

SYLLABUS for BIOLOGY I (BIOL 1610, 3 cr)

Vernal only / Mondays and Wednesdays / 5:00 – 7:50 pm / Vernal, B120

INSTRUCTOR

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Biology I and Biology II (BIOL 1610 & BIOL 1620) and the associated laboratory courses (BIOL 1615 & BIOL 1625) comprise a year-long course sequence designed to prepare biological sciences majors for advanced studies in biology, including ecology, evolution, biochemistry, cell biology, genetics, and organismal biology. Because evolution is the central unifying concept for understanding biology and its sub-disciplines, its importance is emphasized in both courses as a framework for learning concepts. This course (Biology I) focuses on major concepts in cell biology, energetics, genetics, and natural selection and how they fit into an evolutionary framework. Specific learning outcomes will be provided in class for each topic we discuss.

INSTRUCTOR'S OFFICE HOURS**Wednesdays & Thursdays, 12:00 – 1:00 pm**

These lunchtime office hours may not be accessible for everyone. Therefore, please feel free to call or stop by with questions or comments at any time you find me *in my office*. The best way to contact me is by *email* because I check my email each workday and will respond to you quickly.

MEETING TIMES- VERNAL ONLY**Mondays and Wednesdays, 5:00 – 7:50 pm, room B120**

Since lecture (BIOL 1610) and lab (BIOL 1615) are closely integrated, with the same student enrollment, and in the same room, we have flexibility with our schedule. Therefore, time scheduling for the courses is combined. Most meetings we will spend some time reviewing lecture material before transitioning to lab activities. Expect to spend a combined average per week of about 2 ½ hours in lecture, and 2 ½ hrs in lab.

REQUIRED MATERIALS

- Textbook (print OR electronic version):** *Biology: How Life Works*, 2nd edition, by Morris et al. with Launchpad access code (2016, W.H. Freeman and Company). Print ISBN: 978-1-319-06779-3; Alternative packages that cost less than the hard copy of the book:
 - Looseleaf ISBN: 978-1-319-06780-9
 - LaunchPad 12 month access- comes with electronic version of the textbook that you can read online ISBN: 978-1-319-01599-2
- REEF student response system:** Download the app at <http://reef-education.com/download> (see instructions there) NOTE: If you already own an i>clicker2 remote, then you can use it in class but you'll still have to create a REEF account in order to share your responses with me, and to take advantage of the features, and to receive grade credit.

COURSE GOALS

The broad goals for this course are to help you:

- Develop an understanding of biology as inter-related concepts (not memorization of facts) within a framework of biological evolution
- Begin to think like a biologist by recognizing "Big Ideas" in biology and developing skills used by biologists such as critical thinking and the scientific method

- Identify and apply important biological content, concepts and themes as a foundation for continued study in biology related fields
- Strengthen learning strategies for success in college and beyond (lifelong learning skills)

Specific learning objectives for each chapter will be provided in class.

COURSE OBJECTIVES AND EVALUATION

USU uses the Individual Development and Education Assessment (IDEA) student rating system as one measure of course evaluation. The IDEA Student Ratings system “looks at instruction in terms of its endgame. Rather than emphasizing teaching style or personality, the IDEA system focuses on student learning and the methods used to facilitate it.” (www.theideacenter.org) The IDEA learning objectives emphasized in this course are aligned with more specific course goals in the table below.

After successful completion of this course, students should be able to:

IDEA Center Learning Objectives	Course Learning Objectives Upon successful completion of this course you will be able to
<p>Objective 1. Gain factual knowledge (terminology, classifications, methods, trends)</p> <p>Objective 2. Learn fundamental principles, generalizations, or theories</p>	<p>REMEMBERING, COMPREHENDING</p> <ul style="list-style-type: none"> • Use appropriate terms to describe biological structures, processes and concepts • Provide examples to explain core concepts about: evolution by natural selection; cell structure and function; information flow, exchange & storage; pathways and transformations of energy and matter; and systems • Recognize common patterns, processes and themes in biology
<p>Objective 3. Learn to apply course material (to improve thinking, problem solving and decisions)</p>	<p>APPLYING, ANALYZING, EVALUATING, SYNTHESIZING</p> <ul style="list-style-type: none"> • Identify relationships between concepts, processes and structures • Predict the outcome of a specific alteration of a process • Apply what you know to solve a new problem • Apply the theory of evolution to explain common patterns, processes and themes in biology • Analyze and interpret data

