BIO 101 (01)
CONCEPTS OF BIOLOGY, SPRING 2019

Macromolecules – organelles (chloroplast) – cells - organisms

Instructor: Dr. Diana I. Ortiz
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Lecture: HSC 150 - MWF 9:20-10:20 am
Lab: HSC 316 - Mon, 2:00-5:00 pm

Office hours: Wed/Fri 2-3:00 pm, Thu 10am-12 noon
OR other times by appointment: simply email, call or ask me for a time that will work for you. The sole purpose of making an appointment is to make sure that I will be in my office at the time you can meet with me.

OVERVIEW
This course is an exploration of biological organisms and how they function. We will learn about how organisms work from a molecular and cellular level all the way up to an organismic level. We will discuss current scientific theories and current technologies in biology, their biological basis and the ethical issues that surround them. This course also explores the scientific method and will allow you to practice your deductive and critical thinking skills. You will learn how to make observations, formulate hypotheses, design experiments, and analyze your own data. Scientific knowledge is based on observation and curiosity.

Course lectures are designed to supplement the textbook and each lecture is prepared with the expectation that you have read the material before class. As students, you should come to class prepared and expect to ask and answer questions.

COURSE OBJECTIVES
By the end of this course students should be able to,

- Demonstrate their understanding of the organization of scientific literature and their ability to read, interpret and present primary articles (assessed through a literature lab worksheet and a journal club presentation)
- Demonstrate an understanding of key concepts in biology, and an ability to explain them clearly in writing (assessed through exams and in-class exercises)
- Demonstrate an ability to carry out experiments, collect data, analyze data and draw conclusions (assessed through lab worksheets)
- Demonstrate an ability to summarize information and discuss ethical issues surrounding new biotechnology initiatives (assessed through class discussion and a review article)

REQUIRED MATERIALS

✓ Lab manual: There is no formal laboratory manual for this class. Each new lab exercise handout will be Available on Desire-To-Learn (D2L) prior to each new lab unless otherwise indicated.

CLASS STRUCTURE
Each week there will be three one-hour sessions of lecture. You are required to bring each of the following to lectures: course textbook and your class notebook for lecture notes. Use of cell phones and laptops/tablets
will be permitted in class only for research purposes. Their use for recreational purposes during class is strictly prohibited.

**Course readings, lecture notes, and note-taking:** The readings for each lecture will come primarily from the textbook (indicated in the course schedule below). PowerPoint slides for lectures will be available in DL2 and typically will be posted prior to the lecture period. PowerPoint files are meant for you to use as guides only, and it is strongly recommended that you record your own notes during class. It is also important to note that the PowerPoint presentations are "living documents"; content maybe modified after posting into D2L to improve instruction of the topic. Do not depend on these PowerPoint files only to study for this course. These slides should provide a framework for your notes and should relieve some of the pressure of having to write down absolutely everything or test your artistic or diagrammatic skills. However, these slides are NOT "the complete package" of material you will need to understand and apply. You should anticipate supplementing the information on the slides with your own note-taking. Though you are welcome to use your computer for note-taking, significant research indicates that taking notes by hand is more effective in retaining information (see link) even if you diligently stay away from distractions on the computer.

**Class Participation:** Students are expected to participate in class discussions, questions, and activities. Throughout the lectures, questions may be asked randomly to individuals. Come prepared to answer questions and actively use your textbook and/or online internet resources.

**BIO 101 course pages on D2L:** Much of the material for this course can be obtained from the textbook, the lecture, PowerPoint presentations, lab handouts, required readings, and D2L course page. Students are expected to download and print off material, such as syllabus, lab handouts, and specific guidelines or assignments. Other course information (i.e. quizzes) will be available on the course D2L site. Students are expected to check their email each day to receive course updates and announcements.

**Pre-Exam Quizzes:** The purpose of pre-exam quizzes is to prepare students for the upcoming exam by answering questions and/or exercises pertinent to material that will be included in the exam. The quizzes will be posted for two weeks on D2L; your instructor will be sending an email with a notification that the quiz has been posted. Students will have two opportunities to take the quiz; the highest score will be kept. After the two weeks, access to the quiz will be automatically blocked. Not taking the quiz may result in a zero (0) score, unless you provide a reasonable excuse (i.e. medical emergency) for missing the quiz. If no reasonable excuse is presented, the instructor reserves the right to provide a make-up quiz, which may be administered at a later date. The quiz will be discussed the day it is due during class.

