Biology 114: Form, Function, Diversity, & Ecology. (4 sem hrs)  
Fall Semester, 2012

Lecture: Tuesday & Thursday, 9:35-10:55am, Hitchcock Hall 131

Lecturer: Dr. Lucas Skywalker, Department of Evolution, Ecology & Organismal Biology  
skywalker.123@osu, 292-1234
Office Hours: T & R, 1:00-2:00pm, Aronoff Labs 231

Course Coordinator: Ms. Leia Organa, Center for Life Sciences Education  
organa.17@osu.edu, 292-3333
Office hours: W, 1:00-3:00pm, Jennings Hall 255F

Head TA: Mr. Moff Tarkin, Department of Entomology  
tarkin.1@osu.edu, 292-9876
Office Hours: T & R, 8:30-9:15am, Jennings Hall 247

Prerequisite: Biology 1113 (including AP or EM Credit) or Permission of Instructor


Additional Readings: Optional: The Concise Fetal Pig Study Guide, BioCam Productions  
Optional: The Concise Sheep Brain, Cow Heart Study Guide, BioCam Productions

GEC Goals & Objectives: Courses in the Natural Sciences foster an understanding of the principles, theories and methods of modern science, the relationship between science and technology and the effects of science and technology on the environment.

Learning Objectives:

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students learn key events in the history of science.
3. Students provide examples of the inter-dependence of scientific and technological developments.
4. Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

How students meet the GEC objectives through this course: In Biology 1114, majors in the biological sciences meet the GEC Natural Science Learning Objectives in multiple ways. The course, in conjunction with Biology 1113 is an in-depth study of the laws, structures, and interrelationships within the biological universe. Students gain an understanding of the foundations of modern biology by studying organismal diversity, ecological relationships within and among species, behavior, and the evolutionary and ecological constraints placed upon form and function, with particular emphasis on plants and animals. In the laboratory activities, students not only reinforce the biological concepts introduced in lecture, but also learn scientific reasoning and methods. Through the study of the history and key discoveries in biology, Biology 1114 students learn the details of the interrelationship between technology and scientific methods in the modern investigative study of biology, and gain an appreciation of the social and philosophical ramifications of the knowledge of biology and biological discoveries.
**Course Description:** Biology 1114 is intended for students majoring in the natural sciences and is the continuation of Biology 1113. In this course, you will deal with the organismal and supra-organismal levels of biological organization. Evolution will be the unifying theme and will be stressed throughout. The diversity, form, function, and ecology of organisms will be covered, with particular emphasis on plants and animals.

**Biology 1114 Learning Outcomes:** These are guidelines to where students should focus their learning in each of the four main topics covered in Biology 1114.

Successful students will be able to:

1. **Evolution**
   a. explain the mechanisms of microevolution.
   b. use concepts associated with microevolution and macroevolution to explain patterns of speciation and extinction
   c. explain mechanisms of sexual selection and the evolution of social behavior.
   d. describe methods used to infer evolutionary relationships.
   e. explain the relationship between evolutionary hypotheses and the biological classification system.
   f. use the geologic time scale to identify when major biological evolutionary events occurred.

2. **Diversity of life**
   a. characterize the biological domains and kingdoms.
   b. describe the major features of and evolutionary relationships within the Kingdoms Fungi, Plantae, and Animalia.
   c. describe the major groups of animals in terms of their body plan, embryology, and symmetry.

3. **Organismal form and function**
   a. explain how different groups of plants reproduce and transport water and food.
   b. describe the major groups of animals in terms of their characteristics, such as modes of reproduction, feeding specializations, skeletal system, sensory system, gas exchange, and osmoregulation.

