BIOL 206- Introduction to Organismal Biology- Spring 2024 (5 credits)

Alejandro Acevedo-Gutiérrez (he/him/his)

Class: BH109; MWF 08:30-09:50 h

Lab: BI355; T 8:00-10:50; W 11:00-13:50; R 8:00-10:50 h

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Office hours: Biology 309. M 12:00-12:30; W 10:30-11:00, 14:00-14:30 h; and by appointment

Graduate TAs: Victoria Vinecke (vineckv@wwu.edu), Jason Gronich (gronicj@wwu.edu), and Ekaterina Monakhova (monakhe@wwu.edu)

Undergraduate TAs: Jack Story, Emanuel Keene, Allison Loftus

Required texts

- Freeman, S. et al. 2019. Biological Science. 7th edn. Pearson. ISBN: 9780134678320 **OR** Freeman, S. et al. 2016. Biological Science. 6th edn. Pearson. ISBN 9780321976499 [You only need the book, NOT any of the mastering biology or other electronic options.]

-Staff. Introduction to Organismal Biology. Lab Manual 2023-2024. ISBN 9781533956798.

Optional text: Knisely, K. 2021. A Student Handbook for Writing in Biology. 6th edn. Sinauer Associates. Any prior edition is OK.

There is a Canvas website for the class portion of the course as well as a different one for the lab. Check these websites regularly for pre-class quizzes, course-related announcements, updated grades, and files displaying the Powerpoint slides that you are expected to read before class.

Course Description

In this last course of the BIOL-200 series you will receive a firm base in plant and animal physiology and anatomy. The course will focus mostly on flowering plants and multicellular animals. You will explore the diverse ways in which organisms have dealt with the challenges that they face. To do so, you will construct your own knowledge by reading, thinking and discussing the topics for the day, and relating them to prior concepts. The course will emphasize active participation and de-emphasize lecture.

Undergraduate and graduate teaching assistants will be in the lab to facilitate discussions, guide your study, and grade assignments. They are important to your success in this course. Do respect what they do for you and don't hesitate to ask them for assistance. Your graduate TA will provide the schedule of lab exercises and describe the work, assignments and exams on which your lab grade will be based.

By the end of this course you should be familiar with the strategies used by plants and animals with regards to form and function, nutrition, internal transport and responses to the environment. The course is organized around five major ideas and four overarching core concepts.

Five major ideas

-Life forms have a hierarchical level of organization, each with novel properties not present in the simpler levels of organization.
-There is a correlation between structure and function at all levels of biological organization.
-Laws of physics and chemistry affect the structure and function of organisms.
-Organisms use the same mechanisms to carry out different functions.
-Organisms carry out work to create favorable gradients that allow them to perform the general functions of life.

Four overarching concepts

-Multicellular organisms have developed a division of labor, assigning functions to specific structures through mechanisms derived from previous adaptations that are common among cells.
-The exchange of materials and energy is a component of the total energy budget characteristic of all living things, with similarities and differences between multicellular autotrophs and multicellular heterotrophs.
-The movement of solutions within multicellular organisms serves to transport nutrients, wastes, and chemical messages to coordinate and support specialized functions in different tissues and organs.
-Sensing and responding to short-term changes in the internal and external environments supports the maintenance of function in a multicellular organism.

To succeed in this class (and in life) you will need a **strategic mindset**: effort, perseverance, and continually asking yourself how you can improve. You can read about this mindset in Canvas\Files\Resources for Studying.

Justification for Class Format
How People Learn: Brain, Mind, Experience and School http://www.nap.edu/openbook.php?isbn=0309070368 and documents in Canvas\Files\Resources for Studying.

Enrollment Policy
You are currently enrolled in this course and only you can change this. If you fail to complete all of the assignments, or stop coming to class and do not fill out an official withdrawal, you will receive a failing grade. This policy is in place due to the fact that demand for this class often exceeds space availability and to facilitate responsible and timely decisions regarding enrollment.

