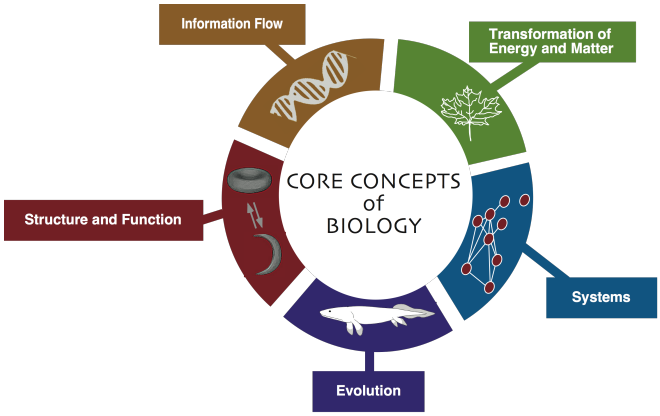
Biology 1050-009: General Biology I

California State University, Stanislaus

Fall 2019



INSTRUCTOR:

Sarah Bissonnette, Ph.D.
Assistant Professor, Biology
Accustomed to: she/her
Email: sbissonnette@csustan.edu
Office: N264

Student Hours:
Tuesdays 11am-12 pm; Wednesdays 10-11am N264
Or e-mail me for an appointment.

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COURSE CREDIT: 4.0 Units (in combination with an accompanying Biol 1050 lab section)
PREREQUISITES: Chemistry 1100 or its equivalent is encouraged, but NOT required.
SCHEDULE: Tuesdays and Thursdays, 12:30-1:45 pm (Lecture)
LOCATION: Naraghi Hall, Room 101
WEBSITE: Stan State Blackboard site for Biol 1050-009, Spring 2019

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COURSE DESCRIPTION: This course is the first in a two-course series intended for Stan State biology majors. Course teaching strategies will engage students as a community of biologists in the classroom, where biology concepts, investigative skills, leadership skills, and language processes integral to biology learning are emphasized. An overarching goal of the course is for students to gain insight into the nature of scientific inquiry, the process by which knowledge in biology is acquired, and of the strengths and limitations of the process and the evidence obtained. To this end, students will consider experiments and data that support our current understanding of biological systems and how they function. Students will gain skills in working with peers as they learn to identify their confusions, ask questions, and think critically and skeptically about biology. Students will also have the opportunity to improve their communication skills through numerous writing assignments and in-class activities.

Course content is designed to deepen student understanding of essential functions of living things and the structures that mediate these functions, with additional insights into the history of biology that resulted in the emergence of these principles. In addition, readings and discussions about current events, scientific policies, and historical documents will provide opportunities for students to apply their knowledge and explore the applications of these biological concepts and their influence on society. This course aspires to support students in developing the interests, basic content knowledge, and skills necessary to evaluate new discoveries in the life sciences and to continue to deepen their knowledge of biology throughout their lives.

STUDENT LEARNING OUTCOMES: Students report learning a host of different things during their time in Bio 1050! My anticipated learning outcomes for you during the course include, but are not limited, to the following…

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Overall

• Evaluate the accuracy of biological information from a variety of sources.
• Develop a personal science identity and a sense of belonging to a community of scientists.
• Practice strategies for figuring out complex biological ideas, namely U-ABC-IT.
• Distinguish the relative contributions of different scientists to key biological discoveries.
• Apply an understanding of microscopic processes to explain everyday, macroscopic phenomena.

For Structure & Function…

• Justify definitions of life based on structural versus functional evidence.
• Predict the relative size and scale of different biological objects.
• Diagram the process by which proteins are built based on DNA codes.
• Predict how different types of mutations in DNA may affect the protein produced.
• Predict the implications of different kinds of mutations in specific genes on the development of cancer.

For Information Flow…

• Compare and contrast the purposes of mitosis and meiosis.
• Predict the possible gametes and probability of likely offspring from a given set of parents.
• Predict the likely mechanism by which traits are inherited from a pedigree chart.
• Predict the molecular basis of dominant versus recessive traits.
• Explore scientific research literature that connects genetics to DNA and protein biology.

