

**BIO 2102: General Biology  
Seattle Pacific University  
Spring Quarter 2019**

**Instructor:** Jenny Tenlen, Ph.D.

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**Office hours:**

MWF, 10:00 am - 11:30 am, or by appointment,  
or stop by any time my door is open.

**Lecture:** M, W, F 8:00 am - 9:20 am

**Lecture classroom:** Bertona 3

**Laboratory instructor:** Mary Chaffee

**Laboratory room:** Eaton 230

**Laboratory sections:**

CRN 46582, Thurs., 8:00 am – 10:50 am	TA: Angie Vazquez
CRN 46583, Thurs., 12:00 pm – 2:50 pm	TA: Cameron Ashton
CRN 46584, Thurs., 3:00 pm – 5:50 pm	TA: Ngan Dang

*“Seattle Pacific University seeks to change the world and engage the culture by graduating students of competence and character, cultivating people of wisdom, and modeling a grace-filled community.”  
[SPU Mission Statement]*

**Textbooks and other materials**

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*Required textbook: (Available in SPU Student Bookstore, (206) 281-2137)*

Freeman, S. 2017. *Biological Science* (6<sup>th</sup> Edition). Pearson/Prentice Hall Publishing, Upper Saddle River, NJ. ISBN 9780321976499. Access to the online materials, called MasteringBiology, is *optional*. [Note: the 6th edition is new. If you already own the 5th edition, that will be acceptable. Chapter-equivalents for each reading assignment will be provided on Canvas.]

*Lab materials:*

For lab, you will need **goggles** (your goggles from Chemistry are suitable) and a **dissection kit** (available for purchase from the bookstore). You will also need a 3-ring binder for your lab notebook (1” should be sufficient).

**Course Description**

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BIO 2102 is designed to equip you with a scientific understanding of animal life. First, we will explore the *diversity* of life. You will become familiar both with the science of *systematics* and with the relationships among major animal groups (phyla and classes). We will study reproductive strategies as well as development and differentiation.

Next, we will examine the variety of animal life through the study of animal *structure and function*, with special emphasis on vertebrate anatomy and physiology. However, invertebrate anatomy and physiology will be discussed when appropriate and compared and contrasted with vertebrates. Whenever applicable the clinical (medical) aspects will be discussed to help us understand the application of physiology. Often the most interesting comparisons and contrasts are the physiological convergences observed for distantly related animals adapted to similar environments (e.g. desert adapted organisms) or the physiological divergences for closely

related animals adapted to different environments (e.g. freshwater vs. marine fishes). It is anticipated that when the student has completed this course they should have an understanding of the diverse means of successful survival. Evolution, animal diversity and the relationship of structure to function will form the unifying themes for the entire course.

Student assessment is based on exams, an analysis of a scientific paper, participation in class activities, completion of problem sets and other assignments, and completion of laboratory exercises.

## Goals and Objectives

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**Department of Biology's mission:** The Biology Department at Seattle Pacific University is dedicated to teaching the principles and practices of modern biology, grounded in the theory of evolution. We are committed to building a community that promotes academic excellence, enriches Christian faith, and respects and welcomes diversity.

**Biology Department Learning Outcomes:** The objectives of the Biology Department can be found online at: <http://spu.edu/academics/college-of-arts-sciences/biology/about/mission-goals-and-objectives>. We will specifically address these outcomes:

1. Students learn the major themes and core concepts of cell biology, molecular biology, genetics, organismal biology, ecology, and evolution by natural selection.
2. Students use appropriate supporting data and analyses to effectively communicate in oral and written forms.
3. Students explore the integration of science with a Christian worldview.

**University Objectives:** The mission statement and goals of Seattle Pacific University can be found online at: <http://spu.edu/about-spu/mission>

## Grading

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Category	Points Possible	Percentage	Letter
Syllabus quiz	5	93-100	A
Problem Sets (6 x 10 pts each)	60	90-92.9	A-
Lecture exams (4 x 75 pts each)	300	87-89.9	B+
Scientific paper proposal	5	83-86.9	B
Scientific paper analysis	45	80-82.9	B-
Lab assignments (9 x 5 pts each)	45	77-79.9	C+
Lab quizzes (7 x 5 pts each)	35	73-76.9	C
Lab exam	25	70-72.9	C-
Lab notebook & participation	25	67-69.9	D+
<b>total</b>	<b>545</b>	60-66.9	D
		0-59.9	E

(Point values may be altered during the course of the class depending on available time and other course constraints.)

