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### BIOB 160N.01: Principles of Living Systems

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# **PRINCIPLES OF LIVING SYSTEMS (BIOB 160N)**

*Spring Semester 2022*

***MWF 11:00AM-11:50AM in Interdisciplinary Science Building ISB 110***

## **Instructor**

Annie Green, PhD

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phone: 243-5160

Office: Health Sciences 210

Office hours: Wednesdays 1-2 pm or by appointment.

(Note for Spring 2022: because of the COVID-19 pandemic, contact by email and zoom is preferred.)

[Campus map](#)

## **Overview and Objectives**

Biology encompasses a diverse set of disciplines that includes biochemistry, molecular and cell biology, genetics, evolutionary biology, ecology, behavior, ecosystem biology, conservation biology, human and veterinary medicine, agronomy, and more. Knowledge of biology is also increasingly important in other disciplines, such as economics, politics, social policy, ethics, business, technology, engineering and design, and architecture. It is difficult to find any human activity for which an understanding of biology has not become relevant and important.

BIOB 160N, *Principles of Living Systems*, is a broad survey course that is a pre-requisite for all options in the Biology and Wildlife Biology majors and is generally required for all pre-professional programs in the health sciences. In BIOB 160N we will work to develop a strong foundation for your future studies in Cell and Molecular Biology, Genetics and Evolution, Developmental Biology, Anatomy and Physiology, Ecology, and related options.

## **Learning Outcomes**

This course will prepare students for more detailed investigation and advanced study as they progress through the biological curriculum. Upon completion of BIOB 160, students will have gained a deeper understanding of the general principles of biology as a whole and a broad but solid foundation of knowledge of the form and function of living systems. By the end, students will have a general understanding of five core concepts of biology: 1) evolution; 2) structure and function; 3) information flow, exchange, and storage; 4) transformations of energy and matter; and 5) systems.

This course is the first exposure to the rigors of scientific thinking, experimentation, and exploration. Students will be exposed to the various important principles that guide scientific discovery in the biological world. Learning goals will introduce a set of core

competencies, namely the ability to: 1) apply the process of science, 2) use quantitative reasoning, 3) use modeling and simulation, 4) tap into the interdisciplinary nature of science, 5) communicate and collaborate with other disciplines, and 6) understand the relationship between science and society. Students will learn the basics of hypothesis development and testing to apply that knowledge in their future science-based courses and fields of study.

In particular, students will:

1. Grasp how science works (What is science? What is not science?);
2. Learn how to construct *testable* questions, design experiments that test such questions, then interpret observational data that answer those questions;
3. Learn how to communicate your ideas about the structure, function, and evolution of living systems;
4. Understand the basic physical and chemical properties that characterize living systems;
5. Know the main types of molecules common to all living systems;
6. Understand how energy is captured, stored, used, and passed through living systems;
7. Understand how biological information is preserved, inherited, and modified;
8. Understand how stored biological information is unpacked to make biological machines;
9. Understand how the processes of natural selection and evolution work;
10. Understand some of the ways that humans affect biological processes on Earth.

*Principles of Living Systems* is a cumulative course so your success in grasping the material presented one week will depend on having mastered material presented in previous weeks. You need to keep up with the readings and homework assignments. If you fall behind, it will be difficult to catch up. For this reason, there will be weekly assignments on the online platform, LaunchPad.

If you find yourself in trouble, please advise your professor or learning assistants as early as possible. We will be better able to help you if you talk with us as problems arise; we will be less sympathetic ten minutes before an exam. If you cannot meet at any of the designated office hours, please work to schedule an appointment at another time.

Learning is not a passive activity; in BIOB 160 (and in all your coursework!) you need to take an active role. We are here to facilitate your learning, but we ask that you:

- Come prepared and actively participate in the class meetings
- Be prepared and willing to work cooperatively in groups during class meetings
- Reflect objectively on your progress and understanding

### **10 things that require ZERO talent:**

1. Being on time
2. Work ethic
3. Effort
4. Body language
5. Energy
6. Attitude
7. Passion
8. Being coachable
9. Doing extra
10. Being prepared

### **Textbook & LaunchPad Online Homework**

You will be able to access most of the resources for this class on the course [Moodle site](#). We will post pdf files of lecture notes as well as other information. You will need your NetID and password to access the Moodle site, which you can look up [here](#).

