

# ESS 311

## Ecosystem Ecology

Monday, Wednesday 3-4:15 Clark A 206

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**Overview:** In this class, students will learn the general principles of ecosystem ecology. We will also examine how natural and anthropogenic drivers/disturbances affect dominant ecosystem processes and the services these systems provide. The class will emphasize a systems approach to understanding and managing ecosystems under change. We will also consider humans as integral components of ecosystems through the study of coupled human-natural systems.

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### **Student Performance Objectives**

*By the end of this class, you should*

- 1) Understand the basic principles of ecosystem ecology;
- 2) Understand how both natural and anthropogenic drivers affect ecosystem processes;
- 3) Understand the coupled human-natural systems approach to managing under change;
- 4) Possess the skills and knowledge to sustain stated ecosystem processes and to recognize the ecosystem tradeoffs involved in management decisions;
- 5) Develop skills for successful communication about ecosystems and their sustainability

### **Course Materials**

**A. Canvas (required):** Course information, assignments, grades, readings and other important information will be posted on Canvas (<http://info.canvas.colostate.edu/login.aspx>). It will be updated on a regular basis. Also, feel free to post your comments about the course and course material on the discussion forum. The webpage will contain links to lecture materials, homework assignments, grades, and other important links.

**B. SimUText Simbiotic software (required).** Selected lab simulations. Total cost: \$32

Please follow the instructions below to subscribe to SimUText for your **ESS 311** course at **Colorado State University**.

It is important that you review the information below *before* you subscribe to the SimUText. **To avoid possible problems, do not wait until the last minute.**

- CHECK YOUR TECH! Visit <https://simutext.zendesk.com/hc/en-us/categories/200170134-Check-Your-Tech-> to confirm that the SimUText application will work on your computer, and/or to explore your options if there is a problem.
- If you purchased a SimUText Voucher from your bookstore, be sure to have it with you when subscribing, as you will need to enter your voucher code.
- When you are ready to subscribe and download installers, follow this link to initiate the process: <https://www.simutext2.com/student/register.html#/key/LP3C-v4NM-kBBM-zpVP-2VXX>
- After you have completed the subscription process, if you need to download the SimUText application installers again, you will be able to access them by logging into the **SimUText Student Portal** (<https://www.simutext2.com/student>).

Should you encounter problems, you may need your course-specific Access Key. It is: **LP3C-v4NM-kBBM-zpVP-2VXX**

Problems or questions? Visit **SimUText Support** (<http://simbio.com/support/simutext>)

**C. iClicker (required).** *You MUST bring the iClicker to every class lecture.*

You are required to purchase an iClicker remote for in-class participation. iClicker is a response system that allows you to answer questions during class and receive credit for participation. In order to receive credit, you will need to register your iClicker remote online within the first two weeks of class at the following web site.

<http://clicker.colostate.edu>

There you will find this help for students:

### **Students**

To use iClicker with Canvas:

- Register your iclicker remote, a one-time registration, in a Canvas course to sync your iClicker with the Canvas gradebook. [Canvas iClicker7 Student.pdf](#)

**Format and Evaluation:** This class will consist of lectures, student-led discussions and presentations, and limited active learning exercises.

**Grading:**

Examinations	15% (each) x 2 = 30%
Homework Assignments	5% (each) x 6 = 30%
Mountain Data and Storymap Project	25%
Class Participation (i-clickers)	15%

The exams are scheduled for October 12 and December 7. There is no final exam; instead, you have a group story map due on December 14. Homework assignments are due before class time on the due date. Late homework assignments will not be accepted. There will be no opportunity to make up points for missed class periods.

**Educational Philosophy:** Our role in the learning process is to present material to you in an interesting and understandable manner. I will work hard to do this and to help you achieve the student performance objectives listed in this syllabus. I expect you to attend all classes, to actively participate in class, to do all assignments on time, and to regularly check the course website.

**Classroom Environment and Etiquette:** It is very important that you be courteous and respectful to the instructors, the other students, and our guest lecturers. To do so, you must be prompt for class, turn off your cell phones, and not speak when others are speaking. Feel free to ask questions in and out of class. Also, feel free to provide feedback on class materials, assignments and readings throughout the semester.

