2014

162-02/04 General Biology II

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General Biology II (BIOL 162)  
Section 02: T, TH 10:00 to 11:15 Albers 103  
Section 04: T, TH 2:30 to 3:45 Albers 103  
F 1:00 to 1:50 in TBA

Spring 2014

Instructor: Ann M. Ray, Ph.D.  
Office: Albers 03  
Phone: 745-2054  
Office hours: T, Th 1-2 pm  
Email: raya6@xavier.edu  
And BY APPOINTMENT

Course Description
General Biology II is the second half of a two-semester series in introductory biology for science majors. This semester, we will focus on the evolution, ecology, behavior, diversity, and conservation of organisms. A passing grade in General Biology I (BIOL 160) or equivalent transfer credit is an expectation for this course.

Course Goals
Your goal for this course is to learn as much biology as possible, by preparing for and attending class, and by using the study resources available to you. I trust you to work hard and seek help when you need it. I ask you to make a commitment to this class and to achieving the goals of the course.

My goal for this course is to facilitate your learning. I will define, explain, and apply the material; I will help you to practice and I will point out common pitfalls. I will give you timely feedback and I will answer questions. I have great confidence in your abilities and I am committed to your success.

The goal of the biology department is for you to obtain a thorough understanding of fundamental biological concepts that you will use in the further study of biology or related fields. The other instructors in the biology department will expect to build on what you learn this semester.

NSTA SCIENCE STANDARDS- Satisfies 1e

Textbook
Campbell BIOLOGY- 9th ed., Reece et al.

Some people like textbooks. Some people don’t like textbooks. I don’t make any money at all from the sale of this book, so it doesn’t matter to me one bit whether you buy it or not. You may use an older version of Campbell Biology if you would like. You may use ANY BIOLOGY TEXTBOOK published in the last 5 years if you would like. General biology is general biology and most of the information is the same (with the exception of the taxonomy of bacteria, protists, and fungi, which changes frequently due to advances in molecular phylogenetics, etc.). Obviously, the chapter and page numbers will not be the same as the chapters and page numbers in Campbell 9th ed. and we will follow the taxonomy listed in Campbell.

Purchases made at the university bookstore benefit YOU and the Xavier community. Thus, I do encourage you to purchase your textbooks and other course materials through our campus bookstore.

Online Resources
You can access Canvas through the MYXU portal. Test scores and announcements will also be posted here. Do not attempt to calculate your grade based on the point totals listed on Canvas. I will post an Excel document showing you how to calculate your final grade. I will use Canvas to post lecture PowerPoints after lecture. The PowerPoints and the lecture outlines are your study guides.

As part of the continued transition between high school and college, I will not post lecture outlines or practice tests this semester. Professors in upper-level biology classes will expect that you can create study resources for yourself, so it is important for you to develop your skills as note-takers and effective readers.
We will use Mastering Biology again this semester for homework assignments (see below).

Class attendance
I expect you to attend class. If you don’t attend class, you can’t engage with your peers, and you can’t participate in class activities. THERE ARE NO MAKEUP POINTS/ASSIGNMENTS FOR IN CLASS ACTIVITIES. For most classes, you should also plan to attend the ENTIRE class, and not leave early because you are bored or need a coffee break. Of course, you may always leave during emergencies (vomiting, other body fluid emergencies, to get a quick drink of water at the fountain closest to the classroom, emergency phone calls from spouses, parents, children). You do not need to ask me permission to leave class. If you have a medical condition that requires that you leave class regularly, please let me know.

Athletes will be excused on travel dates, with documentation.

In off chance that the 45 points for in class assignments is not enough incentive for you to attend class, I reserve the right to deduct up to 10 points from your final grade in the case of truly egregious absences. Deductions for attendance violations and what constitutes an egregious number of absences are solely at my discretion.

Regular attendance for the full duration of class earns you special privileges and special treatment, such as ability to take an exam early (even if you don’t have a genuine excuse), and rounding up if your final course grade lands between letter grades. If you do not attend (the full duration of) class regularly, you do not earn special treatment.

