Term Information

Effective Term	Autumn 2017

General Information

Course Bulletin Listing/Subject Area	Biology
Fiscal Unit/Academic Org	Introductory Biology - D0326
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	1110
Course Title	Biology for the Health Sciences
Transcript Abbreviation	Bio for Health Sci
Course Description	Catalog Description: A survey of biological topics including evolution; structure and function; information flow, exchange and storage; pathways and transformations of energy and matter; and systems intended as preparation for Pre-Nursing and Pre-HRS students. Not intended for students on a Pre-Medicine or related track, or for students intending to major in biology or related areas.
Semester Credit Hours/Units	Fixed: 4

Offering Information

Length Of Course	14 Week, 12 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Laboratory, Lecture
Grade Roster Component	Lecture
Credit Available by Exam	Yes
Exam Type	EM Tests via Office of Testing
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	None.
Exclusions	Not open to students with credit for 1101 (101), 1102 (102), 1113 (113), or 1114 (114).

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.0101
Subsidy Level	General Studies Course
Intended Rank	Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

General Education course:

Biological Science

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Apply core concepts in biology through the study of Structure and Function.
- Apply core concepts in biology through the study of Pathways and Transformations of Energy and Matter.
- Apply core concepts in biology through the study of Information flow, Exchange and Storage.
- Apply core concepts in biology through the study of Evolution.
- Apply core concepts in biology through the study of Systems.
- Synthesize core biological concepts to explain observations of current events in the natural world.
- Demonstrate an understanding of the nature of science.
- Analyze the significance of technological innovation and its interaction with science on society. Explore potential consequences of technology on society.
- Demonstrate the ability to work collaboratively.

Content Topic List

- Identify properties of life
- Identify macromolecules of biological systems and the role diet plays in their acquisition.
- Identify structural differences in prokaryotes, eukaryotes, viruses, retroviruses, and prions and how they relate to treatment of disease.
- Explain processes of cell growth, reproduction, and apoptosis.
- Explain variation in processes of cellular division between various cell types.
- Analyze how instances of loss of control in cellular regulation processes result in various medical conditions.
- Describe processes of osmosis and diffusion and apply concepts to human health.
- Explain the biochemical pathways of energy flow through biological systems and how they are governed by the laws of thermodynamics.
- Explain the interaction between the processes of photosynthesis, cellular respiration, and fermentation and the variations that exist between taxa.
- Apply effects of diet and exercise on cellular respiration.
- Apply the effects of fermentation on energy production.
- Explain the role of enzymes in biological systems.
- Explain Gene Theory and its origins.
- Identify the role of DNA and RNA in biological systems.
- Describe applications of recombinant DNA technology and evaluate social implications that continue to arise as a result of technological developments.
- Explain principles of Mendelian genetics and Heredity Theory.
- Apply Mendelian genetics to explain inheritance of disease.
- Explain basic assumptions and conclusions of natural selection.
- Explain the role of genetic drift in evolution of populations.
- Explain how two populations can diverge genetically over generational time.
- Apply concepts of evolution to the dynamic problem of antibiotic resistance and vaccine production.
- Identify biodiversity of taxonomic kingdoms and select animal phyla.
- Identify the nature of pathogenic organisms.
- Apply ecological and evolutionary principles to interactions between taxa as related to energy flow.
- Identify various human impacts on the environment and evaluate potential solutions.
- Explain the role of hypotheses and theories in the scientific method.
- Apply knowledge of the scientific method to derive hypotheses and design experiments to test those hypotheses.
- Interpret data presented through tables or graphs and apply quantitative reasoning when reading and writing scientific papers.
- Communicate conclusions drawn from own experimental data and evaluate those of others.
- Explain the nature of science as a human endeavor with its assumptions and limitations.
- Explain the self-correcting nature of science.

Attachments

- Proposal for Biology 1110.docx: Course Proposal

(Other Supporting Documentation. Owner: Andrews,Adam Lee)

- Biology 1110 Sample Syllabus.pdf: Course Syllabus

(Syllabus. Owner: Andrews,Adam Lee)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Andrews,Adam Lee	09/20/2016 02:09 PM	Submitted for Approval
Approved	Misicka,Matthew Alan	09/20/2016 02:32 PM	Unit Approval
Approved	Fink,Steven Scott	09/21/2016 10:44 AM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole	09/21/2016 10:44 AM	ASCCAO Approval

Proposal for Biology 1110: Biology for the Health Sciences
4 credit hours
3 lecture hours, 3 lab hours

Catalog Description: A survey of biological topics including cell structure and function, energetics, genetics, evolution, and ecology intended as preparation for Pre-Nursing and Pre-HRS students. Not intended for students on a Pre-Medicine or related track, or for students intending to major in biology or related areas.