COURSE STRUCTURE

I view my role as your instructor not to tell you what is in the textbook (you can read), but to help you learn complex concepts that you may not glean directly from the readings. I have designed this course to maximize our time together to help you construct your knowledge of biology. Lectures will include activities intended to strengthen your thinking and learning skills. I will help you structure your learning. Learning is your responsibility.

I expect you to have read (at least skimmed) the assigned text material prior to coming to class. In addition to my lectures, we will spend a significant portion of our time together doing activities designed to develop higher order thinking skills like application of concepts in different contexts, and data analysis. Lecture time will be spent alternating between mini-lectures and activities. Learning in the lecture portion of the course will be assessed through pre-class reading quizzes, participation, graded activities, and exams.

About Pre-class Online Reading Quizzes- Reading quizzes for each week are assigned on Launchpad (companion site to your textbook). The quizzes (5 to 10 lower-order thinking questions) are **due 45 minutes**

before class begins (4:30pm). Pre-reading before class ensures that you come prepared with a basic understanding of the material to be discussed. The quiz results for the class allow me to see what students were able to master on their own, and what concepts students need more help with. In this way, I can tailor lecture time to maximize your learning. The two lowest scores will be dropped.

About In-class REEF “Clicker Questions” and Participation- Peer Instruction is a learning method demonstrated to help students build their knowledge and develop higher-order thinking skills. You will discuss with your peers responses to complex concept questions without knowing the correct answer (if there is one!). It is the DISCUSSION itself that produces the learning, so take the discussions seriously even though they might actually be fun! Clicker activities serve several purposes:

- Student engagement-
 - Anonymous responses offer low risk, active involvement
 - Peer discussions help you actively build your knowledge
- Immediate feedback- You and I can gauge how well a concept is understood before we move to a new topic

To encourage you to take clicker activities seriously, I will award **CREDIT FOR PARTICIPATION**. You will earn full credit for each lecture with a clicker session that you use your clicker to vote on at least 75% of the questions. Two sessions will be dropped at the end of the course.

You must create a REEF account online within the first week of class to participate and receive credit. You can participate using an Internet browser (smart device or laptop) or by downloading the app at iTunes or Google Play. More information about the **REEF Polling system** and creating an account go to app.reef-education.com.

Other Learning Assignments

Additional activities or projects will be completed in or outside of class to provide practice in meeting the more difficult learning objectives of the course. Points for these assignments will not exceed 7.5% of the course.

Course Management System: Canvas

Use the USU course website to access current grade status, course information, link to my email, study guides, links to useful learning resources and more. Go to <https://canvas.usu.edu/> and login to CANVAS using your A number and password, click on Courses in the top menu, and then click on the Biology 1610 link. **Be sure that your account is set to send you announcements** to be sure you remain up to date on the course. Please be patient with me as I work toward making this a useful component of this course.

Exams

Exams are your chance to show me what you’ve learned after all you’ve read, studied, practiced, and incorporated feedback. All exams will include new material since the previous exam, as well as comprehensive questions from previous exams in which students had difficulty. The format includes multiple choice, fill-in-the-blank, and short essay. Exams are taken in the USU UB Testing Center (Roosevelt or Vernal; see Canvas for schedules and deadlines). The final exam will include ~70% new material and ~30% comprehensive material from all previous exams. Twenty-four hour notice is required if you cannot take the exam during the scheduled time. You will receive no credit for missed exams without documentation of an emergency.

GRADING

	% Course Grade
Lecture-related activities (70%)	
Reading Quizzes (Launchpad web site)	15
Other Assignments	10
Clicker Participation	10
Exams	65
Total Lecture:	100

Course grading scale will be no stricter than:

Total Points Possible	Final Grade
93-100%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
60-66%	D
Below 60%	F

Grading Standards.

