

Ecology Lab (Biology 204)

Spring 2022

(T 2:00 pm – 4:50 pm ISC 107)

Course overview

The ecology laboratory is designed to complement the second-year ecology course, Principles of Ecology (Biology 203). Laboratories will consist of research projects that address questions at each level of ecological organization, from organisms to populations, communities, and ecosystems. Emphasis is placed on the types of research questions and designs used by a variety of sub-disciplines of ecology to expose students to the diverse nature of this field. You will be engaged in all aspects of the development of an ecological study: making observations, formulating hypotheses and predictions, designing experiments and strategies for data collection, statistical and graphical analysis, interpreting results, and reporting findings in written and oral formats.

Course details

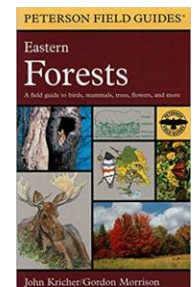
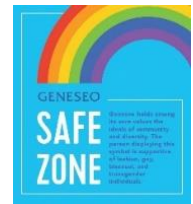
Dr. Jennifer L. Apple (*she/her/hers*) Office: ISC 258 Lab: ISC 340
e-mail: applej@geneseo.edu Phone: 245-5442

Office hours: Online: Mon 1-2 pm (by appt via Google Calendar), W 1:30-2:30 pm
In-person (**in ISC 107**) or online: R 10-11 am

Required text: *A Field Guide to Eastern Forests* by John Kricher (Houghton Mifflin, 1998; ISBN: 978-0395928950)

Other requirements: Laptop with Microsoft Word, Excel, R, and RStudio installed

Course website: canvas.geneseo.edu



Learning outcomes

Upon completion of this course, successful students will be able to:

- make observations, generate hypotheses, and carry out simple experiments and/or collect field data to answer questions from different sub-disciplines in ecology
- collect, organize, analyze, and present ecological data using appropriate sampling methods and instrumentation and quantitative statistical and graphical analyses
- explore and evaluate the primary ecological literature to provide background information for their studies as well as to help put their results into the context of other ecological research
- communicate their findings using the conventions of scientific writing in reports and presentations which include: 1) an introduction which identifies the context for the work, citing previous research; 2) a description of methods; 3) results including figures, tables, and statistics; and 4) a discussion which identifies and explains the key results and their significance

COVID-19 considerations

Attendance expectations and public health

In the context of the COVID-19 pandemic, it is vital that we all do what we can to protect the health and safety of each other. If you are experiencing symptoms associated with COVID on a day that lab meets in-person, do not attend. Remember that it is better to stay home if you are not feeling well than to attend lab and risk spreading illness to others. Throughout the semester, please be proactive in communicating about absences. I can support you in keeping up with lab work if you are out for COVID-related reasons, but I need you to take responsibility for being transparent and clear in letting me know when you are out and why. Also please remember that we are primarily a face-to-face institution. Although I can work with you on keeping up, missing opportunities to work with your group and complete lab tasks impact your ability to realize your full potential in this class. For extended absences (i.e., more than a couple of days of classes), you should contact the Dean of Students who can assist with reaching out to your professors about challenges you face and accommodations you may require.

Health and well-being in a stressful time: take care of yourself

The changes brought on by COVID-19 have impacted us all in a number of ways and will continue to do so at various times and to varying degrees during the upcoming semester. Your health and well-being are foundational to your ability to learn, and if you find that you are feeling unwell (physically or mentally) and it is impacting your ability to complete your coursework, please reach out. Concerns about academic performance, health situations, family health and wellness (including the loss of a loved one), interpersonal relationships and commitments, and other factors can contribute to stress. Students are strongly encouraged to communicate their needs to faculty and staff and seek support if they are experiencing unmanageable stress or are having difficulties with daily functioning. The [Dean of Students](#) (585-245-5706, www.geneseo.edu/dean_students) can assist and provide direction to appropriate campus resources. The college also has collected resources in a [Coping with College webpage](#).