Biology as a discipline can be broken into 5 core subject areas (evolution; structure and function; information flow, exchange and storage; pathways and transformations of energy and matter; and systems), all of which are typically addressed to some extent in introductory surveys of the biological sciences. The Center for Life Sciences Education currently offers two tracks for students in introductory biology. Students majoring in the life sciences take a two semester sequence, Biology 1113 and 1114, which when combined cover all five of these areas. Students taking Biology in fulfillment of a General Education (GE) Natural Science requirement who are not science majors have two primary options. Biology 1102 is a single-semester, non-laboratory course covering all of the subject areas, but with a primary focus in human form and function. Biology 1101 also covers the spectrum of the five areas with an additional required laboratory component, but with minimal emphasis on anatomy and physiology.

The endeavor to cover the entire spectrum of Biology in a semester is one that requires a specific approach for Biology 1101 and 1102. In our instruction, we aim primarily at a goal of scientific literacy for students. To be sure, students learn core facts and methods in science. We aim to focus on the bigger picture, however, so as to build students' core understanding of the nature of science and give instruction on how to best find reliable sources of information they may need in the future. Instructors have a great deal of freedom in deciding the depth of investigation and context of applications that they use to help the students learn the biological concepts.

We have been very successful using these methods, as borne out by our multiple methods of assessment, and have historically believed we were offering the best selection of courses possible to meet the needs of the Ohio State student population. Discussions with the College of Nursing have brought to our attention, however, that there is a population of students for whom our models are not ideal. Students enrolled in the Pre-Nursing track are required to take either Biology 1101 or Biology 1113 as the prerequisite to their program, with the majority opting for Biology 1101. Students in programs within the School of Health and Rehabilitation Sciences (HRS) take only Biology 1113. Students who take 1113 learn only three of the five core subject areas, while students who take 1101 learn the subject areas in a variety of application contexts. Therein lies the problem as Pre-Nursing track students would benefit from learning concepts in all 5 subject areas as they apply to human contexts.

We propose to create Biology 1110, which will serve this particular niche of students at Ohio State, and will in some ways be a hybrid of other courses in the CLSE catalog. As laid out in the course learning outcomes (*See Appendix B*), the course learning goals will cover the spectrum of biological topics, but with more defined learning outcomes associated with human contexts within each area than exist in Biology 1101. For example, students in Nursing are expected to

come out of Biology with an understanding of membrane transport, a topic that may or may not be covered in an offering of Biology 1101. By making the outcomes more specific, we can ensure that this population of students is better prepared for future programmatic coursework. Organismal form and function will be de-emphasized as students in these programs will be introduced to this topic when taking courses in Anatomy and Physiology. The specific topics chosen will have real-world applicability, and will illustrate the intersection of multiple biological topics. Many of the topics will be approached at a depth similar to that in our majors biology courses, but as a trade-off, we will cover less overall breadth.

Biology 1110 will fulfill a general education laboratory requirement with required weekly laboratory sessions. While some weeks will have stand-alone exercises, we intend to integrate a Classroom Undergraduate Research Experience (CURE) in the 1110 laboratory. The CURE module, called Prevalence of Antibiotic Resistance in the Environment (PARE), spans multiple weeks and has students conduct authentic research. By completing this research project, students will learn laboratory techniques in molecular biology, microbiology, and field collection. The project culminates with oral and poster presentations on their research to peers and the community. These are all skills which will serve pre-health professional students well in future coursework and careers. While working through the PARE project in the laboratory component of the course, the lecture will have the opportunity to use antibiotic resistance as a model to teach cell structure and function, genetics, evolution, and ecology. Other weekly laboratory exercises will potentially include macromolecular chemistry, cellular diversity, cell division, natural selection, and production and use of biofuels.