For Transformation of Energy and Matter…

• Trace specific atoms and molecules through biological processes and systems.
• Predict the relative biomass of different organisms and its origins.
• Compare and contrast the purposes of photosynthesis and cellular respiration.
• Predict the outcomes of experiments investigating photosynthesis and cellular respiration.
• Evaluate clinical laboratory results to determine likely poison that was a cause of death.

For Systems Biology…

• Apply an understanding of cellular processes to explain systems-level phenomenon.
• Predict the outcome of disruption of homeostasis for sugar, water, and gases in humans.
• Apply an understanding of osmosis to cases of human death.
• Diagnose the types and mechanisms of diabetes from patient evidence.
• Evaluate the origins of a sexually transmitted disease in a transmission simulation.

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MATERIALS:

- STRONGLY RECOMMENDED: Campbell Biology in Focus, 2nd edition by Urray et al., ISBN 9780134203140 OR 3rd edition (this book used heavily in BIOL1150)
- REQUIRED:
    - One pack of 3x5 index cards (~100, any style) – bring a few to every lecture
    - Your own iClicker (available at the Stan State Bookstore)
    - Web/E-mail access

CLASS CULTURE: Biology 1050 is a community of biologists trying to increase their understanding of the biological world. The classroom culture is designed to engage you in thinking like a biologist. This means cooperative learning and problem solving will be emphasized. Often, we will seek to understand complex topics by analyzing "case studies," which may include reading scientific articles or discussing real-world dilemmas.

Students Should:

- Attend and actively participate as a member of the Biology 1050 community.
- In all situations display respect, tolerance, and patience when interacting with colleagues.
- Be open to learning in many different ways and trying new learning and study strategies.
- Approach me for help early and often, and provide me with feedback.
- Seek out additional information through resources like Wikipedia, YouTube, etc.
- Use text and other readings to clarify information and extend knowledge.
- Take responsibility for your own learning by staying attentive and organized.
- Not use portable electronic devices in class (phones, iPods, etc.).
- Not use computers for non-class related activities during lecture (Facebook, etc.)

GRADING: This course is designed *to promote your learning* and is customized in many ways for that purpose. I use the graded assignments and exams outlined below specifically to facilitate your understanding of biology from many different viewpoints and using many different teaching styles. In addition, these assignments (particularly in-class lecture activities and Blackboard assignments) give me highly valuable information throughout the term, allowing me to adjust the course to meet your educational needs.

Biol 1050 is a 4-unit course. The course is split into lecture and laboratory components. The **lecture grade** will comprise 75% of the **final grade** while the **lab grade** will comprise 25% of the **final grade**. Your lecture grade will be earned through the following:

Percent	**Description**
30%	Lecture Activities and Homework Assignments • Clicker Questions (in class) • Index Cards (in class) • Concept Maps (handed in in class) • Biologist Journals (submitted to Blackboard) • Final Reflection Paper (submitted to Blackboard)
70%	Exams (4, in-class, each is cumulative)

Total = 100%

Grade assignments will be based on the percentage of total points earned. I as the instructor do not decide your grade, but rather you as a student do the work to earn your grade.

%	GRADE	GRADE POINTS
93-100	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
0-59	F	0

EXTRA CREDIT: Extra credit that can make up for missed clicker points or homework assignments is available: 1) 10 points EITHER for meeting with me one-on-one OR for attending an exam review session, as well as 2) 10 points for turning in all (or all except one) Biologist Journals on time. Additionally, extra credit questions are offered on each exam that can make up for exam points missed.

LATE ASSIGNMENTS: Due to the large size of this class, I cannot award points for assignments submitted more than 10 minutes after the deadline. Even if you miss the deadline for an assignment, I still highly recommend doing the work as preparation for the exams.

ATTENDANCE: Attendance of lecture sessions is ***essential*** for success in this course. Lectures often include in-class activities and discussions of the material in ways not emphasized in suggested and required readings. In addition, questions and problems practiced in lecture sessions will appear on exams. Positive attendance means being present at the start of class (12:30 pm sharp!) and remaining present throughout class (1:45 pm). Attendance will be monitored through responses to iClicker questions. You are responsible for responding to iClicker questions yourself, and you may NOT respond for any of your colleagues.

