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| <b>Plant Ecology in a Changing World (Biology 5460) – A 3-credit course</b>                    |  |
| Class meets in person on Monday, Wednesday and Friday at 8:35 – 9:25 am @ Marriot Library 1150 |  |
| Class discussions with TA happen once a week in two groups.                                    |  |
| <b>Instructor</b>  | Eleinis Ávila-Lovera, eleinis.avila@biology.utah.edu |
| <b>Teaching assistant</b>  | Rebecca Senft, rebecca.senft@utah.edu                |
| <b>Office hours</b>  | W, F 9:40 - 10:30 am ML 1150                         |

BIOL 5460 is a lecture-based course that provides an ecological study of terrestrial ecosystems, emphasizing the quantifiable patterns in the primary producer community at the foundation of those ecosystems and the impacts of climate change on existing ecological relationships. We will start by studying physiological processes at the individual level, how these processes influence individual growth, reproduction and life-history traits, which in turn affect population structure, plant distributions, community structure and ecosystem functioning. We end up studying the current challenges to maintaining biodiversity.

Discussion sessions with the TA are optional but highly recommended. The TA will provide useful discussions on topics presented during the lectures, can help with assignments, reviewing exam results, and studying for quizzes and exams. Whenever you have questions about a class topic, first ask the TA.

### Course learning outcomes

By the end of the semester, students will be able to:

- Discuss the foundations of plant physiology, growth, and reproduction and how such traits affect plant fitness in varying environmental conditions;
- Describe patterns of plant distributions and posit hypotheses for those distributions;
- Interpret ecological data (tables, graphs) to understand plant functioning;
- Evaluate how variation in plant physiological processes in local environments affects performance in a changing climate.

### Achieving learning outcomes

These course learning outcomes will be achieved by attending lectures, reading assignments, attending discussions with the TA and completing required assignments, which will all provide opportunities for students to create their own knowledge on the foundations of plant ecology and how climate change is affecting plants' life.

### Required textbook and other reading materials

- Gurevitch J, Scheiner SM, Fox GA (2006) The Ecology of Plants, Third edition. Sinauer Associates, Sunderland, Mass.
- Occasional extra readings will be provided via CANVAS.

### CANVAS

- The CANVAS site contains all class-related files.
- All assignments are available and submitted via CANVAS.

### Assessments

Most assignments are individual-based (quizzes, midterm and final exam); in-class participation and canvas assignments can be group-based. For individual-based assignments, students are expected to complete the effort on their own. For group-based

assignments, groups of 3 students may work together producing a single contribution. Each student within a group receives the same score.

| Formative and summative assessments        | Points | Notes  |
|--|--------|--|
| In-class participation (clicker questions) | 75     | Three absences allowed. 15% of the total grade |
| Quizzes (3)                                | 75     | Each quiz is 5% of the total grade             |
| Midterm exam                               | 100    | 20% of the total grade                         |
| Assignments (10)                           | 100    | 20% of the total grade                         |
| Final exam                                 | 150    | Cumulative. 30% of the total grade             |
|  | 500    |  |

**In-class participation:** participation will be assessed through questions using iClicker. You should expect at least one clicker question per lecture. If you attend all lectures (three absences allowed), you should obtain 75 points. This means that **attendance** is required for most of the semester. If you cannot attend class due to sanctioned University activities, University closures, disability accommodations, and/or sudden illness or emergencies, we will provide reasonable accommodations, but you need to let us know at least one week in advance (except for sudden illness or emergencies).

**Quizzes:** three quizzes throughout the semester will assess your understanding of the topics presented in lecture in smaller, manageable group of topics. These quizzes will also help you prepare for the midterm and final exams.

**Midterm exam:** the midterm will assess your understanding of the functioning of plants, their responses to their environment (at the individual level), and properties at the population level.

**Assignments:** must be submitted through CANVAS by the deadline (date and time). **Late assignments will be allowed for 24 hours but will be penalized 50%.**

**Final exam:** the final exam will assess your understanding of the functioning of plants, their responses to their environment (at the individual level), properties at the population and community level, how plant communities change in response to disturbance, the structure of ecosystems and biomes, and how climate change is affecting all properties of the life of plants.

Students are not competing with each other for a grade; in theory everyone can achieve an "A". A student's final grade will be based on a cumulative point total, using a scale approximating score percentages as shown below.

92-100% = A; 90-91% = A-

79% = C+; 71-78% = C; 70% = C-

89% = B+; 81-88% = B; 80% = B-

60-69% = D; <60% = E

### Class etiquette

As colleagues, I expect everyone in this class to treat everyone else with respect. This includes the following:

- Arrive to class on time.
- Turn off cell phone ringers before entering the classroom.
- Do not sleep, text, chat, and/or pass notes.
- Do not work on material from other classes during class time.

