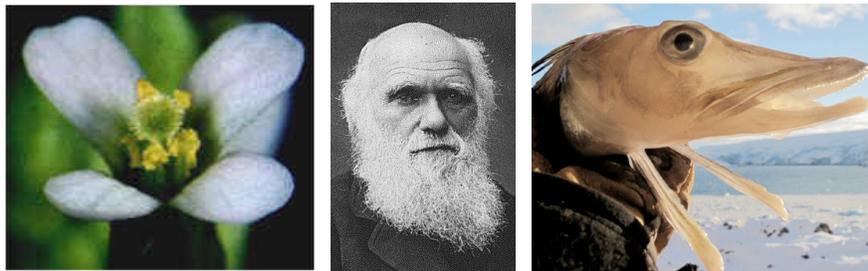
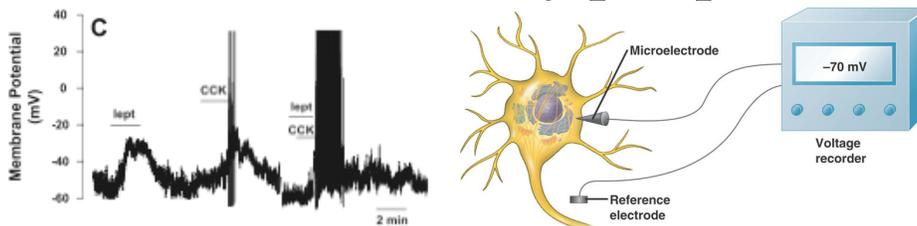


Bi212:Organisms

A CLASS COVERING PLANT & ANIMAL
PHYSIOLOGY AND DEVELOPMENT



with an evolutionary perspective



and a focus on the experimental data we use to build a scientific worldview

SYLLABUS FOR SPRING 2014

Bi 212 General Biology II: Organisms Syllabus for Spring quarter 2014

For more information see our
BLACKBOARD based website

Instructor: Mark Carrier, mcarrier@uoregon.edu
541 346-4199

OFFICE: 15D Klamath

Bi 212 Schedule Spring 2014

Week	Lectures			Lab/ Discussion
	Date	Topics, Quizzes and Exams	Due dates	
1	3/31	Enzymes and organisms 1		Enzymes I
	4/2	Homeostasis, BMR, temperature regulation 2		
	4/4	Size and metabolism in animals 3		
2	4/7	Introduction to plant biology 4		Enzymes II
	4/9	Plant structure and growth 5		
	4/11	Movement across membranes/ Ψ_w 6		
3	4/14	Transporting materials in plants 7	Homework #1 due Wednesday by 3pm	Transpiration investigation
	4/16	Transporting materials in plants 8		
	4/18	Quiz 1 ; Transporting materials in plants 9		
4	4/21	Transporting materials in animals 10		Blood pressure investigation
	4/23	Transporting materials in animals 11		
	4/25	Transporting materials in animals 12		
5	4/28	Obtaining energy and nutrients in plants 13	Homework #2 due Wednesday by 3pm	Student Investigation: planning
	4/30	Obtaining energy and nutrients in plants 14		
	5/2	Midterm 1		
6	5/5	Obtaining energy and nutrients in animals 15		Data Analysis
	5/7	Obtaining energy and nutrients in animals 16		
	5/9	Obtaining energy and nutrients in animals 17		
7	5/12	Animal nutrient homeostasis 18	Homework #3 due Wednesday by 3pm	Student Investigation: data collection
	5/14	Sense mechanisms 19		
	5/16	Quiz 2 Plants and light 20		
8	5/29	Auxin 21		Student Investigation: data collection
	5/21	Plant development 22		
	5/23	Animal Reproduction and development 23		
9	5/26	HOLIDAY, NO CLASSES	Homework #4 due Wednesday by 3pm	Fertilization & development
	5/28	Animal development 24		
	5/30	Midterm 2		
10	6/2	The nervous system 25	FINAL PAPER DUE MONDAY AT 2 PM!	Investigation presentations
	6/4	The nervous system 26		
	6/6	The nervous system 27		
Exam Week	6/13	Final Exam Friday 6/15 10:15		

This schedule is subject to change upon the discretion of the instructor.