Missed Exam and Late Work Policy:
It is your responsibility to make it to all exams/quizzes. Makeup exams will be given ONLY if you are excused from the exam BEFORE the scheduled date, or, in the event of illness, you have a note from a health professional confirming that you were unable to take the exam during the scheduled time. (Contact me directly.) It is also your responsibility to contact me as soon as you return. Failure to do so may jeopardize your chance of a make-up exam.

Program Assessment:
The department conducts a quarterly program assessment. During the quarter, you will receive a link to an online assessment and three extra-credit points for completing it, regardless of how well you do. Please try your best so we have accurate data and can best identify areas in which we can improve.

Departmental Learning Goals and Objectives:
The department has identified content and competencies learning goals and objectives that all biology students should attain by the end of their education at WWU. You are expected to acquire the foundation for these goals in this course and to master them as you progress through higher-level Biology courses.

Content Goal 1: *You will understand and apply fundamental biological principles of ecology, genetics, evolution, cell and molecular biology, and organismal biology).*

- You will explain and apply your understanding of the form and physiological function of multicellular organisms (plants and animals).

Competencies Goal 1: *You will develop the ability to apply the process of science.*

- You will interpret data and draw conclusions from scientific studies.
- You will employ critical thinking strategies to solve problems
- You will identify questions that can be addressed scientifically.
- You will apply the scientific process, including designing and conducting experiments and examining hypotheses.
- You will acquire laboratory skills necessary to perform laboratory exercises and experiments.

Competencies Goal 2: *You will develop effective quantitative reasoning skills.*

- You will develop and interpret graphs.
- You will use mathematical equations to represent and explain biological phenomena.

Competencies Goal 3: *You will use models and simulations to understand biological phenomena.*

- You will discuss biological processes using precise scientific terminology.
- Students will be able to prepare written and oral reports in standard scientific formats.

Competencies Goal 4: *You will engage in the interdisciplinary nature of science.*

- You will apply physical laws to understand biological systems.
- You will apply the chemistry of molecules to understand biological systems.

Competencies Goal 5: *You will communicate and collaborate with others.*

- You will discuss biological processes using precise scientific terminology.
- You will participate in teams
- You will prepare written and oral reports in standard scientific formats.

Course Aim	**Learning Goal**	**Indicators of Performance** (assessment for learning) UNGRADED	**Evaluators of Performance** (summative assessment) GRADED
Development of biological content knowledge	You will explain and apply your understanding of the form and physiological function of multicellular organisms (plants and animals).	*-Class: quizzes, participation.* *-Lab: discussions, activities, quizzes*	*-Class: exams.* *-Lab: exam, reports*
Development of science competencies	You will develop the ability to apply the process of science.	*-Class: quizzes, participation.* *-Lab: discussions, activities, quizzes*	*-Class: exams.* *-Lab: exam, reports*
	You will develop effective quantitative reasoning skills.	*-Class: quizzes, participation.* *-Lab: discussions, activities, quizzes*	*-Class: exams.* *-Lab: exam, reports*
	You will use models and simulations to understand biological phenomena.	*-Class: quizzes, participation.* *-Lab: discussions, activities, quizzes*	*-Class: exams.* *-Lab: exam, reports*
	You will engage in the interdisciplinary nature of science.	*-Class: quizzes, participation.* *-Lab: discussions, activities, quizzes*	*-Class: exams.* *-Lab: exam, reports*
	You will communicate and collaborate with others.	*-Class: quizzes, participation.* *-Lab: discussions, activities, quizzes*	*-Lab: reports*

Student Responsibilities:
Success in this class will require maturity, responsibility and hard work, as well as concept application, problem solving, some memorization and integration of the subject matter with your personal experiences and/or current events. Understanding biology requires the use of a specialized vocabulary and placing ideas within a framework, both of which are developed through active participation in lecture and lab. You are expected to read the assigned chapters before class. Pre-reading involves a careful survey of chapter contents, with special attention paid to section headings, figures, boxed information, bulleted items, and terms in bold face or italics. The purpose of pre-reading is to provide you with a conceptual context and an introduction to the vocabulary so that you may actively participate in lecture.