A - achievement that is outstanding relative to the level necessary to meet course requirements.

B - achievement that is significantly above the level necessary to meet course requirements.

C - achievement that meets the course requirements in every respect.

D - achievement that is worthy of credit even though it fails to meet fully the course requirements.

F - represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit, or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I grade.

I (Incomplete) - assigned at the discretion of the instructor when, due to extraordinary circumstances (e.g., hospitalization), a student is prevented from completing the work of the course on time.

ABOUT STUDY AND PREPARATION FOR THE COURSE

Studying

Do your best to complete assignments on time. Spend time outside of class thinking about making connections between:

- what you are reading in the textbook
- what we are talking about in class
- what we are doing in lab
- your daily life

Since we will spend time on complex concepts in class, you are responsible for learning much of the simpler concepts and vocabulary on your own. Flash cards are good for this. If you are still struggling with study effectiveness or a specific concept, I encourage you to seek help. Specific recommended resources follow.

Study Resources

General Study Strategies:

- Have a **BLAST!** Use the Blooms-based Learning Strategies for Students (BLAST) guide at the end of this syllabus for a list of study individual and group study strategies for learning biology.
- Visit the **USU Academic Success Center** (<http://www.usu.edu/asc/studysmart/>) for suggestions to improve general study skills including note-taking, reading, active listening, and managing time, test anxiety and more.
- I also have a link on my Canvas course site to a good one-stop resource at Louisiana State University that I highly recommend (**Learning Strategies Online** at <http://appl003.lsu.edu/slas/lsoweb.nsf/index>)

Biology Concepts Online:

- The **Launchpad** website provides amazing practice opportunities related to our textbook (<http://www.macmillanhighered.com/launchpad/morris2e/3734026>). Spend some time exploring this site right away so you know what the site has to offer.
- Links to **Optional Resources** hand-picked by me (not too simple, not too advanced) are provided for most chapters on Canvas.
- You can also explore excellent education sites like **Khan Academy** (Khanacademy.org) for biology content.

In-person Study Resources:

- **Peers**- Well-organized study sessions with your peers are very helpful for most students. Use the BLAST guide.
- **Instructor**- My job is to help you learn, so use office hours or make an appointment. Do make every effort to use other resources first to develop life-long learning skills that will endure beyond this course.

COURSE POLICIES

Instructor's Responsibilities

I will help you learn by engaging you in the material and challenging you to think like a biologist. You can expect me to attend all lectures, read the assigned material, and prepare examinations and quizzes that are fair and representative of the reading assignments and class activities as they relate to the learning objectives provided. I will also be available by email, telephone, or in my office during the day to answer specific questions and provide any needed assistance toward the course learning objectives.

Student's Responsibilities

You are expected to read the relevant material in the text, attend each lecture and laboratory, participate in activities, and take comprehensive notes. You should focus your efforts on achieving the learning objectives by doing the appropriate problems in the text and lab manual, reviewing concepts, and practicing problem solving. In the event that there is any difficulty in keeping up with the pace of the course, it is YOUR responsibility to contact me for advice or assistance. If you cannot attend a class, you are still responsible for all content. (I *strongly* suggest exchanging contact information with your **biology-buddy** right now!) If you cannot take an exam during the scheduled period, you must make other arrangements with me **at least 48 hours before the exam** is given.

Attendance

Attendance is very important to be successful in this course. However, I do not keep track of attendance *per se* (other than clicker participation). Be aware that you are fully responsible for all announcements made and material covered in the lecture portion of the course. Use your biology-buddies!

Late submission of assignments

Without prior arrangement at least 24 hours in advance, I will deduct 10% of the assignment value for each day it is late. For example, if you turn in an assignment two days late, I will deduct 20% prior to grading.

