ORGANISMIC AND EVOLUTIONARY BIOLOGY
BILD 3
Spring 2023 - Dr. Keefe Reuther

UC San Diego

"Nothing in biology makes sense except in the light of evolution."
– Theodosius Dobzhansky, Evolutionary Geneticist (1900-1975)

Course Information

Course Description	This course deals with the living world at the level of whole organisms, populations, communities, biomes, ecosystems and the biosphere. It is designed to introduce you to the fields of evolution, systematics, ecology, environmental science, behavior and conservation biology. The major focus of the course will be on evolution, since an understanding of the evolutionary process enables us to grasp why there are so many different kinds of living things, how they interact with each other to produce complex ecosystems, the ways in which these interactions may lead to the evolution of complex behaviors, how evolution has often brought about large changes in body plan, and how species (including ourselves) are likely to continue to evolve. Such knowledge is essential for understanding biology in general, and provides the tools for our stewardship of the planet's biota and the sustainability of the ecological services we take for granted.
Credits	4
Instructor	Prof. Keefe Reuther (Call me Dr. Keefe or Dr. K) Email address: kdreuther@ucsd.edu (**please put BILD 3 in the subject line**) **OFFICE HOURS:** Thursday 9:30-1030am in H&SS 8016 Monday (not week 1) 12:30-1:30p on ZOOM: https://ucsd.zoom.us/j/97584213347
Course Format	This is an in-person course. Please see the grading and assessment guide
In-Person Course Elements	Lectures & Midterm: TuTh 411a-12:20p (all lectures will be videocast) in **CATALYST 125** Final Exam: In a TBD room on Tuesday 6/13 11:30a-2:30p Discussion Sections: Your registered discussion time (see next table)
Asynchronous Course Elements	Quizzes (posted each Thursday and due Sunday 11:59pm on Canvas) Study Activity: (posted each Sunday night and due the following Sunday 11:59pm on Canvas)

COURSE LECTURE SCHEDULE

Week	Lecture Topic (timing may vary)
1	Introduction; Evolution - History and Evidence
2	Natural & Sexual Selection
3	Genetic Drift, Gene Flow, Mutation
4	**MIDTERM 1 (Tuesday)** Speciation
5	Phylogenetics and Taxonomy; History of life
6	Biological Diversity: Prokaryotes, Protists, Plants, Fungi & Animals
7	**MIDTERM 2 (Tuesday)** Biological Diversity: Animals Cont.
8	Human Evolution; Intro to Ecology
9	Population Ecology; Community Ecology
10	Ecosystem Ecology; Conservation Biology & Climate Science

14 LEARNING OUTCOMES:

1. Explain how the processes of natural selection and evolution work, including the roles of mutation, genetic drift, and gene flow.
2. Explain how evolutionary processes such as natural selection, sexual selection, gene flow, and chance events (mutation, genetic drift) change allele frequencies and phenotypes over time.
3. Interpret evolutionary trees to determine homology, derived traits, common ancestors, and relationships between taxa.
4. Identify the relative order of, and approximate elapsed time between, major events in earth's history, including the origin of the earth and of major taxonomic groups.
5. Explain the processes by which new species arise and the mechanisms of reproductive isolation.
6. Describe the evolution of Homo sapiens, including anatomical differences from our ancestors and our evolutionary relationship with non-human primate species.

7. Identify the evolutionary relationships among the 3 domains of life: Archaea, Bacteria, and Eukaryota.
8. Compare and contrast animals, plants, and fungi, including their adaptations, ecological roles, and evolutionary relationships.
9. Identify the major phyla of animals and major plant groups based on their characteristics.
10. Describe the ecological roles of producers, consumers, and decomposers and how they interact in a food chain/web.
11. Describe how energy flows, and nutrients cycle, within ecosystems.
12. Explain how species in an ecological community interact with one other and their environments.
13. Describe factors that produce different population growth patterns.
14. Describe the causes and major consequences of global climate change.