Face masks

According to [current campus policy](#), face masks are required in all instructional spaces (including classrooms, lecture halls, and laboratories) and all common areas including residence halls and academic buildings. If you forget your mask, please be sure to pick up a disposable one before entering the classroom. Masks must be worn for the duration of lab sessions and must cover both your mouth and your nose. Masks must also be worn the entire time that we are in a van for a field trip. If you do not have a mask or are unwilling to wear one properly, you will be asked to leave the classroom. I cannot safely hold class if all students are not wearing face masks properly. If my teaching could be more accessible if I wear a clear face mask, please let me know as soon as possible. Students who have concerns about wearing a face mask due to a documented disability need to contact the Office of Accessibility Services (access@geneseo.edu) to request reasonable accommodations.

How is this course organized?

Working in groups of three or four, you will cooperate to set up and run experiments or make observations, collect data, and prepare for each of three projects done over the course of the semester. Because some projects require more time and steps than others, we may be engaged in

several projects at one time. You will also be practicing skills in data analysis and visualization using R throughout the course. You will work in groups to prepare written and oral presentations of your results.

What projects will we be doing?

Project 1 Squirrel foraging behavior (Behavioral ecology) – You will participate in a citizen science project (the Auburn Squirrel Project) on the foraging behavior of gray squirrels. Independently you will collect weekly data on the eastern gray squirrel and near the end of the semester you will analyze class data along with data collected from other sites.

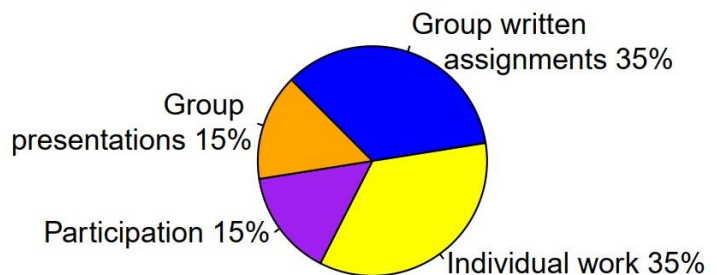
Project 2 Forest communities (Community ecology) – We will learn how to quantitatively describe a forest community using plot and plotless sampling techniques. We will calculate diversity indices and standard measures of plant community structure to compare forest composition and structure in at least two contrasting environments in a local forest stand.

Project 3 Soil CO₂ emission (Ecosystem ecology) – In a forested ecosystem, we will investigate factors that affect soil CO₂ emission, a process that results from both root respiration and decomposition of organic matter in soils. Using the soda-lime method we will determine the effects of particular microclimate or soil characteristics on the rate of CO₂ emission in a field incubation experiment.

How will your grade be determined?

Group written assignments (35%): These written assignments include plans for lab reports, data analysis for projects, and final lab reports.

Group presentations (15%): Your group will present the results of your three main projects.



Individual assignments/quizzes (35%): You will have online or in-classes quizzes on most weeks to help prepare you for lab activities or assess you on skills. You will also have some assignments related to data analysis.

Participation (15%): Your participation grade is based on completion of in-class assignments, your engagement in lab work, your individual performance in group presentations, peer evaluations, and reflections on your participation.

Grading scale

A	93.0-100%	B	83.0-86.9%	C	73.0-76.9%
A-	90.0-92.9%	B-	80.0-82.9%	C-	70.0-72.9%
B+	87.0-89.9%	C+	77.0-79.9%	D	60.0-69.9%

I follow conventional rounding procedures, so a 92.94% would represent an A- (rounded down to 92.9%), while a 92.95% would be rounded up to 93.0% and an A.

Developing your scientific writing and data analysis skills

Throughout this course we will be developing your skills in writing lab reports and employing the conventions of scientific writing. You will be preparing reports using the professional standards of scientific writing for each of the projects described above. The components of each report include the following sections, along with a descriptive project title and literature cited.

1. Introduction
2. Methods
3. Results
4. Discussion

All members of the group will participate in the design of each project as well as the collection and analysis of data. It is in everyone's best interest that your group establishes a good working relationship, which will sometimes involve meeting outside of lab time.