**Exams:** There will be 3 exams (75, 100, and 100 points, respectively) throughout the semester and a 4th/comprehensive final exam. The final exam (140 points) will be administered on the date set by the final exam period and in the same room where we meet for lectures (see schedule below). Exams will contain a mixture of multiple choice, short-answer or problem-solving questions, matches, true or false, pictures, and/or diagrams. Students are strongly encouraged to ask the instructor questions regarding the course material that will be included in the exam. Attendance to exams is required.

**Laboratory Exercises:** The best way to learn the process of scientific inquiry is by doing scientific inquiry - a "hands on" approach to active/experiential learning. A number of the laboratory exercises in this course are based on the "inquiry method" as opposed to "cookbook science". The inquiry method requires you, the student, to make observations or identify problems, propose one or more hypotheses, design experiments, analyze and evaluate the data, and then draw conclusions. All handouts will be posted on the course website (D2L) and should be printed and read BEFORE the lab session (unless otherwise indicated). Quizzes will be administered before starting each module (see schedule below). Please bring to the lab along your lab notebook, the lab handout, and your laptop/tablet or cell phone (for research only).

**Research Presentation:** As a culminating lab project, students will be working on a research study and will be producing a final presentation report in front of their peers. Lab 10 "Measuring Soil Invertebrate Diversity" will be the subject of your research presentation. Guidelines and suggestions for the report will be posted in D2L. Research studies require significant amounts of background research before preparing a report. Also, raw data needs to be "processed" (converted into tables, graphs, etc.). Preparation for this laboratory exercise must be included in your report, along with an introduction, methods, results, observations, calculations, etc. Drafts by sections will be also submitted (see lab schedule below). Comments and suggestions given by your
instructor on the section drafts will allow you to revise and improve your final submission. The final research article must be submitted to the instructor via D2L by the date listed on the syllabus.

**Biology-in-the-News (BIN) articles and lab presentation:** You will pick an article from a list of websites, provided by your professor, that focus on the field of biology, environmental science, or medicine and write a review of the article. Your article will address the science behind the topic or technology, its uses, and the ethical implications of using it. Your instructor will give you guidelines for writing your article. During the semester, you will be presenting your article (using PowerPoint) presentation to the rest of the class. You will be provided with some guidelines on how to do a biology presentation earlier in the semester.

**Journal Club Presentation:** Before and during Lab 4 (see schedule below), you will learn to read and interpret a primary research article of your choosing (articles will be provided by the instructor). You and your lab partner give a presentation about your chosen article to the rest of the class.

**Biology Seminar:** You will be required to attend one (1) biology seminar (biology, molecular biology, or environmental science) during the semester. You are also required to write a short summary and critique of the seminar, and submit it to D2L for grading within one week of your attendance. Your instructor will be posting a list of seminar presenters on D2L at the beginning of the semester. Seminars are held at 11:40 AM on scheduled Fridays at the new Dietz-Sullivan conference room (Hoyt Room 101).

Guidelines for the proper submission of the report will be posted on the course’s D2L site under the folder “Guidelines”. One week (7 days) after the seminar, your instructor will not accept a report submission from the previous seminar (checked via D2L submission date/time stamp). An optional 2nd seminar report may be submitted for extra credit.

**Biology URAC Poster:** Students are required to attend two (2) research posters or oral presentations in biology or molecular biology during the Undergraduate Research and Arts Celebration (URAC) on April 24, 2019 (Wed) and write a brief synopsis (or review) of each poster. Both reviews need to be submitted to the course’s D2L site by May 1, 2018 by 5:00 pm. Guidelines for the proper submission of each report will be posted on the course’s D2L site under the folder “Guidelines”. An optional 3rd poster report may be submitted for extra credit.

### COURSE POLICIES AND EXPECTATIONS

**Class and E-mail Etiquette:** The field of biology deals sometimes with controversial issues from multiple perspectives and consideration of these issues may cause disagreements and/or evoke strong personal feelings, depending on our individual experience, history, identity and worldviews. Therefore, in all interactions and communications, course participants are expected to exhibit mutual respect and tolerance for one another and for any course guests and members of the community with whom we come into contact. If you feel you have been offended by any content or interactions, you are strongly encouraged to discuss this with your instructor in private.

Email is the best way to reach your instructor. In the spirit of promoting a healthy work-life balance, please keep in mind the following email etiquette guidelines: (1) indicate the course in the subject line and topic (e.g. BIO 201 Lab worksheet question), (2) use proper grammar/punctuation, (3) expect responses Monday-Friday between 9:00am and 5:00pm, with at least a 24-48 hour time lag, and (4) always check the syllabus or D2L before asking any course-related questions. Not following these guidelines may result in a delay in responding to your email.