- Laptop computers, tablets, and other electronic devices are allowed as long as they do not cause classroom distractions.
- Please obtain permission from the instructor if you intend to record the lectures.
- Please refrain from getting up and leaving the classroom while instruction is in progress unless it is truly an emergency or an extremely pressing issue. If you have a medical issue, please sit close to the door to minimize disruption.

### Class schedule

| Week     | Part   | Monday   | Wednesday   | Friday   | Pre-class readings   |
|----------|--|--|---|--|--|
| 1 (8/19) | I. Individuals and Their Environments                                    | 1. Course Introduction. The science of plant ecology (Ch 1). <b>What is plant ecology? Pre-class assignment (due on 8/16)</b>      | 2. Photosynthesis and light (Ch 2)  | 3. Photosynthesis and light (Ch 2)   | <b>Ch 1:</b> 1-18<br><b>Ch 2:</b> 20-41                              |
| 2 (8/26) | I. Individuals and Their Environments                                    | 4. Photosynthesis and light (Ch 2). <b>Compare and contrast the three photosynthetic pathways post-class assignment (due 8/26)</b> | 5. Water relations and thermal energy (Ch 3)  | 6. Water relations and thermal energy (Ch 3)   | <b>Ch 2:</b> 42-50<br><b>Ch 3:</b> 52-81                             |
| 3 (9/2)  | I. Individuals and Their Environments                                    | Labor Day  | 7. Water relations and thermal energy (Ch 3)  | 8. Water relations and thermal energy (Ch 3).  | <b>Ch 3:</b> 75-81   |
| 4 (9/9)  | I. Individuals and Their Environments/<br>II. Individuals -> Populations | 9. Soil and terrestrial plant life (Ch 4). <b>What is soil made of? Pre-class assignment (due on 9/6)</b>                          | <b>Quiz 1 (Ch1 – Ch4)</b>   | 10. Individual growth and reproduction (Ch 6)  | <b>Ch 4:</b> 82-108<br><b>Ch 6:</b> 142-153                          |
| 5 (9/16) | II. Individuals -> Populations   | 11. Individual growth and reproduction (Ch 6)  | Individual growth and reproduction (Ch 6). <b>In-class assignment (due on 9/18)</b> | 12. Plant life histories (Ch 7)  | <b>Ch 6:</b> 153-175<br><b>Ch 7:</b> 176-189                         |
| 6 (9/23) | II. Individuals -> Populations   | 13. Plant life histories (Ch 7)  | 14. Population structure, growth, and decline (Ch 8)                                | 15. Evolution: processes and change (Ch 9). <b>Post-class assignment (due on 9/27)</b> | <b>Ch 7:</b> 189-197<br><b>Ch 8:</b> 198-229<br><b>Ch 9:</b> 230-244 |
| 7 (9/30) | II. Individuals -> Populations   | 16. Evolution: processes and change (Ch 9)   | Review  | <b>Midterm (Ch 1 – Ch 8)</b>   | <b>Ch 9:</b> 244-257   |