The topics chosen for the course are those that are not only the most relevant to the students' programmatic success, but also those which allow us to fulfill the general education requirements most effectively. As illustrated by PARE, but as will be encapsulated by every topic in the course, the facts and principles of modern science are at the core of the content. The technology which will allow students to perform tasks such as analyzing DNA sequences during the PARE project provides an opportunity in the course to discuss how we have gone from understanding the structure of DNA in 1953 to being able to manipulate the genome in the 21st century. The progression of technology is but one example of meeting the second GE objective regarding the evolving nature of science. With advancing technology comes the inevitable effect on society. Students will be asked to reflect upon philosophical questions such as the ethics of rewriting one's genome and what societal problems may arise as a result. Genetics is just one example where we can point to achieving the GE objectives for a natural science course. When we talk about drug development or human impacts on the environment, a new set of ethical questions arises surrounding the development of and use of technology.

As the course will fulfill a General Education Natural Science requirement, it will be open to any undergraduate student. The course will have no required prerequisites, as University standards for admission suggest that all students will have had high school biology or an equivalent. We intend to build upon that base-knowledge, but expect students will largely be taking this course as first-term freshmen without other prior college coursework. To ensure sufficient space for students in Pre-Nursing and HRS we will place reserve capacities on the enrollment, however, the course will be left to open GE enrollment for any student. The model for course enrollment will be based on a lecture limited only by classroom size. A lecture capacity of up to 700 would

not be problematic. The laboratory portion of the course is taught by Teaching Associates. Each lab section will be capped at a maximum of 24 students, which is the capacity of our departmental lab rooms. While initially offered only as a face-to-face course, we envision future offerings of a hybrid course where the lecture is taught online and students attending face-to-face laboratory sessions. At this time, we do not plan for a completely distance learning version of the course as the laboratory component cannot be adequately replicated in the online environment.

Appendix A: Natural Science Learning Outcomes and Justification
(*See Attached*)

Appendix B: Biology 1110 Course Learning Objectives
(*See Attached*)

Appendix C: Assessment Plan
(*See Attached*)

Appendix D: Sample Course Syllabus
(*See Attached*)

Appendix A: Natural Science General Education Objectives and Justification

General Education Natural Science Goals & Objectives

Students who successfully complete this course will fulfill the following GE Natural Science goals and objectives:

Goals/Rationale: Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

Learning Objectives:

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the inter-dependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Students in Biology 1110 will be exposed to a survey of the biological world, using foundational knowledge to apply core concepts in biology (evolution; structure and function; information flow, exchange and storage; pathways and transformations of energy and matter; and systems) to a variety of topics of current interest. Themes in the course will include the dynamic nature of scientific discovery and how the fundamental science is translated to applied science through technology. Students will analyze the ethical consequences to and impacts on society that come with technology. The laboratory component of the course will give students the opportunity to experience a hands-on approach to the concepts and technology introduced in lecture, while the assignments throughout will both address core concepts and require reflection on philosophical issues resulting from scientific discovery.

Appendix B: Biology 1110 Course Learning Objectives

Upon successful completion of Biology 1110, students will demonstrate the ability to:

1. Apply core concepts in biology through the study of specific subject areas:
    a. Structure and Function
        i. Identify properties of life
        ii. Identify macromolecules of biological systems and the role diet plays in their acquisition.
        iii. Identify structural differences in prokaryotes, eukaryotes, viruses, retroviruses, and prions and how they relate to treatment of disease.
        iv. Explain processes of cell growth, reproduction, and apoptosis
        v. Explain variation in processes of cellular division between various cell types
        vi. Analyze how instances of loss of control in cellular regulation processes result in various medical conditions
        vii. Describe processes of osmosis and diffusion and apply concepts to human health
    b. Pathways and Transformations of Energy and Matter
        i. Explain the biochemical pathways of energy flow through biological systems and how they are governed by the laws of thermodynamics.
        ii. Explain the interaction between the processes of photosynthesis, cellular respiration, and fermentation and the variations that exist between taxa.
        iii. Apply effects of diet and exercise on cellular respiration.
        iv. Apply the effects of fermentation on energy production
        v. Explain the role of enzymes in biological systems.
    c. Information flow, Exchange and Storage
        i. Explain Gene Theory and its origins.
        ii. Identify the role of DNA and RNA in biological systems.
        iii. Describe applications of recombinant DNA technology and evaluate social implications that continue to arise as a result of technological developments.
        iv. Explain principles of Mendelian genetics and Heredity Theory
        v. Apply Mendelian genetics to explain inheritance of disease
    d. Evolution
        i. Explain basic assumptions and conclusions of natural selection
        ii. Explain the role of genetic drift in evolution of populations
        iii. Explain how two populations can diverge genetically over generational time
        iv. Apply concepts of evolution to the dynamic problem of antibiotic resistance and vaccine production.
    e. Systems
        i. Identify biodiversity of taxonomic kingdoms and select animal phyla.
        ii. Identify the nature of pathogenic organisms.
        iii. Apply ecological and evolutionary principles to interactions between taxa as related to energy flow.