I also expect you to be respectful of your peers and of me. Don’t socialize during class. Turn your cell phone to silent. Avoid texting, Snapchat, looking at Tumblr, or otherwise browsing the internet. If you are holding your phone in front of your face and scrolling with your thumb, or smiling at your crotch, I know you are not doing something related to the class. The only acceptable uses of wireless-enabled devices are to take notes, look up supporting materials, or to make sound recordings of the lecture. I reserve the right to ban technology that interferes with the learning environment.

If you have a major illness or other emergency that causes you to miss more than two or three days of class, you or your family should contact the associate dean’s office. The personnel there will send an official notice to all of your instructors. This is especially important for extended absences that might involve making up several exams. If you miss more than four consecutive classes without an excuse, I will notify the Office of Student Retention and your academic advisor.

Communication
I will communicate important information via class and email announcements. In class announcements are the primary means by which I will communicate. Thus, you must download lecture notes and check email to get announcements about schedule changes, homework assignments, pre-class assignments, and other information. I will expect that you check your Xavier email at least 2X per day.

This semester, I have a new policy regarding communication. If I have announced a due date/ test location/ change of date/ etc. in class, in electronic versions of the lecture, and/or via email, I will not respond to individual email requests for the same information. I will simply ignore your question. You then will know that you should check the lecture notes or your email for any answer to the question.

The reasons for this policy is that I spend a disproportionate amount of my time responding to emails from students who don’t attend class, or who come to class late or leave early, and who neither download notes nor check email. By responding to these individual emails, I reward poor behavior.

As always, I am happy to reply to questions from students who regularly attend class (see attendance section above).

Supplemental Instruction
The Learning Assistance Center (LAC) offers approved Supplemental Instruction (SI) General Biology study groups. SI groups have been shown to have a positive effect on achievement of students enrolled in this course. Please take advantage of this terrific (and free) resource!

This year’s SI leaders are: Adonis Hewari (Section 02); Alexzandra Rudinoff (Section 04)
Days, times & location: TBA

If you can’t make it to “my” SI sessions, please feel free to attend ANY SI session.

Accommodations
Anyone who feels he/she may need an academic accommodation based on the impact of a disability (e.g., sensory, learning, psychological, medical, mobility) should contact me to discuss your needs as soon as possible. I rely on the Disability Services Office for assistance in verifying your eligibility for academic accommodations related to your disability. If you have not previously contacted Disability Services, I encourage you to do so at 513-745-3280 on the Fifth Floor of the Conaton Learning Commons, Room 514 to coordinate reasonable accommodations.

If you are having psychosocial issues preventing you from achieving success in this class, you should seek qualified help. Campus resources include Res. Life, McGrath, the Veterans Center (for veterans), and psychological services via the counseling center. You should alert your academic advisor. Within reason, I am willing to accommodate psychosocial challenges, with appropriate documentation.

Academic Honesty
Science is collaborative, and seldom does any scientist work alone. You may and should work with others on homework and to study for exams, but make sure you are benefiting intellectually from the collaboration—not simply copying.

Otherwise the policy is simple: don’t cheat. Demonstrate integrity. The value of your education decreases whenever you or one of your peers cheats to earn grades or a degree. Cheating hurts other students and harms the reputation of the university. I put my heart and soul into my courses, and cheating insults me. It makes me want to quit my job and move into a camper van on a beach in Oregon. Therefore, the penalty for academic dishonesty in this course is a failing grade. Per university policy, academic dishonesty will be reported to the dean. It is your responsibility to acquaint yourself with what constitutes academic dishonesty.

To eliminate the appearance of cheating, all cell phones, computers, backpacks, and notes must be stored in the front of the room during exams. Headphones or earbuds are not allowed unless you have a documented disability that requires them. You may not leave the room for any reason during an exam—so please go potty and get a drink before the test begins.

If your study strategy involves writing answers on your hand, you should make sure that all answers are washed from your hand before you take your exam.

