Bi 1 – Spring 2016
Principles of Biology

Instructor:
Prof. Dianne Newman: dkn@caltech.edu (302 Braun; x3543)

Head TAs:
Sofia Quinodoz (Reciations, Admin): squinodo@caltech.edu *Scott Saunders (Recitations)*: ssaunder@caltech.edu
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***Class Meeting times*:**
Lecture: Tu, Th 1:00 – 2:25 pm. 119 Kerckhoff Recitation sections: as registered (Thursday night or Friday).

Synopsis:
Microorganisms have dominated the biosphere throughout Earth's history. Microbes play major roles in processes ranging broadly from the maintenance of human health to sustaining ecosystems. The fundamental assumption that guides this course is that the biology of microbes provides a unique opportunity to present unifying principles of biology. Therefore, for each topic, our point of departure will be the microbial world. With this foundation, we will then explore how other organisms, like plants and animals, have diversified in form and function, abstracting from the basic 'rules' provided by the microbial world. This class emphasizes hypothesis-testing as a way to gain insight into complex, non-linear biological systems. We will reinforce this approach through lectures, homework sets and recitation exercises; in addition, you will be guided through the process of writing an original scientific proposal on a biological topic of your choice. This writing assignment will teach you communication skills that are valuable in any science or engineering field. Because some of the most exciting questions in science in the 21st century lie at the intersection between biology and other disciplines, we will expose you to examples of interdisciplinary research (often from Caltech groups) that bear on important societal problems.

Reading materials:
We have chosen *Microbiology: An Evolving Science* to provide appropriate reference material to supplement the lectures and reading assignments. While it is not required, we strongly encourage you to purchase a copy of the book as it provides helpful background information on many of the topics that will be covered. You may purchase the book in hard copy and/or ebook format, or for $50 you can purchase 180 days of access to the interactive ebook. Four copies of the textbook (including prior editions) will be on closed reserve in SFL. Additional required readings and resources will be posted to the course website on Moodle; daily quiz material throughout the term may come from any assignment or lecture material.

***Lectures and Quizzes*:**
Classes will include the following components:
(1) Lectures will integrate concepts from micro- and macrobiology. You are welcome to record the lectures, but recordings will not be made available. Only audio recordings are allowed. While we will post images associated with the lectures, we will not post notes; you must attend class to get the content that was presented on the blackboard. We welcome questions during class at any time if you are confused about the material being presented.
(2) At some point(s) during the class, Professor Newman may call on you to answer a question. The goal is to incentivize your being enganged in the lecture and help you become comfortable speaking up in class and thinking on your feet.

Recitation section:
Recitation sections will provide practice for important skills and reinforce key concepts presented in each week. You will need to complete a pre-req assignment (posted weekly on the course website) *prior* to section. This assignment must be turned in at the start of section, and will count towards your participation grade (see below). For this reason, you must always attend the same section unless you make arrangements with your assigned TA to attend another section because of an exceptional circumstance. If you need to change your section permanently because of a time conflict you must contact the TA of your registered section and the Head Rec TA, Sofi Quinodoz. Permanent changes are not allowed after the first week.

Homework and writing assignments:
You will be assigned four sets of questions to help you master key Bi1 concepts. These homework sets must be turned in on Tuesdays at the beginning of class. See "late work" policy below. These sets will feature biological problems with an interdisciplinary or quantitative component, and may also involve reading and analyzing primary research articles. The writing assignments will also be due by the beginning of class on Tuesdays, generally to be uploaded to Moodle. See "late work" policy below.

Grading:
This class may only be taken for a grade.

- Writing Assignment (see separate guide): 30%
- In-Class Midterm Exam (Thursday, April 28): 20%
- In-Class Final Exam (Thursday, June 9): 25%
- Homework (4 sets throughout the course): 15%
- Active participation in recitation: 10%

Honor code:
We expect you to follow the Caltech Honor Code, which states that no member of the Caltech community shall take unfair advantage of any other member of the Caltech community. Suspected violations will be promptly reported to the BoC.

Course policies:

- **Attendance.** We expect everyone to arrive on time and attend each lecture and recitation section. We may call on you to answer questions in class from time to time.
- **Electronic devices**. You may use an electronic device (*e.g.*, tablet, laptop) to take notes during class only if you use it for this purpose. We will ask you to turn off your electronic devices or ask you to leave, if their use is off-topic or distracting to others.
- **Collaboration**. While you may discuss assignments with your classmates and TAs, you must write up your work yourself and in your own words. Preparation for sets and exams should be done in groups of no more than 5 people, where every member of the group contributes ideas. Quizzes and in-class exams are to be completed individually, without any consultation or collaboration. For the writing assignment, you are encouraged to discuss ideas and seek feedback from your friends but you should not edit each other's work.
- **Late work.** Homework assignments will be posted online at least one week before their due date and are to be turned in at the beginning of class on alternate Tuesdays (see calendar for dates). We will collect your assignments in a box on the front podium; this box will be shut at 1:05 pm and assignments will be considered late if they are not in the box at that time. The writing assignment components are detailed in a separate file, where due dates can also be found.
    - For work turned in between 1:05 pm and the end of class, you will lose 25% of your earned score
    - For work turned in after class but before 2:30 pm Thursday, you will lose 50% of your earned score
    - For work turned in after 2:30 pm on Thursday, no credit will be given.

If you cannot complete your homework or writing assignment on time for a medical reason, you must have a note signed by a medical doctor (not a dean) to document this AND you will need to let Caroline Werlang know that it will be late *before* it is due.

- **Ditch Day.** In the event that Ditch Day falls on the day that an assignment is due, the deadline will be extended to two calendar days later (i.e., if Ditch Day is on a Tuesday when a problem set or writing assignment is due, then the revised due date will be Thursday at 1:00 pm). If Ditch Day falls on a day with regularly scheduled recitations or lecture, schedule changes will be announced via email and on the course website (Moodle).