

General Biology (BIOL 101)

University of Wisconsin-Stevens Point at Wausau, Fall 2019, 5 Credits

- Instructor:** Dr. Kristine Prahl
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Office hours: 10 a.m. – 11 a.m. on Mondays, Tuesdays and Thursdays
1:30 p.m. – 3:30 p.m. on Wednesdays
Also, feel free to make scheduled and/or unscheduled office visits at any other time.
- Lecture:** 12:00 p.m. – 12:50 p.m. Mondays, Wednesdays and Fridays in room 233
- Laboratory:** 8:00 a.m. – 10:50 a.m. Wednesdays in room 277 for students in section 81872.
8:00 a.m. – 10:50 a.m. Fridays in room 277 for students in section 81873.
- Textbook:** The required textbook is available free online at www.openstax.org/details/concepts-biology. If you prefer to purchase a hardcopy version, the ISBN-13 is 978-1-938168-11-6. The digital version ISBN-13 is 978-1-947172-03-6. Additional readings which offer more information and additional perspectives will also be provided.

Course Catalog Description

Biological principles; survey wide variety of plant and animal life.

Class Attributes: Lab Science (AAS), Natural World (AAS), and Natural Sciences (GEP)

Course Introduction and Learning Outcomes

This course introduces non-major students to the basic principles of biology and acquaints them with the diversity of life. We will explore basic cellular-level processes, genetics and reproduction, evolution, biological diversity, animal physiology, and how organisms relate to one another within their environments, with special emphasis on the applicability and relevance of biological concepts, knowledge, and technology to average citizens. Students completing this course will attain varying levels of proficiency in their ability to:

- 1) Describe the diversity of living organisms.
- 2) Describe the components of the living cell.
- 3) Explain the metabolic and genetic systems of organisms.
- 4) Discuss how the functions of cells are accomplished.
- 5) Discuss the growth and reproductive processes of living organisms.
- 6) Use vocabulary of biology.
- 7) Describe how organisms influence each other and their environments.
- 8) Discuss how organisms are affected by each other and by their environments.
- 9) Design and carry out experiments to answer specific scientific questions.
- 10) Communicate scientific information in a clear and concise manner.
- 11) Solve problems through application of the scientific method.
- 12) Discuss biological principles including:
 - cellular level functions that are necessary for life
 - inheritance and evolutionary change

- the diversity of animals and plants within an evolutionary context
 - the function of animal organ systems
 - the basic functioning of populations, communities, and ecosystems
- 13) Discuss the relevance of biological principles to their lives and society.

This course is designed to help students appreciate biology and motivate students to keep on learning about biology after college.

Course Expectations

Students are expected to be present at all class sessions. Some discussion-based assignments will be done in some sessions. So, unexcused absences may negatively affect a student's course grade. All students and the instructors are expected to respect one another. Students should not use ear buds, laptop computers, cell phones or other electronic devices in class unless they have spoken with the instructor about this first. Respect should be shown for property of the college. Textbook reading assignments should be completed before the designated class meeting time. Students should come to the labs prepared, having read the introductory material (if any) before the designated time. Laboratory safety guidelines will be given to students and must be followed completely. Students may work together on assignments unless notified otherwise. However, students may not copy answers from each other as each person's answers must be in his or her own words. Examinations should be completed independently without using any books or notes. The policies found in chapter UWS 14 of the Wisconsin Administrative Code will be used in the case of suspected academic misconduct. For effective communication, you are expected to type and spell-check your work on assignments unless notified otherwise. Students should daily check their student email account and Canvas as some class announcements and some handouts and some reading assignments will be given using these technologies. Scores on assignments and examinations will be posted on Canvas, and an estimation of your course grade will be kept updated during the semester on Canvas.

Care Team

The University of Wisconsin-Stevens Point is committed to the safety and success of all students. The Office of the Dean of Students supports the campus community by reaching out and providing resources in areas where a student may be struggling or experiencing barriers to their success. Faculty and staff are asked to be proactive, supportive, and involved in facilitating the success of our students through early detection, reporting, and intervention. As your instructor, I may contact the Office of the Dean of Students if I sense you are in need of additional support which individually I may not be able to provide. You may also share a concern if you or another member of our campus community needs support, is distressed, or exhibits concerning behavior that is interfering with the academic or personal success or the safety of others, by reporting here: <https://www.uwsp.edu/dos/Pages/Anonymous-Report.aspx>.

Title IX

UW-Stevens Point is committed to fostering a safe, productive learning environment. Title IX and institutional policy prohibit discrimination on the basis of sex, which includes harassment, domestic and dating violence, sexual assault, and stalking. In the event that you choose to disclose information about having survived sexual violence, including harassment, rape, sexual assault, dating violence, domestic violence, or stalking, and specify that this violence occurred while a student at UWSP, federal and state laws mandate that I, as your instructor, notify the Title IX Coordinator/Office of the Dean of Students.

