

**BIO 2102: General Biology  
Seattle Pacific University  
Spring Quarter 2016**

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

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**Office hours:**

MWF, 10:00 am - 12:00 pm, or by appointment,  
or stop by any time my door is open.

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

**Lecture classroom:** Otto Miller 109

**Laboratory instructor:** Quinton Ouellette

*Email:* [ouelletteq@spu.edu](mailto:ouelletteq@spu.edu)

**Laboratory sections:**

CRN 46584, Wed., 3:00 pm – 5:50 pm

CRN 46582, Thurs., 8:00 am – 10:50 am

CRN 46583, Thurs., 12:00 pm – 2:50 pm

**Laboratory room:** Eaton 230

TA: Lola Sosanya

TA: Gailynn Benjamin

TA: Jacob Krodel

*“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. 2014. *Biological Science* (5<sup>th</sup> Edition). Pearson/Prentice Hall Publishing,  
Upper Saddle River, NJ. ISBN 13-978-0321-74367-1. Access to the online materials,  
called MasteringBiology, is *not* required but is recommended.

*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.

## Course Learning Objectives

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### **Seattle Pacific University's goals:**

*Seattle Pacific University seeks to be a premier university committed to engaging the culture and changing the world by graduating people of competence and character, becoming people of wisdom, and modeling a grace-filled community.*

### **Department of Biology's goals:**

We seek to produce graduates who understand and respect scientific approaches to the study of life and demonstrate excellence in scientific training. We seek to prepare our graduates to think critically, make informed decisions, and to communicate biological principles effectively. We seek to produce faculty and students who demonstrate personal and professional integrity and wholeness.

### **Department of Biology's objectives:**

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>.

Those objectives that are addressed within this course are listed below.

1. *Science as a way of knowing about the natural world.* We'll talk about how science can and is being used (and also how it "should" and "shouldn't" be used).
2. *Science as a process.* By examining animal anatomy and physiology through the use of laboratory experiments you will see the process of science.
3. *Science as a human endeavor requiring competence, character, and wisdom.* You will learn how to perform laboratory experiments and dissections.
4. *Unifying themes recognized as pervading all of biological science.*  
You will observe the diversity of animal species, and we will focus on evolution and homeostasis as organizing principles of biology.
5. *Fundamental concepts associated with heredity and evolution.* The diversity of animals and the physiological mechanisms within them will be examined from an evolutionary framework.
6. *Fundamental concepts associated with organismal biology.* You will learn the similarities and differences between animal species as it relates to their anatomic and physiological mechanisms.
7. *Fundamental concepts associated with ecology and environmental science.* Many of the physiological processes and morphological adaptations that we will discuss relate to environmental adaptation and the impact of the species on the environment as well as the environmental impact on the species.

## Grading

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Category	Points Possible
Syllabus quiz	5
In-class assignments (var.)	var.
Problem Sets (7 x 10 pts each)	70
Lecture exams (4 x 75 pts each)	300
Scientific paper proposal	5
Scientific paper analysis	50
Lab quizzes (7 x 10 pts each)	70
Lab exam (1 x 25 pts)	25
Lab assignments (var.)	50
Lab notebook & participation	25
<b>total</b>	<b>~600</b>

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

Scale:

Percentage	Letter	Percentage	Letter
93-100	A	73-76.9	C
90-92.9	A-	70-72.9	C-
87-89.9	B+	67-69.9	D+
83-86.9	B	60-66.9	D
80-82.9	B-	0-59.9	E
77-79.9	C+		

## 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/20156/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. I am required by Student Academic Services to monitor attendance. Attendance will be based on participation in regular small graded in-class activities. There will be discussions, special assignments, and other activities during the class period that cannot be made up. I recognize that this is an 8:00 am class, but you are expected to be in class, on time.

If you plan to be absent due to a university-sanctioned event (e.g., music performance or athletic competition), please alert Dr. Tenlen in advance. If you are unable to attend class due to a severe illness or other emergency, you must notify Dr. Tenlen *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 Dr. Tenlen's discretion. Excessive absences will be dealt with on a case-by-case basis.

**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
- b. Conversations or whispering
- c. Cell phones ringing
- d. Text messaging/App-playing
- e. Frequent bathroom breaks
- 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 Blackboard. (You can access Blackboard from mySPU on the SPU website.) Dr. Tenlen does not track student use of either Blackboard or the MasteringBiology website; these are study resources only and are not used for formal assessment. Instructions for the scientific paper analysis will be provided separately.