Course Overview

The purpose of this class is to invite students to join the scientific community in our quest to use experimental data to increase our understanding of how life works.

This course is about plant and animal physiology and development. We study the constraints set by geometry, the environment, and natural laws that dictate what organisms must accomplish in order to survive and reproduce. We study the forces and machinery that allow movement across membranes, enzyme regulation and kinetics, differential gene expression, and mechanisms of cellular computation and perception. We generate models of systems that organisms use to create homeostasis, which is an internal environment in which their individual cells can participate optimally in the process of meeting the challenges of life on earth. We also study how cells manage to take on specific and unique roles in the organism, which is the study of developmental biology.

Students taking the course will learn how to carry out epistatic analyses of various biological pathways and to interpret and generate complex graphical representations of data. Students propose, design, and conduct experiments on the physiology of long-range transport in plants or animals. They analyze the data they generate and write a scientific paper describing their work. This course is part of the introductory biology sequence, and has as a prerequisite Bi211. This course is itself a prerequisite for Biology 214 (but not 213) and for the introductory human physiology sequence.

Course Prerequisites

The prerequisites for Bi 212 are C-, P, or better in Bi 211 and one term of Chemistry (111 or higher).

Bi211-214 Sequence Goals

There are three major goals for the Bi211-Bi214 sequence.

Concepts The diversity of organisms on earth is awe inspiring, but so too is the commonality of all life. We will focus the course on a reasonably small set of concepts that will help us understand how all organisms work.

To succeed in this course, students will need to demonstrate a working understanding of these major concepts, and be prepared to apply their understanding to novel situations as well as to demonstrate comprehension of these concepts in the context of examples we discuss in lecture.

Skills It is important for all citizens to be scientifically literate, whether or not they are in a science profession. Part of science literacy is the ability to find, evaluate, and communicate or act on scientific information and issues. We will practice these skills in this course. We take a quantitative approach to the study of organisms, and the skills practiced include making sense of scientific data, evaluating experimental design, understanding and generating written and graphic representation of scientific data

Science as a process: We think that it is important for all people, not just professional scientists, to understand how science works. To learn to be a better scientist you will read scientific papers and discuss not only the findings, but also how science is conducted. You will practice scientific methodology by learning to test hypotheses (even in lecture), doing controlled experiments, and evaluating observational studies. The focus of this term will be experimental design, and how we obtain evidence to test a hypothesis.

Bi212 Course Goal

Study the commonality of mechanisms used by plants and animals to meet the challenges of aquatic and terrestrial environments so we may derive or reveal the basic principles of physiology that apply to all organisms.

Bi212 Course objectives

Students will:

...learn to use primary literature sources to obtain specific information that they can use to generate models of biological systems

...learn to interpret and generate complex graphical representations of data

...study several established models of the mechanisms used to maintain such aspects of organismal homeostasis as temperature regulation, metabolic rate regulation, blood flow regulation and plant gas exchange regulation to establish a pattern of what these processes have in common; to enable them to then predict how other aspects of homeostasis will be accomplished.

...learn to use single and double mutant phenotype data to carry out epistatic analyses and generate models of how physiological regulatory systems operate.

...learn and apply basic principles of enzyme kinetics to predict how the regulation of enzymes is used to maintain homeostasis in each of the covered physiological systems, and identify the types of regulation being used on the basis of experimental results.

...Study the regulation of metabolic processes in relation to all aspects of physiology to solidify students understanding of energy flow as a basic principle of life.

...Study the role of differential gene expression and developmental genetic pathways to make or critique predictions about how cells take on specific roles in multicellular organisms.

...Students investigate specific results of the experimental use of genetic constructs to alter or reveal gene expression patterns in plants and animals, and use this training to make predictions about the most likely outcome of experiments in which other constructs are used.

