

Ecology:
Theme – Texas Hill Country
Dr. Romi L. Burks; @ProfRomi
Chair & Professor of Biology



Semester Class Time: 10 – 11:15 am Tuesday/Thursday, Fondren Jones 103; Lab W 2 -4:50 pm FJS 220

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About this Course: As a discipline, ecology focuses on describing the distribution and diversity of organisms and explaining the mechanisms and processes across and between patterns. Actually, if you think about it, you have been learning the basic principles of ecology since elementary school. Consequently, much of the content of ecology may seem familiar, but the ways of thinking will likely be new and possibly uncomfortable. “Questions” in ecology rarely have a “right” answer, or even just a single answer. Instead, the answer lies on a continuum of “it depends” – the real question is “on what does the answer depend?”

During the course, we will explore these fundamental principles of ecology:

1. “It” depends.
2. “It” relates to evolutionary theory.
3. “It” connects to something else.
4. “It” is rarely simple.
5. “It” matters.

My goal is for students to be able to explain the nuance between each of those principles. I do not see ecology as simply a set amount of content. Although often viewed as simple, the field of ecology continues to expand into more and more subdisciplines: urban ecology, landscape ecology, molecular ecology, disease ecology, human ecology and much more. To me, ecology also involves the ability to

observe and analyze the patterns and processes around me. Ecology epitomizes the “Paideia” philosophy of making connections because it’s all about connections.

Friendly Upfront Message:

If you do not want to take ownership of your learning process, then this class might not be for you. I choose to use my upper-level classes to teach skills beyond content. It may seem that I don’t “teach” you ecology directly – but I’m teaching you to think about ecology and I’m guiding your professional development as a scientist and a scholar. In 5 or 10 years, no one will be there to give you “lectures,” and you will probably not remember the difference between a fundamental versus realized niche, BUT you will remember how you learned to synthesize a lot of information and put it into an understandable and engaging synopsis.

Course Components:

Ecology will include each of the following skills using particular assignments or activities:

<u>SKILL</u>	<u>ACTIVITY/PRODUCT</u>
1. Observing and documenting ecology at field sites	Field notebook
2. Reading and critiquing primary literature	Pair presentation and questions
3. Analyzing data using rising platform using R	R tutorials and data analysis
4. Designing and conducting an experiment	Wildflower Seed Toss (Research Poster)
5. Translating science for the public + creativity	Creative Works Symposium (CWS)
6. Improving presentation skills	Highlight Lecture
7. Learning the language of ecology	On-line quizzes
8. Gaining specific insight into Hill Country Ecology	Essay discussion and reflections
9. Participating in a variety of ways	Multiple assessments
10. Connecting it all together	Final exam

Each of these “skills” will be worth 10% of your grade (if it makes it easier, you can think of each item as 100 points). You may not be the best at all skills, but each one only counts for 10% so you can consider each element a relative “low-stakes” assignment. However, keep in mind that even “low stakes” need to reflect a certain level of quality. Particularly on writing assignments, I will expect high quality as you all have taken Methods in Ecology and Evolution. Overall, skills get better through practice so a solid effort will take you far in this course. In some cases (notebook entries, R worksheets, quizzes), there will be more than one component to the 10% and in others (exam, lecture), just a single assessment. Students that work together will receive the same grade.

COMPONENT DETAILS:

1. Observing and documenting ecology at field sites
 - Field notebook

Each student will keep a field notebook that will document their experience in Ecology. Minimally, the field notebook should contain 10 solid entries indicative of a student’s engagement in the work of the day. We will have a minimum of five “field trips” (Berry Springs, Wildflower Center, TPWD, Wild Basin, Stream) that will provide content for the field notebook. Entries in a field notebook include basic demographics (date, condition, location) as well as quantitative details (measurements) and qualitative

observations. Field notebooks often also include sketches and thoughtful reflections. I encourage you to make your field notebook your own souvenir from your ecology experience. **Field notebooks will due on March 11th and April 23rd (day after Earth Day).**

2. Reading and critiquing primary literature **For Detailed Expectations, SEE MOODLE**
 - Pair presentation and questions

During seven class periods, we will examine primary literature papers from the “hot” areas of ecology:

- Urban ecology
- Microbial ecology
- Climate ecology
- Disease ecology
- Restoration ecology
- Big data ecology
- Molecular ecology

These topics will hopefully correspond with the content in the textbook but may integrate several areas. A pair of students will be responsible for describing the “hot topic” and then selecting a paper to dissect and discuss. The rest of the students in the class will be responsible for bringing 2-3 thoughtful questions to class. The goal will be to integrate discussion of the paper and make sure that everyone’s questions get discussed. The pair presentation will be worth half the points allotted for this skill and the questions the other half. Students will get one “pass” of having questions for one of the papers.

