California State University, Los Angeles
Department of Biological Sciences
BIOL 1030: Life Science, Spring 2017

Course Information

INSTRUCTOR INFORMATION
Instructor: Dr. Paul Narguizian
Office Location: ASCB 323C
Telephone: 818.343.2054
Email: pnargui@calstatela.edu
Office Hours: Thursdays, 1:00 PM – 3:00 PM
Class Days/Time: Tuesdays/Thursdays/4:30 – 5:45 PM (lecture section: 01) BIOS 246
Lab Day/Time: Tuesdays: 6:00 – 8:30 PM (lab section 02) ASCL 231
Prerequisites: None

COURSE DESCRIPTION

Principle concepts in life science, such as the flow of energy and information through biological systems. Topics include science pedagogy and the nature of science, metabolism, inheritance, evolution, organismal structure and function. No credit toward Biology major or minor. Recommended for Elementary Subject Matter (ESM) majors. Lecture 3 hours, laboratory 3 hours. GE B2.

The course will focus on unifying themes such as energy and information flow through biological systems, which integrate processes across multiple scales, from single cells and organisms to species and ecosystems. Following this approach, we will emphasize the commonality of plant and animal evolutionary solutions to shared challenges (e.g., energy acquisition, water and temperature balance, reproduction, receiving and responding to environmental signals, communication). Thus, the course will emphasize critical thinking and science pedagogy by asking you to carefully consider the nature of the scientific evidence discussed, and the integrity of public statements on this topic.

COURSE OBJECTIVES/OUTCOMES

Upon successful completion of this course, students will be able to:

- Apply scientific reasoning and evaluate evidence to reach a conclusion.
- Evaluate the strengths and limitations of scientific epistemology.
- Describe the relationship between the history of photosynthetic organisms on Earth and Earth’s climate.
- Describe the attributes shared by all living systems.
- Relate the processes of inheritance and evolution.
- Describe the relationship(s) between DNA, genes, the organism, the environment, and adaptation.
- Compare and contrast plant and animal solutions to similar fundamental life challenges.

Instructor reserves the right to alter and/or amend the syllabus throughout the quarter as necessary.
• Explain why the diversity of secondary chemicals (with impacts on human health) is higher in plants than in animals.
• Work collaboratively with peers to find a solution to a problem.
• Formulate a sound hypothesis based on observations.
• Design an experiment with appropriate controls.
• Analyze data to evaluate alternative hypotheses.
• Write a scientific report.
• Describe the fundamentals of physical life science (physics and chemistry) required by the California standards.
• Demonstrate an improved ability to formulate hypotheses and evaluate the accuracy and precision of experimental data;
• Apply the scientific method to simple problems in order to develop reasonable conclusions.
• Develop and participate in hands-on activities stressing active learning;
• Actively participate in group learning, and collaborative sharing of written and oral presentations of findings;
• Students will have gained hands-on experience from laboratory activities;
• Be able to extract and integrate useful life science online resources with classroom materials.
• Demonstrate the ability to use technology by completing tasks such as downloading assignments and reading materials from the Internet and course webpage and by designing elementary school science activities.
• Apply online and in-class experiences to their future elementary teaching of Life Science.
• Demonstrate knowledge about specific topics in life science as required by the new California Science Standards for multiple subject credentials.
• Improve their understanding of the certainty, universality and limitations of the scientific knowledge.
• Develop knowledge of and skills to use Internet resources and in-class demos for teaching life science.
• Develop students’ confidence in regards to life sciences and their ability to communicate effectively those concepts at the level appropriate to K-8 settings.
• Explain the connection between science and society in terms of environmental, cultural and societal impacts.

Specific Learning Objectives for BIOL 1030:
The additional Student Learning Outcomes listed below in table format correspond to the NEW Next Generation Science Standards (NGSS). This is a requirement handed down by the State of California which is required of ALL students pursuing a degree in any field which corresponds to the Elementary Subject Matter requirements.