## Course Policies

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**Academic integrity:** The Undergraduate Catalog contains the University policy and commitment to academic integrity (<http://spu.edu/catalog/undergraduate/20189/academic-policies-procedures/integrity>). Academic dishonesty of any kind is a breach of this policy. Cheating on quizzes, exams, laboratory assignments and any other assignment for this course is NOT tolerated. Copying answers from a fellow student, bringing concealed answers to an exam, turning in someone else's work as your own are all examples of academic dishonesty. Plagiarism is copying portions of or complete works by another person without giving them appropriate acknowledgment. If you are not sure whether you are in danger of plagiarism ASK before you turn in your assignments. Once they have been turned in you are responsible for the consequences. The first offense will result in a failing grade for the assignment or exam. Any second offense will result in failing the course.

**Lecture Attendance:** You are expected to attend all scheduled sessions. There will be discussions, special assignments, and other activities during the class period that cannot be made up. If you plan to be absent due to a university-sanctioned event (e.g., music performance or athletic competition), please alert your instructor in advance. If you are unable to attend class due to a severe illness or other emergency, you must notify your instructor *before* class if possible. If you miss a graded class activity for an *unexcused* absence, you will not be able to make it up. If you miss a graded class activity for an *excused* absence, you may be asked to do a makeup assignment, at your instructor's discretion. Excessive absences will be dealt with on a case-by-case basis, and may result in the loss of a letter grade.

**Course citizenship:** This course depends on participation, both in lab and in lecture. You are expected to respect the learning of others at all times by avoiding the following behaviors:

- |                                |                               |
|--------------------------------|-------------------------------|
| a. Arriving obtrusively late   | d. Text messaging/App-playing |
| b. Conversations or whispering | e. Frequent bathroom breaks   |
| c. Cell phones ringing         | f. Reading newspapers         |

As a good rule of thumb, consider that you will be expected to behave professionally on the job once you graduate, and such behavior should become a regular habit starting now. This can be reflected in the final evaluation that is your grade. If you behave unprofessionally, you may be "fired" for the day, that is, required to leave the classroom or lab.

**Cell phones** must be turned off and put away during lecture, laboratory and examination periods. If you use a laptop, stay on task!

**Course materials:** All course materials will be posted on Canvas. You can access Canvas from mySPU on the SPU website. Your instructors do not track use of either Canvas or the optional MasteringBiology website; these are study resources only.

**Assessment and grading:** Class activities are graded at your instructor's discretion. This means that you may receive points for providing correct answers or simply for completing an activity. Some activities may not be graded at all. Grades in BIO 2102 are not curved. You will be able to view all of your raw scores in Canvas.

**Late assignments** will be subjected to a penalty of 10% for each calendar day late, unless prior arrangements were made in writing with your instructor. No late assignments will be accepted after the start of the final exam.

**Syllabus Quiz:** There will be a quiz to check your understanding of the syllabus. This quiz will be administered via Canvas, and must be completed by **11:59 pm on Friday, March 29, 2019**.

**Problem Sets:** To help you apply vocabulary and concepts from readings and lectures, you will complete 6 problem sets throughout the quarter. While you may seek help from your instructors or classmates, all work **MUST BE YOUR OWN**. All due dates are noted in the syllabus. You will turn in your problem sets through Canvas. Any assignment submitted after the deadline will be subjected to the late assignments policy.

**Lecture exams:** There will be three unit exams and a final exam this quarter. Note the dates and time of all exams, including the final exam, and make your travel plans accordingly. Make-up exams will be considered only for extraordinary circumstances and only if your instructor has been notified in writing in advance (flying home early for spring break does not count as an extraordinary circumstance). The format of a makeup exam is your instructor's choice. If these conditions are not met, and an exam is missed, then you will get a 0 for that exam. Please note, exams are not graded on a curve.

Exams may cover material from lectures, the textbook, assignments, and class activities. The exams are designed to test basic knowledge of facts as well as the ability to apply knowledge in solving problems. Exam questions may use a variety of formats, including multiple choice, fill-in and short answer. Students are not permitted to leave the room during an exam. Correct spelling is required of biological terms.

The final exam will be primarily over the material covered in the final two weeks of the quarter. However, there will be some cumulative questions. Examples of cumulative questions will be provided in the study guide for the final exam.

**Students involved in university sponsored activities that take them away from campus during an exam should notify the instructor a minimum of ONE WEEK prior to the exam so that arrangements can be made with coaches/directors to proctor the exam.**

**Course evaluations:** Student feedback is essential for ensuring that the course meets academic expectations. Students will have an opportunity to evaluate the course at the end of the quarter through the Student Feedback module in Canvas. Evaluations submitted through Canvas are anonymous and are not available to the instructors until after final grades are recorded by the university. If greater than 80% of the class completes a course evaluation by **Wednesday, June 12, 2019**, then everyone in the class will receive 5 pts extra credit.

