

Biology 230: Introductory Biology

San Francisco State University—Fall 2017

COURSE CREDIT: 5.0 Units (in combination with an accompanying Biol 230 lab section)
PREREQUISITES: Chemistry 115 or its equivalent is encouraged, but not required.
SCHEDULE: Mondays, Wednesdays, and Fridays 9:10 a.m. – 10:00 a.m. (Lecture)
LOCATION: Knuth Hall, Creative Arts Building, Room 124
WEBSITE: SFSU iLearn site for Biol 230, Fall 2017
INSTRUCTORS: Burrus, Owens, Simonin, de la Torre

Dr. Laura Burrus, PhD

Professor and Chair, Biology

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Office: Hensill Hall 534

Hours: Tues (11:00 a.m. – 12:00 p.m.) and Weds (10:30 – 11:30 a.m.). To book a time slot during these hours, please go to lburrus.youcanbook.me. To make an appointment outside of normal office hours, please email me.

Dr. Kevin Simonin, PhD

Assistant Professor, Biology

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Office: 438 Hensill Hall

Hours: Monday: 1-2pm, or by appointment.

Dr. Melinda T. Owens, PhD

Postdoctoral Fellow, Biology

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Hours: Thursday: 12:30-1:30pm, Friday: 10:30-11:30am, or by appointment.

Dr. José de la Torre, PhD

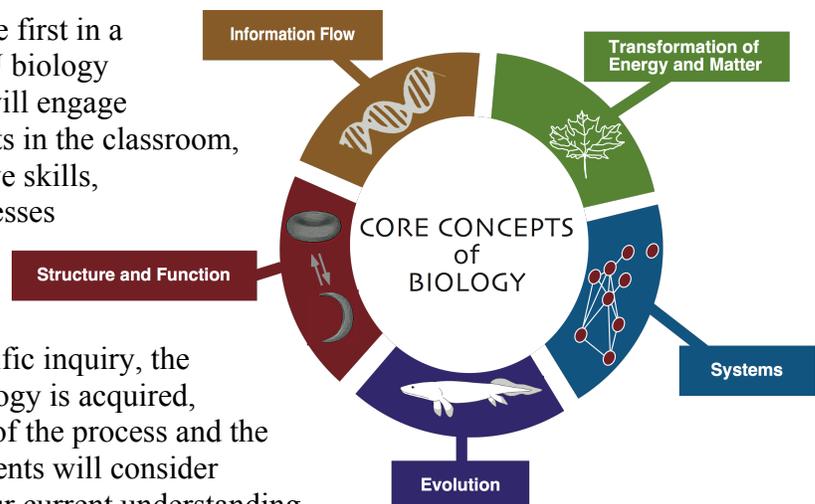
Associate Professor, Biology

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Office: 437 Hensill Hall

Hours: Tuesday: 10:00 to 12:00, or by appointment.

DESCRIPTION: Biology 230 is the first in a two-course series intended for SFSU 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.



In Biology 230, students will deepen their understanding of the essential functions of living things by exploring the physical structures and biological principles that underlie them. We will also place science in a social context by examining and discussing current events, scientific policies, and historical documents. 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 230! Our anticipated learning outcomes for you during the course include, but are not limited to, the following...

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 (such as U-ABC-IT) for figuring out complex biological ideas.
- Distinguish the relative contributions of different scientists to key biological discoveries.
- Explain everyday, macroscopic phenomena in terms of underlying microscopic processes.

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 the development of cancer.
- Explain how the structure of key components of the cell (e.g., membranes, proteins, etc.) determines their biological function.

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 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 phenomena.
- Predict the outcome of disruption of homeostasis for sugar, water, and gases in humans.
- Explain how osmosis can, in some circumstances, kill.

- Diagnose the types and mechanisms of diabetes from patient evidence.
- Explain how biological systems are affected by global climate change.

MATERIALS:

Recommended Text

- *Campbell Biology*, 8th edition: Pearson, 2008. Authors: Campbell, Reece, Urry, Cain, Wasserman, Minorsky, and Jackson (Any edition may be used, but page numbers for recommended readings will be based on the 8th edition. Note that used copies of the 8th edition are quite inexpensive, yet the contents are just as valid for this course as the contents of a more recent edition.) Note that this text is different than the *Campbell Biology Concepts and Connections* text.