3. Analyzing data using rising platform using R **Worksheets, SEE MOODLE**
 - R tutorials and data analysis

We will have two labs (R Day 1 and R Day 2) in which we will refresh your statistical understanding and prepare you for analyzing your data from the Wildflower Toss (R Day 3). As part of my own professional development this semester, I have been chosen as a participant in the QUBES on-line group “Make Teaching with R in Undergraduate Biology Less Excruciating.” QUBES stands for Quantitative Undergraduate Biology Education and Synthesis. For a description, This Faculty Mentoring Network is intended for undergraduate biology instructors with prior R programming experience who are interested in learning ways to teach with R effectively to students with little to no programming experience. Participants will focus on developing, implementing, and sharing modules for teaching statistical and biological concepts in R with Swirl. Swirl lessons simplify the R learning process by providing a guided, interactive experience through on-screen prompts and exercises which students answer directly in the RStudio console. Participants will learn the Swirl program, implement one existing Swirl lesson, contribute one new lesson and will leave the FMN with ready-to-use Swirl lessons covering diverse biology and data analysis concepts.

4. Designing and conducting an experiment **For Detailed Expectations, SEE MOODLE**
 - Wildflower Seed Toss (Research Poster)

In the spirit of the theme of Hill Country Ecology, we will focus our experimental efforts on improving the aesthetics, native plant diversity and pollinator habitat on Southwestern’s campus. With the help and guidance of Lance Roberson, Master Naturalist and SU Garden Caretaker, we will do a “Wildflower

Seed Toss” into plots. One factor will be the timing of the toss. Students will then brainstorm on what other factors to test (diversity, abundance, seed scarring, etc...). Groups will then sample subplots after several weeks (species diversity, species abundance, plant height, number of leaves, number of florets, distance to nearest neighbor). Students will analyze the data using R and create a research poster.

5. Translating science for the public + creativity – **For Detailed Expectations, SEE MOODLE**
 - Value Project for Creative Works Symposium (CWS)

Task: Create an intentional “work” about the ecology of Texas Hill Country that integrates material you have learned across your experience in Ecology and educates the public audience by showcasing interdisciplinary links. As a means of pushing you to think creatively, the form of value projects will remain pretty wide open [persuasive essay, poetry, informative educational flyer, art piece, social media campaign, video, etc...] **but focus on Hill Country Ecology.** As you know, Southwestern’s signature program, Paideia, focuses on three I’s: Interdisciplinary, Intentional and Integrative. These three I’s describe an ideal creative value project.

Student Learning Objectives: With the projects, students will be able to:

1. Educate an audience about the Texas Hill Country;
2. Increase their ability to identify interdisciplinary connections;
3. Tap their critical thinking skills to create a sense of how ecology relates to everyone;
4. Foster creativity by creating some type of visual presentation that can be shared with your peers and perhaps the greater community.

As a class, we will feature these value projects at the Creative Works Symposium on April 14th. You will need to produce an abstract for the CWS and submission for abstracts will be accepted from January 16 - February 24. For more information, see: <https://www.southwestern.edu/faculty-dean/research-creative-works-symposium/submission-of-abstracts/>.

6. Improving presentation skills **For Detailed Expectations, SEE MOODLE**
 - Highlight Lecture

Lecture Days - Your choice: As a pair or solo, you will prepare and deliver lecture “highlights” to the class (30-45 minutes) using only 20 key slides. Pairs will do two lectures. Students will receive the lecture PointPoint slides (including Figures) and supplemental material from the textbook. If done as a pair, students should have similar amounts of presentation time.

Lecture Highlights have four expectations:

1. Review material from the chapter and make it “matter”
2. Connect to some previous content
3. Connect to Texas Hill Country
4. Engage the class in some type of interactive and/or review exercise

“Call Your Professor” - Note that students can request that I (Dr. Burks) cover one section/concept within the chapter that they find confusing or difficult. The remainder of the class time will be available for additional integration work guided by me.