**Disabilities statement:** All students have the right to learn, and your instructors care very deeply that students feel supported and engaged in class. In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, students with specific disabilities that qualify for academic accommodations are strongly encouraged to contact Disabled Student Services (DSS) in the Center for Learning (<http://www.spu.edu/depts/cfl/dss/index.asp>). DSS in turn will send a Disability Verification Letter to the course instructor indicating what accommodations have been approved.

**Inclement weather:** The University maintains an Emergency Closure Hotline (206-281-2800). In the event of inclement weather or an emergency that might close the university, please call the Hotline for the most up-to-date closure information or check the SPU website. Both will be updated before 6:00 a.m. In the event that class is cancelled unexpectedly, please check the course Blackboard site for makeup information.

**Emergencies:** If there is an emergency during lecture that requires evacuating the building, meet as a group in the Ross parking lot (adjacent to Bertona). If an evacuation occurs during lab, meet as a group in Tiffany Loop. Please do not leave this area, as your instructor needs to account for all students immediately following the evacuation. If possible, pair up with your nearest neighbor in an emergency and keep track of each other until the situation has been resolved. If there is a lockdown, please stay in the classroom and follow your instructor's directions. Additional information about emergency procedures is provided on the next page.

## Emergency Preparedness Information

### Report an Emergency or Suspicious Activity

Call the Office of Safety & Security (OSS) at 206-281-2922 to report an emergency or suspicious activity. SPU Security Officers are trained first responders and will be dispatched to your location. If needed, the OSS Dispatcher will contact local fire/police with the exact address of the location of the emergency.

### SPU-Alert System

The SPU-Alert System is SPU's emergency notification system. It can send information via text message, email, electronic reader board, computer pop-ups (for SPU computers), loudspeaker, and recorded cell phone messages. Text messaging has generally proven to be the quickest way to receive an alert about a campus emergency. In order to receive text messages from SPU-Alert, you must provide SPU with your cell phone number through the Banner Information System on the web, <https://www.spu.edu/banweb/>. Select the Personal Menu then choose the Emergency Alert System tab. Contact the CIS Help Desk if you have questions about entering your personal contact information into the Banner Information System. Emergency announcements may also be made by SPU staff members serving as Building Emergency Coordinators ("BECs").

### Lockdown / Shelter in Place – General Guidance

The University will lock down in response to threats of violence such as a bank robbery or armed intruder on campus. You can assume that all remaining classes and events will be temporarily suspended until the incident is over. Lockdown notifications are sent using the SPU-Alert System.

#### If you are in a building at the time of a lockdown:

- Stay inside and await instruction, unless you are in immediate visible danger. If you are in immediate danger: run to escape or hide in a securable area, and plan to defend yourself if necessary.
- Move to a securable area (such as an office or classroom) and lock the doors and silence your phone.
- Close the window coverings then move away from the windows and get low on the floor and if you are with other people spread out around the room.
- Remain in your secure area until further direction or the all clear is given (this notification will be sent via the SPU-Alert System).

#### If you are outside at the time of a lockdown:

- Leave the area and seek safe shelter off campus. Remaining in the area of the threat may expose you to danger.
- Return to campus after the all clear is given (this notification will be sent via the SPU-Alert System).

### Evacuation – General Guidance

Students should evacuate a building if the fire alarm sounds or if a faculty member, a staff member, or the SPU-Alert System instructs building occupants to evacuate. In the event of an evacuation, gather your personal belongings quickly and safely proceed to the nearest exit. Most classrooms contain a wall plaque or poster on or next to the classroom door showing the evacuation route and the assembly site for the building. Do not use the elevator.

Once you have evacuated the building, proceed to the nearest evacuation assembly location. The "Stop. Think. Act." booklet posted in each classroom contains a list of assembly sites for each building. The assembly sites are also listed online at: <https://emergency.spu.edu/campus-emergency-procedures/evacuation-and-assembly-areas/>. Check in with your instructor or a BEC (they will be easily recognizable by their bright orange vests). During emergencies, give each BEC your full cooperation whenever they issue directions.

### Additional Information

Additional information about emergency preparedness can be found on the SPU web page at <https://emergency.spu.edu/> or by calling the Office of Safety & Security at 206-281-2922.

