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BIOB 160N.01: Principles of Living Systems

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PRINCIPLES OF LIVING SYSTEMS (BIOB 160N)

MWF 1 – 1:50 pm in Urey Lecture Hall [[Masks required in class!](#)]

Fall Semester 2021

Instructors

Art Woods

art.woods@mso.umt.edu

Office hours ([by zoom](#)): Mon 4:30 - 5:30 and Thu 1:30 - 2:30, or by appt.

Brandon S. Cooper

brandon.cooper@umontana.edu

Office hours ([by zoom](#)): Tue 2:30 – 3:30 and Fri 2 - 3, or by appt.

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. In fact, it is difficult to find any human activity for which an understanding of biology has not become relevant and important.

BIOB160N, *Principles of Living Systems*, is a broad survey course that is a pre-requisite for all options in the Biology and Wildlife majors, and is generally required for all pre-professional programs in the health sciences. In BIOB160N 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

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 each broad area of biology, which will prepare students for more detailed investigation and advanced study as they progress through the biological curriculum. This course is the first exposure to the rigors of scientific thinking, experimentation, and exploration and, as such, students will be exposed to the various important principles that guide scientific discovery in the biological world.

Furthermore, students will learn the basics of hypothesis development and testing and will be well suited 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 that your success in grasping the material presented one week will depend on having mastered material presented in previous weeks. It is essential for you to keep up with the readings and homework assignments. If you fall behind, it will be difficult to catch up. If you find yourself in trouble, please advise your professors or Graduate Teaching Assistants 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 BIOB160 (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 breakout groups during class meetings
- Reflect objectively on your own progress and understanding

Lectures

We will meet MWF 1 – 1:50 in Urey Lecture Hall. We also will record most lectures and make them available afterward via Moodle. However, we strongly encourage everyone to attend lectures in person, as this is the best way to stay fully engaged in class and to participate in class activities. **In accordance with UM policy, masks are required while attending class (and labs).**

Textbook & LaunchPad Online Homework

This course uses Hillis et al. *Principles of Life* (Sinauer/Macmillan), 3rd edition and an associated homework service called LaunchPad. These resources are being delivered to you electronically and a “digital book fee” has been assessed to your tuition bill. This is a distribution model called “all-inclusive” in which the faculty member, the publisher, and the bookstore have negotiated a

low price and immediate access on the first day of class. To access your content, log in to the BIOB160 Moodle site, then follow the instructions on the opening course Moodle page.

LaunchPad will give you practice with the material that we cover in class and in your readings. Launchpad assignments are designed to complement upcoming lectures—so you often will be covering readings and topics that we haven’t yet discussed in class. Launchpad assignments typically will be due Tuesdays at midnight, although we encourage you to work on them earlier and at your own pace. In addition, some of the questions on your in-class exams and final exam will be derived from (but not necessarily identical to!) the LaunchPad assignments. Your score in LaunchPad will make up 20% of your grade in class.

If you do not want to participate in the all-inclusive model, you can opt out via the textbook link, which will be available until the last day to [drop classes](#), September 20th. If you opt out, your access will be revoked and you will have to purchase the materials elsewhere. Note that a standalone code for LaunchPad may cost more than the all-inclusive package from the bookstore. If you have any questions concerning Inclusive Access, please reach out to Amanda Peterson at The Bookstore at UM, apeterson@montanabookstore.com. We will keep several print copies of the book on reserve at the Mansfield Library. 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 thing for an additional \$40.

Course Schedule

In addition to material we cover in lectures, you will be responsible for readings indicated below. A more detailed schedule of subchapter readings and assignments will be provided on Moodle.

Week of	Prof.	Topic	Reading from Text	Lab Activity (if you are taking the lab portion of the class)
Aug 30	AW BC	Introduction and overview Key concepts for life What is science? Start processes of evolution	Chaps. 1, 13	What is science?
Sept 6	BC	<i>No class Monday, Sept 6; Labor Day</i> Processes of evolution (forces of evolutionary change, evolution of populations)	Chap. 13	No labs
Sept 13	BC	Processes of Evolution Phylogenies	Chaps. 13 and 14	How to read and find scientific papers
Sept 20	AW BC	History of life on earth Wednesday, Sept 22 – Test 1 Speciation 1	Chap. 16	The Tasmanian Wolf

Sept 27	BC/AW	Speciation 2/3 Ecological systems in time and space		Term project instructions
Oct 4	AW	Ecological systems in time and space	Chap. 38	Simbio: Population ecology
Oct 11	AW	Populations	Chap. 39	Water
Oct 18	AW	Monday, Oct 18 – Test 2 Biological macromolecules	Chap. 3	Work on term projects
Oct 25	AW/BC	Biological macromolecules Cell structure and membranes	Chaps. 3 and 4	Enzyme function
Nov 1	BC	Cell structure and membranes	Chap. 4	Work on term projects
Nov 8	AW	Energy and cell metabolism Cellular respiration and photosynthesis	Chap. 2.3, 2.4; Chap. 5	No labs
Nov 15	AW	Monday, Nov 15 - Test 3 Photosynthesis (W)	Chap. 5	Photosynthesis
Nov 22	AW	Respiration/photosynthesis <i>No class W or F (Thanksgiving)</i>		No labs
Nov 29	BC	Cell cycle and cell division DNA + From DNA to protein	Chap. 7	DNA
Dec 6	BC	Molecular evolution Bonus lecture: host-microbe interactions	Chap. 9, Chap. 10	Term project symposium
Dec 15		FINAL EXAM: 1:10 – 3:10		