All files (Excel spreadsheets, R code, .csv files referred to in R code, etc.) used for analyzing your data must be submitted by the dates indicated so that I can check your analyses and provide feedback. Submissions of final reports and presentations must also be accompanied by your R code and data as they are part of my evaluation of your work.

How to be successful in this course

Come to lab as long as you are well

Your participation in lab every week is expected as long as you are well. If you are feeling unwell on a day that lab meets, do not attend so you can avoid spreading illness to others. If you cannot attend lab because of illness, you must contact me *before* lab to inform me of your absence. You should also contact your group members about your absence to learn what you will be responsible for on any group assignments. You are still responsible for contributing to group assignments even if you miss lab. I will not coordinate your interactions with your group members. It is your responsibility to contact me in a timely manner to make arrangements for making up any work you missed for the lab. If you miss lab without providing an explanation, you cannot make up the work and your participation grade will be negatively affected.

Be prepared for lab

You are expected to pay attention to the syllabus, emails from me, and posted announcements on Canvas and come prepared for each day's planned activities. If we are doing a field-based activity, you should be dressed for the weather with appropriate outerwear and shoes that can get muddy or wet – it is your responsibility to check the weather conditions and use your judgment about what to wear. Bring all lab-related handouts to each lab session (especially previously collected data), and when requested, bring your laptops. Sometimes plans for a lab session may change at the last minute because of the weather; you should make sure to check your email on the day of a lab to find out any changes. Please be courteous to the instructor and your classmates by arriving on time, particularly on field trip days.

Work as a team

Success in this course depends to a great degree on effective collaboration with your group members. Be responsive to your group members for setting up meetings and arranging completion of your assignments. If your group is having problems working together, please alert

me as soon as possible in the semester so that we can come up with a solution. Procrastination is often at the root of difficulties in completing assignments well, so each of you should make an effort to get started early to avoid holding up your group.

Come see me if you need help!

Office hours. Some of my office hours will be **online** this semester and conducted via video conference. I will have regular “walk-in” office hours which are first-come, first-served. You may have to wait in the Zoom “waiting room” until I finish with other students. I will also have scheduled 15-min office hour sessions that you can sign up for via my Google Calendar. See Canvas for details. If any of the posted times do not suit you, you can email me to set up another appointment for a video conference. When doing so, please suggest some possible times that you are available to meet in your email to make our correspondence more efficient. I will also hold some in-person office hours at a set time in our lab room, ISC 107. Generally, I will not meet with students for office hours in my office.

Email communication. I can often answer your questions by email as well. I will try to get back to you within 24 hours. If you have a question about R, attach both your complete R code (not just the part with an error) and the data file (.csv) that you are using with it (if applicable) to your email message. You can easily attach these files to your email message. A screenshot of an error message is generally useless in diagnosing your problem without the actual code itself. Feel free to seek help in this way - sometimes it only requires a second set of eyes to solve your problem!

Back up your work

Do yourself a favor to avoid last-minute computer calamities and stress by saving your work frequently and backing up your files using some kind of cloud storage system like Google Drive, Dropbox, or some other service. Also, don’t wait until the day before a deadline to get started!

Lab and field work and safety

Your safety and comfort are important to me. Please be prepared for our field trips by dressing appropriately for the weather and terrain, bringing water, and carrying any medication you might need (allergy medication, inhaler for asthma, epipen, etc.). Inform me of any allergies or other medical conditions that could require emergency treatment. Also be prepared by applying sunscreen when appropriate or wearing clothing to protect yourself from the sun. We could encounter mosquitoes, ticks, other biting/stinging insects, and poison ivy on our outings, so be aware of these risks, and feel free to ask me any questions about them. While we are traveling to a field site in a vehicle you should be wearing a face mask over your mouth and nose at all times. Also, be mindful of your safety if you go to a field site on your own outside of our regular lab sessions. It is a good idea to bring a friend with you, or at least to tell someone where you are going and when you expect to be back.

No food or drink containers are permitted in the lab, either during or outside regular lab times. You should not be eating or drinking in the lab and should always have your mask on in the lab, even if alone, because it is a shared space.