7. Learning the language of ecology
 - On-line quizzes

Engaged lecture depends on students reading the material. Instead of having students make up the quizzes (often my practice), I decided to utilize the textbook materials. The on-line supplemental site (<https://ecology4e.sinauer.com/protected/>) contains quizzes for each Chapter, each with 15 multiple choice questions.

Students need to take 15 quizzes during the course of the semester, including the chapter that the students present. You can choose to take the quizzes BEFORE class (get benefit of 2 pts) or within 1 day AFTER class (grade as is). You will need to keep a log of your quiz taking that you can share with me.

8. Gaining specific insight into Hill Country Ecology
 - Essay discussion and reflections

We will use Hill Country Ecology as a means to integrate concepts provided in the text. On Discussion days, students should bring a thoughtful reflection (minimum 300-word reflection; maximum 500 words) to the section covered that day. I (Dr. Burks) will lead the discussions of the text but will expect contributions from 2-3 students. These students should do a little more preparation in light of the upcoming discussion and have the ability to make connections. Each student should complete five reflections.

9. Participating in a variety of ways
 - Self, peer and Dr. Burks assessment

PARTICIPATION: Regular class participation is the default circumstance for students in upper level Biology courses. Class participation involves discussing primary literature, posing questions about class materials, following thru exercises and working well in groups. It will also involve being engaged and interactive on class field trips. Routine communication with me will also be an important indication of participation. Group members should feel responsible and obligated to report any “hitchhikers” on group or pair projects.

10. Connecting it all together
 - Final exam

The final exam will be take-home and consist of 7-8 short essay questions and students will need to answer 5 of them. For Seniors, the final exam will be due **Sunday May 3rd at 12 pm**. For others, the deadline is **Tuesday, May 5th at 4:30 pm**.

IMPORTANT DATES:

- February 17 Monday – Last day to drop without record
- February 25 Wednesday - Last day to drop courses with W
- April 10 Friday - SU closed – no classes
- April 14 Tuesday - Spring Research and Creative Works Symposium (No Classes)
- April 29 Wednesday - Last day of classes
- April 30 Thursday Study day – no classes;
- May 1-3 Fri-Sun - Study days – no classes **SENIOR FINAL DUE**

- May 4 Monday Seniors' (prospective May graduates) grades by noon.
- May 4-8 Mon-Fri Final examinations

REQUIRED BOOKS:

1. Ecology, 4th edition by Cain, Hacker and Bowman

ISBN-13: 978-1605356181

ISBN-10: 9781605356181

It needs to be the 4th edition. You can get a paperback, rent or e-copy of this book. Prices vary.

If you buy a used book, then you will want to add the electronic supplemental features:

Students who purchase used copies of the book can purchase student online quizzing site access here:

https://register.dashboard.oup.com/catalog?pagename=Ecology4e_CW.

2. Hill Country Ecology by Jim Stanley

ISBN-10: 1936449749

ISBN-13: 978-1936449743

GENERAL POLICIES:

Accessibility, Academic Success, Student Distress:

All of us learn in slightly different ways and I try to design my courses so that there are multiple means of accessing class information, multiple ways to take part in class activities, and multiple avenues for being assessed on class work. If there are circumstances that may affect your performance in this class, please let me know as soon as possible so that we can work together to develop strategies for adapting assignments to meet both your needs and the requirements of the course. If you have documented disabilities, please see paragraph below.

It is Southwestern University policy to make reasonable accommodations for students with documented disabilities. To arrange accommodations students should contact the Assistant Director of Academic Success within the Center for Academic Success and Records (CASAR in the Prothro Center room 120; phone 863-1286). Students seeking accommodations should notify the Assistant Director of Academic Success at least two weeks before needed. It is the student's responsibility to discuss any necessary accommodations with the appropriate faculty member. Please take advantage of the CASAR workshops and resources tailored to the first-year experience that might help you. In addition, any student who has any life difficulties (it happens) and believes this may affect their performance in the course, is urged to contact any director in the division of Student Life for support.

Honor Code: All work in this course needs to adhere to the Honor Code, which the Student Handbook describes in detail. Please pay special attention to the discussion of plagiarism. I encourage group work and discussion among you all, but do independent work on your own (feel free to discuss the topic with classmates, etc., but when you sit down to write, you should do that on your own). You will also need to be careful with how you use your research sources—summarizing and/or paraphrasing an author's ideas requires citation. The Honor Pledge, which you will write on exams, quizzes, essays and other work you submit for grades for all of your coursework at Southwestern (unless otherwise indicated by your professor) is: **"I have acted with honesty and integrity in producing this work and am unaware of anyone who has not."** For electronic assignments, students can put it in the header and initial.