GE outcomes for B2: Students successfully completing B2 Biological Science will be able to: Course Content and SLOs Addressing GE Block B2 Student Learning Outcomes:
<table>
<thead>
<tr>
<th>GE B2 Student Learning Outcome</th>
<th>Course Content</th>
<th>Course Learning Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Demonstrate an understanding of the principles of scientific inquiry (i.e., the &quot;scientific method&quot;), the nature of science, the potential limits of scientific endeavors, and the value systems and ethics associated with scientific inquiry.</td>
<td>Lecture: <strong>I.C</strong> – Studying life and the nature of science; <strong>II.B.2</strong> – evaluating quotes about climate change activity; <strong>II.B.2</strong> – What makes a species? (small group debate) Lab: Experimental design, data collection and analysis</td>
<td>- Apply scientific reasoning and evaluate evidence to reach a conclusion - Evaluate the strengths and limitations of scientific epistemology - Formulate a sound hypothesis based on observations - Design an experiment with appropriate controls - Analyze data to evaluate alternative hypotheses</td>
</tr>
<tr>
<td><strong>2.</strong> Demonstrate knowledge of basic scientific principles as they apply to broader concepts (e.g., global climate change, the spread of infectious diseases, etc.), including historical developments of the disciplines and major contributions from various cultures of the world.</td>
<td>Lecture: <strong>II.B.2</strong> – Plants and atmospheric carbon dioxide / global climate change through time (quotes about climate change activity); <strong>III.B.1</strong> – Inheritance and Mendel; <strong>III.B.4</strong> – Darwin and Drift; <strong>VII.D</strong> – Diversity and global ecosystem services; <strong>VII.E</strong> – Conservation of biological and cultural resources</td>
<td>- Describe the relationship between the history of photosynthetic organisms on Earth and Earth’s climate - Explain why the diversity of secondary chemicals (with impacts on human health) is higher in plants than in animals</td>
</tr>
<tr>
<td><strong>3.</strong> Evaluate the credibility of sources of scientific information.</td>
<td>Lecture: <strong>II.B.2</strong> – Plants and atmospheric carbon dioxide / global climate change through time (quotes about climate change activity) Lab: Evaluating online resources</td>
<td>- Apply scientific reasoning and evaluate evidence to reach a conclusion - Evaluate the strengths and limitations of scientific epistemology</td>
</tr>
<tr>
<td><strong>GE B2 Student Learning Outcome (cont.)</strong></td>
<td><strong>Course Content</strong></td>
<td><strong>Course Learning Outcome</strong></td>
</tr>
<tr>
<td><strong>4.</strong> Draw appropriate conclusions based on the analysis of qualitative and quantitative data.</td>
<td>Lecture: <strong>III.B.3</strong> – Inheritance and Mendel (test cross activity); <strong>III.B.3</strong> – Phylogenetics (tree-reading activity); <strong>VII.B</strong> –</td>
<td>- Analyze data to evaluate alternative hypotheses</td>
</tr>
</tbody>
</table>
quantitative empirical data. | Measuring diversity (phylogenetic exercise)  
Lab: Data analysis (qualitative and quantitative) included with every lab activity, with additional opportunities for input and feedback from lab instructors  
| 4 |

5. Demonstrate an understanding of the value of science in developing a rigorous understanding of the natural world and of the impact of science on societal, environmental, political, economic, and/or technological contexts. | Lecture: I.C – Studying life and the nature of science; II.B.2 – Plants and atmospheric carbon dioxide / global climate change through time (quotes about climate change activity); VII.C – Diversity and ecosystem stability; VII.D – Diversity and global ecosystem services; VII.E – Conservation of biological and cultural resources  
| 5 |

6. Students successfully completing a science laboratory will be able to demonstrate hands-on skills applying specialized methods and tools of scientific inquiry (such as collecting, analyzing, and interpreting the data, presenting the findings, and using the information to answer questions). | Lab: All laboratory activities are hypothesis-driven and emphasize scientific inquiry. Students will experience hands-on wet lab data collection as well as online simulations that allow for exploration of various parameters. All exercises will require data collection, analysis, and interpretation to evaluate hypotheses.  
| 6 |

**Required Course Materials:**  
**Required Textbook:** *Concepts of Biology* (available for free, online, by OpenStax: [http://cnx.org/contents/s8Hh0Oc@9.18:Pi8cW7X1@4/Introduction](http://cnx.org/contents/s8Hh0Oc@9.18:Pi8cW7X1@4/Introduction))

**Other Readings**  
ALL other additional reading materials, articles, multimedia, and videos will be provided by the instructor on the MOODLE course site for you to review.

**Course Structure**  
Classes meet face-to-face twice a week, and you will also access an online platform using the Cal State LA learning management system.

Instructor reserves the right to alter and/or amend the syllabus throughout the quarter as necessary.
called MOODLE [https://moodle.calstatela.edu] frequently to reinforce concepts covered in class. I will ask you to think at high cognitive levels beyond basic memorization of facts, and how to apply what you learn in this class to choices you make in your life.

**Computer Requirements**
You will need to have access to Word, Adobe PDF, and PowerPoint to complete reading and written assignments.

You will need to have an up-to-date browser, operating system and some additional software on your computer to take this class. Check the ITS Helpdesk Student Resources page for instructions. Some of the documents in this course will be available to you in PDF form. You will need download and install Adobe Acrobat Reader software on your computer.