LECTURE ACTIVITIES AND HOMEWORK ASSIGNMENTS: Participation in lecture sessions means not just being physically present, but being mentally and intellectually present as well. **Your voice matters** in large and small group discussions, and we will provide you with numerous opportunities to share your ideas. One way I will hold you accountable for lecture participation is through the use of index cards. At the beginning, middle, or end of lecture, I will present you with a question or statement that challenges your scientific and/or personal viewpoints. In addition, I will be doing several case studies in class that will require you to work with others to identify your questions about a biological problem, go find information about the case outside of class as a homework assignment, and share what you've learned with others during a following class. I hope that these in-class activities a) allow you a chance to think through your ideas, b) take the pressure off the formal testing process by accounting for a portion of your grade, and c) provide me with an idea of your understanding of the concepts we cover in class. *If you are absent for an index card or other in-class activities, you may not make them up.*

BIOLOGIST JOURNALS: For you to turn knowledge into something you can use, it is important to reflect on what you know and what issues are still confusing to you. Twice a week, you will be required to submit a Biologist Journal to me via Blackboard (see schedule for due dates). I will provide prompts for you to write about or respond to. You should spend approximately **40 minutes** considering the prompt and responding in writing. These reflections are not meant to be formal essays, or finely polished documents for public view. They should show your own ideas and thought processes, and should be as much for your own benefit as mine. Grades will be assigned for turning these journals in on time, exceeding the word count requirement, and writing thoughtfully on topic. The point of these journals is to give you practice researching topics and writing about science thoughtfully. Each journal will also deal with a topic that we will be talking about in class, so I want you to have thought about the topic before you get to class. Students who have taken the course before must submit brand new work. You may not submit all or parts of a Biologist Journal that you have submitted previously. These will be flagged by Turnitin and be graded a 0. In addition**, there is no quoting allowed in biologist journals**, unless you are quoting something that someone said (for example, in an interview). You may not copy words directly from a source, even if you use quotation marks and cite the source. You must always put things in your own words, and then cite the source of your information. ***Since we will often discuss the contents of the Biologist Journals in class on Tuesdays and Thursdays, they are due NO LATER THAN 11:59pm on Mondays and Wednesdays, respectively.***

iCLICKERS: iClickers will be used to allow both you and me as the instructor to understand how our community is thinking about a biological topic. You will receive points for participating in iClicker questions given during class, but I will not grade you on the correctness of your answer because I want you to be honest about how you are thinking. ***Under no circumstances can you operate anyone else's iClicker.*** Any instance of one student responding for another student will be considered and handled as a cheating incident. Either the iClicker + or 2 is fine.

LECTURE EXAMS: There are 4 lecture exams throughout the semester. See the course calendar for the exact dates of these exams. The exams will include a variety of question styles that require you to recall, evaluate, apply, and reflect on what you learned. These exams cover concepts discussed in lecture, in-class activities, and homework assignments. Questions, problems, and discussion/reflection prompts from class will appear as exam questions. I will supply a study guide in advance of these exams. If you miss an exam due to a verifiable, unplanned emergency, you **MUST** a) notify me (by phone or E-mail) of the problem **PRIOR** to or **ASAP after** the exam and b) provide adequate documentation (doctor's note, copy of death certificate etc.). Contact me immediately to schedule a make up. In all situations, exams must be made up within 1 week of the original exam date.

FINAL REFLECTION: A final reflection on your experiences in this course is due at the end of the semester on **Wednesday, December 11th, 2019 by 11:59pm.** The prompt for this reflection will be: "What did you learn in Biology 1050 that will continue to influence you for many years to come? How did you learn these things?"

COMPUTERS: This is an electronically supported course. You must have easy access to a computer and the internet in order to be successful in this course. A list of computer labs on campus can be found at: https://www.csustan.edu/oit/computer-labs.