...learn to generate hypotheses, carry out and modify experimental protocols, collect data, carry out statistical analyses, and generate papers formatted and organized to be appropriate for a typical scientific journal.

Course Format

Lectures (Monday, Wednesday and Friday, 11:00-11:50 in room **LIL 182**)

You should be familiar with the assigned readings before coming to lecture. I ask lots of clicker questions and I typically encourage students to work together to answer them. Exams and quizzes are given during lecture hours except for the final exam. Sometimes we use more than just the lecture hall for exams.

Clickers (Personal Response Systems) Clickers will be used in almost every class to encourage participation and to provide valuable feedback to instructors and students. Each student is expected to purchase a clicker for use in this class. You should register your clicker on the course blackboard site. (If you've already registered your clicker *this term*, for another class, then you don't need to register it again.) Questions during lecture that require clickers will be multiple choice.

Lab/Discussion activities

The lab/discussion is a smaller group that meets once a week for 110 minutes. The focus of this term's labs will be on designing experiments to test hypotheses related to physiology. Five of the ten labs will be devoted to designing, conducting, analyzing, and presenting experiments in physiology. See the section on Student Investigation Project for a more detailed explanation. Each laboratory exercise is introduced by a **Pre-lab** write-up. You should read both the pre-lab and the lab write-up before attending the lab session. The Pre-lab will introduce you to the topic to be covered in lab and help focus your thinking so that you will get more out of the laboratory. Pre-labs will prepare you for quizzes given in the lab.

HW/Problem Solving Sessions (several sections to be scheduled during the term)

The single biggest problem students have in general biology is solving the kinds or problems presented in homework problems and exams. These are similar to the kinds of questions that biologists ask; many can't be solved by memorization of facts. In the problem solving sessions, we will go over homework problems and discuss ways to approach these problems. Although attendance is not required, we strongly encourage you to attend these sessions on a regular basis, or to regularly attend the office hours of one of the GTFs or tutoring session of one of the Biology Tutors.

Review Sessions (scheduled during the term)

Graduate students and Undergraduate Biology Tutors (BTUs) often volunteer to organize review sessions to help students prepare for quizzes and exams. *Review sessions are much more likely to be offered when office hours and biology tutoring hours are well attended.* The course instructor also often conducts review sessions during the week of an exam. We get access to large classrooms for these events. Review sessions are run on a question and answer basis. No new information is presented exclusively at review sessions. GTFs and BTUs who participate will not have seen the upcoming quiz or exam.

Office Hours:

The number of office hours offered for this class is very large. The course instructor offers 12 office hours in addition to HW problem solving sessions. PLEASE USE THEM!

Readings

Textbook *Biological Science* by Freeman, 3rd edition or 4th or 5th edition.

The text should be used as a general reference throughout the three quarters of General Biology. Pertinent chapters are indicated in the schedule below; specific page assignments will be given as we proceed. The readings include background material useful to prepare you for lecture and for studying for exams. We don't expect you to remember all the details in this material. A good strategy is to read the material twice: the first time skim over it, concentrating on the major concepts; the second time read it more carefully, concentrating on the parts relevant to the homework, lectures, or labs. You may expect that exams will cover only the material covered in lecture, but the text will provide a context and an alternative method of explaining that material.

Course Packet This packet contains many of the handouts you will need during the quarter including lab handouts, the Student Investigation handout, and homework assignments. You should bring the packet with you to lab section. The packet will also be available on Blackboard.

Articles:

We will make available a set of assigned and a set of optional readings on our website. Our textbook provides plenty of information and covers a wider range of topics than we cover in all four semesters of this biology sequence. Textbooks in general fail to provide an idea of the evidence supporting the models we teach for how biological systems work, and the processes that lead to our understanding of how things work. They tend to simplify too much. Our assigned articles are designed to provide examples of the science methodology that leads to an understanding of the field, and to offer up to the minute coverage of topics that may not make it into textbooks for years to come.

