

ENVS 21: Introduction to Environmental Science
Lecture: M/W/F 10:30-11:35am

Winter 2014
Lab: M/W 2:15-5:00pm

Instructor: Holly Moeller
Office Hours: M 1:00-2:00pm, W 9:00-10:00am, or by appointment; Varsi 221
Email: hmoeller@scu.edu (Include "ENVS 21" in the subject line!!)

Required Text: Andrew Friedland, Rick Relyea, David Courard-Hauri. Environmental Science: Foundations and Applications. W.H. Freeman & Co., 2012. (Note that this is also the text for ENVS 23, so majors may want to hold onto their books!)

The lab manual and additional required readings will be posted on Camino.

Course Description: Perhaps the biggest challenge that our species will face in our lifetimes is sustaining healthy human life on Earth. In order to do so, we must first understand how the Earth functions, and how humans are fundamentally altering these functions on global scales. To this end, ENVS 21 presents the tools and applications of environmental science, with a particular focus on the biological sciences. This course links fundamental concepts in biology – from genes and evolution to ecosystem ecology and dynamics – with their applications to current environmental questions. You will be challenged to think critically through a synthesis of lectures, varied reading materials, and group discussion. The associated laboratory will include both on- and off-campus exercises to illustrate the tools of environmental science, apply the scientific method, and learn the fundamentals of data analysis.

Assignments and Grading: During this quarter, I expect you to (1) learn the fundamentals of environmental science, (2) apply these concepts, together with the scientific method, to ask questions about the world around you, and (3) link these classroom and laboratory experiences with real-world applications. To keep us on track to meet these goals, I will be evaluating your progress throughout the quarter with in-class quizzes on reading material, lab notebook checks, and lab reports. In addition, we'll have the traditional midterm and final examinations.

IMPORTANT: There is a mandatory field trip on Saturday, January 25! (See laboratory schedule for more details)

Grading Breakdown:

Class Participation	10%
In-Class Quizzes	10%
Lab Notebook & Preparedness	10%
Lab Reports	20%
Midterm Exam	20%
Cumulative Final Exam	30%

Course Policies:

- 1. Attendance:** is mandatory for all laboratory sessions, **including the special field trip on Saturday, January 25.** *Unavoidable* absences *with documentation* are acceptable, but you must make up the missed lab on your own time. (This involves borrowing equipment, making the trek to the field site, etc. Quite the inconvenience, so I don't recommend it!)

I won't take attendance in lecture, but I will cover material that won't be found in your readings, so I highly recommend that you join us. In addition, a portion of your final grade will depend on lecture participation, including in-class exercises and a final debate.

- 2. Disruptions to Class:** may result in you being asked to leave class. Please switch cell phones to silent and put them away. If you prefer to take notes on your laptop or other electronic device, please sit in the front two rows of the classroom.
- 3. Course Communications:** will, in general, use Camino. This is where you will find supplementary reading material, lecture slides, laboratory manuals, and your grades. (Note that these grades are just an indication of your current progress, and are not necessarily equivalent to your final grade.) I will also keep an up-to-date version of this syllabus there.
- 4. Late Assignments:** will incur a 30% penalty per day overdue. I will not accept pre-lab assignments late!
- 5. Make-Ups:** are generally not permitted, except for extenuating, appropriately documented excuses. I will not give make-ups for in-class reading quizzes.
- 6. Disability Accommodation Policy:** To request academic accommodations for a disability, students must contact Disabilities Resources located in Benson Center, 216. (408) 554-4109. Students must provide documentation of a disability to Disabilities resources prior to receiving accommodations.
- 7. Academic Integrity:** must be practiced! The penalty for cheating or plagiarism is a failing grade for the course, and the University may take further disciplinary action. Plagiarism occurs when you use the words or ideas of someone else without reference to the source. (If you have questions about how to cite material, please contact me before you turn in your assignment!) All of the work that you turn in must be your own, and not that of a classmate or copied from another source. Please see <http://www.scu.edu/academics/bulletins/undergraduate/Academic-Integrity.cfm>.