Test questions may not be photographed, scanned, or hand copied. Possession of an electronic copy of any exam (whether you made the original copy or not) is a violation of my policies on academic dishonesty. If I find that any student has an electronic copy of an exam, that student will receive a 0 for whatever exam is copied, will be reported to the dean, and may earn a failing grade in the course. Do not underestimate the power of the Xavier rumor mill, or the desire of upperclasspeople to see me get entertainingly mad.

Student athletes: I do my very best to accommodate your travel schedules and to ensure academic propriety at all times. However, sometimes I have a difficult time communicating my standards to your athletic advisors and coaches. If you believe that your academic integrity has been compromised, or if you feel that the conditions of the exam you were given on the road may have violated my policies on academic dishonesty/integrity, please let me know immediately. You will NOT be punished.
Auditors
If you earned a 4 or 5 on an AP Biology exam, you have credit for Gen Bio II and you may audit this course. I will implement the same policy as last semester: you may attend classes/complete homework or take the exams. Attendance will be recorded for auditors that select the class attendance option. If you have AP credit, please see the form called “Information for Auditors” under course documents on Blackboard. Please fill this form out and return to me by Jan. 21. It is YOUR responsibility to make sure that you are enrolled as an auditor.

Grading
Grades are an assessment of how you are developing your understanding of fundamental biological concepts (see Course Goals). Grades provide you with feedback that you can use to modify/improve your study habits while you are enrolled in the course. You can use your final grade to determine if you are prepared to continue in biology. Grades also allow people who do not know you to predict your ability to be successful in an academic environment (e.g. research internship, medical school, graduate school).

Your final grade will be determined using scores from exams, attendance in class, attendance at Friday sessions (and at mandatory sessions for first year students), and homework assignments.

Grading scale:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>100 pts</td>
</tr>
<tr>
<td>Test 2</td>
<td>100 pts</td>
</tr>
<tr>
<td>Test 3</td>
<td>100 pts</td>
</tr>
<tr>
<td>Test 4</td>
<td>100 pts</td>
</tr>
<tr>
<td>In class activities (weighted)</td>
<td>45 pts</td>
</tr>
<tr>
<td>Friday seminar attendance</td>
<td>50 pts</td>
</tr>
<tr>
<td>Homework</td>
<td>45 pts</td>
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<tr>
<td>Final Exam</td>
<td>200 pts</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Total</td>
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Exams
Exams will take place during the test time on Fridays at 1:00 in CLC 412. Exams will cover lectures, material from in-class presentations, any associated articles, and information from Friday sessions. The first exam will have several questions from this syllabus. The comprehensive final exam will not have questions about the syllabus. The tests will contain multiple choice or true/false questions.

You MUST correctly fill in your name and the first 9 digits of a memorable ID number and Test Form A on your Scantron sheet. This is extremely important. If you have a disability that makes it difficult to fill in long series of numbers on Scantron sheets, please see me. I WILL DEDUCT 4 POINTS FOR INCORRECTLY FILLED IN SCANTRON SHEETS.

Dates and point values for exams are listed in the schedule. Please note the dates of your exams NOW. Professors divide the semester into even sections to keep the amount of material in exams manageable. Instructors of other courses divide the semester equally as well, and as a result you will likely have multiple exams within a short period of time.

A word on test format: Multiple-choice tests are just one method (among many) to assess learning. Multiple-choice exams have their shortcomings, as do all assessment methods. Despite their faults, multiple-choice exams are gatekeepers for the future professions of most of the students in this course. The MCAT is required for entry into medical
school, the PCAT for pharmacy school, the DSAT for future dentists, the VCAT for veterinary college, the biology or chemistry GRE for future graduate students—these are all multiple-choice exams. Licensing exams for medical doctors (USMLE) and teachers (PRAXIS) and physical therapists (NPTE) and nurse practitioners (ANCC) are also composed of multiple-choice questions. It is my responsibility to test you in the way that you will be tested later. It is in your best interest to learn to take multiple-choice exams. This skill, as much as your grades, will determine if you get into the graduate or professional school, and later will determine if you obtain a license to practice what you have studied.