Required

- One pack of 3x5 index cards (~100, any style, cost ~\$0.90) – bring 3 to every lecture
- Your own iClicker or iClicker 2 (available at the SFSU Bookstore)
- Internet and e-mail access

CLASS CULTURE: Biology 230 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 every class and actively participate as a member of the Biology 230 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 us for help early and often, and provide us with feedback.
- Seek out clarification and additional information through resources like Wikipedia, YouTube, and/or the recommended textbook.
- 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, shopping, etc.)

GRADING: This course is designed to promote your learning and is customized in many ways for that purpose. We 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 iLearn assignments) give us highly valuable information throughout the term, allowing us to adjust the course to meet your educational needs.

Biology 230 is a 5-unit course. The course is split into lecture and laboratory components.

Course component	Percent of final grade
Lecture component	60% of final grade
Laboratory component	40% of final grade
	Total=100%

Your lecture grade will be earned through the activities shown in the table below.

Percent	Description
30%	Lecture Activities and Homework Assignments <ul style="list-style-type: none"> • <i>Clicker Questions (in class)</i> • <i>Index Cards (in class)</i> • <i>Concept Maps (handed in in class)</i> • <i>Case Studies and Journals (submitted to iLearn)</i> • <i>Final Reflection Paper (submitted to iLearn)</i>
70%	Exams (4, in-class, each is cumulative)
Total=100%	

Extra credit is available for meeting with one of the three instructors for at least 10 minutes during an office hour session to discuss biology, your progress and/or feedback for class (10 points) OR attending an exam review session (10 points). In addition, 10 points extra credit will be awarded for turning in **all** iLearn homework on time. Students missing up to two deadlines will receive 9 points extra credit. Extra credit questions will also be available on each exam.

Grade assignments will be based on the percentage of total points earned. We as instructors 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

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 (9:10 am sharp!) and remaining present throughout class (10:00 am). 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.

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

LECTURE ACTIVITIES: 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 we will hold you accountable for lecture participation is through the use of index cards. At the beginning, middle, or end of lecture, we will present you with a question or statement that challenges your scientific and/or personal viewpoints. In addition, we 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 other during a following class. We 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 us with an idea of your understanding of the concepts we cover in class. If you are absent for an index card or case study activities, you may not make them up.

HOMEWORK: Homework assignments are designed to take approximately 40 minutes. Your submissions 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 ours. Grades will be assigned for submitting homework on time, exceeding the word count requirement, and writing thoughtfully on topic. Since we will usually discuss the homework in class the following day, assignments must be submitted **NO LATER THAN 11:59 p.m.** on the due date. We will provide instructions and a submission link on iLearn. We do not accept homework by email.

ORIGINALITY: All writing you submit for this course should be your own original work. We emphasize this for several reasons. First, putting things in your own words helps you learn. There is no better way to discover quickly what you understand and what you don't than to explain a concept to someone else. Second, trying to pass someone else's words off as your own in a professional setting can lead to trouble.

To encourage original writing in this class, we route all homework through **Turnitin**, an originality checking service. Our goal is not to *catch* anyone (although we can't give credit for plagiarized material), but to help everyone make a habit of using their own voice. Take this opportunity to practice original writing. You may find it challenging at first, but it will get easier. And the payoff will be huge.

iCLICKERS: iClickers will be used to allow both you and us as instructors to understand how our community is thinking about a biological topic. You will receive points for participating in iClicker questions given during class, but we will not grade you on the correctness of your answer because we 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 1 or 2 is fine.

FINAL REFLECTION: A final reflection on your experiences in this course is due at the end of the semester on Friday, December 18th by 11:59 p.m. The prompt for this reflection will be: "What did you learn in Biology 230 that will continue to influence you for many years to come? How did you learn these things?" A link for submitting the reflection will be available through iLearn.

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. A portion of the exam questions will be based on questions, problems, and discussion/reflection prompts from class. We 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 the instructors (by phone or E-mail) of the problem **PRIOR** to the exam and b) provide adequate documentation (doctor's note, copy of death certificate etc). Contact one of the instructors immediately to schedule a make up. In all situations, exams must be made up within 1 week of the original exam date.