INSTRUCTIONAL ASSISTANTS AND DISCUSSION SECTION TIMES:

SECTION	DAY	TIME	BUILDING	ROOM	IA	EMAIL
D01	M	8:00a-8:50a	WLH	2112	Sophia W.	sow001@ucsd.edu
D02	M	9:00a-9:50a	WLH	2112	Sophia S.	sslankar@ucsd.edu
D03	M	10:00a-10:50a	WLH	2112	Sohum	sseedhar@ucsd.edu
D04	M	11:00a-11:50a	WLH	2112	Adele	w1hong@ucsd.edu
D05	M	12:00p-12:50p	WLH	2112	Alan	asinthav@ucsd.edu
D06	W	5:00p-5:50p	WLH	2112	Liz	estuart@ucsd.edu
D07	W	6:00p-6:50p	WLH	2112	Liz	estuart@ucsd.edu
D08	W	7:00p-7:50p	WLH	2112	Eleanor	eterner@ucsd.edu
D09	W	8:00p-8:50p	WLH	2112	Alessandro	agallen@ucsd.edu
D10	W	11:00a-11:50a	WLH	2112	Ariya	amcdonal@ucsd.edu

CONTACT: The best way to contact me is by email: kdreuther@ucsd.edu. On all emails PLEASE put BILD 3 in the subject line to indicate that the email pertains to this course. If you email about anything regarding your status in the course, please include your UCSD username, and PID. If you have questions about course content, it is often faster to email your IA directly.

TEXTBOOK: Campbell Biology, 11 Edition, available at the Price Center Bookstore. It is **OPTIONAL**. I also have posted freely downloadable OpenStax textbooks on Canvas.

LECTURE 'NOTES': A pdf of figures and pictures from the lecture PowerPoints will be posted on Canvas. The lecture will be videocast.

WEBSITE: Everything related to the class is kept on the Canvas site (https://Canvas.ucsd.edu/webapps/login/). Announcements will be posted on the Canvas site. Check the site often! All grades will be posted on Canvas.

MENTIMETER: We will use this free iOS, Android, or web app to participate in class and mark attendance. Please download from your preferred app store.

LEARNING PHILOSOPHY:

This course is designed to be an environment for everyone to learn and construct a shared understanding of the material. **Active participation** by engaging with the lecture material, asking and answering questions, and contributing to breakout sessions during discussion time is expected. Being able to communicate understanding, and confusion, is critical to success in any discipline, and is very useful for learning. To encourage collaboration, section activities will be done in groups, and grades will not be assigned on a curve. Instead of memorization, we will focus on developing an understanding of fundamental concepts as they apply to different examples. Therefore, assignments and assessments will include questions that are based on solving problems in new context

WEEKLY STUDENT DELIVERABLES

All due times are 11:59pm PST	
Sunday EVERY WEEK	Quizzes, Study Activities
Tuesday/Thursday EVERY WEEK	Lecture Attendance (See grading and assessment guide)
Sunday after week 1	Pre-Course Survey #1 & #2
Tuesday week 4	Midterm 1
Tuesday week 7	Midterm 2
Sunday week 10	Post-Course Survey #1 & #2, CAPEs
Finals Week	Final Exam

ASSESSMENT:

The general grading scheme is as follows, although it may be adjusted to improve everyone's grades if necessary. BILD 4 is not graded on a curve, i.e. 20% of students getting A, B, C, and such. Thus, the ability to do well in this course is not dependent on others doing poorly. Grade cut-offs will never be shifted up, but may be shifted down depending on the final overall grade distribution. There is NO rounding of your course grade.

Name	Range	
A+	100%	to 97%
A	< 97%	to 93%
A-	< 93%	to 90%
B+	< 90%	to 87%
B	< 87%	to 83%
B-	< 83%	to 80%
C+	< 80%	to 77%
C	< 77%	to 73%
C-	< 73%	to 70%
D	< 70%	to 60%
F	< 60%	to 0%

ASSESSMENT PHILOSOPHY:

As educators in this course, our primary goal is to help you develop the mindset of a biologist rather than just memorizing their knowledge. To facilitate this, the course is designed around the learning goals outlined earlier in the syllabus. Assessment is a crucial component of this process, encompassing all tasks for which you receive feedback or grades. This enables both you and the instructional team to monitor your progress towards mastering the skills embedded in this course.

While the grading guide's five assessment categories may appear overwhelming, each is essential for evaluating your growth as a responsible, creative, and productive scientist. Exams alone cannot adequately achieve this objective. Adopting a more holistic approach to feedback and grading provides a better understanding of your strengths and areas for improvement.

To help you stay organized, we recommend establishing an intentional and user-friendly system to keep track of your goals and tasks. A calendar app is an excellent starting point, ensuring that each deliverable for every class is scheduled and regularly reviewed. For notes, thoughts, and other materials, you can explore various options such as paper and pen, Apple Notes, Notion, Evernote, etc. This class will support your organization with a schedule and

grading guide in the syllabus, as well as weekly announcements and module pages listing all upcoming deliverables.