This course uses Hillis, *et al.*, *Principles of Life*, 3<sup>rd</sup> edition, and an associated online homework service called LaunchPad (cost: \$40). This is the unique URL of your LaunchPad course: <https://www.macmillanhighered.com/launchpad/hillis3e/18773109>. (A physical copy of the book will also be available at the bookstore.) To access your content, log in to the BIOB 160 Moodle site, click the link called iClicker, LaunchPad, and Textbook Instructions, then follow the instructions we've put in there. Detailed instructions for accessing LaunchPad are also [here](#).

LaunchPad will give you access to the textbook, and practice with the material that we cover in class. You will have regular assignments to do on this site. To help you prepare for class discussion, assigned reading and the LaunchPad homework quiz will generally cover material to be discussed in class the upcoming week. Online quizzes and assignments are due *before class* on the day indicated on the LaunchPad calendar.

***There will be no make-up quizzes.*** If you miss the deadline for online quizzes or assignments you lose all the points for that quiz or assignment. (However, the three lowest quiz scores will be dropped and not cause you to lose points.) Your score in LaunchPad will make up 100 of 700 points for your grade in the class.

Students can now access course content via VitalSource or RedShelf websites for more information (<http://info.macmillanlearning.com/JF0RC10unG0OV0c3vw000b0> or <http://info.macmillanlearning.com/I0F1W000Rncw3G0vb000v0C>). If you have any questions concerning access, please reach out to The Bookstore at UM or email [help@redshelf.com](mailto:help@redshelf.com) or consult their public knowledge base, RedShelf Solve - [solve.redshelf.com](http://solve.redshelf.com). For any questions about billing please contact Amanda Peterson at [amanda.peterson@mso.umt.edu](mailto:amanda.peterson@mso.umt.edu). In addition, if you want a hard copy of your own (and you're signed up for the all-inclusive package), you can go to the UM Bookstore to request a print-out of the entire book for an additional \$40.

## iClickers

We will use the iClicker Reef response system in the lecture this semester. This technology will provide you (and us!) with valuable feedback about what you know and don't know and will help promote better learning and understanding of the concepts presented in the lecture. We recommend that you use the [iClicker Reef Application](https://app.reef-education.com/#/login) (5\$) on your smart device (iPhone, Android, tablet, or laptop). **You must register your clicker online at: <https://app.reef-education.com/#/login>** **Software: iClicker Reef; LMS: Moodle. Please enter your 790-number student ID, and check it carefully.** (If you don't enter your student ID correctly, you will not receive credit for participation.) Instructions for creating your iClicker account and registering can be found here: <https://macmillan.force.com/iclicker/s/article/How-to-Create-an-iClicker-Reef-Student-Account-for-Online-Classes>.

Participation using iClickers will make up 100 points (about 14.3% of your grade) in class. Note that you may not bring a friend's iClicker to class and answer questions for him/her. We will consider this cheating, and if we see you do this you will not get any participation points for the entire semester.

## Diversity

Diversity is a source of strength, creativity, and innovation at the University of Montana. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Montana fulfills its public mission by creating a welcoming and inclusive community for people from every background— people who as students, faculty, and staff serve Montana and the world.

## Grading

We will use “reverse grading” in this course. The total number of points possible is 700. Everyone starts with an “A” (700 points) on day one and then you lose points over the semester. Your grade will be based on the following weighting of course components: Exams: 300 points total (the lowest score will be dropped); online quizzes: 100 points (the lowest three will be dropped); homework assignments: 100 points; iClicker: 100 points; and final exam: 100 points.

Grades in the lecture part of the course will be assigned in the +/- system. The students that retain more than about 90% of the points will receive A/A- grades, and the students who retain fewer than about 60% of the points will receive a failing grade. The grades in between will typically be 80-89% = B; 70-79% = C; 60-69% = D.

