

Syllabus BILD 46 “Ecology of a changing planet” Winter quarter 2023

Lectures: T/Th 11 a.m. -12:20 p.m. Mandeville Basement 150, all lectures, tests and discussion sections in person

Final exam: March 23rd, 11:30 a.m.-2:30 p.m. location TBA

NOTE: This syllabus is subject to change if necessary due to public health crises or other unforeseen events

Faculty:

Prof. Elsa Cleland (she/her/hers) email: [ecleland@ucsd.edu](mailto:ecleland@ucsd.edu)

There will be time to chat at the end of every lecture, or we can make office hours by appointment

Instructional Assistant:

Isaiah Freedman (he/him) email: [ifreedman@ucsd.edu](mailto:ifreedman@ucsd.edu)

Discussion sections: noon-12:50 and 1-1:50 p.m. Warren Lecture Hall 2208

**Course Description:** Climate change is predicted to impact nearly all species, across all ecosystems. We are currently experiencing the sixth major extinction event in the history of Earth, due to myriad factors associated with anthropogenic activities. Changes in biodiversity in response to these changes includes not only losses of species, but also invasions of species into new areas, often with large ecological, environmental and economic impacts. This course will introduce basic concepts in ecology and evolutionary biology, through a focus on case studies documenting changes in biodiversity across the globe. In addition, the course will introduce students to management strategies that have the potential to conserve both biodiversity and the ecosystem services on which humans depend. With no pre-requisites, this course is open to a diversity of majors at UC San Diego.

**Attendance** in all lectures and discussion sections is expected. By enrolling in this course, you *agree to be present and participate in all components*, unless you have an *unavoidable absence* due to illness or emergency. Similarly, faculty and IAs are committed to being present in person, unless they have an *unavoidable absence*. In that case, the lecture will be recorded and placed on Canvas, or the discussion section will be led via Zoom if possible.

**Prerequisites:** None

**Textbook:** None, but there are recommended readings for each lecture (see Canvas)

**Lectures:** Material presented in the lectures will be the majority of what appears in exams, and the question and answer sessions during class time are an opportunity to clarify points of confusion and hear questions from other students. Lectures will be podcast and available at [podcast.ucsd.edu](http://podcast.ucsd.edu) after the lectures. The podcasts are great for catching up if you miss a lecture, but should not replace attending lectures. In some rare cases, for technical reasons, the podcasts may be unavailable or incomplete. Note that there are pop-quizzes in lecture to encourage attendance (see details later in the syllabus). **Please do not attend lectures in person if you are ill and/or have any cold/flu-like symptoms. If you have symptoms you believe are allergies, please wear a mask for the comfort of your classmates.**

**Discussion sections:** Discussion sections are designed so that students have the opportunity to think critically and creatively, communicate ideas both verbally and in writing, and learn through peer-peer interactions. Approximately 5-8 review questions will be assigned each week, posted on Canvas. The discussion section grade is based both on participation and written assignments.

The written questions must be submitted to Canvas **by 11 am on the day of your assigned section** (no credit given for late submissions; don't wait until the last minute to submit to avoid issues such as power outages, etc.). The answers to discussion section questions must be your own work, and may not be

copied wholly or in part from the textbook, lecture slides, external sources or other students. An initial submitted assignment with suspected plagiarism will receive a score of 0 points. Any subsequent submission of an assignment with plagiarized content will constitute a violation of UCSD's policy on Academic Integrity.

During section, students will discuss an assigned question in small groups, and will then present that answer to the larger group. Hence, it's important to come prepared. The submitted questions will be graded based on completeness (e.g. full sentences) but not accuracy, so it is the students' responsibility to make sure they understand the answers by participating in section discussion. A great way to do this is to "correct" your answers during the section. Participation in discussions is critical to doing well in the course. **Please do not attend sections in person if you are ill and/or have any cold/flu-like symptoms.**

**Note that your IA keeps track of all discussion section points.** If you have any questions about your grades for discussion section, please direct them to your IA.

**Group work during discussion section:** Working in a group is a great way to practice productive professional relationships. You should treat your fellow students in the same way that you would want to be treated in a workplace. Treat everyone with respect, and ask questions rather than make assumptions about shared views or experience. Put your best effort into group work, including listening to everyone's perspectives and ideas.