**Assignments and Grading Policy**
**Assessments** are based on a detailed grading rubric developed for this course:

**Grading Criteria / Points Possible:**

**Course Grading:** Final grades will be based on the following combination of assignments:

50 points – In---Class Activities  
50 points – Midterm Exam I  
50 points – Midterm Exam II  
50 points – Midterm Exam III  
100 points – Comprehensive Final Exam  
300 points – Laboratory Activities and Assignments (Detailed in the Laboratory Syllabus)

**Total Course = 600 points**
Grading Scale: You will receive a single grade for the lecture and lab portions of the course. Letter grades will be determined based on the grading scale below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Minimum Percent</th>
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<tbody>
<tr>
<td>A</td>
<td>92</td>
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<tr>
<td>A-</td>
<td>90</td>
</tr>
<tr>
<td>B+</td>
<td>88</td>
</tr>
<tr>
<td>B</td>
<td>82</td>
</tr>
<tr>
<td>B-</td>
<td>80</td>
</tr>
<tr>
<td>C+</td>
<td>78</td>
</tr>
<tr>
<td>C</td>
<td>72</td>
</tr>
<tr>
<td>C-</td>
<td>70</td>
</tr>
<tr>
<td>D+</td>
<td>68</td>
</tr>
<tr>
<td>D</td>
<td>62</td>
</tr>
<tr>
<td>D-</td>
<td>60</td>
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<tr>
<td>F</td>
<td>&lt;60</td>
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</table>

4. Policy: Everything submitted as an assignment, project, or discussion post must be original work. References to resource materials are expected and proper citation is required. Assignments are due on the dates specified. Late submissions will not be accepted.

Rubrics

I will be using Rubrics in all of the assignments in order to provide you with specific and descriptive criteria to evaluate your work. Please submit all assignments in MS Word format (using a .doc. or .docx file extension).

Grades

You can view your grades using the GRADES button in the course navigation links. Please check your grades regularly to make certain that I have received all your assignments. If you have a question about a grade, email me at pnarqui@calstatela.edu. Please do not post your personal concerns in a discussion forum.

Course Communication

Interaction with Instructor

The Instructor will make every effort to communicate frequently with students through announcements and postings within the Moodle site. Post any questions or comments you have about the course content and/or requirements in the Announcements forum.
Questions of a more personal nature can be sent to the Instructor via email to pnarqui@calstatela.edu.

As a student, you should expect to receive assignment feedback and responses to postings within 48 hours. The Instructor will post an announcement alerting the students if he or she will be unavailable for more than a day.

Email Policy

I will respond to a received email no later than close of work on the next day. I will post an announcement alerting you if I will be unavailable for more than a day. It is your responsibility to check your email daily for updates and announcements. Excessive emails impact both the professor and the student. Please make sure you have a legitimate reason for emailing.

I will email you about:
• Questions arising from difficulty in understanding course content.
• Requests for feedback on a graded assignment.
• Private issues.

I will not respond to email about:
• Questions that are answered in the course information.
• Lacks a subject line clearly stating the purpose of the email.
• Raises an inappropriate question.

Questions:
In online courses it is normal to have many questions about things that relate to the course, such as clarification about assignments, course materials, or assessments. Please post these in the Frequently Asked Questions forum.

My Teaching Philosophy:
My teaching philosophy is grounded in high expectations, accountability, and belief in appropriate behavior conducive to learning. Five principles guide my teaching philosophy:
1. All students can become lifelong learners.
2. Significant change requires significant commitment and time.
3. Struggle is a necessary and important part of life.
4. Students must accept responsibility for their learning progress.
5. I will never do for students what students can do for themselves.
That said, I will work hard and use multiple ways of learning to help you succeed in this course. Hopefully we’ll also have a few laughs as we go along.
Participation and Attendance:
Please arrive to class on time and ready to learn. I expect all students to attend every class session. There is plenty of research that shows final grades are positively correlated with attendance. To this end you will be able to earn classroom activity points in every class meeting, but cannot make them up if you are absent. Thus, if you miss more than two class meetings, your final grade will be negatively affected! Assignments are due at the start of class (or on your way out if we did it in class). You will talk and work frequently in small groups, and sometimes present your ideas to the entire class. Most importantly, please do not disrupt the learning environment, rights, and property of others. Of course, all gadgets not conducive to learning in the course, such as cell phones/music devices/etc. should be turned off during class. Be honest, hold yourself accountable for your actions, and hold me accountable for mine.