Exam reviews
Each exam will be available for review in my office during regular office hours (or by appointment) for two weeks after the date of the exam. After two weeks' time, exams will no longer be available for review. The department chair has now prohibited exam reviews in the bio office. The reasons for this are 1) the staff assistant cannot complete her work amid a constant stream of students in the office, 2) the staff assistant cannot police behavior of students, especially regarding academic dishonesty (e.g. use the use of electronic devices during reviews and copying of exam questions), and 3) end-of-semester exam reviews inspire frenzied and poor study habits, including cramming.

Photos and photocopying of exams are prohibited. You may make general notes about the questions. You may NOT use a computer, tablet, or any other device when reviewing your exam.

Possession of an electronic copy of any exam (whether you made the original copy or not) is a violation of my policies on academic dishonesty. Students found to be in possession of electronic copies will receive a 0 for whatever exam is copied, will be reported to the dean, and may earn a failing grade in the course.

Exam conflicts and make-up policies
If you know a week or more in advance that you will miss an exam because of a medical procedure, a religious observance, ROTC training, or other legitimate, documentable conflict, you make take the exam early. You must provide me with documentation (within reason). Vacations, basketball games, your mom/auntie/godmother/second cousin visiting or requesting that you travel to Chicago, your being tired, your ride to Toledo leaving early for Spring Break, fundraising for AB, SGA, CAC, CFJ, VOS, Take Back the Tap, or other such things are NOT legitimate reasons.

If you are an athlete and miss an exam because of a meet, you must take the exam before you leave, or I will provide a team official a copy of the exam for you to take on the road. Please contact your athletic advisor to schedule the exam on the road. All correspondence about conflict exams for athletes must go through athletic advisors (not coaches and not students). If I do not receive notification at least 48 hours in advance of your trip, you must make up the exam at the end of the semester. If you are an athletic trainer, you should also make arrangements to take the exam before you leave, or you will need to ask your supervisor to contact me for a copy of the exam to take on the road. Otherwise, you can make up the exam at the end of the semester.

All makeup exams will be given at the end of the semester, on the last Friday. If you miss an exam for any reason, you must email me as soon as possible to explain your absence. IF YOU DO NOT EMAIL ME WITHIN 24 HOURS OF THE EXAM, YOU WILL NOT BE ALLOWED TO MAKE UP THE EXAM AND YOU WILL RECEIVE A SCORE OF 0 FOR THAT EXAM. You will not be permitted to make up more than one exam at the end of the semester without a note from the associate dean.

If you miss the final exam with a suitable excuse, you will receive an Incomplete for the course. At the beginning of next semester, you must contact me within one week of the start of classes for a make-up exam. If you miss the final exam without a suitable excuse, or if you don’t contact me within one week of the start of classes next semester, your grade for that exam will be 0.

To reiterate my policy on conflicts with exams: if you have a legitimate, documentable conflict, athletic or otherwise, you make take the exam early. Athletes and persons operating within an official capacity in association with an athletic team have the option to take the exam while on the road. If you cannot take the exam early, you will have to take a make up exam at the end of the semester. You may not take more than one make-up exam at the end of the semester without a note from the associate dean.
**Homework: (15 assignments x 3 points = 45 points)**

Pre-class homework assignments will be posted within the Mastering Biology interactive website [www.masteringbiology.com](http://www.masteringbiology.com).

There will be 15 homework assignments. Each is worth 3 points, for a total of 45 points. For all homework assignments, you will get a % correct score; multiply by 3 to get your score for the assignment. Then, add together all points, divide by 45 and multiply by 100 to get your percentage. There are no dropped scores.

There will be one assignment per week and the assignments will be due each Tuesday at 10 am (except the first week [assignment due THURSDAY], the week of Spring Break, and the week of Easter)—there are no exceptions. You may complete the assignment after it is due for a 35% deduction in points per hour it is late. You should complete the assignments after you have skimmed the chapter (or an analogous chapter in another textbook). You may use your book and you may work with friends. The assignments will typically take between 30-45 minutes.