Grading

Course Component	Percent of Grade
Laboratory Activity Reports (5)	5
Pop quizzes (given in lab)	1
Homework assignments (4)	10
Clickers & "self-tests"	5
Exams	65
• Midterm (2)	25
• Quizzes (2)	10
• Final Exam	30
Project	15
• proposal	4
• paper	required 8
• presentation	required 3

Attendance at lab is mandatory. Missing multiple labs, or your presentation, without an acceptable excuse will result in a failing grade for the course.

Homework Assignments There will be four homework assignments during the quarter. The homework will help you to learn the material from your readings, lectures and labs that we think is important and thus may be included on the exams. Homework assignments will have a Blackboard based, computerized version that will be the graded form of the assignments. Paper based Homework will be used only to help you complete the Blackboard assignment. I will hold HW sessions to help you understand these problems, and using this resource will almost certainly be worth your while. Solutions to the homework will be posted on the web by the afternoon of the due-date, so **late homework will not be accepted.**

You must do your own work on homework. Copied homework will be treated as academic dishonesty. It's not smart to cheat on homework anyway, the homework is there because if you can figure out these answers you'll do well on tests.

Laboratory activities Lab worksheets, either paper or electronic, will be turned in at the end of some labs. You will receive full credit for the laboratory activity reports (5%) if you attend lab and pass these in after a BULA or GTF has checked them for you. Labs **cannot** be made up because they involve extensive setup of materials. If you miss a lab because of an illness, call or email your GTF as soon as possible to see if you can attend another lab section. Missing labs without an instructor verified explanation may cost you additional course points. Two hour lab sections are **held in Klamath 13.**

Student Investigation Project You will conduct experiments on circulation in humans (blood pressure) and plants (transpiration). Your instructors have designed these experiments, and everyone in the class will collect data that will be pooled for analysis. In the 5th week, you will choose one of these systems to use for your investigation and you will prepare a proposal with 2 or 3 other students in your lab. Each group will carry out their investigation during the 7th and 8th week of the term and then communicate their findings in a paper and oral presentation. The project, worth 15% of your grade, consists of three parts: proposal (4%, group grade), a paper written by each individual (8%, individual grade), and a presentation (3%, group grade). Papers will be due as per the syllabus; late papers will not be accepted. Failure to write a paper will result in failing the class. The experiments you conduct will be of your own design. You will generate the protocol and design the control and experimental conditions. Each student must write his or her own paper. **You may not write them together.** All experiments are subject to the approval of the instructor.

Investigation Paper: Once again, different papers are to be written by each student. You may not work together writing the paper. You are required to submit your paper to *SafeAssign*, located on the course blackboard site. *SafeAssign* checks your work for originality by checking it against published work and previous work submitted by Bi212 students.

Pop Quizzes: Unannounced quizzes will be given during some labs. These quizzes will cover material in the pre-lab and lab write-ups.

Exams and grading: There will be three exams (two midterms and a comprehensive final) and two quizzes. The exams will cover material from all aspects of the course including lectures, labs and readings. Exams will probe a deep understanding of the concepts and principles discussed, and an ability to apply the concepts to novel situations. **EXAMS CANNOT BE MADE UP. EVERYONE IS REQUIRED TO TAKE THE FINAL EXAM. BE CAREFUL WHEN MAKING TRAVEL PLANS AS THE FINAL IS ON FRIDAY JUNE 15TH AND THERE WILL BE NO EARLY EXAMS AND NO MAKE-UP EXAMS.**

Exams are graded by Graduate Teaching Fellows under the supervision of the faculty. To promote consistency, one person grades the same question on all exams. If, upon receiving your exam back and reading the posted key, you think that you should have received more credit for an answer, submit your exam to your GTF, along with a **WRITTEN EXPLANATION** of why you think your answer is correct, within **ONE WEEK** of getting your exam back. Your entire exam will then be re-graded by the people who originally graded it and by the faculty member and your new score will be used. If a simple addition error occurred, you may just take it to a GTF.