Inevitably, life events can interfere with your ability to attend class or submit assignments on time. Balancing these challenges with a fair grading policy is a complex task. Here are two guiding principles that underpin our approach:

1. Life happens, and your privacy matters. Illness, family emergencies, or other unforeseen events might prevent you from completing assessments on time, and you should not be obligated to share these personal matters to your instructor or instructional assistants.
2. Grading policies have both advantages and disadvantages. While accepting late assignments could benefit many students, there are costs involved. Instructional assistants, who are often busy students themselves, need to manage their grading schedules effectively. Additionally, accepting late work after answer keys are posted is problematic. To balance these concerns, we will either drop a certain number of assignments for all students or adjust the weighting of missed assignments/exams. This approach accommodates everyone, particularly those uncomfortable discussing their reasons for late or missed submissions.

While grades may currently be a primary focus, it's crucial to remember that once you embark on your chosen career or academic path, your skills, knowledge, motivation, and wisdom will take precedence. Focus on cultivating these attributes in each of your classes, ultimately building a solid foundation of knowledge and expertise. Prioritizing genuine understanding over letter grades is like ascending a solid mountain instead of a sand dune - your efforts yield meaningful progress, leaving you invigorated and closer to your goals, rather than drained and no further ahead.

PLEASE REFERENCE THE GRADING GUIDE ON THE NEXT PAGE!!!

BILD 3 Grading guide

DR. KEEFE SPRING '23

Weekly Canvas Quizzes (25%)

- Each quiz will open Thursday at 5pm PST on the course Canvas site. You will have 60 minutes and 1 attempt.
- There will be a quiz weeks 1-10.
- Your 2 lowest scores will be dropped.
- No late or makeup quizzes - the key will be posted the next day.
- Each quiz is non-cumulative and covers materials and concepts from that week in lecture.

Due: Every Sunday @ 11:59pm (Weeks 1-10)

Weekly Study Activities (20%)

- Each study activity will post Sunday and will be due the following Sunday at 11:59pm PST (Beginning week 2)
- You may use your discussion section to work on this activity collaboratively. However, you may not copy or plagiarize the work of others.
- Your 2 lowest scores will be dropped.
- Late penalty is -2% per hour for any reason.
- After 48 hours or if assignment can't be completed, then you will receive a 30% credit for the missing assignment.

Due: Every Sunday @ 11:59pm (Weeks 2-10)

Lecture Participation (5%)

- Participation in lecture weeks 2-10 will be recorded.
- Download the Mentimeter app. No account or $ needed.
- You may miss up to 6 lectures and still receive full credit.
- You may not receive credit for a lecture you do not attend and participate on the app for any reason. I understand that life happens (e.g., sickness). This is why you can miss up to 6 lectures and still receive full credit.

Lecture TuTh @ 11am Catalyst 125

Midterm 1 (10%) & Midterm 2 (15%)

- It is in-class and must be taken at the scheduled time. They are cumulative.
- You get a single 6"x 4" notecard of your own creation and a basic calculator. The notecard must have your name on it and be turned in with exam.
- A single missed midterm for any reason will add that grade weight to the final exam. A second missed midterm for any reason and you will receive a 30% credit for the first midterm and the final exam will then be worth 40% of your grade.

In-class Tuesday of weeks 4 and 7

Final Exam (25%)

- Cumulative with material roughly divided:
  - 25% midterm 1
  - 25% midterm 2
  - 50% new material
- You get a single 6"x 4" notecard of your own creation and a basic calculator. The notecard must have your name on it and be turned in with exam.
- Missing the final exam for any reason will be handled according to the School Incomplete Policy.

Tuesday 6/13/23 11:30a-2:30p

Extra Credit +1%

- Complete Pre-Course Survey by the end of week 1 for 0.25% EC
- Complete Post-Course Survey by the end of week 10 for 0.25% EC
- Complete CAPE Survey by the end of week 10 for 0.5% EC if 80% of the class responds.

Due: Sunday at the end of weeks 1 & 10

NOTE: Appropriate exceptions will be made for students with AFA letters.

SUPPLEMENTAL INSTRUCTION (SI):

Supplemental Instruction (SI) sessions offer students the opportunity to master course material within a community of learners. The SI program gives students a safe and inclusive environment to engage with, ask questions, and review lecture material with their peers. The SI Leaders facilitate these discussions through activities and guided questioning.