Lecture Exam #1	Friday, September 15, 2017
Lecture Exam #2	Friday, October 13, 2017
Lecture Exam #3	Wednesday, November 8, 2017
Lecture Exam #4 (Final Exam)	Wednesday, December 13, 2017 (8:00-10:30)

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: <http://tech.sfsu.edu/content/lab>

LAB FEE: There is a lab fee for this course, required to help defray the cost of materials. You will pay this along with your tuition.

STUDENTS WITH DISABILITIES: Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu). (<http://www.sfsu.edu/~dprc/facultyfaq.html#1>)

STUDENT DISCLOSURES OF SEXUAL VIOLENCE: SF State fosters a campus free of sexual violence including sexual harassment, domestic violence, dating violence, stalking, and/or any form of sex or gender discrimination. If you disclose a personal experience as an SF State

student, the course instructor is required to notify Mary Ann Begley, the Dean of Students. To disclose any such violence confidentially, please contact:

- ***The SAFE Place***
(415) 338-2208
http://www.sfsu.edu/~safe_plc/
- ***Counseling and Psychological Services Center***
(415) 338-2208
<http://psyservs.sfsu.edu/>

POLICY ON OBSERVANCE OF RELIGIOUS HOLIDAYS: The faculty of San Francisco State University shall make reasonable accommodations for students to observe religious holidays when such observances require students to be absent from class activities. It is the responsibility of the student to inform the instructor, in writing, about such holidays during the first two weeks of the class each semester. If such holidays occur during the first two weeks of the semester, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. (SFSU Policy F00-212)

STATEMENT ON PLAGIARISM AND CHEATING: Students are expected to maintain academic integrity in all work pursued at San Francisco State University (see the SF State Standards for Student Conduct at <https://conduct.sfsu.edu/standards>). 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. Additional information is available at <https://conduct.sfsu.edu/plagiarism>.

Departmental and University Deadlines and Procedures

DROP DEADLINE -- Sep 13, 2017

During the first two weeks of instruction, dropping a course(s) is permitted without academic penalty. No symbol is recorded on the student's permanent record. Students are responsible for making changes to their official academic schedule. If you decide not to attend a class you enrolled in, you must drop that class through GATOR REG during access hours. If you added a class during the first two weeks and then decide to drop, you also must drop through GATOR REG. As a courtesy, please notify the instructor that you are dropping. It is not the instructor's responsibility to drop students and students will not "automatically" be dropped if they stop attending. Students should confirm the enrollment status for all of their courses via their student portal before the deadline.

WITHDRAWAL FROM CLASS -- Sep 14 – Nov 17, 2017

After the first two weeks of instruction, withdrawal from a course is not permitted except for serious and compelling reasons. The "W" grade carries no connotation of quality of student performance and is not used as units attempted in calculating grade point average or progress points. The expectation of being dropped for nonattendance is not a sufficient reason for withdrawal. If the withdrawal is approved, the student will receive a "W" grade. Requests for withdrawal are reviewed by the Instructor and Department Chair. Students must submit their unofficial transcripts along with their petitions. Students may only withdraw from a course twice.

NEW: Effective Fall 2017. Students are only allowed a total 18 units of withdrawals. *To withdraw from the course, students must submit the withdrawal request along with a transcript.* Students who leave a course without filing a proper withdrawal will be assigned a WU (Withdrawal Unauthorized; numerically same as an F) if normal evaluation of course performance is not possible.

WITHDRAWAL EXCEPTIONAL CIRCUMSTANCE -- Nov 18 – Dec 12, 2017

Withdrawals are normally not permitted during this period except in cases of verified accident or serious illness where the cause of withdrawal is due to circumstances clearly beyond the student's control and where the assignment of an incomplete is not practical. Ordinarily, withdrawals in this category involve a total withdrawal from the University. All requests during this period must be reviewed by the Instructor, Department Chair, and Associate Dean. Students must submit their unofficial transcripts and appropriate documentations along with their petitions.

Note: According to the University withdrawal policy, a student may withdraw from an individual course only 2 times, regardless of the particular circumstances. The third time that the student enrolls in the same course (if the course repeat policy has been waived), they CANNOT withdraw for any reason.

Class Topic Sequence and Guiding Questions

This topic sequence is approximate and may change. Reading and homework assignments will be given out in class and posted on iLearn. It is your responsibility to check iLearn regularly.