**Assessment and grading:** Class activities are graded at Dr. Tenlen'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. Preparation worksheets and follow-up worksheets may be graded in full, in part, or not at all. In other words, Dr. Tenlen may choose to count only some of the questions, but you will not know ahead of time which questions will be graded. Raw scores for exams and some assignments will be posted on Blackboard.

**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 assignments will be accepted after the final exam.

**Quiz:** There will be a quiz to check your understanding of the syllabus. This quiz will be administered via Blackboard, and must be completed by **11:59 pm on Monday, April 4, 2016**. There may be other quizzes, both announced and unannounced, during lecture. There will be weekly quizzes in lab.

**Problem Sets:** To help you apply vocabulary and concepts from readings and lectures, you will complete 7 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. Problem Sets will be due at the start of class. If you are late to class, your problem set will be counted as late.

**Scientific Literature Analysis:** See explanation of this assignment in the separate handout (available on Blackboard under *Lecture Materials*).

**Lecture exams:** There will be four unit exams this quarter. Note the date and time of all exams, including the final exam, and make your travel plans accordingly. About 25% of the

final exam will be cumulative. Make-up exams will be considered only for extraordinary circumstances and only if your instructor has been notified in writing in advance. 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.

**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 take the exam during the trip.**

**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 Banner Information System. Evaluations submitted through Banner 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 **Monday, June 13, 2016**, 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 Otto Miller parking lot. 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 and Security to report an emergency or suspicious activity by dialing 206-281-2911 or by pressing the call button on a campus emergency phone. SPU Security Officers are trained first responders and will be dispatched to your location. If needed, the SPU 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.
- Move to a securable area (such as an office or classroom) and lock the doors.
- Close the window coverings then move away from the windows and get low on the floor.
- 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 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. 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 <http://www.spu.edu/info/emergency/index.asp> or by calling the Office of Safety and 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 will 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 points**: pre-lab worksheets for each exercise will be turned in to your teaching assistant for grading at the START of 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 and quizzes, assembled neatly and in order. The lab notebook itself is worth 25 points.

**Laboratory practical examinations**: There will be weekly lab quizzes, each worth 10 points. 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 Blackboard. 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 Blackboard site, I will post resources that you may find helpful as you move through the course. Here are a few general tips that I encourage you to follow:

1. Use the syllabus as a schedule for reading the textbook. Check Blackboard for assignments that are due at the start of the next class. 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 textbook chapter and *think* about it. A general rule is that you should spend at least two hours of study time for every hour of class.
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, or are unsure of how to approach a genetics problem, 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. I will try to make lectures available after class through TechSmith Relay.
  - 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. Valerie Chieng will provide tutoring for BIO 2102 students at the CFL's Study Table. Tutoring will begin the week of April 4.
  - b. At **Study Tables**, tutors will host a study area where students can come to ask questions, do homework or prepare for exams.
  - c. This is a drop-in service and is FREE of charge.
  - d. Times/locations for Study Tables can be found on the CFL website at [www.spu.edu/studytables](http://www.spu.edu/studytables).