**Communication:** Nearly all communication should be *in person*. There is time at the end of lecture and in discussion sections to answer all of your questions. **Please note, we cannot answer content questions via email;** this policy is based on years of experience - often times if students have a question, their understanding of a topic is "muddy," making the question unclear, and it's hard for us to know if we've addressed your question via email. Much better to just ask in person!

If you need to have a confidential discussion about unavoidable absences or other circumstances that are impacting your learning, or you'd like to discuss graduate school pathways etc., please email Prof. Cleland to set up an individual Zoom meeting.

### **Schedule of lectures, readings and assessments:**

Jan 10 Lecture 1: Introduction to ecology: components of diversity, communities, and ecosystems, including San Diego habitats and species, syllabus, overview of course

<https://www.nature.com/scitable/knowledge/library/characterizing-communities-13241173/>

<https://www.nature.com/scitable/knowledge/library/global-change-an-overview-13255365/>

Jan 12 Lecture 2: Habitat loss: impacts on populations and species, including the pattern of habitat loss, influence of maintaining corridors

<https://www.nature.com/scitable/knowledge/library/conservation-of-biodiversity-13235087/>

<https://www.nature.com/scitable/knowledge/library/spatial-ecology-and-conservation-13900969/>

[https://en.wikibooks.org/wiki/Ecology/Island\\_biogeography](https://en.wikibooks.org/wiki/Ecology/Island_biogeography)

Jan 17 Lecture 3: Introduction to Earth's climate, relationships between biodiversity and climate

reading: <https://www.nature.com/scitable/knowledge/library/introduction-to-the-basic-drivers-of-climate-13368032/>

<https://www.nature.com/scitable/knowledge/library/terrestrial-biomes-13236757/>

Jan 19 Lecture 4: Observed and expected responses of species to climate change

reading: <https://www.nature.com/scitable/knowledge/library/environmental-constraints-to-the-geographic-expansion-of-13236052/>

Optional: <https://science.sciencemag.org/content/355/6332/eaai9214>

Jan 24 Lecture 5: Nitrogen deposition: another significant effect of fossil fuel combustion, impacts of acid rain, biodiversity loss due to nutrient enrichment

reading: <https://www.scientificamerican.com/article/acid-rain-caused-by-nitrogen-emissions/>

Jan 26 Lecture 6: Invasive species: what allows species to invade?

reading: [https://en.wikibooks.org/wiki/Ecology/Invasive\\_species](https://en.wikibooks.org/wiki/Ecology/Invasive_species)

reading: <https://www.britannica.com/science/invasive-species/Solutions>

Optional: Cane toads movie: <https://www.youtube.com/watch?v=6SBLf1tsoaw>

Jan 31 midterm 1, based on lectures 1-5

Feb 2 Lecture 7: How do invasive species alter interactions among native species? How do we manage them?

readings:

<https://www.nature.com/scitable/knowledge/library/predation-herbivory-and-parasitism-13261134/>

<https://www.nature.com/scitable/knowledge/library/trophic-cascades-across-diverse-plant-ecosystems-80060347/>

Feb 7 Lecture 8: Increasing wildfire: relationships among drought, invasion, pests and fire

<https://www.nature.com/scitable/knowledge/library/the-ecology-of-fire-13259892/>

<https://www.npr.org/2020/08/24/899422710/to-manage-wildfire-california-looks-to-what-tribes-have-known-all-along>

Feb 9 Lecture 9: Evolution via natural selection

<https://www.nature.com/scitable/knowledge/library/evolution-is-change-in-the-inherited-traits-15164254/>

reading: [https://evolution.berkeley.edu/evolibrary/article/evo\\_01](https://evolution.berkeley.edu/evolibrary/article/evo_01) (note, I recommend completing sections: An introduction to evolution, Mechanisms: the process of evolution, and Microevolution, but all of the sections are good, and short)

Feb 14 Lecture 10: Impacts of urbanization: species composition, evolution of bird song, behavior

video: <https://vimeo.com/user3004053>, only watch video 6 "Evolution in Action..."

Feb 16 midterm 2, based on lectures 6-10

Feb 21 Lecture 11: Ecological restoration: what defines success? Should we accept "novel ecosystems"?