Respectful Classroom Atmosphere:
This class is a “judgment-free zone” at all times. This means that when you disagree with somebody’s opinion on a subject, you do not have the right to sling insults, raise your voice, or criticize them. I most certainly encourage disagreement on controversial topics and conversations are livelier if people do disagree on a subject. However, polite civil disagreement and outright hostility are two very different things. I will not tolerate hostility in the classroom, and anyone participating in this behavior will be escorted out of the room and not allowed to return for the rest of the class period.

Evolution:
“Respect for data, comfort in faith.” Someone much wiser than me told me this a long time ago, and it stayed with me. If you can live by the aforementioned quote then you’ll be fine in this class. Evolution and natural selection are central tenets of biology and will be critical aspects of this course, openly discussed and referred to frequently.

Math:
Every biologist uses math and statistics. In this course you will use some math as it applies to biology. This mostly includes making and interpreting graphs, but may also include calculating averages and variation around an average. I will help you and there will be chances to practice. NOTE: a calculator is good for this class.

Discussion Forums:
Each week begins on Tuesday morning. You will be required to post one original thread on Moodle by Thursday at 11:55pm and respond to one other. You have until 11:55pm on Sunday evening to complete the discussions on the assignment for the week it’s due. Within 48 – 72 hours of a discussion’s end, I will review all student responses and post a response as part of Announcements.
You will be assessed on the content, appropriateness, length, and how well the post is written (grammar and punctuation). See the rubric below. I expect at least 2-3 thoughtful and well-written paragraphs. You may find it useful to write your post on Word, which can assist with spell check, and then cut and paste it into Moodle. The points earned by each student will be posted to the online gradebook no later than one week after the discussion ends.

All students have the right to express their own opinions and every other student must respect this right. Any student posting a comment disrespectful of this right will be asked to leave the discussion, and a grade of 0 will be recorded.

Three suggestions to help you be successful:
1. Base your discussion posts on an authoritative source.
2. Get to the point! The longer posts seem to generate the least enthusiasm among the other learners. If needed, chunk your posts into multiple, reader-friendly posts.
3. Get some initial ideas into the discussion within the first few days of the discussions. Then, continue to add throughout the week.

Netiquette
When posting on the discussion boards and chat rooms it is important to understand how to interact with one another online, netiquette. You can read more about the rules of netiquette at 15 Rules of Netiquette for Online Discussion Boards

Virtual Office Hours
N/A

Turnaround/Feedback
During the week (M-F) I will check Frequently Asked Questions and monitor the discussion board several times a day. If you have a concern and send me an email message, you can expect a response within two days.

Helpful Student Resources
Technical Resources
Information on CSULA technical support resources for students: Technical Support

Student Support Services
Information on CSULA student support resources for students: Student Services

Academic Support Services
Information on CSULA academic support resources for students: Academic Support

Moodle Mentor Site
Information for students on how to be a successful online student and how to use Moodle: Moodle Mentor (Moodle Tutorials)

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Course & University Policies
Student Handbook
Information on student rights and responsibilities, academic honesty, standards of conduct, etc., can be found in Schedule of Classes for the current quarter visit the Cal State LA Schedule of Classes Information under Policies and Procedures.

Dropping and Adding
Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Students should be aware of the current deadlines and penalties for adding and dropping classes by visiting the GET home page.
(Registrar news and information)

Americans with Disabilities Act (ADA)
Reasonable accommodation will be provided to any student who is registered with the Office of Students with Disabilities and requests needed accommodation. For more information visit the Office for Students with Disabilities home page.

Academic Honesty/Student Conduct

This link contains the Cal State LA Policies and Procedures on Academic Honesty:
http://ecatalog.calstatela.edu/content.php?catoid=12&navoid=842

Academic Honesty: Many incidents of plagiarism result from students’ lack of understanding about what constitutes plagiarism. However, you are expected to familiarize yourself with Cal State L.A.’s policy on plagiarism. All work you submit must be your own scholarly and creative efforts. Cal State L.A. plagiarism as follows: “At Cal State L. A., plagiarism is defined as the act of using ideas, words, or work of another person or persons as if they were one’s own, without giving proper credit to the original sources.”