        iv. Identify various human impacts on the environment and evaluate potential solutions.
2. Synthesize core biological concepts to explain observations of current events in the natural world.
3. Demonstrate an understanding of the nature of science, including:
    a. Explain the role of hypotheses and theories in the scientific method.
    b. Apply knowledge of the scientific method to derive hypotheses and design experiments to test those hypotheses.
    c. Interpret data presented through tables or graphs and apply quantitative reasoning when reading and writing scientific papers.
    d. Communicate conclusions drawn from own experimental data and evaluate those of others.
    e. Explain the nature of science as a human endeavor with its assumptions and limitations.
    f. Explain the self-correcting nature of science.
4. Analyze the significance of technological innovation and its interaction with science on society. Explore potential consequences of technology on society.
5. Demonstrate the ability to work collaboratively.

Appendix C: GE Assessment Plan

Natural Sciences			
ELO 1 Students understand the basic facts, principles, theories and methods of modern science.	• Student achievement will be assessed through embedded questions on quizzes and exams, as well as specific items from lab reports. • PARE report	• Exam and quiz questions will be tied to GE and course outcomes. We will consider a 70% average on objective assessment to be considered mastery of the objective. • On the SALG, we will take a response of 3 or above (out of 5) to reflect student acknowledgment of self-identified gains.	Data from the Student Assessment of Learning Gains survey will be reviewed, in conjunction with data pulled from the scores on line items of the paper rubric criteria. Based on this data, we will discuss what happened, what went well, and what we want to work on. This will allow for a data-driven plan for future offerings.
ELO 2 Students understand key events in the development of science and recognize that science is an evolving body of knowledge.	• Student achievement will be assessed through embedded questions on quizzes and exams, as well as specific items from lab reports.		
ELO 3 Students describe the inter-dependence of scientific and technological developments.	• The final PARE report will require students to address the relationship between science and technology. • Student achievement will be assessed through embedded questions on quizzes and exams.		
ELO 4 Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.	• Students will be assessed on this outcome through the two discussion article summaries and their contribution to the related discussion. • Student achievement will also be assessed through embedded questions on quizzes and exams, as well as specific items from lab reports.		

Appendix E: Sample Syllabus
Biology 1110: Biology for the Health Sciences
Autumn 2017 – 4 credit hours

Lecturer:

Course Coordinator: Adam L. Andrews
Center for Life Sciences Education
255B Jennings Hall
1735 Neil Avenue
Phone: 247-6345
email: andrews.171@osu.edu

Program Assistant: Valerie Gilbert
Center for Life Sciences Education
240A Jennings Hall
1735 Neil Avenue
email: gilbert.578@osu.edu

Assistant Coordinator: Erica Szeyller
Center for Life Sciences Education
255D Jennings Hall
1735 Neil Avenue
Phone: 688-5495
email: szeyller.1@osu.edu

Head Teaching Associate:

Safe Ride Service
Service available from 7:30P-2:40A
614-292-3322
https://dps.osu.edu/safe-ride
Twitter: OhioStateSSS

Class Meeting Schedule

Lecture: 3 hours weekly
Lab: 3 hours, once weekly – *See your BuckeyeLink schedule*

Required Course Materials

Biology: Concepts and Investigations (3rd Edition) by Mariëlle Hoefnagels – ISBN: 978-0-07-352554-9
Biology 1110 Laboratory Manual 2017-2018 Edition; ISBN:
Cell Phone or Internet-connected device (i.e. smart phone, laptop, tablet, etc.)