Do we restore what was there originally, or what will be appropriate with climate change? Review in class for midterm 2

reading: <https://www.nature.com/scitable/knowledge/library/restoration-ecology-13339059/>

Feb 23 Lecture 12: Assisted migration and assisted gene flow: Helping species and genes spread faster to newly suitable habitat with climate change

<https://www.scientificamerican.com/article/assisted-migration-in-the-rambunctious-garden/>

Feb 28 Lecture 13: Ecosystem services and economic incentives for biodiversity protection

video: <https://docuseek2.com/if-nat> Banking Nature (ecosystem services)

Mar 2 Lecture 14: Policy & conservation: local, national and international agreements regarding biodiversity protection and climate change

reading: <https://www.nature.com/scitable/knowledge/library/saving-endangered-species-a-case-study-using-19445898/>

Mar 7 Lecture 15: Mar 9 Climate change mitigation: offsets, geo-engineering and other large scale engineering solutions to climate change have been proposed, we will review evidence of potential success and impacts on biodiversity

March 8: Optional extra credit independent project due

Mar 9: Optional lecture focused on Prof. Cleland's climate change research, this material will not be included in the midterm or final, no pop-quiz this day

Mar 14 midterm 3 based on lectures 11-15

Mar 16 in class review session for the final, no pop-quiz this day

March 23 Final exam, cumulative across the quarter

**Grading & Assessment:** Assessment reinforces the ideas presented over the quarter, and allows students to gauge their progress in the subject. Grading will be based proportionally on the following assessments:

#### 60% tests

The course will have four tests (three midterms and a final) each equally weighted. Students will be able to drop their lowest of the three (so each of the remaining tests will be worth 20%). There will be ***no make-up exams***; the option to drop the lowest test score is meant to account for issues such as illness, emergencies, and other ***unavoidable absences***. We do not distribute "practice tests." The tests will focus on material presented in lectures, there will not be questions from the readings unless the material was also covered in lecture. ***The lecture follow-up assessments and discussion section questions are meant to help you prepare for tests*** (see below).

#### 3% pop quizzes

There will be four "pop quizzes" during lecture, to encourage students to attend lectures and stay up to date with material. The lowest score of the four will be dropped, to account for ***unavoidable absences***. There will be no pop quizzes during the first two weeks of the quarter, so that students who add the class late are not penalized.

#### 15 % lecture follow-up assessment & definitions

After each lecture students will answer a series of practice quiz questions, there are unlimited attempts so all students should have the opportunity to get full credit. These questions are meant to be answered immediately after the lecture, to solidify the learning from the lecture. Hence, the lecture follow-up assessments are due the day after each lecture. Late submissions are allowed (until March 22), but students are encouraged to stay up to date, since they really help you study for the midterms. Note: you're welcome to repeat these assessments to study for the final exam (in this case, Canvas will mark the repeated submission as late but don't worry, you still receive full credit).

#### 22 % Discussion section

16 % will be for turning in weekly discussion section questions ***on time*** and ***fully completed***. Questions are due before each section, because they will be discussed in section, and they will be the basis for your participation. Late submissions will receive zero points (with the exception of the first two weeks, where students can complete the questions by week 3 for full credit, due to late-adds, see due date on Canvas). Assignments that are incomplete or display minimal effort will receive between zero and half credit. Note that the questions will not be graded for accuracy; it's your responsibility to check that your answers are correct when they are discussed in section.

6% is for **attendance** and **participation** in discussion sections. Full credit will be given for attending and participating in at least 6 of the 8 sections - this allows for missed sections due to **unavoidable absences** such as illness, or students who add the course late.

Jan 9<sup>th</sup> introductions, SEEK exercise (attendance taken, plan to come the first day!)

Jan 16<sup>th</sup> MLK Holiday, **no section** questions for lectures 1 & 2 due Jan 17<sup>th</sup>

Jan 23<sup>rd</sup> questions for lectures 3 & 4

Jan 30<sup>th</sup> questions for lectures 5, midterm 1 review

Feb 6<sup>th</sup> questions for lecture 6 & 7, go over midterm 1 answers

Feb 13<sup>th</sup> questions for lecture 8 & 9 (questions for lecture 10 will be discussed in class)

Feb 20<sup>th</sup> President's Day holiday **no section**

Feb 27<sup>th</sup> questions for lecture 11 & 12, go over midterm 2 answers

Mar 6<sup>th</sup> questions for lectures 13 & 14

Mar 13<sup>th</sup> questions for lectures 15, review for midterm 3 and final

#### Optional extra credit: 1% independent project

Using the freely available SEEK app by iNaturalist, students will identify five species on natural areas of the UC San Diego campus, and research information on their ecology, conservation and management. This assignment is designed to give students a brief introduction to local natural areas and species, through a citizen-scientist activity. Although due in week 9, students may complete this project at any time during the course. This is the only extra credit opportunity for the course.