Student Conduct: http://ecatalog.calstatela.edu/content.php?catoid=12&navoid=843
# Course Outline/Schedule of Assignments:

## Tentative Lecture Schedule:

<table>
<thead>
<tr>
<th>WEEK/DATE</th>
<th>TOPIC(S)</th>
<th>Read:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 24 Intro, what is biology and the nature of science (to vaccinate or not to vaccinate?)</td>
<td>Chapter 1, watch video on “Learning how to Learn in Biology” and “the Nature of Science (NOS)”</td>
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<td>Jan. 26</td>
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<tr>
<td>2</td>
<td>Jan. 31 Defining life, chemical building blocks, water (evidence from space)</td>
<td>Chapter 2</td>
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<tr>
<td></td>
<td>Feb. 2 Cellular basis of life, membranes and transport (wonder drug)</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>3</td>
<td>Feb. 7 Energy and enzymes (power foods); Energy flow and photosynthesis (mighty microbes)</td>
<td>Chapter 4 (Intro., 4.1 – 4.2), Chapter 5</td>
</tr>
<tr>
<td></td>
<td>Feb. 9 Metabolism and nutrition (We’re #2!); Energy and respiration (Supersize Me)</td>
<td>Chapter 4 (4.3 – 4.5)</td>
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<tr>
<td>4</td>
<td><em>Feb. 14</em> MIDTERM #1 (Nature of science, food, cells)</td>
<td>Chapter 9 (Intro., 9.1 – 9.2)</td>
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<td></td>
<td>Feb. 16 DNA structure &amp; function (DNA will set you free)</td>
<td>Chapter 6 (Intro., 6.1 and 6.2); Chapter 14</td>
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<td>5</td>
<td>Feb. 21 Cell division &amp; mitosis</td>
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<tr>
<td></td>
<td>Feb. 23 Genetic mutations &amp; cancer (fighting fate)</td>
<td>Chapter 6 (6.3 – 6.4)</td>
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<td>6</td>
<td><em>Feb. 28</em> Single gene inheritance &amp; meiosis (shuffling a deck of cards)</td>
<td>Chapter 7 (Intro., 7.1 – 7.2)</td>
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<tr>
<td></td>
<td>Mar. 2 Complex inheritance (sex and depression)</td>
<td>Chapter 7 (7.3)</td>
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<tr>
<td>7</td>
<td>Mar. 7 Genes to proteins</td>
<td>Chapter 9 (9.3 – 9.4)</td>
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<td></td>
<td>Mar. 9 Biotechnology</td>
<td>Chapter 10 (Intro.,10.1, 10.2)</td>
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<tr>
<td>8</td>
<td><em>Mar. 14</em> Stem cells &amp; cell differentiation (grow your own)</td>
<td>Chapter 10 (10.2 – 10.3)</td>
</tr>
<tr>
<td></td>
<td>Mar. 16 MIDTERM #2 (Sex, genetics, biotechnology, and Stem Cells)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Mar. 21 Darwin’s big idea &amp; evidence for evolution (fish with fingers)</td>
<td>Chapter 11 (Intro., and 11.1)</td>
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<tr>
<td></td>
<td>Mar. 23 How populations evolve (bugs that resist bugs)</td>
<td>Chapter 11 (11.2 – 11.4)</td>
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<td></td>
<td>Mar. 28 and 30 – Spring Break – No Lectures or Labs This Week</td>
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<tr>
<td>10</td>
<td><em>Apr. 4</em> Common misconceptions about Evolution!</td>
<td>Chapter 11 (11.5)</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr. 6</td>
<td>Darwin meets genetics, species (evolution in the fast lane)</td>
<td>Special Topic (not in book)</td>
</tr>
<tr>
<td>11</td>
<td>Apr. 11</td>
<td>Sexual selection; the paradox of sex</td>
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<td></td>
<td>Apr. 13</td>
<td>Coevolution and Mutualism</td>
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<tr>
<td>12</td>
<td><em>Apr. 18</em> Midterm #3 (Evolution)</td>
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<tr>
<td></td>
<td>Apr. 20</td>
<td>Importance of biodiversity</td>
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<tr>
<td>13</td>
<td>Apr. 25</td>
<td>Energy flow through ecosystems</td>
</tr>
<tr>
<td></td>
<td>Apr. 27</td>
<td>Community ecology</td>
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<tr>
<td>14</td>
<td><em>May 2</em></td>
<td>Importance of biodiversity: local ecosystem services</td>
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<tr>
<td></td>
<td>May 4</td>
<td>Importance of biodiversity: Insects and Plants: A Symbiotic Relationship (I)</td>
</tr>
<tr>
<td>15</td>
<td>May 9</td>
<td>Importance of biodiversity: Insects and Plants: A Symbiotic Relationship (II)</td>
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<tr>
<td></td>
<td>May 11</td>
<td>Human biodiversity impacts (Amazon on fire); Good news for a change (army of one)</td>
</tr>
<tr>
<td>16</td>
<td><em>May 19</em> Final Exam: TUESDAY, MAY 16 @ 3:40 – 5:40 PM!!!</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** There are NO Face-to-Face (F2F), on-campus lectures, on dates that begin and end with *.

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