Spring 2-1-2018

BIOB 160N.01: Principles of Living Systems

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PRINCIPLES OF LIVING SYSTEMS (BIOB 160N, CRN 38327)

MWF 11 – 11:50 pm in Interdisciplinary Science Building 110

Spring Semester 2018

Instructor
Dr. Erick Greene
Office: Health Sciences Building, Room 203  
erick.greene@mso.umt.edu; 243-2179
Office hours: Monday and Friday at 12-1, or by appointment

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 is 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
Principles of Living Systems will give you a solid foundation in the general principles of biology. This will help prepare you for the more advanced courses in your curriculum. You will be exposed to important principles that guide scientific discovery in the biological world.

In particular, you will:

1. Learn 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 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 though 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 depends 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 can be difficult to catch up. If you find yourself having any troubles, please let me know as EARLY as possible. I am extremely willing to be flexible and help you if you have troubles. You will find that I am very sympathetic if you let me know about problems as they arise; I will be less sympathetic ten minutes before an exam. If you cannot meet during designated office hours, please schedule an appointment at another time.

Learning is not a passive activity; in BIOB160N (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 own progress and understanding

**Textbook & MasteringBiology Online Homework**

We will use Campbell’s *Biology*, 11th edition and an associated online homework service called MasteringBiology. These two resources are being delivered to you electronically and a “digital book fee” has been assessed to your tuition bill. This is a new 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. This is saving you a lot of money!

To access your content, log in to the BIOB160 Moodle site, then in the folder “E-book and Mastering Biology” click the link for “Access to E-book and Mastering Biology.”

MasteringBiology will give you practice with the material that we cover in class and in your readings. You will have regular assignments to do on this site. In addition, some of the questions on your in-class exams and final exam will be derived from (but not necessarily identical to!) the MasteringBiology assignments.

If you do not want to participate in this digital book, you can opt out via the textbook link, which will be available until the last day to add/drop, which is 9 February. If you opt out, you will have to get a textbook somewhere else. There will be some on reserve in the library, and about 10 hard copies for sale in the bookstore. However, you will also need to purchase a standalone code for MasteringBiology which may cost more than the all-inclusive package from the bookstore. 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 $50.

**Course Schedule**

In addition to material we cover in lectures, you will be responsible for readings indicated below.
<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
<th>Reading from Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 22</td>
<td>Introduction and overview. Natural selection – domestication &amp; Galapagos</td>
<td>Chaps. 1, 22</td>
</tr>
<tr>
<td>Jan 29</td>
<td>What is science? Flies and spiders. A brief history of life on Earth</td>
<td>Chap. 25</td>
</tr>
<tr>
<td>Feb 5</td>
<td>Phylogeny and the Tree of Life</td>
<td>Chap. 26</td>
</tr>
<tr>
<td>Feb 12</td>
<td>Animal Behavior</td>
<td>Chap. 26</td>
</tr>
<tr>
<td>Feb 19</td>
<td><strong>No class on Monday, 19 Feb</strong> What is so special about water?</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Feb 26</td>
<td>What’s so special about carbon? Biological Molecules: carbohydrates and lipids</td>
<td>Chap. 4 Chapter 5 (first half)</td>
</tr>
<tr>
<td>March 5</td>
<td>Biological molecules: proteins and nucleic acids</td>
<td>Chap. 5 (second half)</td>
</tr>
<tr>
<td>March 12</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td>March 19</td>
<td>Energy and metabolism</td>
<td>Chap. 8</td>
</tr>
<tr>
<td>March 26</td>
<td>Spring Break</td>
<td></td>
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<tr>
<td>April 2</td>
<td>Cellular respiration</td>
<td>Chap. 9</td>
</tr>
<tr>
<td>April 9</td>
<td>Photosynthesis</td>
<td>Chap. 10</td>
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<tr>
<td>April 16</td>
<td>Mitosis</td>
<td>Chap. 12</td>
</tr>
<tr>
<td>April 23</td>
<td>Meiosis and DNA replication</td>
<td>Chap. 13 Chapter 16</td>
</tr>
<tr>
<td>April 30</td>
<td>From gene to protein</td>
<td>Chap. 17</td>
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<tr>
<td>May 10</td>
<td><strong>FINAL EXAM is 10:10-12:10 in ISB 110</strong></td>
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**Grading**

Your grade will be based on the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>20</td>
</tr>
<tr>
<td>Test 2</td>
<td>20</td>
</tr>
<tr>
<td>Test 3</td>
<td>20</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
<tr>
<td>Mastering Biology</td>
<td>15</td>
</tr>
<tr>
<td>iClicker participation</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
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**Tests**

You will take three 50-minute exams and one 2-hour Comprehensive Final, each worth 20% of your grade. Each test will consist of multiple-choice and matching questions whose answers will be recorded on electronically-graded Scantron forms (which you will have to bring). The only
things you will need to bring on exam days are #2 pencils and a scantron. All electronic devices (except calculators) must be stowed and in the “off” position.

*Make-up tests* will be administered one week *after* the scheduled exam. Make-up exams will only be allowed if you contact me BEFORE missing a test. Only students presenting verifiable medical or university excuses directly to me at least 24 hours before the regularly scheduled exam will be eligible for a make-up exam. The make-up test will consist entirely of essay questions.

**iClickers**
We will use the iClicker response system in lecture this semester. This technology will provide you (and us!) with valuable feedback about what you know and don’t know and help promote better learning and 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 have two options for participating using iClicker: 1) you can use an iClicker 2 Student Remote (for sale at the UM Bookstore; 2) You can use the iClicker Reef App on your smart device (iphone, Android, tablet or laptop).

If you choose to use iClicker Reef, follow [this link](#) to create your own account. NOTE: 1.Use your [University of Montana email](#) when creating your account, and [add your 790 number as your student ID](#), this will help ensure your participation is recorded accurately. 2. Once you have created your account, you will want to add the course by clicking the + icon to start a course search for **BIOB 160N: Principles of Living Systems at the University of Montana**.

If you don’t own a smart device, you can use an iClicker2 Student Remote or iClicker + Remote to participate. iClicker Remotes are available for purchase at the Bookstore. NOTE: Register your iClicker Remote ID (8 digit number found on the back) to record your participation in class. It's easy to do in UM Online: sign in to the course Moodle page and go to ‘Dashboard.’ In the lower left part of the page, follow the link for iClicker student registration.

Note that you may not bring a friend’s iClicker to class and answer questions for him/her. This will consider this cheating, and if we see you do this it will be a serious violation of the Student Conduct Code ([Student Conduct Code](#)).

**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.

**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](#).
Dissability Services
The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. We are happy to work with you and DSS to provide appropriate accommodations for your learning and testing.

Computers
The Division of Biological Sciences maintains a computer lab dedicated for 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 in 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.

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.

Classroom Behavior
You must conduct yourself as a responsible, courteous adult. Disruptive or distracting behavior such as talking, sending or receiving cell phone messages, including text messages, reading the newspaper, and eating, will not be permitted.