**Grading:** Due to the high amount of course material that will be graded by the instructor throughout the semester (ex. exams, lab handouts, etc.;), expect the grading process to take between 7-14 days after the due date. Throughout the semester it is possible that unexpected situations could occur, such as instructor’s illness, emergency travel or meetings, which could delay grading. Please allow your instructor this time period to complete grading.

**Class Attendance:** There is a strong correlation between classes/labs missed by students and their grades; the more classes missed, the lower their scores. It is expected that students will attend class on-time and regularly. Your instructor will be recording attendance for each course session on D2L. There is a significant amount of material covered in this course and your overall success in learning the material largely depends
on your attendance. Lectures may not follow the text exactly. Your instructor will be more generous with grading for students who have attended lectures consistently, especially if they also ask questions and participate in discussion. Unexcused absences from class will have a major impact on your final grade in the form of:

- 3 unexcused absences = subtraction of 30 points from overall final score and advisor’s notification
- 5 unexcused absences = subtraction of 50 points from overall final score and advisor’s notification
- 6 or more unexcused absences = subtraction of 70 points from overall final score and advisor’s notification

Sleeping or texting in class will not be tolerated and maybe be considered a class absence. You are responsible for any material covered if absent from class regardless of the reason. If you have questions and need help regarding material missed during an absence, you need to talk to your instructor before/after class or arrange an appointment to discuss the material during office hours. However, it is important to understand that your instructor will not repeat the entire lecture and can only be of help if you have read the material before the meeting.

**Exam attendance:** Students are required to attend all scheduled exams. Taking an exam outside of class will only be allowed under extraordinary circumstances and in accordance with Westminster College policy (see Undergraduate Catalogue). If you know ahead of time that you cannot make a scheduled exam (e.g. sporting event, funeral) you MUST notify your instructor in advance in writing via email. All requests to make up an exam must be made BEFORE the exam, even if you are sick the day of the exam. If you are experiencing a medical emergency immediately before an exam, you may contact your instructor as soon as the emergency has passed. In addition, if you are ill the day of the exam or lab, you must provide a doctor’s note within 24 hours of your return to campus. The make-up exam must be taken within 72 hours of your return to campus. All requests will be honored at your instructor’s discretion.

**Lab attendance:** Attendance is mandatory to the laboratory. If you have an unexcused absence, 10% from your total notebook points will be deducted from your notebook. If you have two (2) unexcused absences from lab, and additional 10% from your total notebook points will be deducted from your notebook. Excused absences from lab follow Westminster College policy (documented illness, family emergency, WC-sponsored event, etc.). If you have an excused absence from lab, you must contact your instructor before the absence to make arrangements. If you are experiencing a medical emergency immediately before a lab, you may contact your instructor as soon as the emergency has passed. Requests to re-schedule missed lab made within 48-72 hours after the emergency has passed will be honored. However, due to the research-based nature of the labs, most missed lab assignments cannot be made up at a later date. If you are working with other members of your class on a laboratory/field experiment, you are responsible for maintaining frequent contact with your classmates regarding the material and tasks assigned.

**Assignment responsibility:** The ability to meet and manage work deadlines in light of other responsibilities is a critical component of professionalism. Late work will incur a 5% per day penalty. No late work will be accepted five (5) days after the assignment deadline, unless arranged privately with the professor. All submitted assessments should represent the individual student's efforts, unless they are performed as teams. Students are encouraged to discuss or work on assignments with classmates, but the written tasks should be completed independently. Past due assignments will not be accepted unless a reasonable excuse is presented.

**Accessibility Statement:** Westminster College actively strives for the full inclusion of all our students. Students with disabilities who require access solutions for environmental or curricular barriers should contact Faith Craig, Director of Disability Resources, located in 209 Thompson-Clark Hall, phone: 724-946-7192, email: craigfa@westminster.edu. Students requiring disability accommodations must meet with the instructor in person within 1 week of the start of the semester and provide documentation (both hard & electronic copies).

**Academic Integrity:** No form of academic dishonesty will be tolerated. Students enrolled in this course are expected to abide by the “Academic Integrity Undergraduate Pledge”. The definitions and penalties for violations of academic integrity apply to this course (see Westminster College Undergraduate Catalog).