## Exams

You will take four 50-minute exams and one 1-hour comprehensive final exam, each worth 100 points. Each exam will consist of multiple-choice, matching, and short-answer questions. Instead of in-class exams, where answers are recorded on electronically-graded Scantron forms, for Spring 2022, we will be conducting exams remotely using Moodle, proctored using zoom with your camera on.

***There will be no make-up exams.*** Students who have conflicts due to athletic or other scheduled events will notify the instructor at least two weeks in advance and accommodations will be made to take the exam early. Please notify the instructor if you have a verifiable medical excuse or emergency. If a student has already missed one exam due to a verifiable medical excuse or emergency and has another verifiable medical excuse or emergency, accommodations *may* be made to take the exam the next day by communicating with the instructor.

## Course Learning Assistants

There will also be a set of undergraduate Learning Assistants in the class. These advanced biology students will help with class discussions and activities, and they will be a great resource for discussing class materials.

**Study Jam** sessions for students enrolled in biology courses are Mondays from 6:30-9 pm, in-person and remotely for Spring 2022. Students can access Study Jam through its website: <https://www.umt.edu/study-jam/>

**Extra credit:** None offered.

## Students with disabilities

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at (406) 243-2243, [ode@umontana.edu](mailto:ode@umontana.edu), or visit [www.umt.edu/disability](http://www.umt.edu/disability) for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish. If you would like to request reasonable accommodations, you are advised to provide your ODE verification letter to Dr. Green in the first week of class so appropriate arrangements can be made. If you decide after the semester begins to disclose your disability and request accommodations, you should provide documentation, if possible, at least 10 days before the upcoming assessment so I may prepare appropriately. It is the responsibility of students to make sure they understand the types of modifications available to them before assessments.

## Computers

The Division of Biological Sciences maintains a computer lab dedicated to use in biology courses. It is located in Health Sciences 114. You can log in using your netID. There are also lots of computers available in the Mansfield Library and the basement of the Payne Family Native American Center.

## A Note on Email and Spam Filters

All email communication for the course will be sent to your official university email and not to other email providers. If you don't normally check your university email, you will miss important emails. You can have your university email forward messages to other email addresses (e.g., Gmail, Yahoo, etc). When we email the whole class, the

message will go to lots of email addresses, and some email providers will block this as spam. You should check the settings of your spam filters so that they allow such messages.

## Plagiarism and Cheating

Although you will be encouraged to work collaboratively with others in this class and the lab, ***the work you hand in must be your own***. This includes the iClicker: ***you may only use your iClicker***. A good rule of thumb is that you can work together up to the point of committing words to paper (or computer). After that, the words you put down should be your own. We remind you of the official University policy on plagiarism: "Plagiarism is the representing of another's work as one's own. It is a particularly intolerable offense in the academic community and is strictly forbidden. Students who plagiarize may fail the course and may be remanded to Academic Court for possible suspension or expulsion (See Student Conduct Code section of this catalog). Students must always be very careful to acknowledge any kind of borrowing that is included in their work. This means not only borrowed wording but also ideas. Acknowledgment of whatever is not one's own original work is the proper and honest use of sources. Failure to acknowledge whatever is not one's own original work is plagiarism." (Quotation from The University of Montana Catalog).

If you have any questions about the line between collaboration and plagiarism, see your professors or consult with the Writing and Public Speaking Center before you hand in the material. Assignments from two or more students that have significant overlap will be regarded as reflecting a violation of the expectation that students turn in independent work. All the students involved will be given no points for that material, and the violation will be dealt with according to the Student Conduct Code. Penalties for plagiarism and cheating can be as severe as suspension or expulsion from The University. For more information on UM policies on plagiarism, see the [Student Conduct Code](#).

## Adds, drops, and changes of grading

University policies on drops, adds, changes of grade option, or changes to audit status will be strictly enforced in BIOB 160N. These policies are described in the [course catalog](#). The last day for dropping the course with a refund is February 7, 2022.

For more information, see UM's [dates and deadlines](#) document.