It has come to my attention that many students are using the internet to answer Mastering Biology questions. This is low-stakes cheating. Also, it doesn’t help you learn anything. I can’t police you at home, so whatever. Just know that I know this is happening. This problem has become so widespread that I may get rid of Mastering Bio...something seems wrong with paying $50 for an access code and looking up all the answers on the internet. It is paying for points. Sadly, what this means is that future students will not get the little grade boost that comes from MB assignments. This is why we can’t have nice things.

If you took Gen Bio I last semester, you will be able to log in using the same ID and password that you used last semester. If you took Gen Bio I or II prior to last semester, you should try to log in with your old ID and password, however, I cannot guarantee that your code is still active.

Buyer beware! The codes for Mastering Biology that are packaged with “international” or “global” editions of the textbook will not work for our course. If you wish to purchase a book online, I recommend that you purchase it without Mastering Biology and then purchase access to the software from the bookstore.

The course ID for Section 02 (10 am) is: RAYS2014SECTION2
The course ID for Section 04 (2:30 pm) is: SECTION04S2014RAY
I will deduct 20 points (!!) if you fail to enroll in the correct section of Mastering Biology. Improperly enrolled students cause massive problems with my grade book.

If you have technical problems with Mastering Biology, I cannot help you, no matter what anyone tells you. When I call Mastering Biology, I have to sit on hold for an hour just like you do, and then the technician asks me a bunch of questions that I can’t answer because I am not the one having trouble with Mastering Biology. Try these things, in this order:

1. Click on the support link at the bottom of the Mastering Biology page. Click on System Requirements. Make sure your system requirements match the required settings.
2. See the Xavier Help Desk
3. Call the numbers listed under “Help” on the software

It is YOUR responsibility to make sure that you have access to Mastering Biology from the beginning of the semester and that you complete your assignments on time. I will not give ANY extensions because your access code is in the mail or you are trying to learn to use your computer. It is time to be adults. The only exception will be for students on the GI Bill who are experiencing delays in tuition payments.

**Attendance at Friday sessions (50 points):**

Every student will be required to attend five Friday sessions, each session will be worth ten points. Attendance will be recorded. All first year students will be required to attend two MANDATORY sessions one February 7 & 14 (these can
count as two of your five sessions). First year students who fail to attend the mandatory sessions without a documented excuse will lose 20 points from their Friday attendance grade (there is a reason that we want you to attend). Second year students (especially major-changers) may attend these sessions, however upperclasspersons will receive little benefit from these two group advising sessions. Information presented in Friday sessions are fair game for the exams, so I encourage you to attend whenever possible. You must sign the attendance sheet to earn attendance points.

**In class activities (45 points—weighted score):**
(To calculate—determine the percent of available points you earned, then multiply that percentage [decimal] by 45)

We will start most class meetings with a short assignment. The assignment may be a short written response, a reflection, a short worksheet, a mini-quiz, or a group activity. These activities will start PROMPTLY at the beginning of class and will take 5 minutes or less to complete. If you are late to class, you will miss the assignment. The assignment may be based on an article, podcast, video, the textbook, or other material. You will be expected to partake of this material prior to class. If you are not present, you will not be able to complete the assignment. No makeup work will be available. I will drop the lowest two assignment scores (use your dropped assignments carefully).

Responses will be graded on a 5-point scale.

0=absent or didn’t turn in work, no name
1=present and with a pulse, but response has nothing to do with the material
2=Response is tangentially related to material
3=Response is related to the material, but doesn’t address the prompt
4=Response partially addresses the prompt
5=Response fully addresses the prompt

**Strategies for Success:**
Successful performance in this course will require a large amount of factual memorization, but most importantly, conceptual understanding, as manifested by the synthesis and application of knowledge to solve problems.

- **Before Class:** Get “big picture” in preparation to understand the lecture.
  1. Skim and/or read the chapter in the textbook.
  2. Watch the animations posted on Blackboard for the chapter (if any). Find other animations on YouTube, if needed.
  3. Complete the Mastering Biology assignment.