Plagiarism includes but is not limited to: extensive quoting, paraphrasing or copying, from any other source; books, articles, websites, other students work or class material; incorrect or inadequate citation of quotes, data, ideas or images; directly copying experiments or research projects that have been developed by another student, or published by another researcher. Practice of plagiarism or any other form of academic
dishonesty will result in a grade of zero for the assignment and formal notification of the offense to the Dean of the College. Repeat violations of the integrity policy will result in a grade of F for the course and potentially, suspension and/or expulsion from the College. This is especially important when dealing with scientific writing. You are encouraged to work together and discuss your assignments and reports with your colleagues, but all written assignments must be your own work. Quotes, data, photographs or ideas taken from another source must be cited correctly at all times. You will be given guidelines on how to do this, but if you have any doubts – YOU MUST ASK. Written reports and assignments will be scrutinized regularly using turnitin.com, which compares submitted work against and existing database.

**ASSESSMENT POINTS**

<table>
<thead>
<tr>
<th>Activity</th>
<th>*Points (%)</th>
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<tbody>
<tr>
<td><strong>Class</strong></td>
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<tr>
<td>Exams 1-3</td>
<td>275 (28%)</td>
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<tr>
<td>Final Exam</td>
<td>150 (14%)</td>
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<tr>
<td>Pre-exam Quizzes (4)</td>
<td>75 (6.6%)</td>
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<tr>
<td>Biology Seminar Report (1)</td>
<td>20 (2%)</td>
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<tr>
<td>URAC Poster/Presentation Reports (2)</td>
<td>20 (2%)</td>
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<tr>
<td>Class Participation</td>
<td>40 (4%)</td>
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<tr>
<td><strong>Laboratory</strong></td>
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<tr>
<td>Lab worksheets (9)</td>
<td>180 (18%)</td>
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<tr>
<td>Lab quizzes (9)</td>
<td>70 (8%)</td>
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<tr>
<td>Journal Club pres. (Lab 4)</td>
<td>20 (2%)</td>
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<tr>
<td>BIN Review Article/Pres.</td>
<td>40 (4%)</td>
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<td><strong>Lab Research project</strong></td>
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<tr>
<td>Proposal</td>
<td>10 (1%)</td>
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<tr>
<td>Final lab project report draft</td>
<td>30 (3%)</td>
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<tr>
<td>Final project report</td>
<td>40 (4%)</td>
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<tr>
<td>Final project presentation</td>
<td>30 (3%)</td>
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<tr>
<td><strong>Bonus</strong></td>
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<tr>
<td>Lab Safety Quiz (1)</td>
<td>10 (1%)</td>
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<tr>
<td>Biology Seminar Reports (1)</td>
<td>10 (1%)</td>
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<tr>
<td>URAC Poster/Presentation Reports (1)</td>
<td>10 (1%)</td>
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<tr>
<td>Course evaluation (1)</td>
<td>10 (1%)</td>
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<td><strong>Total</strong></td>
<td>1000</td>
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*Bonus points will be available but optional to all students in the course; these points will not be part of the total points (denominator) and will be included in the final grade calculation.