SI Leader: Yufei Zhang yuz181@ucsd.edu

Content Tutoring provides tutoring support for students in various STEM courses from peer tutors who are ready to help! Services are available in-person and online via appointment. Students are welcome to bring any questions or concepts you would like to review. We'd appreciate it if you encourage your students to come early and often!. This Winter quarter we are open:

- In-Person (Geisel Library 1st Floor West)
  - Monday - Thursday; 12 PM - 8 PM
  - Friday; 12 PM - 5 PM
- Online (Zoom)
  - Monday - Friday, Sunday; 5 PM - 9 PM

Learning Strategies is a program designed to support students in study skills and non-course specific academic support. Students have access to a Canvas site with study strategy and exam prep resources, one-on-one appointments, and workshops. Some topics our peer learning strategists can support you with include note-taking, time management, and general study strategies.

REGRADES:

If a grading error has been made, you should submit a regrade request to Dr. Keefe using the regrade request form available on Canvas.

LETTERS OF RECOMMENDATION:

If you think you may want me to write you a letter of recommendation (or any other instructor), please consider what a good letter would contain and how your actions in the course demonstrate the qualities you will want highlighted in a good letter. When students ask me for

a letter of recommendation, I ask them to write to me about how they demonstrated critical thinking, leadership, collaboration, and professionalism. I will be specifically looking for examples of these qualities *that I could have noticed* during lab/lecture and office hours. Be sure to actively participate in the discussions, talk to me during the lab/lecture and my office hours: ask questions, offer your own ideas and interpretations of your results, bring interesting facts/papers that are connected to the material we are studying. If you don't actively show the qualities that are needed to write a good letter, it will be hard for me to write a letter that is meaningful and useful.
Therefore, in order to ensure I am able to write substantive, insightful, and informative letters, I am only able to potentially write letters for students who fit the following criteria:

- If you are applying for an undergraduate grant/job/program:
    - You must have received at least a "B-" grade in one of my courses or be actively enrolled and passing one of my courses.
    - You must have met with me more than once outside of class (e.g. office hours/Coffee with a Prof) OR the letter is more than 2 months from being due and we can schedule at least one significant meeting.
- If you are applying for a post-graduate program (e.g. med school, post-bacc program)
    - You must satisfy ONE of the following criteria:
        - You received an "A-" or higher in one course.
        - You took more than one class with me and demonstrated clear improvement.
        - You worked with me as an Instructional Assistant or in some other professional capacity.
    - AND you must ALSO satisfy ONE of the following criteria:
        - We have met and talked multiple times in a way where I was reasonably able to assess your potential for your applied program. Examples include office hours, IA meetings, or Coffee-with-a-prof.
        - The due date for the letter is greater than one academic quarter away and you commit to meeting with me at least once to have a formal conversation.

ACADEMIC INTEGRITY:

https://students.ucsd.edu/academics/academic-integrity/index.html

Students are expected to do their own work, as outlined in the UCSD Policy on Academic Integrity. Academic misconduct is broadly defined as any prohibited and dishonest means to receive course credit, a higher grade, or avoid a lower grade. Academic misconduct misrepresents your knowledge and abilities, which undermines the instructor's ability to determine how well you're doing in the course. Please do not risk your future by cheating.

Students suspected of AI violations on exams will be invited to Zoom follow-up meetings where they will be asked to (in real time, on video) justify their answers (before the graded

exams or solutions are released). If the instructor isn't convinced during the meeting, or the student refuses to participate, they're submitted for AI violations.

Integrity of scholarship is essential for an academic community. The University expects that both students and faculty will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual(s) to whom it is assigned, without unauthorized aid of any kind. In this course, we need to establish a set of shared values. Following are values* adopted from the International Center for Academic Integrity, which serve as the foundation for academic integrity.

	As students we will.....	**As the teaching team we will.....**
Honesty	• Honestly demonstrate your knowledge and abilities according to expectations listed in the syllabus or in relation to specific assignments and exams • Communicate openly without using deception, including citing appropriate sources	• Give you honest feedback on your demonstration of knowledge and abilities on assignments and exams • Communicate openly and honestly about the expectations and standards of the course through the syllabus and in relation to assignments and exams
Responsibility	• Complete assignments on time and in full preparation for class • Show up to class on time and be mentally and physically present • Participate fully and contribute to team learning and activities	• Give you timely feedback on your assignments and exams • Show up to class on time and be mentally and physically present • Create relevant assessments and class activities
Respect	• Speak openly with one another while respecting diverse viewpoints and perspectives • Provide sufficient space for others to voice their ideas	• Respect your perspectives even while we challenge you to think more deeply and critically • Help facilitate respectful exchange of ideas
Fairness	• Contribute fully and equally to collaborative work, so that we are not freeloading off of others on our teams • Not seek unfair advantage over fellow students in the course	• Create fair assignments and exams and grade them in a fair and timely manner • Treat all students and collaborative teams equally
Trustworthiness	• Not engage in personal affairs while on class time • Be open and transparent about what we are doing in class Not distribute course materials to others in an unauthorized fashion	• Be available to all students when we say we will be • Follow through on our promises • Not modify the expectations or standards without communicating with everyone in the course
Courage	• Say or do something when we see actions that undermine any of the above values	• Say or do something when we see actions that undermine any of the above values