- **During Class:** Actively listen and participate to connect concepts.
  1. Take thorough notes. Take notes as if you were taking them for a best friend who was solely dependent upon the information you write down to be successful. If you are unsure about your note-taking abilities, compare notes with your peers. Do your notes look like your friend’s notes? What are you missing?
  2. Make a sound recording of the lecture if necessary.
  3. Try to ask conceptual or higher level questions in class.
  4. Try to make connections between previous and current information.

- **After Class:** Assess your understanding.
  1. Review your notes the same day. Make notes in the margin concerning information that is unclear.
  2. Obtain clarification of unclear information from the book, a peer, SI leader, tutor, professor, or any other reliable resource.
  3. Re-write your notes or make flash cards (if this is helpful for you).
  4. I highly recommend forming a study group, especially if you did not do as well as you would have liked in Gen Bio I. However, you should make sure that you prepare beforehand and stay mostly on task (e.g. talking about biology>flirting/gossiping).
  5. Solve problems to assess your understanding. The “Study Area” of Mastering Biology is exceptional.
  6. Attend Supplemental Instruction on a regular basis. Enlist the help of a LAC tutor if needed.
ASK FOR HELP. It is much easier to turn your grades around in February than in April. There is no extra credit at the end of the semester.

**Tentative course schedule** (Subject to change).

<table>
<thead>
<tr>
<th>Week of</th>
<th>Chapter(s)</th>
<th>Subject</th>
<th>Tentative Friday Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN 13</td>
<td>22 &amp; 23</td>
<td>Introduction to Evolution Mastering Biology Assignment 1 due Thursday at 10 AM!</td>
<td>New Year’s Resolutions  <em>Want to do better this semester? Review strategies for success in science classes.</em>  <em>(No attendance taken; no requirements satisfied: this one has to be just for you)</em></td>
</tr>
<tr>
<td>20</td>
<td>23 &amp; 24</td>
<td>Evolution of Populations</td>
<td>The Fundamental Interconnectedness of All Things  <em>Species invaders — Dr. Blair  Lessons for human present in human past — Dr. Smythe</em></td>
</tr>
<tr>
<td>27</td>
<td>24 &amp; 25</td>
<td>Origin of species/History of Life</td>
<td><strong>Test 1</strong> Friday (Jan 31) 100 points</td>
</tr>
<tr>
<td>FEB 3</td>
<td>52 &amp; 53</td>
<td>Ecology</td>
<td>Your Four-Year Plan, Part I: MANDATORY FOR ALL FRESHMEN  <em>Learn about the core curriculum and major requirements, common minors, GPA</em></td>
</tr>
<tr>
<td>10</td>
<td>53 &amp; 54</td>
<td>Population &amp; Community Ecology</td>
<td>Your Four-Year Plan, Part II: MANDATORY FOR ALL FRESHMAN  <em>Continue working on your four-year plan</em></td>
</tr>
<tr>
<td>17</td>
<td>51</td>
<td>Animal Behavior</td>
<td><strong>Test 2</strong> Friday (Feb 21) 100 points</td>
</tr>
<tr>
<td>24</td>
<td>26 &amp; 27</td>
<td>Phylogenetics &amp; Prokaryotes</td>
<td>Evolution Revolution  <em>Paleontology: ancient carnivores — Dr. Anyonge  The placental fortress and global health — Dr. Robbins</em></td>
</tr>
<tr>
<td>MAR 3</td>
<td>No class</td>
<td>SPRING BREAK!</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>28</td>
<td>Protists</td>
<td>Upperclassmen Panel  <em>Advice from seniors: what they did, what they wish they did</em></td>
</tr>
<tr>
<td>17</td>
<td>32 &amp; 33</td>
<td>Animals</td>
<td><strong>Test 3</strong> Friday (March 21) 100 points</td>
</tr>
<tr>
<td>24</td>
<td>33</td>
<td>Invertebrates</td>
<td>Vector Ecology: West Nile in the Wetlands  <em>Dr. Mollie McIntosh and research students</em></td>
</tr>
<tr>
<td>31</td>
<td>34</td>
<td>Vertebrates</td>
<td>Conservation Biology  <em>Ecological and behavioral studies of birds — Dr. Farnsworth  Can manatees be saved? — Dr. Grossman</em></td>
</tr>
<tr>
<td>APR 7</td>
<td>31</td>
<td>Fungi</td>
<td><strong>Test 4</strong> Friday (April 11) 100 points</td>
</tr>
<tr>
<td>14</td>
<td>29</td>
<td>Plants</td>
<td>Final withdrawal date: April 14  <strong>Happy Easter</strong> (no class Thursday, Friday)</td>
</tr>
<tr>
<td>21</td>
<td>35 &amp; 30</td>
<td>More Plants</td>
<td>Pesterig the Pests  <em>Eavesdropping on plant conversations — Dr. Morris  How to quarantine an insect — Dr. Ray</em></td>
</tr>
<tr>
<td>28</td>
<td>56</td>
<td>Conservation Biology</td>
<td>TBA; Makeup exams</td>
</tr>
</tbody>
</table>
I reserve the right to make changes to this syllabus.