Internet Access: Your access to Carmen is an integral and necessary part of this course. You must activate your OSU email account to have access to Carmen. The Carmen URL is http://carmen.osu.edu and Biology 1110 should be listed under My Courses on your Carmen homepage. The username to log on is your OSU name.# and the password is the one you use with all OSU email and registration systems. If you have a problem logging in or using Carmen, contact 688-HELP or carmen@osu.edu. IMPORTANT: The CLSE and its course staff will send email ONLY to your official OSU email account.

General Education Natural Science Goals & Objectives

Students who successfully complete this course will fulfill the following GE Natural Science goals and objectives:

Goals/Rationale: Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

Learning Objectives:

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the inter-dependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Students in Biology 1110 will be exposed to a survey of the biological world, using foundational knowledge to apply core concepts in biology (evolution; structure and function; information flow, exchange and storage; pathways and transformations of energy and matter; and systems) to a variety of topics of current interest. Themes in the course will include the dynamic nature of scientific discovery and how the fundamental science is translated to applied science through technology. Students will analyze the ethical consequences to and impacts on society that come with technology. The laboratory component of the course will give students the opportunity to experience a hands-on approach to the concepts and technology introduced in lecture, while the assignments throughout will both address core concepts and require reflection on philosophical issues resulting from scientific discovery.

Biology 1110 Learning Outcomes:

Upon successful completion of Biology 1110, students will demonstrate the ability to:

1. Apply core concepts in biology through the study of specific subject areas:
    a. Structure and Function
        i. Identify properties of life
        ii. Identify macromolecules of biological systems and the role diet plays in their acquisition.
        iii. Identify structural differences in prokaryotes, eukaryotes, viruses, retroviruses, and prions and how they relate to treatment of disease.
        iv. Explain processes of cell growth, reproduction, and apoptosis
        v. Explain variation in processes of cellular division between various cell types
        vi. Analyze how instances of loss of control in cellular regulation processes result in various medical conditions
        vii. Describe processes of osmosis and diffusion and apply concepts to human health
    b. Pathways and Transformations of Energy and Matter
        i. Explain the biochemical pathways of energy flow through biological systems and how they are governed by the laws of thermodynamics.
        ii. Explain the interaction between the processes of photosynthesis, cellular respiration, and fermentation and the variations that exist between taxa.
        iii. Apply effects of diet and exercise on cellular respiration.
        iv. Apply the effects of fermentation on energy production
        v. Explain the role of enzymes in biological systems.
    c. Information flow, Exchange and Storage
        i. Explain Gene Theory and its origins.
        ii. Identify the role of DNA and RNA in biological systems.
        iii. Describe applications of recombinant DNA technology and evaluate social implications that continue to arise as a result of technological developments.
        iv. Explain principles of Mendelian genetics and Heredity Theory
        v. Apply Mendelian genetics to explain inheritance of disease
    d. Evolution
        i. Explain basic assumptions and conclusions of natural selection
        ii. Explain the role of genetic drift in evolution of populations
        iii. Explain how two populations can diverge genetically over generational time
        iv. Apply concepts of evolution to the dynamic problem of antibiotic resistance and vaccine production.
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        i. Identify biodiversity of taxonomic kingdoms and select animal phyla.
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        iv. Identify various human impacts on the environment and evaluate potential solutions.
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b. Apply knowledge of the scientific method to derive hypotheses and design experiments to test those hypotheses.
c. Interpret data presented through tables or graphs and apply quantitative reasoning when reading and writing scientific papers.
d. Communicate conclusions drawn from own experimental data and evaluate those of others.
e. Explain the nature of science as a human endeavor with its assumptions and limitations.
f. Explain the self-correcting nature of science.

4. Analyze the significance of technological innovation and its interaction with science on society. Explore potential consequences of technology on society.
5. Demonstrate the ability to work collaboratively.

Grading and Evaluation

Your mastery of the course material will be based on seven quizzes administered through Carmen, two midterms, and a comprehensive final exam. Both exams will be administered in class according to the schedule at the end of the syllabus. Material on the quizzes and exams will come from the lectures and labs.

Midterm and Final Exam:

There will be two midterms given during the normal lecture time that will each be worth 100 points. A comprehensive final exam worth 150 points will be given at the time prescribed by the University Registrar. Both exams are listed on the course schedule below. The format for both exams will be multiple choice, true/false, and short answer.