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|-------------------|--|--|---|---|--|
| <b>8</b> (10/7)   |  | Fall Break   | Fall Break  | Fall Break  |  |
| <b>9</b> (10/14)  | III.<br>Populations<br>and<br>Communities                                | 17. Competition /<br>other interactions<br>(Ch 10)   | 18. Competition /<br>other interactions<br>(Ch 10).<br><b>Competition in-<br/>class assignment<br/>(due on 10/16)</b> | 19. Herbivory /<br>other interactions<br>(Ch 11)  | <b>Ch 10:</b> 260-<br>295<br><b>Ch 11:</b> 296-<br>310 |
| <b>10</b> (10/21) | III.<br>Populations<br>and<br>Communities                                | 20. Herbivory / other<br>interactions (Ch 11)  | 21. Community<br>diversity and<br>structure (Ch 12)   | 22. Community<br>diversity and<br>structure (Ch 12).<br><b>Post-class<br/>assignment (due<br/>on 10/25)</b> | <b>Ch 11:</b> 310-<br>330<br><b>Ch 12:</b> 332-<br>368 |
| <b>11</b> (10/28) | III.<br>Populations<br>and<br>Communities                                | 23. Community<br>dynamics and<br>succession (Ch 13)  | 24. Community<br>dynamics and<br>succession (Ch 13)   | <b>Quiz 2 (Ch 9 – Ch<br/>13)</b>  | <b>Ch13:</b> 370-396                                   |
| <b>12</b> (11/4)  | IV.<br>Ecosystems  | 25. Ecosystem<br>processes (Ch 5)  | 26. Ecosystem<br>processes (Ch 5).<br><b>Post-class<br/>assignment (due<br/>on 11/6)</b>                              | 27. Landscapes:<br>pattern and scale<br>(Ch 15)   | <b>Ch 5:</b> 110-139<br><b>Ch 15:</b> 420-<br>431      |
| <b>13</b> (11/11) | IV.<br>Ecosystems  | 28. Landscapes:<br>pattern and scale<br>(Ch 15)  | 29. Climate, plants<br>and climate change<br>(Ch 16)  | 30. Climate, plants<br>and climate change<br>(Ch 16)  | <b>Ch 15:</b> 431-<br>445<br><b>Ch 16:</b> 446-<br>477 |
| <b>14</b> (11/18) | IV.<br>Ecosystems  | 31. Climate, plants<br>and climate change<br>(Ch 16). <b>Nature-<br/>based solution<br/>post-class<br/>assignment (due<br/>on 11/18)</b> | 32. Paleoecology<br>(Ch 17)   | <b>Quiz 3 (Ch 5, Ch<br/>15 – Ch 17)</b>   | <b>Ch 16:</b> 477-<br>492<br><b>Ch 17:</b> 494-<br>511 |
| <b>15</b> (11/25) | IV.<br>Ecosystems  | 33. Biomes and<br>physiognomy (Ch<br>18)   | 34. Biomes and<br>physiognomy (Ch<br>18). <b>Ask AI post-<br/>class assignment<br/>(due on 11/27)</b>                 | Thanksgiving break  | <b>Ch 18:</b> 512-<br>541                              |
| <b>16</b> (12/2)  | IV.<br>Ecosystems  | 35. Global<br>biodiversity<br>patterns, loss, and<br>conservation (Ch<br>19)   | 36. Global<br>biodiversity patterns,<br>loss, and<br>conservation (Ch<br>19)  | Review  | <b>Ch 19:</b> 542-<br>573                              |
| <b>17</b> (12/9)  | <b>Finals week (Final Exam: Wednesday, December 11, 8:00 – 10:00 am)</b> |  |   |   |  |

## University Policies

- 1. *The Americans with Disabilities Act.*** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability & Access.
  - ***In-class attendance is a necessary component of this course.*** Given the nature of this course, attendance is required and adjustments will only be permitted as required by Policy 6-100(III)(O). If you need to seek an ADA accommodation to request an exception to this attendance policy due to a disability, please contact the [Center for Disability and Access](#) (CDA). CDA will work with us to determine what, if any, ADA accommodations are reasonable and appropriate.
- 2. *University Safety Statement.*** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit <https://safeu.utah.edu>.
- 3. *Addressing Sexual Misconduct.*** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 383 South University Street, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).
- 4. *Academic Misconduct Statement.*** It is expected that students adhere to University of Utah policies regarding academic honesty, including but not limited to refraining from cheating, plagiarizing, misrepresenting one's work, and/or inappropriately collaborating. This includes the use of generative artificial intelligence (AI) tools without citation, documentation, or authorization. Students are expected to adhere to the prescribed professional and ethical standards of the profession/discipline for which they are preparing. Any student who engages in academic dishonesty or who violates the professional and ethical standards for their profession/discipline may be subject to academic sanctions as per the University of Utah's Student Code: <https://regulations.utah.edu/academics/6-410.php>.
- 5. *Drop/Withdrawal Policies.*** Students may drop a course within the first two weeks of a given semester without any penalties. Students may officially withdraw (W) from a class or all classes after the drop deadline through the midpoint of a course. A "W" grade is

recorded on the transcript and appropriate tuition/fees are assessed. The grade "W" is not used in calculating the student's GPA. For deadlines to withdraw from full-term, first, and second session classes, see the U's Academic Calendar.

6. **Support for Students.** Your success at the University of Utah is important to all of us here! If you feel like you need extra support in academics, overcoming personal difficulties, or finding community, the U is here for you. Please refer to the [Student Support Services page for the U](#) for updated information.
  
7. **Basic Needs Student Support Statement.** Success at The University of Utah includes learning about and using available resources. The [Basic Needs Collective](#) (BNC) is a coordinated resource referral hub. They educate about and connect students to campus and community resources to help them meet their basic needs. As a central location for resource referrals related to food, housing, health insurance, managing finances, legal services, mental health, etc., any student experiencing difficulty with basic needs is encouraged to contact them. Drop into their office located in the Union basement or schedule with them online for an in-person or virtual visit through their webpage: <https://basicneeds.utah.edu/>.