	• Accept the consequences of upholding and protecting the above values	• Accept the consequences of upholding and protecting the above values

** This class statement of values is adapted with permission from Tricia Bertram Gallant Ph.D.*

CAMPUS POLICIES:

- UC San Diego Principles of Community
- UC San Diego Policy on Integrity of Scholarship
- Religious Accommodation
- Nondiscrimination and Harassment
- UC San Diego Student Conduct Code

Diversity and equity statement

It is important for us to make sure that how we teach this course and how we accommodate different student needs reflects the differences of race, ability, sexual orientation, age, and gender identity that enrich our classroom experience and campus. If you have any concerns related to diversity and equity in the course, please contact the instructor.

If you find yourself in an uncomfortable situation, ask for help. The university is committed to upholding policies regarding nondiscrimination, sexual violence, and sexual harassment.

STUDENT RESOURCES:

Learning and Academic Support	
Ask a Librarian: Library Support *Chat or make an appointment with a librarian to focus on your research needs* Course Reserves, Connecting from Off-Campus and Research Support *Find supplemental course materials* First Gen Student Success Coaching Program	Writing Hub Services in the Teaching + Learning Commons *One-on-one online writing tutoring and workshops on key writing topics* Supplemental Instruction *Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses* Tutoring – Content

Peer mentor program that provides students with information, resources, and support in meeting their goals Office of Academic Support & Instructional Services (OASIS) *Intellectual and personal development support*	*Drop-in and online tutoring through the Academic Achievement Hub* Tutoring – Learning Strategies *Address learning challenges with a metacognitive approach*
Support for Well-being and Inclusion	
Basic Needs at UCSD *Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live is encouraged to contact:* foodpantry@.ucsd.edu | basicneeds@ucsd.edu | (858) 246-2632 Counseling and Psychological Services *Confidential counseling and consultations for psychiatric service and mental health programming* Triton Concern Line *Report students of concern:* (858) 246-1111 Office for Students with Disabilities (OSD) *Supports students with disabilities and accessibility across campus*	Community and Resource Centers Office of Equity, Diversity, and Inclusion *As part of the Office of Equity, Diversity, and Inclusion the campus community centers provide programs and resources for students and contribute toward the evolution of a socially just campus* (858).822-.3542 | diversity@ucsd.edu Get Involved *Student organizations, clubs, service opportunities, and many other ways to connect with others on campus* Undocumented Student Services *Programs and services are designed to help students overcome obstacles that arise from their immigration status and support them through personal and academic excellence*

PRIVACY PRACTICES

(From https://cio.ucop.edu/privacy-tips-for-your-syllabus/)

This course is a community built on trust; as a learning community, we are collectively responsible for upholding privacy protections. In order to create a community built on trust and the most effective learning experience, our interactions, discussions, and course activities must remain private and free from external intrusion. We have obligations to each other to preserve privacy and cultivate fearless inquiry. We respect the individual dignity of all and will refrain from actions that diminish others' ability to learn.

As your instructor, I am committed to protecting your privacy by only using university-approved course technologies and adhering to the Family Educational Rights and Privacy Act
(FERPA) https://catalog.ucsd.edu/about/policies/notification-of-rights/index.html and Campus Privacy Office guidelines. This includes using your educational data only as allowed by FERPA, for example, for legitimate educational purposes such as submitting your final grades to the registrar's office.

SUBJECT TO CHANGE POLICY

Due to unforeseen circumstances, minor aspects of this syllabus may change. This includes changes to scheduling, grading values, and policy. It is the responsibility of the instructor and instructional assistants to announce changes with reasonable notice in multiple formats (e.g. lecture and Canvas announcements, email, etc.). It is the responsibility of the student to make note of these changes and communicate with the instructor if you have questions or concerns about the changes.