Use of mobile devices and laptops in class

As research shows, multi-tasking and unexpected noises and movement automatically divert and capture people's attention, which means that you are negatively affecting your everyone else's learning experience if your cell phone goes off, images move on your laptop screen, etc. For this reason, I expect you to turn off your mobile devices (even vibrate can be distracting). If you must use a laptop, please mute it and sit behind

other students. If you must answer your silenced mobile device in the case of an emergency, please leave the room before speaking. The bottom line- DO NOT DISTURB OTHERS.

UNIVERSITY POLICIES

The entire **USU Student Policy Manual** can be read online at <http://catalog.usu.edu/content.php?catoid=12&navoid=3587> I highlight some of the most relevant policies below.

Students with Disabilities

Please address any special needs or special accommodations with me at the beginning of the semester or as soon as you become aware of your needs. The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program." If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille. For more information go to <http://www.usu.edu/drc/>

Withdrawal and Incomplete Grade

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor. If an incomplete grade is to be given, an Incomplete Grade Documentation Form must be filed by the instructor in the department or college office. Students may not be given an incomplete grade due to poor performance or in order to retain financial aid. An incomplete grade may be granted only if the student has completed the majority of the course and is passing the class at the time. <http://catalog.usu.edu/content.php?catoid=12&navoid=3805>

Classroom Incivility

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action.

Faculty members of Utah State University have the responsibility and authority to determine, maintain, and enforce an atmosphere in their classrooms that is conducive to teaching and learning, in accordance with University policy and practice. Read more at <http://catalog.usu.edu/content.php?catoid=12&navoid=3171>

Academic Honesty and Integrity – The “Honor Pledge”

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

Violations of the Academic Integrity Standard (academic violations) include, but are not limited to:

1. **Cheating:** (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually"; (2) depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) continuing

to write after time has been called on a quiz, test, examination, or any other academic exercise or activity; (6) submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or (7) engaging in any form of research fraud.

2. **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.

3. **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

Read more about Academic Honesty and Integrity at <http://catalog.usu.edu/content.php?catoid=12&navoid=3140>

BLAST- A Guide for Learning Strategies in Biology
(Bloom's-based Learning Activities for Students*)

Bloom's level	Individual activities	Group activities
Remembering (LOCS)	<ul style="list-style-type: none"> Practice labeling diagrams List characteristics Identify biological objects or components from flash cards Quiz yourself with flash cards Take a self-made quiz on vocabulary Draw, classify, select, or match items Write out the textbook definitions 	<ul style="list-style-type: none"> Check a drawing that another student labeled Create lists of concepts and processes that your peers can match Place flash cards in a bag and take turns selecting one for which you must define a term Do the above activities and have peers check your answers
Understanding (LOCS)	<ul style="list-style-type: none"> Describe a biological process in your own words without copying it from a book or another source Provide examples of a process Write a sentence using the word Give examples of a process 	<ul style="list-style-type: none"> Discuss content with peers Take turns quizzing each other about definitions and have your peers check your answer
Applying (LOCS/HOCS)	<ul style="list-style-type: none"> Review each process you have learned and then ask yourself: What would happen if you increase or decrease a component in the system or what would happen if you alter the activity of a component in the system? If possible, graph a biological process and create scenarios that change the shape or slope of the graph 	<ul style="list-style-type: none"> Practice writing out old exam questions on the board and have your peers check to make sure you don't have too much or too little information in your answer Take turns teaching your peers a biological process while the group critiques the content
Analyzing (HOCS)	<ul style="list-style-type: none"> Analyze and interpret data in primary literature or a textbook without reading the author's interpretation and then compare the authors' interpretation with your own Analyze a situation and then identify the assumptions and principles of the argument Compare and contrast two ideas or concepts Create a map of the main concepts by defining the relationships of the concepts using one- or two-way arrows 	<ul style="list-style-type: none"> Work together to analyze and interpret data in primary literature or a textbook without reading the author's interpretation and defend your analysis to your peers Work together to identify all of the concepts in a paper or textbook chapter, create individual maps linking the concepts together with arrows and words that relate the concepts, and then grade each other's concept maps
Evaluating (HOCS)	<ul style="list-style-type: none"> Provide a written assessment of the strengths and weaknesses of your peers' work or understanding of a given concept based on previously determined criteria 	<ul style="list-style-type: none"> Provide a verbal assessment of the strengths and weaknesses of your peers' work or understanding of a given concept based on previously described criteria and have your peers critique your assessment
Creating (HOCS)	<ul style="list-style-type: none"> Generate a hypothesis or design an experiment based on information you are studying Create a model based on a given data set Create summary sheets that show how facts and concepts relate to each other Create questions at each level of Bloom's Taxonomy as a practice test and then take the test 	<ul style="list-style-type: none"> Each student puts forward a hypothesis about biological process and designs an experiment to test it. Peers critique the hypotheses and experiments Create a new model/summary sheet/concept map that integrates each group member's ideas.

