

Syllabus BILD 46 “Ecology of a changing planet”

Winter quarter 2021 Lectures T/Th 9:30-10:50 Remote (all meetings on Zoom)

all quizzes and exams will be held 9:30-10:30 a.m.

Final exam: March 16th, 9:30-10:30 a.m.

NOTE: This syllabus is subject to change, especially in light of the Covid19 pandemic

Faculty:

Prof. Elsa Cleland (she/her/hers)

email: ecleland@ucsd.edu

Zoom Q&A sessions: Tuesday & Thursday 10:15-10:45 (during the last part of the scheduled lecture)

Office hours by appointment

Instructional Assistants (all sections on Wednesdays):

Stefan Samu (he/him/his) ssamu@ucsd.edu

Sections: 9 a.m. 5 p.m.

Sarah Villar (she/her/hers) svillar@ucsd.edu

Section: 11 a.m.

Abby Rollison (she/her/hers) prolliso@ucsd.edu

Section: 3 p.m.

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. Assuming only a high school-level understanding of biology, the material will be made accessible to the diversity of majors at UC San Diego.

Prerequisites: None

Logistics: Each week students will watch two pre-recorded lectures at times convenient to them, with opportunities to discuss the material with faculty over Zoom. These lectures will be accompanied by learning activities, videos, and/or readings from popular science publications and accessible peer-reviewed literature, which will be posted on Canvas. Students wishing to maximize discussion/interaction with faculty should watch the lectures each day during class time, so they can ask questions during the synchronous Zoom session at the end of lecture time each day. Students will also attend one hour per week of Instructional Assistant-led discussion section (on Zoom). The grading scheme is posted on Canvas, and grades will be calculated as follows:

15% final exam

A cumulative final exam will encourage students to master the material and learn from prior assessments.

45% quizzes

The course will have four Canvas quizzes each equally weighted. Students will be able to drop their lowest of the four grades, lowering the stakes for any given exam (so each of the remaining quizzes will be worth 15%). Quizzes and exams are given synchronously (students located in other time zones can request a permanent alternate quiz time, during the first two weeks of the quarter). You may use your notes to answer these questions; however, if you consult your notes for every question you are unlikely to complete the quizzes and exams in the time allotted, so you should plan to stay up to date with course material. On quizzes students will see only one question at a time, in random order, and cannot return to questions. These measures are being enacted to prevent academic misconduct during virtual instruction. You will sign an academic integrity pledge at the start of every quiz. The use of cheating websites, consulting with classmates or anyone else (including search engines) is not permitted on quizzes and exams. You are not permitted to take photos or screenshots or copy the quiz/exam questions in any format. Students suspected of academic misconduct will be referred to the Academic Integrity Board and if found guilty will fail the course.

A synchronous Zoom session will run during the quiz so you can ask questions in real time using the chat function. All cameras will be off and sound muted; the Zoom session is not meant for proctoring.

Make-up exams: if an unavoidable conflict causes a student to miss a quiz or exam, they may take an alternate, essay-based test aimed at assessing their knowledge of the course material, to be completed within one week of the original quiz (with the exception of the final exam, for a missed final, with documentation of emergency or other unavoidable absence the grade will be based on the remaining assessments). Unavoidable conflicts include illness, emergency, loss of internet connectivity, but not scheduled work-related activities (please record the times of the quizzes in your calendar and avoid scheduling work or other activities during these times).

If any student receives less than 80% on a given quiz they may take the make-up exam within one week of the original quiz. Their grade on that assessment will be the average of the original and make-up exam, with a maximum score of 80%. Students must request this option within 7 days of the original quiz.

16% lecture follow-up assessments

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. Late submissions are allowed, but students are encouraged to stay up to date to do their best on the quizzes.

4% independent project

Using the freely available SEEK app by iNaturalist, students will identify eight species on natural areas of the UC San Diego campus (or wherever they are located winter quarter), including whether they are native or introduced from elsewhere, and information on their 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.

20% Discussion section

Of this 20%, 12% will be based on a 5-8-minute individual presentation summarizing a popular science article, video or reading on a topic pertaining to that week. Students will present each week in weeks 2-9, with the remaining time in each section devoted to discussion. An example presentation will be shown and discussed in week 1.

The remaining 8% is for attendance and participation in discussion sections. Full credit will be given for attending and participating in at least 8 of the 10 sections - this allows for missed sections due to unavoidable absences such as illness or loss of internet connectivity.

If a student resides in a location where synchronous participation in discussion sections isn't possible, or have another unavoidable conflict such as with child care, they may complete an alternative assignment for participation points. In this case, they will submit a one-page summary of the week's lectures by the time of their weekly discussion section (full credit for submitting summaries for at least 8 of 10 weeks). Late submissions can receive up to half credit. To choose the asynchronous discussion section option students must email Prof. Cleland by the second week of the quarter.

Schedule of lectures, readings and assessments:

Lecture 1: Jan 5 Introduction to ecology: components of diversity, communities, and ecosystems, including San Diego habitats and species, 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/>

Lecture 2: Jan 7 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

Lecture 3: Jan 12 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/>

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Lecture 4: Jan 14 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/>

Jan 19 Quiz 1, based on lectures 1-4

Lecture 5: Jan 21 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/>

Lecture 6: Jan 26 Invasive species: What species are likely to invade? What ecosystems are invulnerable?

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

Lecture 7: Jan 28 How do invasive species alter interactions among native species, including food webs?

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/>

Lecture 8: Feb 2 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 4 Quiz 2, based on lectures 5-8

Lecture 9: Feb 9 Introduction to contemporary evolution: potential for shifting population genetics on ecological timescales.

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

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

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

Lecture 11: Feb 16 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?

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

Lecture 12: Feb 18 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 23 Quiz 3, focused on lectures 9-12

Lecture 13: Feb 25 Citizen science efforts to document regional biodiversity and responses to climate change (iNaturalist, National Phenology Network, Audubon Christmas Bird Count, etc.). Information on the independent project.

<https://www.sandiegouniontribune.com/news/science/story/2020-10-24/san-diego-inaturalist-hotbed>

Lecture 14: Mar 2 Ecosystem services and economic incentives for biodiversity protection

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

Lecture 15: Mar 4 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/>

March 5: Independent project due

Lecture 16: 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

Mar 11 Quiz 4, focused on lectures 13-16

March 16 Final exam, cumulative across the quarter

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 more information, email the OSD at 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:

Links to information about remote learning, including the loaner laptop program and updated links to available campus computer labs: <https://returntolearn.ucsd.edu/return-to-campus/campus-plan/index.html>

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>