## Syllabus

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

Date	Topic	Readings & Assignments
Wed., 3/30	<b>NO CLASS</b> - View lecture on Blackboard Introduction to Animal Biology	<b>Due (11:59 pm):</b> Lecture quiz <b>Text:</b> 33.1, 33.2
W/Th 3/30-3/31	<b>LAB:</b> Basal phyla	
Fri., 4/1	<b>NO CLASS</b> - View lecture on Blackboard Introduction to Animal Biology	<b>Due (11:59 pm):</b> Lecture quiz <b>Text:</b> 33.3
Mon., 4/4	Non-bilaterians	<b>Due (11:59 pm):</b> Syllabus Quiz (Blackboard) <b>Text:</b> 33.4
Wed., 4/6	Protostomes	<b>Due:</b> Problem Set 1 <b>Text:</b> 34.1
W/Th 4/6-4/7	<b>LAB:</b> Morphological and molecular taxonomy	
Fri., 4/8	Protostomes	<b>Text:</b> 34.2
Mon., 4/11	Protostomes	<b>Text:</b> 34.3
Wed., 4/13	<b>EXAM #1</b>	
W/Th 4/13-4/14	<b>LAB:</b> Lophotrochozoans	
Fri., 4/15	Deuterostomes	<b>Text:</b> 35.1
Mon., 4/18	Deuterostomes	<b>Due:</b> Problem Set 2 <b>Text:</b> 35.2, 35.3
Wed., 4/20	Deuterostomes	<b>Text:</b> 35.3, 35.4
W/Th 4/20-4/21	<b>LAB:</b> Ecdysozoans	
Fri., 4/22	Fertilization	<b>Due:</b> Sci Lit Paper Topic <b>Text:</b> 23.1, 50.1, 50.2
Mon., 4/25	Embryo Development	<b>Due:</b> Problem Set 3 <b>Text:</b> 23.2, 23.3
Wed., 4/27	Stem cells	<b>Text:</b> see Blackboard
W/Th 4/27-4/28	<b>LAB:</b> Deuterostomes	
Fri., 4/29	Reproduction	<b>Text:</b> Ch. 50.3
Mon., 5/2	<b>EXAM #2</b>	
Wed., 5/4	Reproduction	<b>Text:</b> Ch. 50.4
W/Th 5/4-5/5	<b>LAB:</b> Animal Development & Organization	
Fri., 5/6	Adaptation and homeostasis	<b>Text:</b> 42.1, 42.4, 42.5
Sat., 5/7	<b>SEATTLE AQUARIUM VISIT - 10:00 AM</b>	
Mon., 5/9	Water & electrolyte balance	<b>Due:</b> Problem Set 4 <b>Text:</b> 43.1 - 43.3
Wed., 5/11	Water & electrolyte balance	<b>Text:</b> 43.4 - 43.5
W/Th 5/11-5/12	<b>LAB:</b> Fetal Pig Dissection	
Fri., 5/13	Digestion	<b>Text:</b> 44.1 - 44.3
Mon., 5/16	Digestion	<b>Text:</b> 44.3 - 44.4
Wed., 5/18	<b>EXAM #3</b> <b>Due: Problem Set 5 (Aquarium Assignment)</b>	
W/Th 5/18-5/19	<b>LAB:</b> Fetal Pig Dissection	
Fri., 5/20	Gas exchange	<b>Text:</b> 45.1-45.4
Mon., 5/23	Gas exchange	<b>Due:</b> Scientific literature report <b>Text:</b> 45.1-45.4
Wed., 5/25	Circulation	<b>Due:</b> Problem Set 6 <b>Text:</b> 45.5

W/Th 5/25-5/26	<b>LAB: Fetal Pig Dissection</b>	
Fri., 5/27	Nervous system	<b>Text:</b> 46.1-46.4
Mon., 5/30	<b>MEMORIAL DAY - NO CLASS</b>	
Wed., 6/1	Nervous system	<b>Due:</b> Problem Set 7 <b>Text:</b> 46.1-46.4
W/Th 6/1-6/2	<b>LAB EXAM: Fetal Pig Dissection</b>	
Fri., 6/3	Muscles	<b>Text:</b> 48.1-48.2
Tues., 6/7	<b>FINAL EXAM</b> <b>8:00 AM - 10:00 AM</b>	
Mon., 6/13	<b>DUE:</b> Banner Course Evaluations	

## BIO 2102 LABORATORY SCHEDULE SPRING 2016

*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.*

Lab Date	Topics
March 30/31	Basal phyla: Porifera, Cnidaria, Ctenophora
April 6/7	<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>Morphological and molecular taxonomy</p>
April 13/14	<p>LAB QUIZ 1</p> <p>Lophotrochozoans: Platyhelminthes, Rotifera, Annelida, Mollusca</p>
April 20/21	<p>LAB QUIZ 2</p> <p>Ecdysozoans: Nematoda, Tardigrada, Arthropoda</p>
April 27/28	<p>LAB QUIZ 3</p> <p>Deuterostomes</p>
May 4/5	<p>LAB QUIZ 4</p> <p>Animal Development &amp; Organization</p>
May 11/12	<p>LAB QUIZ 5</p> <p>Fetal Pig Dissection: External Anatomy and Muscles</p>
May 18/19	<p>LAB QUIZ 6</p> <p>Fetal Pig Dissection: Digestive, Respiratory, and Circulatory Systems</p>
May 25/26	<p>LAB QUIZ 7</p> <p>Fetal Pig Dissection: Urogenital, Reproductive and Nervous Systems Human senses and reflexes</p>
June 1/2	<b>LABORATORY EXAM: Fetal Pig Dissection</b>