You are also required to read and complete the laboratory pre-assignments and to actively participate in discussions. In many cases, the course of lecture and lab discussions will assume that you are familiar enough with the topic for us to emphasize material that may be more difficult to comprehend or that will go beyond what is covered in the textbook or lab manual.

You are expected to arrive on time and stay until your TA indicates that lab is over.

Your learning and hence your grade will reflect the time and effort you put into reading and participating in class and in the lab. ***All lab assignments and 80% of class assignments must be completed and submitted in order to pass this course.***

Inclusiveness and Respect
You are encouraged to speak up and participate during class. Because the class will represent a diversity of individual beliefs, backgrounds, and experiences, each one of us will respect, appreciate, and embrace every other member of this class.

I am firmly committed to diversity and equality in all areas of life. In this class, I will work to promote an inclusive environment where everyone feels safe and welcome. I recognize that discrimination can be direct or indirect and take place at both institutional and personal levels. I believe that such discrimination is unacceptable and I am committed to providing equality of opportunity for all by eliminating any and all discrimination, harassment, bullying, or victimization. The success of this policy relies on the support and understanding of everyone in this class. We all have a responsibility not to be offensive to each other, or to participate in, or condone harassment or discrimination of any kind. Without failing to speak up, we also have the opportunity to think the best of everyone and give one another the benefit of the doubt.

Equal Opportunity Rights

You have the right to an educational experience that is free from illegal harassment or discrimination on the basis of race, color, creed, religion, national origin, sex, disability, age, veteran status, sexual orientation, gender identity or expression, marital status or genetic information. **If you or someone you know has experienced macro- or micro-aggressions of any kind related to personal identity on campus,** please report any issues to an instructor you feel is an ally, to Dr. Lina Dahlberg a Biology faculty member on the College's Diversity, Equity and Inclusion Committee (dahlbec@wwu.edu), to one of our CSE and Biology Community Ambassadors (https://cse.wwu.edu/biology/cses-ambassadors-community-hours) or using the anonymous form under the Equity and Inclusion tab on the Biology Department homepage (https://biology.wwu.edu/equity-and-inclusion-issues-biology). You can also contact the Equal Opportunity Office for additional advice and help (http://www.wwu.edu/eoo/bias-incident-response.shtml).

Intellectual Honesty

Science is based on trust. If a scientist states that she carried out a particular study and obtained certain results, the rest of us trust that she did such thing. This is one reason why there is no tolerance for people who are not intellectually honest, and this class will be no exception.
https://wp.wwu.edu/academichonesty/

From WWU: Plagiarism is presenting as one's own in whole or in part the argument, language, creations, conclusions, or scientific data of another without explicit acknowledgement. (Learn more at https://libguides.wwu.edu/plagiarism.) Examples include but are not limited to:

- Using another person's written or spoken words.
- Using information from a World Wide Web site, CD-ROM or other electronic sources.
- Using statistics, graphs, charts and facts without acknowledging the source of the ideas.
- Paraphrasing: using someone else's argument without acknowledging the source.

Religious Accommodations

Western provides reasonable accommodation for students to take holidays for reasons of faith or conscience or for organized activities conducted under the auspices of a religious denomination, church, or religious organization. Students seeking such accommodation must provide written notice to their faculty within the first two weeks of the course, citing the specific dates for which they will be absent. "Reasonable accommodation" means that faculty will coordinate with the student on scheduling examinations or other activities necessary for completion of the course or program and includes rescheduling examinations or activities or offering different times for examinations or activities. Additional information about this accommodation can be found in SB 5166: Providing religious accommodations for postsecondary students.