Class #	Day	Date	Guiding Lecture Questions	Who
1	W	23-Aug	Welcome! How do I think like a biologist?	All
		23-25 Aug	Laboratory Sections Begin	

STRUCTURE AND FUNCTION IN BIOLOGICAL SYSTEMS				
2	F	25-Aug	How can we define “living things” based on structures and functions?	KS
3	M	28-Aug	How do we think across size and scale?	KS
4	W	30-Aug	How are the structure and function of prions, viruses, bacteria and eukaryotic cells similar and different?	KS
5	F	1-Sep	How do atoms and molecules interact?	KS
	M	4-Sep	Labor Day Holiday	
6	W	6-Sep	What is the relationship between the structure and function of membranes?	KS
7	F	8-Sep	What is the relationship between the structure and function of membranes?	KS
8	M	11-Sep	Class exercise: How was the structure of DNA discovered? What is the role of human interactions in scientific discoveries?	KS
9	W	13-Sep	What is the relationship between the structure and function of DNA?	KS
10	F	15-Sep	LECTURE EXAM #1	

BIOLOGICAL INFORMATION FLOW				
11	M	18-Sep	What are the relationships among DNA, proteins, & traits? What is central dogma?	LB/ MO
12	W	20-Sep	What are the relationships among DNA, proteins, & traits? What is central dogma?	LB/ MO
13	F	22-Sep	What does central dogma have to do with cancer? What are the roles of mutations in cancer?	LB/ MO
14	M	25-Sep	How do cells acquire mutations? How do cells inherit mutations and traits?	LB/ MO
15	W	27-Sep	What is the source of cancer-causing mutations? When during the cell cycle do mutations form? What happens to DNA during mitosis?	LB/ MO
16	F	29-Sep	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?	LB/ MO

17	M	2-Oct	How is meiosis like a slot machine? What is the relationship between genotypes and phenotypes?	LB/ MO
18	W	4-Oct	What is the relationship between genotypes and phenotypes?	LB/ MO
19	F	6-Oct	Mendel's Genes: What is the relationship between alleles and mutations?	LB/ MO
20	M	9-Oct	How do dominant and recessive alleles contribute to traits?	LB/ MO
21	W	11-Oct	How do we use Mendel's laws to make predictions?	LB/ MO
22	F	13-Oct	LECTURE EXAM #2	

TRANSFORMATION OF ENERGY AND MATTER				
23	M	16-Oct	Photosynthesis: Where does all the matter and energy for living things come from?	KS
24	W	18-Oct	Photosynthesis	KS
25	F	20-Oct	Photosynthesis	KS
26	M	23-Oct	Photosynthesis	KS
27	W	25-Oct	Photosynthesis	KS
28	F	27-Oct	Cellular Respiration: How do living things get energy and molecular building blocks from food?	JT
29	M	30-Oct	Cellular Respiration	JT
30	W	1-Nov	Cellular Respiration	JT
31	F	3-Nov	Cellular Respiration	JT
32	M	6-Nov	How does carbon flow through living systems?	JT
33	W	8-Nov	LECTURE EXAM #3	
	F	10-Nov	Veteran's Day	

BIOLOGICAL SYSTEMS				
34	M	13-Nov	How are living things organized? How do they maintain the internal conditions needed for life?	JT
35	W	15-Nov	How do organisms regulate their levels of water, nutrients and gases?	JT
36	F	17-Nov	How does thinking about water balance help us understand what killed Cynthia Lucero?	JT
	M-F	20-24 Nov	FALL BREAK	
37	M	27-Nov	Water uptake: thinking like a biologist about cholera.	JT
38	W	29-Nov	Food for thought: getting the nutrients we need. Sugar balance.	JT
39	F	1-Dec	Maintaining sugar balance. Morgan Waters' diagnosis.	JT
40	M	4-Dec	Not just hot air: regulating gases in living things.	JT
41	W	6-Dec	More about gasses	JT
42	F	8-Dec	The big picture: how do biological systems respond to	JT

			changing environmental conditions like global climate change?	
43	M	11-Dec	The big picture: how do biological systems respond to changing environmental conditions like global climate change?	JT
44	W	13-Dec	LECTURE EXAM #4, Cumulative 8-10:30 AM	
	F	15-Dec	FINAL REFLECTION PAPER DUE!	