In and after class assignments: We will use Blackboard and iClickers to pose questions that can be graded by computer and provide you with pretty much instant grading and feedback as to your understanding of the material as it is presented.

Clickers (Personal Response Systems) **THESE ARE PART OF YOUR GRADE**

Clickers will be used in almost every class to encourage participation, monitor attendance, and to provide valuable feedback to instructors and students. Each student is expected to purchase a clicker for use in this class. We will register the clickers during lab in week 1 so be sure to have yours with you at that time. Questions during lecture that require clickers will most likely be multiple choice or true/false. Points will be earned for offering a response. More points will be awarded if the response is correct.

Post-lecture Tests on Blackboard **THESE ARE PART OF YOUR GRADE**

Questions relevant to material covered in lecture will be posted at the end of each class. Blackboard will grade them, provide the correct answers, and record your grades. These tests will be short, and will be available from the end of lecture to the start of the next lecture – so your time to complete them is limited. I usually call these “self tests” as you are not in class when you complete them.

Website Many items from the course will be posted on the **Blackboard** based website, including lecture notes. However, a word of caution is in order. Servers occasionally crash and if this happens, the website will be inaccessible. **THUS, WE URGE YOU TO DOWNLOAD OR PRINT ANY MATERIALS OF INTEREST FROM THE WEBSITE WELL IN ADVANCE OF EXAMS. WE WILL NOT RESCHEDULE QUIZZES OR EXAMS BECAUSE THE WEBSITE IS INACCESSIBLE.**

Classroom Conduct

This syllabus is, in effect, an agreement about how all of us will carry out our duties and conduct ourselves this quarter. You should read this carefully and talk to us about it as soon as possible if you are uneasy with parts of this syllabus. We will work hard to make this course valuable to your learning. We welcome suggestions from you at anytime about things you think could be done to improve the course. In return, we ask that you arrive at lab and lecture on time and stay until class is over without making unnecessary noise that could distract your classmates (please turn cell phones off). **Please put away and do not use your own computers, cell phones or other electronic devices during lecture or lab.** Computers are not a very good way for taking notes in biology courses and they are distracting to other students.

The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability related barriers to your participation. You are also encouraged to contact the Accessible Education Center (formerly Disability Services) in 164 Oregon Hall at 346-1155 or uoaec@uoregon.edu.

There are some university guidelines for behavior to which we expect all students to adhere. One of these has to do with plagiarism, or taking credit for the work of others. This is a serious offense and will be treated according to the guidelines in the Student Conduct Code (<http://studentlife.uoregon.edu/LinkClick.aspx?fileticket=puLfAzFDbsg=&tabid=69>). This doesn't mean you shouldn't talk with other students about what you are thinking or writing; it does mean that when you write something, it should be in your own words, not copied from someone else. We take this seriously and have sent several academic dishonesty cases to the Student Judicial Affairs Office. It is one of the least favorite parts of our job and it can have serious consequences for your academic career. Please don't be tempted to commit any of these offenses.

Academic dishonesty includes cheating, plagiarizing (taking credit for the work of others) or knowingly supplying false information -- it is a serious offense. Every assignment you turn in should represent your own work. This includes homework assignments. We want you to learn and to do well in the course, but we will not tolerate academic dishonesty. Sanctions for academic dishonesty include a lowered or failing course grade. If you find yourself in trouble, or if you are aware of academic dishonesty occurring, please talk to one of the instructors.

Out of respect for other students, and in keeping with departmental policy, you should plan to arrive at class on time and to stay until class is over. If, on occasion, you do arrive late, please be considerate of others and enter quietly at a time and in such a way that you don't disturb other students. If you need to leave early, please sit near an exit so that you can leave without disrupting the class. **We ask that you not interfere with the ability of other students to learn by making noise when someone else (instructor or classmate) is talking.**

We all have crises now and then. If you are having a problem that interferes with your ability to do the work in this class, please tell us about it as soon as you can. We are willing to give grades of incomplete or to make some kinds of special arrangements when the need is real **and** when you have done your best to deal with the situation and let us know about it in a timely manner.