**COURSE SCHEDULE**

<table>
<thead>
<tr>
<th>DATE</th>
<th>CHAPTERS/TOPICS</th>
<th>EVENT</th>
<th>LAB (Mondays)</th>
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<tbody>
<tr>
<td>Jan/14 (M)</td>
<td>Ch. 1: Introduction</td>
<td></td>
<td>Pre-Exam Quiz 1 (F)</td>
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<tr>
<td>Jan/16 (W)</td>
<td>Ch. 1; Ch. 2: Life’s Chem. Basis</td>
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<tr>
<td>Jan/18 (F)</td>
<td>Ch. 2; Ch. 3: Molecules of Life</td>
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<tr>
<td>Jan/21 (M)</td>
<td><strong>Holiday – No Class</strong></td>
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<tr>
<td>Jan/23 (W)</td>
<td>Ch. 3: Molecules of Life</td>
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<tr>
<td>Jan/25 (F)</td>
<td>Ch. 3, Ch. 4: Cell Structure</td>
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<tr>
<td>Jan/28 (M)</td>
<td>Ch. 4: Cell Structure</td>
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<td>Lab 2: Scientific reporting, and literature, data analysis (Lab Quiz 2) <strong>(at Computer Lab)</strong> Preparing for Lab 4</td>
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<tr>
<td>Jan/30 (W)</td>
<td>Ch. 4, Ch. 5: Metabolism</td>
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<tr>
<td>Feb/1 (F)</td>
<td>Ch. 5: Metabolism</td>
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<tr>
<td>Feb/4 (M)</td>
<td>Ch. 5, Ch. 6: Photosynthesis</td>
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<td>Lab 3: Exploring enzyme function (Lab Quiz 3);</td>
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<td>Feb/6 (W)</td>
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<td>Feb/8 (F)</td>
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<td>Date</td>
<td>Details</td>
<td>Location/Notes</td>
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| **Feb/11 (M)** | Ch. 7: Cell Respiration  
Ch. 7, Ch. 8: DNA structure/function  
Ch. 8: DNA structure/function | Pre-Exam Quiz 2 (F)  
Lab 4: Journal Club articles and presentations **(at Computer Lab)** |
| **Feb/13 (W)** | Ch. 8, Ch. 9: DNA to Protein  
Ch. 9: DNA to Protein  
Ch. 9, Ch. 11: Mitosis | Lab 6a: ID of environmental bacteria (field work) (Lab Quiz 5) |
| **Feb/18 (M)** | Ch. 11: Mitosis  
Ch. 11, Ch. 12: Meiosis  
Ch. 12: Ch. 13: Mendelian genetics | Lab 6b: ID of environmental bacteria (lab work) |
| **Feb/22 (F)** | -  
Ch. 13: Mendelian genetics  
Ch. 13, Ch. 14: Human inheritance | EXAM 2 (M)  
Lab 5a: ID of GMOs using PCR (Lab Quiz 4) |
| **Mar/11 (F)** | -  
Ch. 13: Mendelian genetics  
Ch. 13, Ch. 14: Human inheritance | Mid-Semester Survey |
| **Mar/18 (M)** | Ch. 14: Human inheritance  
Ch. 14, Ch. 16: Evidence of evolution  
Ch. 16: Evidence of evolution | Pre-Exam Quiz 3 (F)  
Lab 5b: ID of GMOs using PCR |
| **Mar/22 (F)** | Ch. 16, Ch. 17: Processes of evolution  
Ch. 17: Processes of evolution  
Ch. 17, Ch. 43: The Biosphere | Lab 7: Microscopy and mitosis (Lab Quiz 6) (BIN 1 report, 2) |
| **Apr/1 (M)** | Ch. 43: The Biosphere (doc)  
Ch. 43: The Biosphere (doc)  
Ch. 40: Population Ecology | Lab 8: Evolution of finches (Lab Quiz 7); Introduction to final project for Lab 10 (BIN 2 report, 2) |
| **Apr/5 (F)** | -  
Ch. 40: Population Ecology  
-  
No Class | EXAM 3 (M)  
Lab 9: The changing dynamics of human populations (Lab Quiz 8); **(at Computer Lab) (BIN 3 report, 2) |
| **Apr/10 (W)** | Ch. 40: Population Ecology  
Ch. 41: Community ecology -  
No Class | Pre-Exam Quiz 4 (Th)  
EASTER BREAK (F)  
Lab 10a: Measuring Soil Invertebrate Diversity (research project, lab work) (Lab Quiz 9) (BIN 4 report, 2) |
| **Apr/12 (F)** | Ch. 40: Population Ecology  
Ch. 41: Community ecology -  
No Class | EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |
| **Apr/15 (M)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | Lab 12: Measuring Soil Invertebrate Diversity, Project Presentations (Rm. TBA) |
| **Apr/17 (W)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | -  
EASTER BREAK (F)  
Lab 10a: Measuring Soil Invertebrate Diversity (research project, lab work) (Lab Quiz 9) (BIN 4 report, 2) |
| **Apr/19 (F)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | Lab 12: Measuring Soil Invertebrate Diversity, Project Presentations (Rm. TBA) |
| **Apr/22 (M)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | -  
EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |
| **Apr/23 (Tu)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | -  
EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |
| **Apr/24 (W)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | -  
EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |
| **Apr/26 (F)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | -  
EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |
| **Apr/29 (M)** | Ch. 42: Ecosystems  
Ch. 41, Ch. 42: Ecosystems | -  
EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |
| **May/1 (W)** | Ch. 42, Ch. 44: Human effects on the Biosphere  
CH. 44: Human effects on the Biosphere | Lab 12: Measuring Soil Invertebrate Diversity, Project Presentations (Rm. TBA) |
| **May/3 (F)** | Ch. 42, Ch. 44: Human effects on the Biosphere | -  
EASTER BREAK (M)  
URAC (W)  
Lab 10b: Measuring Soil Invertebrate Diversity (research project, lab work) (draft of presentation due on Thursday) (BIN 5 report, 2) |

*This schedule, topics, and syllabus content are tentative; topics included on each exam are subject to change.  
**Computer Lab Room HSC 291 has been already reserved.