Course Goals
When you are finished with this course, you should be able to:

- describe the progression of evolutionary thought from Aristotle to Darwin, including the contributions of Lamarck, Cuvier, Lyell, Wallace, Linnaeus, Malthus, and others
- describe the events in or of the life of Charles Darwin that contributed to the theory of evolution as first described in *The Origin of Species*
- define catastrophism, Lamarckism, the “Chain of Being,” and natural selection
- describe the lines of evidence that support the Theory of Evolution
- distinguish between a scientific theory and the colloquial use of the word “theory”
- use the Hardy Weinburg (binomial) equation to solve problems relating to populations
- define Hardy Weinburg Equilibrium and list the assumptions
- identify violations of HWE in real situations
- describe types of selection (diversifying, stabilizing, sexual, etc.), and apply these concepts to real situations
- describe processes of micro and macroevolution
- define a population and distinguish it from a species and a community
- define sympatry and allopatry
- explain Linnaean rankings and apply evolutionary concepts to real examples
- state the approximate age of the Earth and the describe the lines of evidence that support the age of the Earth
- list the geological eras and the approximate dates for each era, and relate these eras to the origins of life
- describe types of fossils and how fossils inform evolutionary thought
- explain binomial nomenclature and correctly apply the rules of binomial nomenclature to real examples
- define and distinguish between the terms monophyletic, clade, phylogeny, taxonomy, paraphyletic, polyphyletic
- interpret a phylogenetic tree
- distinguish between the three Domains of life
- list the defining characteristics of the Domain Eubacteria and the major taxonomic divisions of bacteria
- explain the economical and ecological significance of bacteria
- list the defining characteristics of the “Kingdom” Protista and the major taxonomic divisions of protists
- explain the economical and ecological significance of protists
- list the defining characteristics of the Kingdom Animalia and the major taxonomic divisions of animals
- list the major animal phyla, describe physical and natural history characteristics of each, and relate the ecological and evolutionary significance of each
- list the defining characteristics of the Kingdom Fungi and the major taxonomic divisions of fungi
- explain the economical and ecological significance of fungi
- describe life cycles of selected fungi
- describe the ecological and evolutionary importance of vascular and non-vascular plants
- describe basic physiology of vascular and non-vascular plants
- distinguish between vascular and non-vascular plants, seed plants and non-seed plants, angiosperms and gymnosperms, and between monocots and “dicots”
- describe alternation of generation in vascular and non-vascular plants, including specific examples of moss, liverworts, ferns, gymnosperms, and angiosperms
- describe basic principles and societal significance of conservation biology
- Evaluate and discuss scientific research (as presented in a popular science format, e.g. Scientific American, National Geographic)
- demonstrate higher-order (critical) thinking skills in using the understanding gained by meeting the previous objectives
• apply information presented in Friday sessions to develop a general plan for coursework and professional enrichment activities