STATEMENT ON PLAGIARISM AND CHEATING: Students are expected to maintain academic integrity in all work pursued at Stanislaus State University. Cheating on tests may, at the discretion of the instructor, result in the automatic disqualification of the test and the student receiving zero points for that test. Cell phone use (text messaging included) during a test for *any* reason (personal or otherwise) is considered cheating. Plagiarism, defined as either ***1) direct copying or loose paraphrasing of text from a published work or from an online source without appropriate referencing, or 2) use of another student's work or ideas without appropriate attribution***, will result in zero points earned for that assignment.

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DEPARTMENTAL AND UNIVERSITY DEADLINES:

September 19th, 2019 – **Last day to drop classes without transcript notation.**

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Class Topic Sequence, Guiding Questions, and Assignments

This topic sequence is approximate and may change. Additional reading and homework assignments will be given out in class.

Week	Date	Guiding Lecture Questions	Assignments & Readings
1		Welcome! How do I think like a biologist?	***Biologist Journal #1, 2 Due!***
	T, Aug. 27	*Lab Sections Begin in N211!*	
2		How will we learn together? ****Introduction to Structure & Function!**** How do we define "living?" How can "living" be based on functions vs. structures? How do we think about size and scale in living things? How are living things structured at the cellular level?	***Biologist Journal #3,4 Due!*** Suggested Reading: Syllabus
3		What are the relationships among DNA, proteins, & traits? How do we build proteins based on DNA codes? How do mutations in DNA influence proteins & traits? What are different kinds of mutations?	***Biologist Journal #5, 6 Due!***
4		Who was Henrietta Lacks? What are Hela cells? What does central dogma have to do with cancer? What are the roles of mutations in cancer? What are the roles of proto-oncogenes and tumor suppressor genes?	***Biologist Journal #7 Due!*** Exam #1 Study Guide!
	T, Sep 17	**LECTURE EXAM #1** **Taken in our Lecture Classroom!!**	
5		****Introduction to Information Flow! **** How do cells acquire mutations? How are mutations and traits inherited by cells? When during the cell cycle do mutations form?	***Biologist Journal #8, 9 Due!***
6		How are mutations and traits passed on between generations? What cells in the adult body are actively dividing? How is mitosis like a copy machine? How is meiosis like s slot machine? What is the relationship between genotypes and phenotypes?	***Biologist Journal #10, 11 Due!***
7		Mendel's Genes: What is the relationship between alleles and mutations? How does the functionality of different alleles result in dominant or recessive traits? How do we use Mendel's laws to make predictions?	***Biologist Journal #12, 13 Due!***

8		How do cells acquire unique functions? How does gene regulation contribute to variety in living things? What is the source of cancer-causing mutations? Are they primarily inherited or (newly) acquired?... What's so special about stem cells? *How do I prepare for Exam #2?*	***Biologist Journal #14 Due!*** ***The Exam #2 Study Guide***
	T, Oct 22	**LECTURE EXAM #2, Cumulative** **Taken in our Lecture Classroom!!**	
9		****Introduction to Transformations of Energy and Matter!**** Where does all the matter and energy for living things come from?	***Biologist Journal #15 Due!***
10		Where does all the matter and energy for living things come from? Where does all the matter and energy for living things come from?	***Biologist Journal #16, 17 Due!***
11		How do living things get energy and molecular building blocks from food? Cellular Respiration	***Biologist Journal #18, 19 Due!***
12		How does carbon flow through living systems?	***Biologist Journal #20 Due!*** ***The Exam #3 Study Guide***
	T, Nov 19	**LECTURE EXAM #3, Cumulative** **Taken in our Lecture Classroom!!**	
13		****Introduction to Systems Biology!**** How do homeostatic mechanisms regulate the levels of water in living organisms?	***Biologist Journal #21, 22 Due!***
14		How do homeostatic mechanisms regulate the levels of glucose in living organisms	***Biologist Journal #23, 24 Due!***
15		How do homeostatic mechanisms regulate the levels of gases in living organisms	***The Exam #4 Study Guide***
	W, Dec 11	***FINAL REFLECTION PAPER DUE!***	*on Blackboard by 11:59 PM*
	T, Dec 17	**LECTURE EXAM #4, Cumulative** **Taken in our Lecture Classroom!!**	11:15 AM-1:15 PM