Our Classroom as Community:

Treat all class members with professionalism and respect. Be fully present in class (i.e.):

- a. Turn off and put away all cell phones, beepers, and laptops when you enter the classroom. Volumes of research shows that student academic success is greater when they do NOT use laptops, etc. in classes, but use paper and pen/pencil instead to take notes. If disability accommodations include your use of a laptop, please obtain the required approval forms and let me know.
- b. **Bring printed out copies of readings or your writing when specified to do so.**
- c. Listen and participate when your peers lead the group
- d. Leave your other work outside our classroom. Do not aim to complete assignments for other classes. Engage in class discussion and activities.

Religious Observances:

Southwestern University recognizes that it has students from a variety of religious and cultural traditions that have special days of observance or celebration that may take students out of their regular activities on certain days during the school year. Since the academic calendar does not always coincide with these days, adhere to this policy to facilitate student absences due to cultural and religious observances.

- *As far in advance as possible, the student is expected to notify the professor(s) or instructor(s) of the class(es) to be missed.*
- *The student is expected to learn what assignments or exams are due or will be assigned on those dates and negotiate with the professor(s) or instructor(s) alternate times for fulfilling those requirements. Students should be prepared to fulfill the requirements prior to the class(es) to be missed.*

Writing Center:

An invaluable resource is the **Writing Center**; Writing Center staff are available to assist you in conceptualizing papers, in helping you create an outline, in reviewing drafts of your papers for the logic and coherence of your argument, the effectiveness of your evidence, etc... The Writing Center requires students to sign into an on-line system. You can do so here: mywco.com/dewc. Check out [website](#), which includes online writing resources, including some new additions!

Attendance: Class attendance is mandatory. One unexcused absence does not count as a penalty (I realize life happens sometimes). However, any additional unexcused absences will result in the loss of a percentage point for each absence from your final grade for the course. If you need to miss class or class-related activities/assignments for religious observance reasons, school-sponsored athletic events, or other potentially excusable reasons, you must let me know (email) prior to your absence. You should also plan to attend Biology seminars.

Participation: Your active engagement with class materials (readings, films) and in class activities (discussions, etc.) are critical to the success of this course. Participation will thus be a portion of your grade.

Moodle: Southwestern uses an interactive course management system called Moodle. You will use Moodle to submit assignments, keep track of your grades, and download additional readings. Your username and password is your regular SU-electronic ID (same as your email). With any new technological application, sometimes things can go awry. Melanie Hoag (hoagm@southwestern.edu or x1644) can be of assistance with any Moodle difficulty.

Submitting Assignments: Moodle/Google Drive. I cannot open “.pages” documents on Moodle. **Please make sure to always make your documents open-able by MS Word or Adobe PDF on a PC platform.** Save them with .doc or .docx extensions, ideally. I may ask you to submit/share some assignments as Google Docs so that I can easily comment on them.

Late Work: 10% penalty per class day. One “Had a Bad Day” extension.

After class: I teach Ecology directly after Capstone. Therefore, we must end class on time and I will not be available for questions immediately after class. Please feel free to catch me in office hours, by appointment or other random times in my office. I’m teaching only Tuesday and Thursday mornings and Wednesday afternoon (Ecology lab), but am otherwise reasonably flexible.

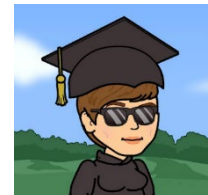
Facebook/Social Media Policy: All official class information goes through Moodle or myself to your SU email. Most students seem to have a Facebook or Instagram account. I’m happy to be “A Friend” with SU students with the knowledge that I am a faculty member at Southwestern first and take that seriously. If I see something that worries me, I will follow up. I believe in better safe than sorry. At the same time, I’m certainly not in the habit of checking up on students but cannot help but read updates when posted. My Profile page is all-inclusive for my friends, family and some students. I do not post anything there that I am not willing to publicly share (this is good advice). So, if you would like to request to be my friend, I will certainly accept but I do not want to compel people. As another social media alternative, you can follow me on Twitter @ProfRomi. I originally started a Twitter account to keep up with the chocolate world and find it an excellent resource. You can also check out my own experiences at www.profromi.com

Moodle Syllabus Statement: After reading the syllabus, please mark important dates on calendars (exam, drop date, presentation) and COMPLETE THE SYLLABUS CHECK by typing in “I have read the syllabus and understand the expectations.” By entering this, I know that you understand:

1. The expectations for success in Biology Capstone are abundantly clear.
2. Students can make an appointment with me if times conflict.
3. All your questions about the syllabus have been answered.
4. Students will first consult syllabus and then clarify with me.