Online Quizzes:

There will be 6 quizzes in this course, worth 15 points each. Use these quizzes to gauge your understanding of course material. Quiz questions will be all multiple choice and administered through the Carmen outside of class. Quizzes **will be open for 72 hours** and you will have until **11:59 pm on the day listed on the syllabus** to complete the quiz. Quizzes will be timed (15 minutes) and you will have **two attempts** at each with the higher score recorded. Questions will be pulled from a pool of questions so that quizzes will not necessarily be the exact same across students. Due to the extended window of time you have to complete the quizzes, extensions and makeup opportunities will not be given except in the most extreme of situations. You are strongly encouraged not to wait until the last minute to complete the quiz as technological issues (i.e. internet or power failures, etc.) will not be grounds to extend the quiz window. Should a technological issue arise, please contact the lecturer immediately. It may be possible to reset a quiz attempt during the quiz window, but deadlines will not be extended if the attempt is not reset or technical problems are not solved before the deadline.

Lecture Participation**:**

We will use TopHat every time we meet in lecture to allow students to become active participants. **No makeup opportunities will be available for missed lectures or non-functioning technology.** For each *correctly answered* question in lecture, you will earn one point. Once you earn 70 points, the next 10 correctly answered questions will be worth 0.5 *bonus* points each. The subsequent 20 correctly answered questions will be worth 0.25 bonus points each, for a total of 10 possible bonus points. It is therefore beneficial for you to come to lecture and participate, even after you have earned the 70 participation points!

**Please note that responding to questions as a proxy for another student will result in BOTH students being reported to the Committee on Academic Misconduct and immediate loss of ALL Lecture Participation points for the course.*

***TopHat Registration:** At the beginning of the semester, we will provide instructions on how to register so that we will be able to link your answers to your OSU name.#; this allows us to know who was in class and to record your answers to the questions. Proper registration is **required** by **Monday, August 28, 2015**. After this deadline, a student will not be eligible to recoup points from previous

lectures***. You must check your grade on Carmen to verify you are earning points.*** Please see announcements on Carmen for further details.

Discussion Articles:
Twice throughout the semester, you will be asked to read an article posted to Carmen. There will be two parts to the assignment associated with each article. First, you must write a one page reaction to the article, consisting of at least two paragraphs (approx. 100-150 words each). The first paragraph is a short summary of the article. The second paragraph is to be your reaction to the article. This page must be typed, and turned in *to the Carmen dropbox* NO LATER than the start of the class period in which the discussion is occurring. You will receive up to 10 points for the summary. During the respective class discussions in lab, all students will be expected to vocally express their comments regarding the article. You will receive 10 points for your **active** participation. No makeup points are available if you are not in class for the discussion, or choose not to say anything. No late summaries will be accepted.

Laboratory: will be assessed on the basis of 290 points:

- Lab Exercises: Each of 9 laboratory exercises will be graded on a 20 point scale. Two points will be for the pre-lab to be completed and turned in *by the start of the lab period*. 18 points will be for completion of the lab report *as a group during lab*.
- PARE: The PARE project will be integrated throughout the lab periods. There will be three pre-lab assignments (2 points each), 3 lab exercises to be completed and turned in (18 points each), technique points worth 20 points, a final report worth 50 points, an oral presentation of results worth 20 points, and a poster worth 50 points.
- Lab Instructor Points: Your participation in lab exercises and cooperative learning opportunities will be monitored by your lab instructor and graded on the basis of 30 points. Your lab instructor will individually specify exactly how these points will be distributed.
- Peer Evaluation: During the last week of the semester you will be asked to evaluate the efforts of your group mates in lab. Your score will be an average of the scores assigned to you by each of the group members and a rating of your own participation, with maximum points of 20. Failure to complete the survey will result in a zero for that student but will not affect group members.

Student Assessment of Learning Gains:
During the last week of the semester you will be asked to complete a survey of the course through Carmen. Completion will be worth 5 points.

LECTURE

2 Midterm Exam (100 pts each)	200
1 Final Exam	150
6 Quizzes (15 pts each)	75
2 Discussion Articles (20 pts each)	40
Lecture Participation	70
SALG	5
	540

LAB

10 Lab Exercises (20 pts each)	200
PARE Project	200
Lab Instructor Points	30
Peer Evaluation	20
	450

Final Grades:
Your final grade will be based on the percentage of the 990 points that you earn during the course of the semester, as indicated below. Please note that we do not grade the course on a curve and *Carmen* does not round scores up to the next nearest percentage point, so 92.11% and 92.97% both earn the grade of A-.