Laboratory Guidelines:

- 1. Laboratory Safety:** is extremely important! There is absolutely NO EATING OR DRINKING (including water bottles) in the lab at any time. You MUST WEAR CLOSE-TOED SHOES at all times. **I will be checking your pre-lab assignments at the start of each lab** – this is primarily for your safety, as it will ensure you are familiar with the hazards you may encounter during the lab! If you have any accidents, break anything, spill a chemical, are injured in any way, etc., TELL ME IMMEDIATELY!
- 2. Field Safety:** depends on your awareness and preparedness. Know the hazards – poison oak, slippery or steep surfaces, bad weather, rattlesnakes, etc. – which are no more serious than you'd encounter on any day hike outside. Dress appropriately for the weather (rain gear, sunscreen, hat, water, sturdy shoes, etc.).
- 3. Lab Notebooks:** must have glued or stitched binding and have at least 50 pages. Lab notebooks are the cornerstone of science: they're our record of methods and results for future publications, reproducing experiments, etc. Starting in the second week of the quarter, **I will periodically spot-check notebooks at the end of lab** to make sure your entry is legible and complete.
- 4. Clean-Up:** is everyone's responsibility. Leave your lab bench as you found it at the start of the lab. Clean and put away any field equipment. Help your neighbors – no one leaves until everyone's cleanup is finished!

Lecture Schedule:

Exam dates are firm, but lecture topics are subject to change. Always check the current version of the syllabus on Camino for updates to the assigned reading, as well as to the lecture schedule.

Reading should be completed before you attend the associated lecture (with the exceptions of Lectures 1 and 2). Plan ahead, because some days will have more required reading than others! Much of the material we cover in this class will not be contained in your textbook. I will frequently provide you with supplementary reading via Camino. **You will occasionally be quizzed** on this material, so be to come to lecture prepared!

Date	DOW	Lec. #	Topic	Reading (subject to change)
Jan. 6	M	1	Course intro; Core scientific concepts	Text Ch. 1 p. 1-11, 15-22; Skim Ch. 2 as supplement if needed
Jan. 8	W	2	Organismal Biology: Evolution	Text Ch. 5 p. 124-134; McKenna 2011; Sifferlin 2013
Jan. 10	F	3	Organismal Biology: Adaptation and the niche	Text Ch. 5 p. 119-123, p. 134-139
Jan. 13	M	4	Population Ecology: basic concepts	Text Ch. 6 p. 151-154, 159-161; Text Ch. 7 p. 182-188
Jan. 15	W	5	Population Ecology: growth models; fisheries ecology	Text Ch. 6 p. 154-158; Pikitch 2012
Jan. 17	F	6	Population Ecology: humanity's ecological footprint	Text Ch. 7; Text Ch. 1 p. 12-14
Jan. 20	M	--	<i>MLK Day, no class</i>	
Jan. 22	W	7	Community Dynamics: species interactions	Text Ch. 6 p. 161-168
Jan. 24	F	8	Community Dynamics: species interactions pt. 2	Basgall 2006; Broache 2006; Hairston et al. 1960 (highly recommended)
Jan. 27	M	9	Community Dynamics: succession and stability	Text Ch. 6 p. 168-170; Text Ch. 3 p. 73-76
Jan. 29	W	10	Guest Lecturer Lauren Oakes: Community Succession in Action – stories from Southeast Alaska	
Jan. 31	F	11	Ecosystem Ecology: Follow the energy flows	Text Ch. 3 p. 57-65; Estes et al. 2011
Feb. 3	M	12	Ecosystem Ecology: Nutrient cycles and limitation	Text Ch. 3 p. 65-76; Pearce 2011