We expect that students will adhere to the CSU principles of academic integrity (refer to <http://www.catalog.colostate.edu/front/policies.aspx>). Failure to do so may result in a zero for an assignment or a failure of the class.

**Talk to us:** If you do not understand something we present in class, please let us know – chances are someone else also does not understand. We welcome all questions regarding the course material, assignments, and the application of the course material to the REAL WORLD!!

If you are physically or otherwise learning disabled, please let us know how we can best accommodate you and help maximize your learning experience in this class.

<i>Date</i>	<i>Class Topic</i>	<i>Assignment Due</i>
	<b><i>I. Fundamentals of Ecosystem Ecology</i></b>	
Aug. 22 (M)	Welcome, course introduction, and introduction to the field of Ecosystem Ecology	
24 (W)	Earth's Climate System & Feedbacks between Climate and Ecosystems	Reading: Chapin chapters 1 & 2
Aug 29 (M)	Carbon Inputs: Photosynthesis	SimUText Ecosystem Ecology, Section 1 due
Aug. 31 (W)	Carbon Inputs: GPP, NPP and Plant Respiration (assign students wedges groups and assignments)	Reading: Chapin chapters 5 & 6
Sept. 5	LABOR DAY	SimUText Ecosystem Ecology, Section 2 due
Sept 7 (W)	Litter and SOM Decomposition (Matt Ramlow)	Reading: Chapin chapter 7
Sept 12 (M)	Stella Lab – meet in NR Computer Lab West (second floor of WCNR building)	SimUText Decomposition, Section 2
Sept 14 (W)	Global Carbon Cycle - Wedges exercise in class	
Sept 19 (M)	Global Carbon Cycle - Wedges exercise in class	Stella Lab
Sept 21 (W)	Nitrogen Cycling 1	Reading: Chapin chapter 9
Sept 26 (M)	Nitrogen Cycling 2	SimUText Nutrient Cycling, Section 2
Sept 28 (W)	Using Stable Isotopes in Ecosystem Science (Francesca Cotrufo)	Reading: Sun et al. 2011
	<b><i>II. Drivers and Impacts of Global Change on Ecosystems and their Processes</i></b>	
Oct 3 (M)	Mountains, Big Data, and Introduction to the Final Storymap Project (assign groups/region/contacts); preview storymaps	Hampton et al. 2013
Oct 5 (W)	Mountain Nitrogen Deposition (Bella Oleksy)	Reading: TBD
Oct 10 (M)	Exam Review	
Oct 12 (W)	MID-TERM EXAM (exam covers material through 09/28)	Mid-term exam
Oct 17 (M)	Story maps <i>Meet in Morgan Library Computer Lab 173</i>	
Oct 19 (W)	Climate change: biodiversity	Reading: IPCCWG1AR5 Sum. for Policy Makers
Oct 24 (M)	Climate change: ecosystem processes	Storymap evidence & responsibility checklist
Oct 26 (W)	Predators and herbivores as top-down controls	Reading: Chapin chapter 10
Oct 31 (M)	Class time to work on group projects	SimUText, Keystone Predator
	<b><i>III. Ecosystem Science for Sustainability</i></b>	
Nov 2 (W)	Building resilience – What is sustainability science?	Reading: Miller 2013 Sust. Science
Nov 7 (M)	Transdisciplinary approaches Rangeland Scenarios in-class exercise 4	

Nov 9 (W)	Class time to work on group projects	
Nov 14 (M)	Multiple Knowledge Systems - Tibetan Plateau case study	Storymap confirmation checklist
Nov 16 (W)	Ecosystem services approach and PES (Xoco)	
Nov 21 (M)	Thanksgiving Break	
Nov 23 (W)	Thanksgiving Break	
Nov 28 (M)	Citizen Science (Greg Newman)	Reading: TBD
Nov 30 (W)	Receive feedback on storymaps and work with group.	Draft of storymap
Dec 5 (M)	Review, course evaluation, wrap up	
Dec 7 (W)	FINAL EXAM (in class)	Final exam
Dec 14 (W)	FINALS WEEK	Final storymap