Please see the information on the Dean of Students webpage for information on making confidential reports of misconduct or interpersonal violence, as well as campus and community resources available to students. Dean of Students: <https://www.uwsp.edu/DOS/sexualassault> Title IX page: <https://www.uwsp.edu/hr/Pages/Affirmative%20Action/Title-IX.aspx>

Disability and Accommodations

In accordance with [federal law and UW System policies](#), UWSP strives to make all learning experiences as accessible as possible. If you need accommodations for a disability (including mental health, chronic or temporary medical conditions), please visit with the [Disability and Assistive Technology Center](#) to determine reasonable accommodations and notify faculty. After notification, please discuss your accommodations with me so that they may be implemented in a timely fashion. **DATC contact info:** datctr@uwsp.edu; 715/346-3365; 609 Albertson Hall, 900 Reserve Street

Academic Integrity

Academic Integrity is an expectation of each UW-Stevens Point student. Campus community members are responsible for fostering and upholding an environment in which student learning is fair, just, and honest. Through your studies as a student, it is essential to exhibit the highest level of personal honesty and respect for the intellectual property of others. Academic misconduct is unacceptable. It compromises and disrespects the integrity of our university and those who study here. To maintain academic integrity, a student must only claim work which is the authentic work solely of their own, providing correct citations and credit to others as needed. Cheating, fabrication, plagiarism, unauthorized collaboration, and/or helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. Failure to understand what constitutes academic misconduct does not exempt responsibility from engaging in it. For more information on UWS chapter 14 visit: <https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx>

Recording of Lectures

Audio recordings of the class lecture periods will be made and posted on our class Canvas site.

Evaluation of Student Work

- 1) Lecture Examinations (400 points)** There will be three lecture exams scheduled during class periods. There will also be a comprehensive final lecture exam on December 16 from 10:15 a.m. to 12:15 p.m. All four of these exams will be closed-book and closed-notes. Point values for each of the exams will be as follows:

Lecture Period Exam 1	100 points
Lecture Period Exam 2	100 points
Lecture Period Exam 3	100 points
<u>Final Exam</u>	<u>100 points</u>
Total	400 points

- 2) Homework Assignments and In-Class Assignments (400 points)** These assignments will be given, collected, and graded throughout the semester, for a total of 400 points. These assignments will give you an opportunity to apply what you have learned in lecture and in lab. Two of these assignments will be essays, one about homeostasis and the other about genetics,

and each of these essays will be worth 30 points. Students are required to participate in the lab activities prior to doing assignments associated with the lab activities.

- 3) **Laboratory Examinations (200 points)** Two in-class laboratory exams will be given, and they will be closed-book and closed-notes. Point values associated with laboratory examinations will be as follows:

Laboratory Exam 1	100 points
<u>Laboratory Exam 2</u>	<u>100 points</u>
Total	200 points

Dates and Topics of Lecture Examinations

September 27	Lecture material covered September 4 through September 25
October 21	Lecture material covered September 30 through October 18
November 25	Lecture material covered October 23 through November 22
December 16	Final examination (includes lecture topics covered from September 4 through December 13) Note: scheduled from 10:15 a.m. -12:15 p.m.

Dates and Topics of Laboratory Examinations

October 23/25	Laboratory topics from September 4 through October 18
December 11/13	Laboratory topics from October 30 through December 6

Grading Scale

Percentage points will be converted to letter grades using the following table:

$\geq 92\%$ = A	80-81% = B-	68-69% = D+
90-91% = A-	78-79% = C+	62-67% = D
88-89% = B+	72-77% = C	60-61% = D-
82-87% = B	70-71% = C-	<60 % = F

Make-Up Labs and Exams

If you must miss a class session, please get notes from another student. Notify your instructor prior to the scheduled exam time if you are unable to take a laboratory or lecture examination at the regularly scheduled time. Failure to give such notification in advance

may result in a score of zero for that examination. You may leave messages on your instructor's voice mail. An acceptable reason must be given for needing to reschedule the testing time. Make-up examinations, if allowed, must be taken within 48 hours of the original testing time unless unusual circumstances exist. If you have a reason to reschedule the final exam, please notify your instructor by December 13. Please notify your instructor in advance if you cannot attend a laboratory period. A make-up lab or alternate activity will be scheduled if an acceptable reason for rescheduling is given to the instructor prior to the class session.

