

Biol 204, Ecology Lab

Spring 2023

Section 1: Monday 10:30 am-1:20 pm

Section 2: Monday 1:30 pm-4:20 pm

ISC 107

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. Students 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.

Instructor: Ms. Regina Clinton Office: ISC 139 Phone: 245-6051 e-mail: clinton@geneseo.edu
Lab: ISC 107

Office hours: T 2:00 – 3:00 pm

W 11:00 am -12:00 pm

R 9:30-10:30 am

Other times by appointment

Required texts:

A Field Guide to Eastern Forests by John Kricher (Houghton Mifflin, 1998)

Primer in Biological Data Analysis by Gregg Hartvigsen (Ingram Publishing)

ISBN 9780231166997 or 9780231202138

Learning Outcomes

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, instrumentation, quantitative statistical and graphical analyses
- explore and evaluate the primary ecological literature to provide background information for your studies as well as to help put your results into the context of other ecological research • communicate their findings using the conventions of scientific writing in reports which include:
 - 1) *Introduction* - identifies the context for the work, citing previous research
 - 2) Description of *Methods*
 - 3) *Results* including figures, tables, and statistics
 - 4) *Discussion* clearly identifies and explains the key results and their significance

Course Organization

Working in groups (of three to four) students will cooperate to set up and run experiments, make observations, collect data, prepare a formal lab report and present their results for each of the 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.

Overview of Projects

Project 1 Invasive species– We will use NY *iMapInvasives*, a GIS - based database and mapping tool to research, analyze data and report on the progress of an Invasive species in our region.

Project 2 Forest communities (Community ecology) – We will learn how to quantitatively describe a forest community using plot and plot-less 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.

Expectations

Throughout this lab we will be developing your skills in writing lab reports; employing the conventions 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. All lab reports will be written as a group (25 pts + 10 pts data analysis + 10 pts peer evaluation). It is in everyone's best interest that your group establishes a good working relationship, which will sometimes involve meeting outside of lab time.

For each of the projects you will analyze and interpret your data, and will present your results together in a Powerpoint presentation. Data analysis assignments will give you practice analyzing and interpreting data, preparing figures, and describing/defending your results to your peers.

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 the instructor can check your analyses

and provide feedback before your presentations. After the submission of each group assignment

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and again at the end of the course, everyone will complete a form evaluating the participation of their peers and describing their own contributions, which will contribute to determining the participation grade earned by each student.

Course Evaluation

Group Lab Reports **30%** (Invasive species, Forest communities, & Soil CO₂ emissions reports)

Quizzes **30%** (In-lab and On-line)

Data analysis **15%** (Group and Individual data analysis)

Participation/Presentations **25%** (includes preparedness, peer evaluations, in-class assignments, engagement in lab work, timeliness of assignments, organization & effectiveness of the PowerPoint presentations)

Course Policies

Lab attendance

COVID is shifting from a pandemic to endemic stage, and we will continue to see variants of the COVID-19 virus well into the future. Because we want you to be successful and because we value your contribution to the lab, we expect you to prioritize attendance. If you are experiencing [symptoms associated with COVID*](#) on a day we have lab, please [take a self-test**](#).

If you test negative and feel well enough to attend, put on a well-fitting mask, come to class, and maintain physical distance as much as possible. If your symptoms do not allow you to attend class, stay home (except to go to the health center), rest, and take care of yourself. It is expected that you will communicate with me about your absences. We can set up a time to discuss missed material. You should also, contact your group members regarding the lab to learn what you will be responsible for on any group assignments.

Contact the Dean of Students if you expect to be out for an extended period of time (i.e., more than a couple of days of classes).

*Examples of common symptoms include:

- fever or chills,
- cough,
- difficulty breathing,
- muscle or body aches,
- Headache,
- new loss of taste or smell,
- sore throat,
- congestion or runny nose
- nausea or vomiting
- diarrhea

**you can [order a free self-test now](#), so you have it when you need it.

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Lab preparation

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.

Online Quizzes

All online quizzes will be due on Sundays at 11:59 pm.

There are *no* make-up quizzes or re-opening quizzes for students that “forgot” a deadline. You are responsible for your success in the lab, and timeliness of assignments is part of that.

Quiz Mechanics:

- All Quizzes are timed (20 minutes). Please inform me by the end of the first week in lab of any requirements (letters of accommodation, additional time, etc.) that will assist with the learning process.
- Make sure you have a good connection before opening your quiz, as your quiz will be submitted if the connection is lost.
- Backtracking is *not* allowed on quizzes. Once you have moved to the next question in the quiz, you will *not* be allowed to go back to any prior questions.

Lab safety

Inform me of any allergies or medical conditions that could require emergency treatment. While in the field you could experience exposure to mosquitoes, ticks, biting/stinging insects, and poison ivy, so be aware of these risks.