Course policies

Late work

Online quizzes should be completed by the indicated due date to help you prepare for lab activities. Once closed on Canvas the quizzes will not be opened up again unless there are extenuating circumstances. Graded assignments will be penalized by a loss of 5% of the total assignment's points possible per day. But if you think you must turn in something late because of extenuating circumstances, feel free to discuss the situation with me and we can negotiate terms.

Plagiarism and academic dishonesty

Plagiarism and other forms of academic dishonesty (cheating, turning in another student's work as your own) will not be tolerated. Evidence of academic dishonesty is grounds for a score of zero on any assignment and further action including notifying the department chair, Dean of Academic Planning and Advising, Dean of Students, and Student Conduct Board, which can result a report filed with the Dean of Students.

According to the Academic Dishonesty Policy in the Student Handbook (<https://www.geneseo.edu/handbook/academic-dishonesty-policy>), plagiarism includes the following:

1. direct quotation without identifying punctuation and citation of source;
2. paraphrase of expression or thought without proper attribution;
3. unacknowledged dependence upon a source in plan, organization, or argument.

In SUNY Geneseo's policy, "Plagiarism is the representation of someone else's words or ideas as one's own or the arrangement of someone else's material(s) as one's own." Take care to properly cite sources of ideas, figures, data, etc. (including internet sources) in your writing and presentations. Even if you properly cite your source, when you borrow wording and sentence structure from the original source and pass it off as your own (i.e., by not using quotation marks), you are guilty of plagiarism. Learn how to paraphrase in your own words information from the original source.

Copyright statement

Many of the materials that are provided to students in this course have been created by me. Students would be best to assume that all course materials are protected by legal copyright. Copyright will be indicated by a "© DATE AUTHOR" on the document. Copyright protection means that reproduction of this material is prohibited without the author's consent. Thus, students are prohibited sharing or posting copyrighted material to any websites outside our course Canvas site. Students are also prohibited from reproducing material to be shared with other more limited groups (e.g., sorority/fraternity test bank).

Student success resources

Accessibility and accommodations. SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities to ensure equal access to academic programs, activities, and services at Geneseo. Students with letters of accommodation should submit a letter to each faculty member and discuss their needs at the beginning of each semester. Please contact the Office of Accessibility

Services for questions related to access and accommodations: access@geneseo.edu, 585-245-5112, www.geneseo.edu/accessibility-office.

Reporting bias-related incidents. Here at SUNY Geneseo, we want to provide a space where everyone feels welcome to learn and grow in their identities as well as in their role as students, faculty, and staff. If in the unfortunate instance you experience an incident of bias, we encourage you to reach out to the we encourage you to reach out to the Chief Diversity Officer (routenberg@geneseo.edu), Interim Director of Multicultural Programs (nweathers@geneseo.edu), and/or our University Police Department. In trying to create an environment that facilitates growth through diverse thoughts and ideas, reporting incidents of bias - including threats, vandalism, and microaggressive behaviors - can help bring a better understanding of our campus climate as well as provide opportunities for learning and restoring harm.

Student well-being and mental health. Prioritizing well-being can support the achievement of academic goals and alleviate stress. Eating nutritious foods, getting enough sleep, exercising, avoiding drugs and alcohol, maintaining healthy relationships, and building in time to relax all help promote a healthy lifestyle and general well-being.

As a student, you may experience a range of challenges that can impact your mental health and thus impact your learning; common examples include increased anxiety, shifts in mood, strained relationships, difficulties related to substance use, trouble concentrating, and lack of motivation, among many others. These experiences may reduce your ability to participate fully in daily activities and affect your academic performance.

SUNY Geneseo offers free, confidential counseling for students at the Lauderdale Center for Student Health and Counseling, and seeking support for your mental health can be key to your success at college. You can learn more about the various mental health services available on campus at health.geneseo.edu. To request a counseling appointment, please complete the online form through myhealth.geneseo.edu. Getting help is a smart and courageous thing to do -- for yourself and for those who care about you.