Additional Resources

Do you have any concerns about your ability to learn in the classroom or your ability to take assessments in the classroom? Contact the Disability Access Center for advice, help, and to request accommodation (650-3083 or https://disability.wwu.edu/).

Do you want feedback on your cover letter or resume? The Career Services Center at Western will gladly review them, compare them with the posting for which you are applying, and provide feedback to you within 48 h: https://www.wwu.edu/careers/

Do you feel unwell or have a health-related question? Contact the Health Center (650-3400) or visit the website of Student Health (https://studenthealth.wwu.edu/)

Do you have an emotional or psychological concern or question? Contact the Counseling Center (650-3164) or visit the website of Counseling Services (http://www.wwu.edu/counseling/).

Do you have a safety concern? Contact the University Police for non-emergency services (650-3555) or visit their website (http://www.wwu.edu/ps/police/index.shtml).

Do you have a family or personal crisis or emergency? Contact the Office of Student Life (650-3450) or visit their website (https://wp.wwu.edu/officeofstudentlife/).

Do you have concerns related to being an undocumented student? Contact Student Outreach Services (650-7443) and check the following site: https://www.wwu.edu/undocumented-students.

Do you have financial difficulties? Go to the Financial Aid Services Center and schedule an appointment with a financial aid counselor (https://www.finaid.wwu.edu/client-services/pages/)

Do you identify as a member of the LGBTQ+ Community? Learn about resources and support by visiting https://lgbtq.wwu.edu/

Do you or someone you know need confidential support related to sexual violence? Contact Survivor Advocacy Services (650-3700 or https://cwc.wwu.edu/survivorservices), the Student Health Center, and/or the Counseling Center.

To report sexual violence, please contact University Police, Bellingham Police, and/or the Title IX Coordinator in Western's Equal Opportunity Office (650-3307). Faculty are required to report sex discrimination, including sexual violence that they learn about to the Title IX Coordinator.

Are you or someone you know in distress? Help is available anytime, all the time: 650-3164 or https://cwc.wwu.edu/suicide-prevention

I also encourage you to check the syllabi policies for students: https://syllabi.wwu.edu/

You will be graded based on your performance on class exams and participation in quizzes; laboratory assignments, exams, attendance and participation, and completeness of laboratory notebook as follows:

Class			
Exams 1, 2, 3	35 points each	105 points total	
Final exam		55 points total105	
Pre-class quizzes (variable)		40 points total	~70%
Participation (in-class quizzes and activities)) (variable)		40 points total	
Subtotal		**240 points**	
Laboratory			
Activity 4.1- Report on effects of temperature on respiration		20 points	
Activity 6.1- Report on plant nutrition		35 points	
In-lab quizzes (8)	5 points each	40 points	~30%
Lab manual checks (3)		30 points	
Practical exam		35 points	
Subtotal		160 points	
		(converted to 100 points)	
TOTAL		**340 points possible**	
Extra-credit programmatic assessment online		3 points	

DO NOTICE THAT THE 160 POINTS FROM LAB WILL BE CONVERTED TO 100 POINTS IN THE COURSE SO CLASS REPRSENTS 70% OF THE GRADE AS PER OTHER 206 CLASSES

IF you take this class as Fail/Pass you need at least 75% to pass the course.

Grading Scale:

95 - 100 %	A	80 – 83.9	B-	67 – 69.9	D+
90 – 94.9	A-	77 – 79.9	C+	64 – 66.9	D
87 – 89.9	B+	74 – 76.9	C	60 – 63.9	D-
84 – 86.9	B	70 – 73.9	C-	below 60 %	F

Changes might be made to the syllabus along the course. These changes will be announced in advance.

