation. Explain how symbiotic nitrogen fixation develops in legume plants. <p>Plant Reproduction (38)</p> <ul style="list-style-type: none"> Distinguish between a seed and spore. Recall key factors that control seedling growth. Explain how seed dispersal impacts plant diversity at the level of a population Define alternation of generations. Recall examples of organisms with gametophyte vs sporophyte-dominated life cycles. Contrast where mitosis and meiosis occur in a gametophyte-dominated vs. a sporophyte-dominated life cycle Evaluate whether alternation of generations was a key adaptation to life on land.

Animal Physiology	<p>General Goals for the unit: Explain how specialized cells and tissues interact to maintain the life of an animal. Relate form and function at the cellular, tissue and organ levels in animals.</p> <p>Animal Form and Function (39)</p> <ul style="list-style-type: none"> Evaluate constraints of large body size and adaptive responses to increase surface area. (39.3) Explain the role of homeostasis Describe the different ways in which animal body temperature is regulated <p>Water and Electrolyte Balance (40)</p> <ul style="list-style-type: none"> Compare and contrast how osmotic stress is regulated in marine vs. freshwater fish Relate the structure and function of the mammalian kidney (40.5) <p>Animal Nutrition (41)</p> <ul style="list-style-type: none"> Identify the role of hormones, enzymes, and glucose co-transporters in the digestive process of animals Relate variations in the structure of animal digestive systems to differences in their functions <p>Gas Exchange and Circulation (42)</p> <ul style="list-style-type: none"> Describe the relationship between the respiratory and circulatory system Relate the structure of hemoglobin to its function Explain the buffering process of blood pH Relate the structure of the heart to its role in regulating blood circulation <p>Animal Nervous Systems (43)</p> <ul style="list-style-type: none"> Describe the structure and function of a neuron Explain the process of an action potential Describe the role of neurotransmitters in synaptic potentials Describe the process of memory formation
Ecology	<p>Populations (51)</p> <ul style="list-style-type: none"> Recall 4 processes that determine a population size. Apply population growth equations to make predictions about future population sizes and growth rates. List density-dependent and independent factors that affect population growth rates <p>Communities (52)</p> <ul style="list-style-type: none"> Define niche. Distinguish between fundamental and realized niche. Classify 4 types of species interactions. Define character displacement Use niche theory to predict which communities are most susceptible to biological invasion. Distinguish between late and early successional communities. <p>Ecosystems (53)</p> <ul style="list-style-type: none"> Define NET primary productivity (NPP) Use the productivity pyramid to explain biomagnifications of pollutants. Explain how and why NPP is changing on land and in the ocean. Recall 4 general consequences of climate change for organisms. Identify major threats of climate change for species on land and in the ocean. Explain why photosynthesis by plants on land produces a negative feedback on climate. <p>Biodiversity and Conservation (54)</p> <ul style="list-style-type: none"> Evaluate how humans could sustain biological diversity for the future

Students with Disabilities: Reasonable accommodations will be made for any student with documented physical, emotional, or cognitive disabilities. Accommodations will also be made for conditions related to pregnancy or parenting. Students should contact the Office of Disability Services (Dr. Tabitha Buggie-Hunt, Erwin 22, 585-245-5112) and their instructor as soon as possible so that we may work out reasonable accommodations to support your success in this course.

Need help with BIO 119? Remember, you have several resources for help:

- Your professor- meet me during office hours or by appointment. Please don't wait until the day before the exam.
- A SI leader is also available for help outside of class. Details will be announced.

If you have read this syllabus, then you are on the right track to succeed in this class!
Looking forward to an enjoyable semester in BIO 119.