Absences and Tardiness

If you must miss or come late to a lecture or lab session, please get notes from another student. Please see your instructor for handouts that were distributed in your absence, and ask your instructor about any announcements which you missed. You are responsible for material covered in all class sessions, including class sessions that you miss. You are also responsible for all assignments given and due during class, even assignments given and due when you are not in attendance. These assignments must be handed in on time (this includes lecture and laboratory assignments that were given or due in your absence) unless your instructor has given you permission beforehand to hand in the assignment late. Please arrive on time for exams.

Late Assignments

Hand in assignments on time. If you are unable to hand in a lecture assignment or laboratory assignment on time, notify your instructor in advance of the due date. You must provide an acceptable reason for handing in an assignment late. Failure to hand in assignments on time may delay the grading of your work. You may lose some or all of the points from a late assignment if your instructor has not given you permission to hand in the assignment late. The typical late penalty will be a loss of 10% of the points per calendar day.

Laboratory Safety

You will be required to bring and wear chemical safety goggles in some of the laboratory sessions this semester. You will know ahead of time when to bring the goggles. Your instructor will show you the type of goggles that are required. Five points may be deducted from a student's score for each time a student does not come to lab prepared with goggles when required. Closed-toe shoes will also be required at all times when you are in the laboratory classroom. You should also wear long pants or a long skirt instead of shorts when you are working with chemicals and other potentially hazardous items in the laboratory classroom.

Academic Support Services

UWSP at Wausau students have academic support resources available to them for FREE. The Tutoring-Learning Center (TLC) offers tutoring services including one on one and drop in tutoring services, academic skills workshops, and one on one academic coaching appointments. For additional information please contact Megan Sippel, the Academic Success Coordinator, via email msippel@uwsp.edu, phone 715-261-6148, or in person in the TLC (located in the library) office 256.

Participation In Co- and Extracurricular Activities

I encourage you to be involved in co-curricular and extracurricular activities as you are able. However, you are responsible for material covered in class sessions that you miss because of

participation in co- or extracurricular activities. You are also responsible for assignments given and/or due during class sessions that you miss because of such activities. If you must miss an exam because of participation in co- or extracurricular activities, you are responsible for notifying your instructor in advance of the exam. The terms of make-up exams and late assignments as stated in above sections of this syllabus apply.

International Module

BIO 101 will include a course module written for the Midwest Institute for International and Intercultural Education. This module will be infused into the course throughout the semester, particularly during discussions of microbiology, virology, immunology, and epidemiology.

1. Module Title: The Global Nature of Bioterrorism (With a Focus on Anthrax, Plague, and Smallpox)
2. Description of Module: Bioterrorism has become an increasing concern worldwide in recent years. In this module, students will study the biological consequences of bioterrorism involving anthrax, plague and smallpox. Students will also consider the potential global impact of a bioterrorism event. The epidemiology and pathogenesis of anthrax, plague, and smallpox will be discussed. International research efforts (including vaccine development) related to these diseases will also be discussed in class.
3. Module Objectives:
 - 1) Understand the international nature of medical research.
 - 2) Describe how the World Health Organization (WHO) is preparing people for possible bioterrorist attacks.
 - 3) Describe the importance of global surveillance of unusual illnesses.
 - 4) Become familiar with the potential global consequences of a possible bioterrorist attack.
 - 5) Understand the differences between viral and bacterial diseases.
 - 6) Describe the epidemiology, pathogenesis, and treatment of anthrax, plague, and smallpox.
 - 7) Describe how smallpox was eradicated worldwide and how international cooperation was necessary to achieve such an accomplishment.
 - 8) Explain how vaccination can, in general, lead to immunity.
 - 9) Describe the pro and cons of vaccination against anthrax, plague and smallpox.
 - 10) Understand the nature of antibiotic resistance in bacteria.
 - 11) Understand the global implications of the existence of drug-resistant pathogens.

**Tentative Lecture Schedule with Major Topics and Textbook References and Canvas
References**

- September 4 Course introduction; Homeostasis; Levels of biological organization; Urinary system and excretion (Chapter 16.1)
- September 6 Digestive system; Nutrition (Chapter 16.2)
- September 9 Respiratory system and gas exchange (Begin chapter 16.3)
- September 11 Circulatory system; Blood and cardiovascular disorders (Finish chapter 16.3 and References on Canvas)
- September 13 Endocrine system and hormones (Chapter 16.4 and endocrinology case study)
-Homeostasis essay will be assigned, due electronically on September 20
- September 16 Muscular system; Skeletal system (Chapter 16.5)
- September 18 Nervous system; Epilepsy (Chapter 16.6 and References on Canvas)
- September 20 Viruses; Vaccines (Chapter 17.1)
- September 23 Immune system and immune system diseases; Lymphatic system (Chapter 17.2 through 17.4)
- September 25 World-wide eradication of smallpox (References on Canvas)
- September 27 **Lecture examination 1**
- September 30 Reproduction (Begin Chapter 18)
Life's Greatest Miracle excerpts (video by Nova)
- October 2 Finish reproduction; Human development (Finish Chapter 18, and references on Canvas)
- October 4 Contraception; Infertility treatments; Stem cells (References on Canvas)
- October 7 Characteristics of living things (Chapter 1.1); Biological chemistry and Biological molecules (Chapter 2)
- October 9 Cell structure; Cell types (Chapter 3.1 through 3.4)
- October 11 Movement of molecules (Chapter 3.5 and 3.6)
Enzymes; Metabolism; (Chapter 4.1)