Feb. 5	W	13	Ecosystem Ecology: Biomes and their constraints	Text Ch. 4; NRCS Report
Feb. 7	F	14	Ecosystem Ecology: Biodiversity	Text Ch. 6 p. 171-172; Text Ch. 18; Kareiva & Marvier 2003
Feb. 10	M	15	Harnessing Natural Systems: Feeding the world	Text Ch. 11; Sachs 2008
Feb. 12	W	16	Midterm In-Class Review Session	Bring your questions to lecture!
Feb. 14	F	--	Midterm (tests through Feb. 7 material)	
Feb. 17	M	--	<i>President's Day, no class</i>	
Feb. 19	W	17	Harnessing Natural Systems: Land use (and abuse)	Text Ch. 10
Feb. 21	F	18	Guest Lecturer Chase Mendenhall: Countryside Biogeography and the Future of Conservation	
Feb. 24	M	19	Class Cancelled	
Feb. 26	W	20	Harnessing Natural Systems: Fossil fuels and energy resources	Text Ch. 12 p. 325-332; Ch. 19 p. 518-533 (focus on C cycle)
Feb. 28	F	21	Harnessing Natural Systems: Climate change and biological impacts	Text Ch. 19 p. 518-540 (focus on temp. rise)
Mar. 3	M	22	Harnessing Natural Systems: Ocean acidification	Doney 2006
Mar. 5	W	23	Guest Lecturer Aaron Strong: Linking Climate Science to Public Policy	
Mar. 7	F	24	Harnessing Natural Systems: Pollution and bioremediation; toxins and bioaccumulation	Text Ch. 14 p. 381-385, 389-399; Text Ch. 17 p. 477-479
Mar. 10	M	25	Harnessing Natural Systems: Fate of the oceans	Halpern et al. 2012
Mar. 12	W	--	Ecosystem services and the economics of nature	Text Ch. 3 p. 77-80; McCauley 2006
Mar. 14	F	26	Ethical considerations; tragedy of the commons; closing messages	
Mar. 17	M		Final Exam, 9:10-12:10am	

Laboratory Schedule:

When you registered for this class, you selected either a Monday or Wednesday lab time.

You will attend a total of six laboratory sessions over the course of the quarter. The class will be divided into two groups (A and B). On some weeks, as described in the schedule below, only one group will attend.

There are two Saturday labs: One, on January 25, is mandatory. I will have you sign up for time slots on the week of January 13.

The second will be held on February 22. This will be a field trip to the baylands to explore the fascinating ecology of salt marshes. Students who attend will be given 5 bonus points on their Final Exam score.

Students who do not attend should get notes from a fellow student. **There will be a question about this field trip on the Final Exam!**

Date:	Activity	Groups
Jan. 6/8	Intro to lab, notebooks, data analysis	Whole Class
Jan. 13/15	Leaf Litter start	Whole Class
Jan. 20/22	No lab this week; special lab on Sat., Jan 25	
Jan. 25	Special Saturday Biodiversity Lab!	Whole Class
Jan. 27/29	Holling Functional Responses	Group A
Feb. 3/5	Holling Functional Responses	Group B
Feb. 10/12	Carbon Accounting	Group A
Feb. 17/19	No lab this week; optional lab on Sat., Feb 22	
Feb. 22	Saturday Salt Marsh Field Trip	
Feb. 24/26	Carbon Accounting	Group B
March 3/5	Leaf Litter conclusion	Whole Class
March 10/12	Optional review Q&A session for final	Whole Class

Pathways: This course is associated with the “Sustainability” Pathway in the core. If you choose this pathway, you may want to save electronic copies of your work for inclusion in the Pathway Portfolio, due in your Senior Year.

Extra Credit: May be obtained in several ways:

- (1) Attend the February 22 salt marsh field trip (worth 5 points on Final Exam).
- (2) Attend an ESS Friday afternoon seminar (schedule online at <http://www.scu.edu/cas/ess/events>) and turn in a two-sentence summary of the talk by the following Friday. (Max of 2; Each worth one in-class reading quiz)
- (3) Volunteer in the Forge Garden for two hours during community gardening hours (M-Th, 2-5pm) and, within one week, bring me a slip of paper signed by Rose Madden (the garden manager) that confirms your presence. (Max of 3; First one = 5 points on Midterm (if completed by Feb. 7) or 5 points on Final (if after Feb. 7); Second one = 5 points on Final (if 1st one counted towards Midterm) or one in-class reading quiz; Third one = one in-class reading quiz)