About PROFROMI – also see www.profromi.com

- Twitter @ProfRomi
- Current Biology Department Chair
- Aquatic molecular ecologist that studies large freshwater snails patterns of diversity/distribution
- Teaches about chocolate across many disciplines
- Part of Environmental Studies at SU
- Owned by one fuzzy bichon - Twinkie
- Excited for year 17 in the Department of Biology
- Lives in Georgetown, avid reader, loves sushi
- Very much available to answer student questions and help.



Tentative Syllabus – will try to stay on schedule as much as possible but dates subject to change.

Week	Date	Day	Topic	Text	HCE	Due
1	1/14	Tues	Introduction, Syllabus, Ecology 101			
	1/16	Thurs	Hill Country History	1	History	
	1/15	Wed Lab	Hill Country 101 – SU Garden			
2	1/21	Tues	Physical Environmental/Biosphere (B)	2, 3	Plants	
	1/23	Thurs	Environmental Variation (B)	4, 5	11-44	Reflection 1
	1/22	Wed Lab	Berry Springs Nature Reserve			
3	1/28	Tues	Evolution and Ecology	6	Plants	
	1/30	Thurs	Life History	7	45-94	Reflection 2
	1/29	Wed Lab	Lab Identification			
4	2/4	Tues	Behavioral Ecology	8		
	2/6	Thurs	Hot Topic 1: Urban Ecology			Questions
	2/5	Wed Lab	Garden Work Day			
5	2/11	Tues	Population Distribution/Abundance	9	Animals	
	2/13	Thurs	Pop Growth/Regulation	10		Reflection 3
	2/12	Wed Lab	Ladybird Johnson Wildflower Center			
6	2/18	Tues	Hot Topic 2: Microbial Ecology			Questions
	2/20	Thurs	Ecologies Game			CWS Abstract
	2/19	Wed Lab	R Day 1			
7	2/25	Tues	Population Dynamics	11	Drought & Rain	
	2/27	Thurs	Hot Topic 3: Climate Ecology			Reflection 4 Questions
	2/26	Wed Lab	Wild Basin Field Trip			
8	3/3	Tues	Predation & Parasitism	12/13		
	3/5	Thurs	Hot Topic 4: Disease Ecology			Questions
	3/4	Wed Lab	Texas Parks and Wildlife Field Trip			R Day 1 Work

Week	Date	Day				
9	3/10	Tues	Competition	14	Riparian Water	
	3/12	Thurs	Hot Topic 5: Restoration Ecology			Reflection 5 Questions
	3/11	Wed Lab	R Day 2			Notebook
10	3/17	Tues	Spring Break – no class			
	3/19	Thurs	Spring Break – no class			
11	3/26	Tues	Community & Change	15/16		
	3/28	Thurs	Biogeography	18		
	3/27	Wed Lab	San Gabriel River Survey			R Day 2 Work
12	3/31	Tues	Hot Topic 6: Big Data Ecology		Land Manage	Questions
	4/2	Thurs	Species Diversity	19		Reflection 6
	4/1	Wed Lab	San Gabriel River Analysis			
13	4/7	Tues	Hot Topic 7: Molecular Ecology			Questions
	4/9	Thurs	Production/Energy Flow	20/21		
	4/8	Wed Lab	Wildflower Plots- Collect data			
14	4/14	Tues	Creative Works Symposium		Nature	
	4/16	Thurs	Nutrient Supply & Cycling	22		Reflection 7
	4/15	Wed Lab	R Day 3			
15	4/21	Tues	Conservation Biology	23		
	4/23	Thurs	Landscape Ecology	24		
	4/22	Wed Lab	Earth Day – Plant a Tree			
	4/23					Field Notes
16	4/28	Tues	Exam Review & Wrap-Up			
	4/29	Wed Lab	Research Posters			Research Poster
	5/3	Sunday	Final Due for Seniors – 12 pm			
	5/6	Tuesday	Final Due for Non-Seniors – 4:30 pm			