Grade Scale

93-100%:	A	80-82.9%:	B-	67-69.9%:	D+
90-92.9%:	A-	77-79.9%:	C+	60-66.9%:	D
87-89.9%:	B+	73-76.9%:	C	≤59.9%:	E
83-86.9%:	B	70-72.9%:	C-		

Posting Of Grades:
All grades will be posted on Carmen. After grades are posted you have 10 working days to challenge any grade or inquire regarding an unposted or missing grade. **After that time, grades are final as posted or zero if missing.** To challenge or inquire about an in-class activity, contact your TA. To challenge or inquire about exam grades, contact the lecturer to set up an appointment to find your scantron. IMPORTANT: Make sure that all of your grades are properly posted on Carmen as you receive them. Challenges about grades, particularly after the end of the semester, cannot be entertained after the 10-day grace period.

Late Assignments Policy:
No late assignments will be accepted. All assignments will have significant windows in which the assignment can be submitted. Please do not save assignment completion for the 'eleventh hour'. Deadlines will not be extended.

Absences:
If you are unable to take the exam at the regularly scheduled time, you must contact Adam Andrews (andrews.171@osu.edu) within 24 hours to schedule a makeup. If your absence is excused for a university-sanctioned event, if you are ill and have been seen by a medical practitioner on the day of the exam, or have other documentable reasons for missing, you may be offered a makeup exam without penalty. If you have no documentation to support your absence, or your absence from the exam is not for an excused reason, you will still be offered the opportunity for a makeup exam, with a 25% overall deduction on your exam score. Lack of transportation, loss of electricity, travel plans, etc. will not be considered as valid excuses. Arrivals to the exam after the first student has turned in an exam will be considered an unexcused absence, and the policy above will apply. The format for makeup assignments is at the discretion of the instructor.

The final exam is scheduled for TBA. Make sure that this time does not conflict with your future plans. No early exams will be given. The only makeup exam will be held on Friday, December 15 at 9:00am in Jennings Hall 270, and is available only with pre-approval from the course coordinator.

The laboratory portion of this course is an integral part of the learning experience. You are expected to come prepared to all lab sessions. This includes wearing appropriate clothing and footwear, having completed the pre-lab assignment, and having read and understood the lab you will be conducting that day – **this is critical**. (See the schedule below.) Each lab will have a pre-lab that must be submitted in person by the start of the lab period. Once class has begun, no further pre-lab activities will be accepted. Students arriving more than 15 minutes after the beginning of the lab session will not be permitted to stay, nor to earn credit for the missed lab. **Missing more than three labs (*excused or unexcused*) will result in the student being automatically assigned a failing grade for the course.** Students must contact their LAB INSTRUCTOR within two days of the original missed lab. There is no opportunity for a make-up assignment if a student contacts her/his LAB INSTRUCTOR on the third day or later. As part of this goal, makeup opportunities will only be given for circumstances beyond the student's control and must be accompanied by written documentation validating the absence. If you are too ill to attend class, you must receive documentation from a medical practitioner from the day of the absence. Attending a lab section other than your regularly scheduled lab is not permitted.

Section Changes: All section changes and adds are done by the Course Coordinator. Due to the need to keep up-to-minute availability of seats in each recitation, the lecturer and Lab Instructors are unable to sign any permission forms.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed, illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/. We will adhere to this policy.

- Unless otherwise specified for a particular assignment, all submitted work should be a student's own unique effort. Collaborative efforts are not permitted unless expressly sanctioned for a particular assignment.
- Using others' verbatim words without the use of quotation marks ***and*** citation is plagiarism. Paraphrased work requires citation to denote the use of others' ideas. Copying other's words without quotation while using citations is still considered plagiarism.
- Use of any technology during a quiz or exam (including but not limited to cell phones, smart watches, headphones, electronic dictionaries, etc.) is strictly prohibited.