Grading scale: We will use the following grading scale this quarter for final grades:

A+ 100% to 98%

A <98% to 90%

A- <90% to 88%

B+ <88% to 86%

B <86% to 80%

B- <80% to 78%

C+ <78% to 76%

C <76% to 70%

C- <70% to 65%

D <65% to 60%

F <60%

Creating a learning community: Discussing course material with fellow students, either in discussion sections or in study groups, is a great way to practice productive professional relationships. You should treat your fellow students in the same way that you would want to be treated in a future job. Treat everyone with respect, and ask questions rather than make assumptions about shared views or experience. Listen to everyone's perspectives and ideas. By entering into the class you have agreed to abide by UCSD's Principles of Community: <https://ucsd.edu/about/principles.html>

Accessing protected campus resources using VPN: In order to access scientific journals and documentaries that are only available to UC San Diego affiliates, you'll need to be able to access the UC Library resources from off campus via "VPN." See this link to set up VPN access:  
<https://library.ucsd.edu/computing-and-technology/connect-from-off-campus/>

Students with disabilities: Students requesting accommodations and services due to a disability for this course need to provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. For instance,

students eligible for OSD accommodations will schedule their tests with the Triton Testing Center, and this takes a few days to set up. For more information, email the OSD at [osd@ucsd.edu](mailto:osd@ucsd.edu), visit their office at University Center 202 8-4:30 M-F, or go online at <http://disabilities.ucsd.edu/about/index.html>

Resources for student support: A college education teaches you to identify solutions to tough problems. These are skills that future employers will value. University students often encounter non-academic issues that can impact student success, and UC San Diego has invested in a variety of resources to help students. You can and should use these resources to ensure your success, here's a partial list that may be useful to you:

**Academic Success**, including advising, tutoring, mentoring, research opportunities etc:

<https://ucsd.edu/academics/academic-success.html>

**Basic Needs** refers to the most essential resources required to thrive as a student, which includes access to nutritious food, stable housing, and financial wellness resources. The Hub is a new UC San Diego space that offers students the opportunity to engage in and link to Basic Needs resources. This includes the Triton Food Pantry: <https://basicneeds.ucsd.edu/>

**The Campus Community Centers** at UC San Diego build community among our diverse population of students, faculty and staff members. Each provides a forum to increase awareness of social issues, encourage dialogue, build community, improve retention, increase outreach and yield, and foster academic success. For a list of the many campus community centers, as well as other resources to support students, go to: <https://diversity.ucsd.edu/centers/index.html>

**Counseling and Psychological Services (CAPS)** provides free, confidential, psychological counseling and crisis services for registered UCSD students. CAPS also provides a variety of groups, workshops, and drop-in forums. For more information, please visit our Counseling Services page: <https://caps.ucsd.edu/>

**CARE** at the Sexual Assault Resource Center is the UC San Diego confidential advocacy and education office for sexual violence and gender-based violence (dating violence, domestic violence, stalking). CARE provides free and confidential services for students, staff and faculty impacted by sexual assault, relationship violence and stalking.

**The Undocumented Student Services Center** is committed to serving our undocumented students and their families through holistic services. We also advocate for generating a sense of community for all students that are undocumented or come from mixed immigration-status families. <https://students.ucsd.edu/sponsor/undoc/>

**Resources for Students with Dependents:** <https://students.ucsd.edu/well-being/wellness-resources/student-parents/index.html>

**The Student Veterans Resource Center (SVRC)** is committed to ensuring that military affiliated students successfully make the transition from the military environment to campus life, and are assisted in their progress toward completing their academic degree. In collaboration with other University partners, the SVRC seeks to identify and mitigate the barriers to academic success that are specific to the military affiliated student community. <https://students.ucsd.edu/sponsor/veterans/index.html>