Other resources. Additional resources are available to support your academic success and well-being, including [academic support services](#), [library research help](#), [computer and technology support](#), food security support, and emergency funding. See the “Student Success Resources” link on the Canvas course page for more information about these services.

Course schedule

Since we must depend on the weather and the schedules of living things to determine when and how to run our projects, the course schedule on the next page is subject to change, often. Welcome to the world of ecologists!

Ecology Lab – Spring 2022: Course Schedule

Date	Notes [†]	Activity	Individual assignments	Group assignments
Week 1: Feb 1	comp	Introduction to course; introduce Auburn squirrel project, sign up for project	Online quiz #1 on squirrel project due Monday, Feb 7 ; find primary source on squirrel feeding behavior	
Week 2: Feb 8	comp/ FW	<u>Squirrel behavior</u> : share primary literature paper; discuss potential squirrel research questions; collect data in the Arboretum	Install R and RStudio on your laptop and do pre-lab R exercise due Monday, Feb 14	Squirrel behavior research questions due Monday, Feb 21
Feb 15		<i>Diversity Summit</i> – no lab meeting this week	Online quiz #2 on lab report format due Monday, Feb 21	
Week 3: Feb 22	comp	Start statistics tutorial & data analysis exercise 1	Due Monday, Feb 28: Data analysis exercise #1; online quiz #3 on Kricher pp. 332-341, 356-358, 442-450; Poison ivy quiz	
Week 4: Mar 1	FW	<u>Forest communities</u> : field trip to learn tree ID and sampling method, collect data as class from one site	Prepare for in-lab quiz #4 on tree ID and sampling methods, Mar 8	
Week 5: Mar 8	FW	<u>Forest communities</u> : field trip to carry out group projects; in-lab quiz #4 on tree ID/sampling methods	Prepare for in-lab quiz #5 on statistics, Mar 22	Plan for forest communities report due Friday, Mar 11
		SPRING BREAK: Mar 14-18		
Week 6: Mar 22	comp	<u>Forest communities</u> : data analysis, plan report, in-lab quiz #5 on stats		Forest communities data analysis due Friday, Mar 25 ; presentation and written lab report due Mar 29
Week 7: Mar 29	comp	<u>Forest communities</u> : presentations of forest results; statistics tutorial part 2; prep for soil CO ₂ project	Online quiz #6 on Kricher pp. 414-436 and soil CO ₂ lab handout due Monday, Apr 4 ; Data analysis exercise #2 due Monday, Apr 4	
Week 8: Apr 5	FW	<u>Soil CO₂ emission</u> : field trip to locate sites for soil CO ₂ emission study, understory & invertebrate sampling	Online quiz #7 on soil CO ₂ emission setup and retrieval methods due Monday, Apr 11	Plan for CO ₂ emission report due Monday, Apr 11
Week 9: Apr 12	FW/ comp	<u>Soil CO₂ emission</u> : field trip to set up experiment and collect soil samples		Groups return on their own 48-72 hrs after setup to retrieve soda lime jars
Week 10: Apr 19	comp	<u>Soil CO₂ emission</u> : soil measurements in lab; work on data analysis & plan report		Soil CO ₂ emission data analysis due Friday, Apr 22 ; presentations and written report due Apr 26

Date	Notes [†]	Activity	Individual assignments	Group assignments
Week 11: April 26	comp	<u>Soil CO₂ emission</u> : presentations of soil CO ₂ emission results; review peer lab reports; progress report on squirrel projects; map squirrel data in R		Squirrel project report plan due Monday, May 2
Week 12: May 3	comp	<u>Squirrel project</u> : analysis of Auburn squirrel project data; work on report		Squirrel project data analysis due Friday, May 6 ; presentations and written report due May 10
Week 13: May 10	comp	<u>Squirrel project</u> : presentation of squirrel results; review peer lab reports		

[†] **FW** = field work: wear appropriate clothing & footwear for working outside – check weather; **comp**: bring your laptop computer to lab

[‡] Readings refer to *A Field Guide to Eastern Forests* by John Kricher