CLASS SCHEDULE

Wk	Date	Class (MWF 08:30-09:50)	Reading *Freeman 7th edn* page numbers (sections)	Laboratory (check with your TA) (T:8-11; W: 11-14; R:8-11)
1	Apr W 3	Introduction	Syllabus	No labs during 1st week.
	F 5	Animal and Plant Body Form Chapters 7, 28, 30, 34, 39	pp 150-151 [s 7.2]	
2	M 8		pp 157, 580-584, 630-631 [table 7.1; s 28.2, 30.1]	Lab 1: Microscopy and Organization of the Plant Body-Primary Growth Quiz 1
	W 10		pp 634-639, 724-732 [s 30.2, 34.1]	
	F 12		pp 733-738, 843-848 [s 34.2, 39.2]	
3	M 15		pp 738-745 [s 34.3-34.4]	Lab 2: Organization of the Plant Body-Secondary Growth Quiz 2
	W 17		pp 848-855 [s 39.3, 39.4, 39.5]	
	F 19		pp 848-855 [s 39.3, 39.4, 39.5]	
4	M 22	**EXAM I** (35 pts) *Chapters 7, 28, 30, 34, 39*		
	W 24	Animal and Plant Nutrition Chapters 3, 5, 6, 9, 10, 36, 41	pp table 3.1, 93 (the review), table 5.1, 119 (the review), 122-125 (review), 194-195, 214-216 [table 3.1, Chapter 3 review; table 5.1, Chapter 5 review; s 6.1 (review), 9.1, 10.1]	Lab 3: Form and Function in Multicellular Animals Quiz 3
	F 26		pp 767-774, 878-880 [s 36.1, 36.2, 41.1, 41.2]	
5	M 29		pp 774-780 [s 36.3, 36.4]	Lab 4: How Do Animals Maintain Homeostasis? Thermoregulation and Respiration Quiz 4 Assign: Activity 4.1
	May W 1		pp 881-891 [s 41.3]	
	F 3		pp 891-893 [s 41.4]	
6	M 6	**EXAM II** (35 pts; *assumes you know prior concepts)* *Chapters 3, 5, 6, 9, 10, 36, 41*		Lab 5: Animal Nutrition: Digestion and Absorption Quiz 5 DUE: Activity 4.1
	W 8	Animal and Plant Internal Transport Chapters 2, 6, 35, 42, 40	pp 65-66, 129-131, 748-751 [s 2.2, 6.3, 35.1]	
	F 10		pp 752-758 [s 35.2]	
7	M 13		pp 758-765; figure 37.22 [s 35.3, 35.4]	Lab 6: Plant Nutrition Quiz 6 Assign: Activity 6.1
	W 15		pp 858-864 [s 40.1, 40.2]	
	F 17		pp 896-904 [s 42.1, 42.2, 42.3]	
8	M 20		pp 905-912; figures 42.23, 42.26 [s 42.4, 42.5]	Lab 7: Water Relations in Multicellular Organisms Quiz 7
	W 22		pp 747-748 [s 35.1]	
	F 24	**EXAM III** (35 pts; *assumes you know prior concepts)* *Chapters 2, 6, 35, 40, 42*		
9	M 27	HOLIDAY!!		Lab 8: Reproduction In Animals and Plants Quiz 8 DUE: Activity 6.1
	W 29	Sensing and Responding to Environment Chapters 11, 37, 43, 44, 46	pp 247-253; 785-791 [s 11.3, 37.1, 37.2]	
	F 31		pp 798-806; 995-997 [s 37.6, 46.3]	
10	Jun M 3		pp 921-929 [s 43.1, 43.2]	**LAB PRACTICAL**
	W 5		pp 930-933; 938-941 [s 43.3, 43.4]	
	F 7		pp 944-950 [s 44.1, 44.2]	
	W 12	**FINAL EXAM: 10:30–12:30 h** (55 pts) ***CUMULATIVE*** *(Emphasis on Chapters 11, 37, 43, 44, 46)*		