## **Additional Laboratory Policies**

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**Lab attendance**, during your scheduled lab time, is required. You may not skip/make-up lab for any reason other than sponsored SPU events (e.g., athletics, music) or illness. For both of these reasons, a note from you coach or from your physician is required, and we must be made aware of this before you miss lab so arrangement can be made for you to attend another session. Laboratory exercises cannot be made up. An alternate assignment may be considered only for extraordinary circumstances and only if your instructor has been notified in advance. Failure to attend a lab may result in your course grade being dropped one full letter grade (e.g., from a B+ to a C+) at the end of the quarter.

**Laboratory safety** is paramount. If BIO 2102 is your first Biology/Chemistry course of the year, you must complete the general lab safety training prior to the first lab session, and sign a Lab Safety Contract. You may be asked to leave the lab (and receive a grade of zero for that session) if you fail to follow the safety rules or are not wearing appropriate clothing or shoes. Safety goggles are required for most lab sessions. You may not remove any equipment, chemicals, or specimens from the laboratory, and you may not perform any experiments other than the ones you are instructed to perform. You are responsible for cleaning up your work area.

**Lab assessment:** Each lab assignment includes a set of pre-lab questions based on the information provided in the lab manual. Your answers are due to your teaching assistant for grading by the START of each lab. Use a three-ring notebook or folder to keep lab papers organized. At the end of the quarter, you will turn in your lab notebook, comprising all lab assignments, lab packets and quizzes, assembled neatly and in order. The lab notebook itself is worth 25 points.

There will be weekly lab quizzes, each worth 5 points. These quizzes will assess your understanding of the concepts and terminology from the previous week's lab. There will be one lab practical examination at the end of the quarter, worth 25 points. You can be examined on any of the activities completed in lab. These include visual identification of animal taxa and internal structures, as well as application of knowledge. You will be asked to interpret data and to demonstrate your understanding of the functional significance of anatomical structures.

**Pre-lab questions and lab protocols will be posted on Canvas. It is the students' responsibility to print and bring these sheets to lab on a weekly basis.**

*Your instructors reserve the right to deviate from the lecture and exam schedules listed in the syllabus in order to enhance the classroom experience. This may include the use of sessions during normal lecture or lab times for the purpose of providing review periods prior to the exams, to make up lecture time lost due to holidays or instructor absence, and/or to facilitate special programs (i.e. guest speakers, video presentations, group discussions, etc.).*



## Succeeding in General Biology

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We will be covering a LOT of material in this course, and it is important that you study regularly to master course concepts. On the course Canvas site, I will post resources that you may find helpful as you move through the course. As a general rule, you should spend at least two hours of study time for every hour of class. Here are a few general tips that I encourage you to follow:

1. Use the syllabus as a schedule for reading the textbook. Check Canvas for problem sets and other assignments. If you start working on assignments sooner rather than later, you will have more time to seek help if you need it.
2. Prepare for each class and lab session so that you can be a productive member of your team. Before each class, read the relevant page in Canvas (under Modules > Lecture Materials). For each class session, I will post a summary of the topic, a link to the relevant textbook reading assignment & study guides, a PDF containing lecture handouts to help in taking notes, and other resources that I think would be helpful.
3. Attend all class sessions and labs! Classes will include different types of activities, including lecture, problem-solving, etc. These activities are designed to help you practice applying the concepts introduced in lecture. When you miss class, you miss out on these learning opportunities.
4. Ask for help! I want all of you to succeed. If you have questions about something we covered in class or lab (whether it is something I said in lecture, how to interpret a phylogeny, etc.), please come talk to me, so I can help you.
5. Form a study group with your classmates to share notes, pick each other's brains, and review concepts. The study area on the main floor of Eaton includes a white board that students are free to use during their studies.
6. The 3Rs: Read, Review, Re-write
  - a. Read the assigned chapters or articles before class, and identify the key concepts. Note any questions you have about the material.
  - b. Review class materials and lectures.
  - c. Re-write your lecture notes after each class – the sooner, the better, since it will still be fresh in your mind. Re-writing your notes will not only allow you to reorganize them, but there is extensive research demonstrating the “hand-brain connection” – writing and re-writing help you to process concepts and information, and move it from short-term to long-term memory.
7. Center for Learning's Study Table
  - a. At **Study Tables**, tutors will host a study area where students can come to ask questions, do homework or prepare for exams. This is a drop-in service and is FREE of charge.
  - b. Tutoring will begin the week of April 1.
  - c. Times/locations for Study Tables can be found on the CFL website at [www.spu.edu/studytables](http://www.spu.edu/studytables).

## Syllabus (updated March 29, 2019)

Additional reading assignments may be posted on Canvas. The syllabus is subject to change. All changes will be announced in class and on Canvas.