- October 14 Cellular respiration (Chapter 4.2 and 4.3)
- October 16 Fermentation and other metabolic pathways (Chapter 4.4 and 4.5)
Tentative Lecture Schedule, Continued
- October 18 Photosynthesis: overview and the light-dependent reactions (Chapter 5.1 and 5.2)
- October 21 **Lecture examination 2**
- October 23 Photosynthesis continued: the Calvin cycle (Chapter 5.3)
- October 25 The cell cycle; Mitosis; Cell division; Cancer (Chapter 6)
- October 28 Meiosis (Chapter 7.1 and 7.2)
- October 30 Chromosomal alterations; Crossing over; Nondisjunction (Chapter 7.3)
- November 1 Mendelian genetics; Pedigree analysis; Extensions of Mendel's laws (Chapter 8)
- November 4 Chromosome structure; DNA structure (Begin chapter 9.1)
- November 6 DNA replication; DNA mutations (Finish chapter 9.2)
- November 8 DNA function; RNA structure and function; Transcription (Chapter 9.3)
- November 11 Translation; Regulation of gene expression (Chapter 9.4 and 9.5)
- November 13 Molecular biology; Genetic engineering; Cloning of genes; Genetically modified organisms; DNA fingerprinting; Gene therapy (Begin chapter 10)
-Genetics essay will be assigned, due electronically on November 20
- November 15 Human Genome Project and applications (Finish chapter 10)
- November 18 Evolution – definitions, genetic variation, adaptation, population genetics, Hardy-Weinberg equation (Begin chapter 11)
- November 20 Types of selection (Chapter 11)
The diversity of life (Chapter 12)
- November 22 Evolution - antibiotic resistance in bacteria (Reference on Canvas)
- November 25 **Lecture Examination 3**
- November 27 Bacteria, Anthrax; Plague; (Chapter 13.1; references on Canvas)

December 2 Overview of protists; Overview of fungi (Chapter 13.2, 13.3 and 13.4)

Tentative Lecture Schedule, Continued

December 4 Overview and review of plants (Chapter 14)

December 6 Population size, density and distribution; Survivorship curves; Exponential growth, Logistic growth, Carrying capacity, Factors affecting population growth (density-dependent and density independent) Age structure diagrams; Greenhouse gases; Defenses against predation; Niches; Symbiosis (Chapter 19)

December 9 Communities; Ecosystems; Food chains; Food webs; Trophic levels; Productivity; Biological magnification; Water and other biogeochemical cycles; Dead zones; Acid rain; Terrestrial biomes, Aquatic biomes (Chapter 20)

December 11 Biodiversity, threats to biodiversity and preserving biodiversity (Chapter 21); Discussion about ecological footprints

December 13 Review for final exam

December 16 **Comprehensive final exam** (10:15 a.m. - 12:15 p.m.)

Tentative Laboratory Schedule

September 4/6	Laboratory introduction, laboratory safety, and begin animal anatomy (models and fetal pig dissection) – urinary system
September 11/13	Animal anatomy - digestive system and respiratory system
September 18/20	Animal anatomy (models, blood cell slides and fetal pig dissection) – circulatory system
September 25/27	Heart rate, blood pressure and lung capacity
October 2/4	Animal anatomy continued – endocrine system and musculoskeletal system
October 9/11	Animal anatomy continued (models and fetal pig dissection) - Eye, ear, central nervous system, immune system, male and female reproductive systems
October 16/18	Microscopy and stomatal density
October 23/25	Laboratory exam one
October 30/Nov. 1	Cell cycle - onion root tip slides; Genetics of corn
November 6/8	Microbiology (introduction to aseptic technique, environmental sampling onto nutrient agar); Looking at protists and fungi
November 13/15	Plant diversity – botany slides and models
November 20/22	DNA extraction; Animal diversity
November 27	Review period
December 4/6	Wrap up animal diversity; Scientific method case study
December 11/13	Laboratory exam two