Diversity and Inclusion: The Center for Life Sciences Education promotes a welcoming and inclusive environment for all students and staff, regardless of race, age, religion, gender, ethnicity, national origin, disability, or sexual orientation. There is no tolerance for hateful speech or actions. All violations of this policy should be reported to the OSU Bias Assessment and Response Team (BART, www.studentaffairs.osu.edu/bias).

Sexual Harassment: OSU and the CLSE consider sexual harassment to be unacceptable behavior that destroys opportunities for learning. While all members of the staff involved in this course have been trained in the OSU sexual harassment policies and procedures, this is not true for all OSU students. Please report any concerns about questionable or unwanted behavior to the lecturer or Mr. Andrews.

Accommodation of Special Needs: Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the course coordinator as soon as possible of their needs. Please do this within the first week of the semester. Only the course coordinator is authorized to sign ODS forms. Please fill out those parts of the proctor sheet forms that are to be completed by the student before bringing the form for signature. This will help us ensure that your individual needs will be met appropriately and fairly. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 292-3307, slds@osu.edu.

Issue Resolution: The CLSE believes that student concerns are usually most effectively addressed by the staff closest to the situation. Therefore, students are ordinarily expected to address issues or concerns with their TAs first. If the issue cannot be resolved by your TA, or for some reason you feel that you absolutely cannot address your concern with your TA, please feel free to contact Adam Andrews, or Assistant Director Matt Misicka.

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Safe Ride Service: Safe Ride (614-292-3322) is a service provided to university students, faculty, and staff who would like safe transportation across campus. Rides are scheduled on a first-come first-serve basis. Phone lines open at 7pm and rides are available until 3am. For more information and service boundaries, please visit https://dps.osu.edu/safe-ride.

AUTUMN 2017 TENTATIVE SCHEDULE

Information in this syllabus is subject to change with as much notice to students as possible.

Week	Date	Lecture Topic	Reading	Laboratory (Week runs Wednesday through Tuesday)	Assignments
1	8/22-25	• Introduction to Biology 1110 • Why ask why? How and why do we do science? Themes in Life	Ch 1	Ex. 1: Nature of Science	
2	8/28-9/1	• Life's chemistry	Ch 2	Ex. 2: Macromolecules and Nutrition	
3	9/4-8	• **NO CLASS 9/4** • Where did cells come from? (Evolution of cells) • What does a cell look like and do?	Ch 3	Ex. 3: Osmosis and Diffusion	**Quiz 1 due**
4	9/11-15	• Biodiversity and microbiology • Viruses and Prions	Ch. 16-17, 18.1,18.6, 19.1, 20.1, 20.7, 21.1, 21.4, 21.7, 21.16	Ex. 4: Cell diversity	
5	9/18-22	• Its all about energy (Metabolism, Energy, Respiration and Photosynthesis)	Ch. 4, 5, 6	Ex. 5: Photosynthesis and cellular respiration	**Quiz 2 due**
6	9/25-9/29	• DNA, gene expression	Ch. 7	PARE I & II	**MIDTERM #1 in lecture** **Discussion #1 in Recitation**
7	10/2-6	• Chromosomes, Cell division	Ch. 8.1-8.5, 9	Ex. 6 Cell division	
8	10/9-13	• Cancer • **NO CLASS 10/12-13**	Ch. 8.6-8.8	**Recitations Only**	**Quiz 3 due**
9	10/16-20	• Genes and Inheritance • Genetic Disease	Ch. 10	PARE III & IV	
10	10/23-27	• Biotechnology	Ch. 11	PARE V & VI	**Quiz 4 due**
11	10/30-11/3	• Evolution and Natural Selection	Ch. 12-13	Ex. 7 Natural Selection	**MIDTERM #2 in lecture** **Discussion #2 in recitation**
12	11/6-10	• Speciation • **NO CLASS 11/10**	Ch. 14	Ex. 8 Speciation	**PARE Draft Report Due**
13	11/13-17	• Populations and Population Dynamics	Ch. 37	Ex. 9 Virulence	**Quiz 5 due**
14	11/20-24	• Ecological Relationships • **NO CLASS 11/22-24**	Ch. 38	**No Labs Sessions Meet**	**PARE Final Report Due**
15	11/27-12/1	• Human Impacts	Ch. 39-40	Ex. 10 Biofuels	**Quiz 6 due**
16	12/4-6	• Global Outlook	Ch. 39-40		
FINALS		**TBA**			