Date	Topic	Readings & Assignments
Mon., 3/25	Introduction to Animal Biology	Text: Ch. 30
Wed., 3/27	Introduction to Animal Biology	Text: Ch. 30
Fri., 3/29	Taxonomy	Text: Ch. 30 Due: Syllabus Quiz (Canvas)
Mon., 4/1	Animal diversity & non-Bilaterian phyla	Text: Ch. 30 Due: Problem Set 1
Wed., 4/3	Protostomes	Text: Ch. 31
Fri., 4/5	Protostomes	Text: Ch. 31
Mon., 4/8	Protostomes	Text: Ch. 31
Wed., 4/10	<b>EXAM #1</b>	
Fri., 4/12	Deuterostomes	Text: Ch. 32
Mon., 4/15	Deuterostomes	Text: Ch. 32 Due: Problem Set 2
Wed., 4/17	Deuterostomes	Text: Ch. 32 Due: Scientific Literature Topic
Fri., 4/19	Reproduction & Development	Text: Ch. 47
Mon., 4/22	<b>NO CLASS - EASTER MONDAY (classes resume at 12:30 PM)</b>	
Wed., 4/24	Reproduction & Development	Text: Ch. 47 Due: Problem Set 3
Fri., 4/26	Reproduction & Development	Text: Ch. 47
Sat., 4/27	<b>SEATTLE AQUARIUM VISIT - 10:00 AM</b>	
Mon., 4/29	<b>EXAM #2</b>	
Wed., 5/1	Adaptation & Homeostasis	Text: Ch. 39
Fri., 5/3	Water & electrolyte balance	Text: Ch. 40
Mon., 5/6	Water & electrolyte balance	Text: Ch. 40 Due: Problem Set 4
Wed., 5/8	Water & electrolyte balance	Text: Ch. 40
Fri., 5/10	Nutrition & digestion	Text: Ch. 41 Due: Scientific Literature Analysis
Mon., 5/13	Nutrition & digestion	Text: Ch. 41
Wed., 5/15	<b>EXAM #3</b>	
Fri., 5/17	Nutrition & digestion	Text: Ch. 41 Due: Problem Set 5 (Aquarium)
Mon., 5/20	Gas Exchange	Text: Ch. 42
Wed., 5/22	Gas Exchange & Circulation	Text: Ch. 42
Fri., 5/24	Circulation	Text: Ch. 42 Due: Problem Set 6
Mon., 5/27	<b>NO CLASS - MEMORIAL DAY</b>	
Wed., 5/29	Nervous system	Text: Ch. 43
Fri., 5/31	Nervous system	Text: Ch. 43
Tues., 6/4	<b>EXAM #4 8:00 AM - 10:00 AM BERTONA 3</b>	
Wed., 6/12	Due: Student Feedback Survey (in Canvas)	



## BIO 2102 LABORATORY SCHEDULE SPRING 2019

*All labs have a pre-lab assignment that MUST be turned in to your lab TA for grading at the START of lab, to receive credit/points for pre-lab questions.*

<b>Lab Week/Date</b>	<b>Topics</b>
March 28	Morphological and molecular taxonomy
April 4	<p><b>Meet in Library with Carrie Fry</b>  <i>Introduction to the Science Paper Assignment - meet during 1<sup>st</sup> hr of lab in the library classroom (main floor), then <u>return to lab</u>.</i></p> <p>Basal phyla: Porifera, Cnidaria, Ctenophora</p>
April 11	<p><i>LAB QUIZ 1</i>            Lophotrochozoans: Platyhelminthes, Rotifera, Annelida, Mollusca</p>
April 18	<p><i>LAB QUIZ 2</i>            Ecdysozoans: Nematoda, Tardigrada, Arthropoda</p>
April 25	<p><i>LAB QUIZ 3</i>            Deuterostomes</p>
May 2	<p><i>LAB QUIZ 4</i>            Animal Development &amp; Organization</p>
May 9	<p><i>LAB QUIZ 5</i>            Fetal Pig Dissection: External Anatomy and Muscles</p>
May 16	<p><i>LAB QUIZ 6</i>            Fetal Pig Dissection: Digestive, Respiratory, and Circulatory Systems</p>
May 23	<p><i>LAB QUIZ 7</i>            Fetal Pig Dissection: Urogenital, Reproductive and Nervous Systems</p> <p>Human senses and reflexes</p>
May 30	<p><b>LABORATORY NOTEBOOK DUE</b></p> <p><b>LABORATORY EXAM: Fetal Pig Dissection</b></p>