CLASS SCHEDULE

Wk	Date	Class (MWF 08:30-09:50)	Reading *Freeman 6th edn* page numbers [sections]	Laboratory (check with your TA) (T:8-11; W: 11-14; R:8-11)
1	Apr W 3	Introduction	Syllabus	No labs during 1st week.
	F 5	Animal and Plant Body Form Chapters 7, 28, 30, 34, 39	pp 146 [s 7.2]	
2	M 8		pp 153, 564-568, 614-615 [table 7.1; 28.2, 30.1]	Lab 1: Microscopy and Organization of the Plant Body-Primary Growth Quiz 1
	W 10		pp 618-623, 704-712 [s 30.2, 34.1]	
	F 12		pp 713-717, 821-825 [s 34.2, 39.2]	
3	M 15		pp 718-725 [s 34.3]	Lab 2: Organization of the Plant Body-Secondary Growth Quiz 2
	W 17		pp 826-834 [s 39.3, 39.4, 39.5]	
	F 19		pp 826-834 [s 39.3, 39.4, 39.5]	
4	M 22	**EXAM I** (35 pts) *Chapters 7, 28, 30, 34, 39*		
	W 24	Animal and Plant Nutrition Chapters 3, 5, 6, 9, 10, 36, 41	pp table 3.1, 91 (the review), table 5.1, 117 (the review), 120-123 (review), 190-191, 210-212 [table 3.1, chapter 3 review; table 5.1, chapter 5 review; s. 6.1 (review), 9.1, 10.1]	Lab 3: Form and Function in Multicellular Animals Quiz 3
	F 26		pp 747-754, 855-858 [s 36.1, 36.2, 41.1, 41.2]	
5	M 29		pp 754-760 [s 36.3, 36.4]	Lab 4: How Do Animals Maintain Homeostasis? Thermoregulation and Respiration Quiz 4 Assign: Activity 4.1
	May W 1		pp 859-869 [s 41.3]	
	F 3		pp 869-871 [s 41.4]	
6	M 6	**EXAM II** (35 pts; *assumes you know prior concepts)* *Chapters 3, 5, 6, 9, 10, 36, 41*		
	W 8	Animal and Plant Internal Transport Chapters 2, 6, 35, 42, 40	pp 62-63, 127-128, 728-731 [s 2.2, 6.3, 35.1]	Lab 5: Animal Nutrition: Digestion and Absorption Quiz 5 DUE: Activity 4.1
	F 10		pp 732-737 [s 35.2]	
7	M 13		pp 737-744; figure 37.22 [s 35.3, 35.4]	Lab 6: Plant Nutrition Quiz 6 Assign: Activity 6.1
	W 15		pp 836-842 [s 40.1, 40.2]	
	F 17		pp 874-884 [s 42.1, 42.2, 42.3]	
8	M 20		pp 884-891; figures 42.25, 42.28 [s 42.4, 42.5]	Lab 7: Water Relations in Multicellular Organisms Quiz 7
	W 22		pp 727-728 [s 35.1]	
	F 24	**EXAM III** (35 pts; *assumes you know prior concepts)* *Chapters 2, 6, 35, 40, 42*		
9	M 27	HOLIDAY!!		Lab 8: Reproduction In Animals and Plants Quiz 8 DUE: Activity 6.1
	W 29	Sensing and Responding to Environment Chapters 11, 37, 43, 44, 46	pp 243-249; 765-772 [s 11.3, 37.1, 37.2]	
	F 31		pp 778-786; 973-975 [s 37.6, 46.3]	
10	Jun M 3		pp 899-907 [s 43.1, 43.2]	**LAB PRACTICAL**
	W 5		pp 908-912; 917-919 [s 43.3, 43.4]	
	F 7		pp 922-927 [s 44.1, 44.2]	
	W 12	**FINAL EXAM: 10:30–12:30 h** (55 pts) ***CUMULATIVE*** *(Emphasis on Chapters 11, 37, 43, 44, 46)*		

GURs:

Foundational Knowledge & Practice Literacies for Developing, Integrating, and Extending Your Core Capacities