Grading

Grades in the lecture part of the course will be assigned in the +/- system, according to the following scheme:

Grade	Percent of Total Points
A	93-100%
A-	90-92.99%
B+	87-89.99%
B	83-86.99%
B-	80-82.99%
C+	77-79.99%
C	73-76.99%
C-	70-72.99%

D+	67-69.99%
D	63-66.99%
D-	60-62.99%
F	Below 60%

Your grade will be based on the following weighting of course components:

Component	Weighting
Exams (best 3 out of 4)	75% (25% per exam)
LaunchPad	20%
iClicker	5%
Total	100%

Exams

You will take three 50-minute exams and one 2-hour comprehensive final, all of equal value. Exams will consist primarily of multiple-choice questions but may also include short answer/essay questions. For calculating final grades, we will take the best three out of your four exam scores – each worth 25% of your grade.

Make-up exams will be administered one week *after* the scheduled exam. Make-up exams will consist of a mix of multiple choice and short-answer questions, and may include additional lecture material covered after the regularly scheduled exam. Students generally find make-ups to be more difficult than the regularly scheduled exam. Only students presenting verifiable medical or university excuses directly to Drs. Woods or Cooper at least 24 hours before the regularly scheduled exam will be eligible for a make-up exam.

iClickers

We will use the iClicker response system during lectures this semester. This technology will provide you (and us!) with feedback about what you know (and don't) and will help promote better understanding of the concepts presented in lecture. We will run clicker polls in most class periods. Starting the second week of classes, you will be graded on your *participation* in the system, not on whether you get answers right. You must use the [iClicker Reef Application](#) on your own smart device, and access to the app is provided via your course fee for BIOB160 (bundled with the textbook and Launchpad). **You must register via the Moodle platform for BIOB160.** Click the link called 'Registering your REEF account' from the main course page to get instructions.

Participation using iClickers will make up 5% 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 doing this you will not get any participation points for the entire semester.

Cost breakdown for course materials

All students in BIOB160N are charged \$63.75 for online access to the textbook (Hillis et al., 3rd Edition), the online homework service (LaunchPad), and iClicker REEF polling app. If you are taking BIOB161 (the lab course associated with BIOB160), you'll also need to buy a hardcopy of the lab manual from the bookstore (approximately \$36). The lab manual includes an account with SimBio, the maker of a piece of simulation software that we'll use during the semester. Note that these prices are significantly lower than they were even a few years ago.

Course Teaching Assistants (TAs) & Labs

There are seven TAs for BIOB 161 this semester:

Jackson Birrell Jackson.birrell@umontana.edu

Keely Corder keely.corder@umontana.edu

James Frakes jameson.frakes@umconnect.umt.edu

Eric Lyons eric.lyons@umontana.edu

Landon Magee landon.magee@umontana.edu

Ryan Mahar ryan1.mahar@umontana.edu

John Statz john.statz@umontana.edu

If you are taking the laboratory portion of the class, you will meet your TA at the first lab meeting, which will start the first full week of classes (week of August 30th). If you are not taking the lab portion, you still are welcome (encouraged) to contact one or more of the TAs with questions about lecture material. Your TA will be an essential resource for this class, and he or she should be your first point of contact when you have questions, either about the course structure or about particular ideas and concepts with which you may be having trouble.

Course Material

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

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, or visit 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.

Land Acknowledgment

The University of Montana acknowledges that we are in the traditional territories of the Salish, Pend d'Oreille, Kootenai, Blackfeet and Kalispel people. We honor the path they have always shown us in caring for this place for the generations to come.

Cultural and Ceremonial Leave Policy

Cultural or ceremonial leave allows excused absences for cultural, religious, and ceremonial purposes to meet the student's customs and traditions or to participate in related activities. To receive an authorized absence for a cultural, religious or ceremonial event the student or their advisor (proxy) must submit a formal written request to the instructor. This must include a brief description (with inclusive dates) of the cultural event or ceremony and the importance of the student's attendance or participation. Authorization for the absence is subject to approval by the instructor. Appeals may be made to the Chair, Dean or Provost. The excused absence or leave may not exceed five academic calendar days (not including weekends or holidays). Students remain responsible for completion or make-up of assignments as defined in the syllabus, at the discretion of the instructor.

Food Insecurity

Any student who faces challenges securing food or housing, and believes that this could affect their performance in this course, is urged to contact any or all of the following campuses resources: Food Pantry Program (umpantry@mso.umt.edu), ASUM Renter Center (<https://medium.com/griz-renter-blog>), and TRiO Student Support Services (www.umt.edu/trio/apply.php). Please also feel comfortable approaching us. We understand the challenges you face and want to help.

Room Behavior

Please conduct yourself as a responsible, courteous adult in class. This means arriving on time and engaging with what's happening in class. Things you should not do include talking to your neighbors (except during designated classes), texting, reading materials online, watching movies, sleeping, etc. If we see you doing these things, we may ask you to leave the classroom.

Email

Please also be courteous when sending emails. For example, use a salutation and sign-off, and write in good English (not text-ese).

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***. 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 your TA before you hand in 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 change to audit status will be strictly enforced in BIOB160N. These policies are described in the [course catalog](#).

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