4. **Population and community ecology**
   a. explain ecological phenomena related to populations and communities in terms of basic mathematical models.
   b. trace chemicals and energy through an ecosystem to explain human and global impacts of perturbations.
   c. describe the interrelationship between biodiversity and community interactions, such as such as predation, competition, and symbiosis.
# Lecture, Lab, and Reading Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Class</th>
<th>Date</th>
<th>Topic</th>
<th>Ch</th>
<th>Lab Exercise</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Aug 23</td>
<td>Evolution: Artificial Selection</td>
<td>22,23</td>
<td>NO LABS THIS WEEK</td>
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<tr>
<td>2</td>
<td>2</td>
<td>Aug 28</td>
<td>Evolution: Natural Selection</td>
<td>23,24</td>
<td>Safety &amp; Intro to H-W</td>
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<td></td>
<td>3</td>
<td>Aug 30</td>
<td>Development of Life</td>
<td>25,27</td>
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<td>3</td>
<td>4</td>
<td>Sep 4</td>
<td>Evolution: Animals</td>
<td>32,33</td>
<td>Ex.1: Population Genetics</td>
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<td>5</td>
<td>Sep 6</td>
<td>Evolution: Fungi</td>
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<td>4</td>
<td>6</td>
<td>Sep 11</td>
<td>Evolution: Plants</td>
<td>29,30</td>
<td>Ex.3: Plant Structure &amp; Function</td>
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<td>7</td>
<td>Sep 13</td>
<td>Plant Structure, Growth &amp; Dev</td>
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<td>5</td>
<td>8</td>
<td>Sep 18</td>
<td>Resource Acquisition &amp; Transport</td>
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<td>Ex.10: Plant Diversity</td>
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<td></td>
<td>9</td>
<td>Sep 20</td>
<td>Macroevolution &amp; Systematics</td>
<td>24,26</td>
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<tr>
<td>6</td>
<td>10</td>
<td>Sep 25</td>
<td>Midterm 1</td>
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<tr>
<td></td>
<td>11</td>
<td>Sep 27</td>
<td>Evolution: Prokaryotes &amp; Protists</td>
<td>27,28</td>
<td>Ex.9: Animal Diversity</td>
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<td>7</td>
<td>12</td>
<td>Oct 2</td>
<td>Evolution of Sex &amp; Multicellularity</td>
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<td></td>
<td>13</td>
<td>Oct 4</td>
<td>Protostome Diversity</td>
<td>32,33</td>
<td>Ex.2a: Systematics</td>
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<td>8</td>
<td>14</td>
<td>Oct 9</td>
<td>Deuterostomes &amp; Chordates</td>
<td>33,34</td>
<td>Ex.2b: Phylogeny</td>
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<td>15</td>
<td>Oct 11</td>
<td>Homology &amp; Analogy</td>
<td>22,26</td>
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<td>9</td>
<td>16</td>
<td>Oct 16</td>
<td>Vertebrates</td>
<td>34</td>
<td>Ex.8: Arthropod Behavior</td>
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<td>17</td>
<td>Oct 18</td>
<td>Vertebrates</td>
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<tr>
<td>10</td>
<td>18</td>
<td>Oct 23</td>
<td>Basic Principles of Animal Form &amp; Fcn</td>
<td>40</td>
<td>Ex.7: Island Biogeography</td>
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<td></td>
<td>19</td>
<td>Oct 25</td>
<td>Exchange Systems &amp; Circulation</td>
<td>42</td>
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<td>11</td>
<td>20</td>
<td>Oct 30</td>
<td>Homeostasis</td>
<td>43,44,45</td>
<td>Ex.6: Skeleton &amp; Brains</td>
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<td></td>
<td>21</td>
<td>Nov 1</td>
<td>Sensory &amp; Motor Systems</td>
<td>48,49,50</td>
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<td>12</td>
<td>22</td>
<td>Nov 6</td>
<td>Midterm 2</td>
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<td>23</td>
<td>Nov 8</td>
<td>Sexual Selection</td>
<td>51</td>
<td>Ex.4: Fetal Pig Anatomy</td>
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<td>24</td>
<td>Nov 13</td>
<td>Behavior</td>
<td>51</td>
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<td></td>
<td>25</td>
<td>Nov 15</td>
<td>Ecosystem Ecology</td>
<td>55</td>
<td>Ex.5: Fetal Pig Circulatory System</td>
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<td>13</td>
<td>26</td>
<td>Nov 20</td>
<td>Population Ecology</td>
<td>53</td>
<td>OPEN REVIEW</td>
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<td>27</td>
<td>Nov 22</td>
<td>NO CLASS: Thanksgiving</td>
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<tr>
<td>14</td>
<td>28</td>
<td>Nov 27</td>
<td>Community Ecology</td>
<td>54</td>
<td>Practical Exam</td>
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<td></td>
<td>29</td>
<td>Nov 29</td>
<td>Conservation Biology</td>
<td>56</td>
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<td>15</td>
<td>30</td>
<td>Dec 4</td>
<td>Human Evolution</td>
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<td>NO LABS THIS WEEK</td>
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<td>16</td>
<td>31</td>
<td>Dec 10</td>
<td>Final Exam</td>
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<tr>
<td>17</td>
<td>32</td>
<td>Dec 10</td>
<td>Final Exam</td>
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## Evaluation

There will be two lecture midterms (worth 100 points each) and a lecture final exam (worth 150 points). The final exam will emphasize detailed questions covering material covered after the second midterm, but also will include comprehensive material from earlier weeks of the course. Questions on the comprehensive material will be of a more general nature.

The laboratory will have a practical worth 80 points, seven quizzes worth 10 points each (60 points total because students will be allowed to drop their lowest quiz score), and five lab exercises worth 25 points each (125 points total). The course point breakdown is as follows:

- Lecture midterms/Final: 350 pts
- Lab worksheets: 125 pts
- Lab practical: 80 pts
- Lab Quizzes: 60 pts
- TOTAL: 615 pts
**Grade Scale:** Your final grade will be based upon the standard OSU grade scale.