*From Crowe et. al., (2009) CBE Life Sciences Education, 7; 368-381. Modified by LE using revised taxonomy terms.

Biology I (BIOL 1610) Course Schedule

L. Etchberger, Fall 2016

Monday & Wednesday, 5:00 – 7:50 pm

Biology: How Life Works by Morris *et al.* 2nd edition (2016), W.H. Freeman Press.Small World Initiative: Student Research Guide & Protocols, 3rd edition (2015).

Wk	Date	Ch [^]	Topic (Tentative)	Small World Initiative Lab	Assessments Due
1	M 8/29 W 8/31	1	Orientation Life (Foundations)	SWI Introduction Lab Safety / Primary Lit.	Sci Discussions (F)
2	M 9/5 W 9/7	2	<i>Labor Day Holiday- No Class</i>		
3	M 9/12 W 9/14	3 4	The Molecules of Life Nucleic Acids and Transcription Translation and Protein Struct.	1- Living in a Bacterial Planet 2- Soil: More Than Just "Dirt" 3- Growth & Culture [Bring Soil]	Citns Q & Primary Lit. (F) Exam 1 (Fri&Sat, Chs 1-4)
4	M 9/19* W 9/21	5 6	Organizing Principles Making Life Work (Energy)	4- Bacteria are What They Eat	Serial Diln.s
5	M 9/26 W 9/28	7	Cellular Respiration "	5- Solid Versus Liquid Cultures	
6	M 10/3 W 10/5	8	Photosynthesis "	6- Meet the ESKAPE Pathogens 7- Antibiotics: Struct. & Discov	ESKAPE Grp Presntns Exam 2 (Fri&Sat, Chs 5-8)
7	M 10/10 W 10/12	9 10	Cell Signaling Cell & Tissue Architecture		
8	M 10/17 W 10/19	11	Cell Division "	8- Getting to Know Isolates (Confirm Isolates/ Pure Culture)	Research Intro.
9	M 10/24 W 10/26	12 13	DNA Replication and Manip. Genomes	BLAST & Lit Review 9- Chemistry	Research Methods Exam 3 (Fri&Sat, Chs 9-13)
10	M 10/31 W 11/2	14 15	Mutation and DNA Repair Genetic Variation		
11	M 11/7 W 11/9	16 17	Mendelian Inheritance Inheritance of Sex Chroms, etc.	Work on poster	Research Results
12	M 11/14 W 11/16	18 TBA	Complex Traits- Gen. & Environ. Students' choice (CH19 or 20)		Research Concl. & Lit Exam 4 (Fri&Sat, Chs 14-TBA)
13	M 11/21 W 11/23	---	No Class- study & work on -> <i>Thanksgiving Holiday- No Class</i>		Poster draft
14	M 11/28 W 11/30	21 ---	Evolution "	No Lab	Poster Peer Reviews Final Poster (for printing)
15	M 12/5 W 12/7	---	Gather Qs for Review Review Wed.	No Lab	Poster Symposium
Final Exam (Ch 21 + Comprehensive)- In Testing Center 12/14-16					

^ Be sure to read the textbook chapters AND have completed the online Reading Quiz BEFORE coming to class.

* Last day to drop classes without notation on transcript: M 9/19 at 5pm