93% = A, 90% = A-, 87% = B+, 83% = B, 80% = B-, 77% = C+, 73% = C, 70% = C-, 67% = D+, 63% = D, below 63% = E.

There are no bonus points. Grades are not rounded up. A curve should not be expected.

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**A Word About Conduct in Large Classes**

This is a large class, but you are not a small part of it! To make our time together as valuable as possible, we all have to work hard at it. The following basic principles may give us some guidelines:

- Every student has the right to learn as well as the responsibility not to deprive others of their right to learn.
- Every student is accountable for his or her actions.

In order for you to get the most out of this class, please consider the following:

a. Attend all scheduled classes and arrive on time. Late arrivals and early departures are very disruptive. If you must be late or need to leave early, please sit in the balcony.

b. Please do not schedule other engagements during either lecture or recitation. You probably wouldn’t like it if we did! We will try to make class as interesting and informative as possible, but we can’t learn the material for you.

c. If you have trouble hearing the material presented in the lecture because of distractions around you, quietly ask those responsible for the distraction to stop. If the distraction continues please let us know. It is often impossible to hear such things from our position in the classroom.

Course Policies

Late Assignments: Assignments turned in after the due date will receive a 10% deduction per day. After five days, no late assignments will be accepted.

Absences: If you are too ill to take the final exam or complete a quiz or assignment, please contact the course coordinator within 24 hours of the class period in which the exam was taken. You must be seen by and receive written documentation from a professional health care practitioner on the day (or period) of the exam in order for a make up to be given. Other serious personal problems will be considered on an individual basis. In all instances, documentation supporting the excused absence will be required. Lack of transportation, loss of electricity, travel plans, etc. will not be considered as valid excuses and you will receive a “0”. Make ups for missed exams and quizzes may be in a different format than the scheduled exam or quiz.

The laboratory portion of this course is an integral part of the learning experience; missing three or more labs will result in the student being automatically assigned a failing grade for the course. Students must contact their laboratory TA within two days of the original missed lab date. There is no opportunity for a make-up assignment if a student contacts his/her TA on the third day or later. In order to establish that the student was prevented from attending lab for a valid reason, some form of written verification acceptable to the Center for Life Sciences Education is required.

Late Arrival at Exams: Any student arriving for an exam, AFTER the first student has completed the exam and left the lecture hall, will be permitted to take the exam during the time remaining and will be assessed a 25% penalty.

CLSE Policies

Problem Solving Pathway: The CLSE believes that student concerns are usually most effectively addressed at the lowest possible level within the organization. Therefore, students are ordinarily expected to address issues or concerns with their TAs first. If the issue cannot be resolved by your TA, or for some reason you feel that you absolutely cannot address your concern with your TA, please feel free to contact your Course Coordinator (listed on the syllabus) or Assistant Director Matt Misicka.

Course Management System: This course uses CARMEN (http://carmen.osu.edu) as its tool to manage grades and communicate timely information to our students. It is expected that all students will check this site frequently for schedule changes, assignment guidelines, and other information. If you are unfamiliar with CARMEN, instructions are available at the Center for Life Sciences Education office (260 Jennings Hall). Additionally, your teaching assistant can help you activate your account if you are unfamiliar with this software.

Section Changes/Adds: All section changes and adds that cannot be accomplished by the student through Buckeye Link or requiring signatures must be done through the Course Coordinator.

Grade Inquiries: All grades will be posted on Carmen; you will have 10 working days to challenge any grade or inquire regarding any unposted grade; after that time, grades are final. To challenge or inquire about quiz or exam grades contact your Course Coordinator to set up an appointment.
University Policies

Students With Disabilities: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Course Coordinator privately to discuss your specific needs within the first two weeks of class.

Academic Misconduct: Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University’s Code of Student Conduct (Section 3335-23-04) is never considered an “excuse” for academic misconduct. Faculty, staff, and TAs employed by the CLSE are obligated by University Rules to report suspicions of Academic Misconduct to the Committee on Academic Misconduct.

Sexual Harassment: While all members of the staff involved in this course have been trained in the OSU sexual harassment policies and procedures, this is not true for all OSU students. Please report any concerns about questionable or unwanted behavior that has the purpose or effect of unreasonably interfering with an individual’s work or academic performance or creating an intimidating, hostile, or offensive environment for working, learning, or living on campus, to your course coordinator.

University Escort Service: To promote safety on campus, transportation across campus is offered by the OSU Department of Public Safety. Service is available between 7:30pm and 2:40am. Call 292-3322 to schedule a pick-up. You must provide at least one hour notice (http://www.ps.ohio-state.edu/sss/escort_info/).

Errors & Omissions: While every effort has been made to insure the validity and correctness of the information presented in this syllabus, any mistakes or clerical errors that are discovered will be corrected and communicated through subsequent editions as necessary.

If you have any questions about any of the above policies please contact the Course Coordinator.