Dress appropriately for the weather and terrain, bring water, and carry required medications (allergy medication, inhaler, *EpiPen*, etc.).

Office hours and email

I am happy to meet with you outside of my regularly scheduled office hours. Email me with possible times that you are available and I will respond with a time that we could meet. In all correspondence, please include your full name, Bio 204 and the lab section you are in to expedite the response process. I will try to respond within 24 hours, but note that I have a number of campus commitments, so do not expect an immediate response. If you are emailing me about a problem with R, be very specific about your problem. Send me your complete R code and excel file (.csv) attach to your email.

Group dynamics

Success in this course depends to a large degree on effective collaboration and communication with group members. If your group is having problems working together, please alert me as soon as possible so that we can resolve issues you are experiencing. Procrastination on assignments is

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often at the root of difficulties, so make an effort to get started early. It only creates stress for yourself and group members when trying to complete an assignment at the last minute.

Student code of conduct

Plagiarism and academic dishonesty. Plagiarism and other forms of academic dishonesty (e.g., copying work from another student) will not be tolerated. According to the Student Code of Conduct (http://www.geneseo.edu/dean_office/dishonesty), “plagiarism shall be considered to be deliberate representation of someone else’s words or ideas as one’s own or the deliberate arrangement of someone else’s material(s) as one’s own.” Read this code to understand the consequences of all forms of academic dishonesty. 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 Dr. Apple. It would be best to assume that all course materials are protected by legal copyright. Copyright protection means that reproduction of this material is prohibited without the author’s consent. Thus, ***students are prohibited from sharing or posting any and all 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). Be aware that UUP (Union of University Professionals, the union representing faculty on this campus) is seeking to take legal action against these and other sites, and that posting or selling copies of materials to such sites may put a student in legal jeopardy.

Student Success Resources

Click on the link below to learn about academic support services (tutoring and learning centers), disability accommodations, library research and technology assistance, and general information about well-being. <https://wiki.geneseo.edu/display/PROVOST/Syllabus+Resources+Related+to+Student+Success>

Accommodations

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will also be made for medical conditions related to pregnancy or parenting. Students should contact the Office of Accessibility (Erwin Hall 22 or access@geneseo.edu or 585-245-5112) and their instructor to discuss needed accommodations as early as possible in the semester. Students with letters of accommodations should submit a letter to your faculty member at the beginning of the semester and discuss specific arrangements. This is especially important for the timed quizzes. Additional information on the Office of Accessibility is available at <https://www.geneseo.edu/accessibility-office>.

Mental health considerations

Diminished mental health, including significant stress, mood changes, excessive worry, or problems with eating and/or sleeping can interfere with optimal academic performance. The

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source of symptoms might be strictly related to your course work; if so, please speak with me. However, problems with relationships, family worries, loss, or a personal struggle or crisis can also contribute to decreased academic performance.

SUNY Geneseo provides mental health services to support the academic success of students. Counseling Services, a part of the Lauderdale Center for Student Health & Counseling, offers free, confidential psychological services to help you manage personal challenges that may threaten your well-being. Campus also has the Dean of Students and Career Services that can be very helpful to students.

Food Security for SUNY Geneseo Students

There are resources available for students who are food insecure. If you're unfamiliar with the phrase "food insecurity," you can learn more at the following link on Feeding America's website: Understanding Food Insecurity (<https://hungerandhealth.feedingamerica.org/understand-food-insecurity/>).

The Pantry at Geneseo, our on campus food pantry, works in partnership with the Geneseo Groveland Emergency Food Pantry (GGEFP) and is facilitated by interns and volunteers working out of the Office of Student Volunteerism and Community Engagement as well as the School of Business, and the GOLD Leadership and Student Athlete Mentors programs.

Any student who is food insecure can submit a request here: Food Pantry Request Form (https://docs.google.com/forms/d/e/1FAIpQLSfFL6VrdsV5kxTLd6yK_mXOL8NGeZtv5x8mzYAhHyiRJepLxA/viewform?usp=sf_link) to receive a bag of food that will provide them with items that will last a few days, including nonperishables and when available fresh fruits, vegetables, meat, and dairy. Once submitted, interns will connect directly with the student to communicate next steps and the time of your pick up. Pickups will take place in the MacVittie College Union, Room 114 - the GOLD Leadership Center.

This program will provide individuals with a bag of food up to once a month. We will do our utmost to ensure anonymity, while also working to destigmatize food insecurity in our community.

Students are also able to access the Geneseo-Groveland Emergency Food Pantry (<https://ggefpantry.org/>) on their own if that is their preference. It is located at 31 Center St. and is open Tuesdays and Thursdays 10 AM - 2 PM and Wednesdays 4 - 6:30 PM.

If you have any questions about this process or anything relating to food insecurity, or have a need beyond what is outlined above, please refer to our website or contact us directly at foodpantry@geneseo.edu / 585-245-5893 or the Dean of Students at 585-245-5706.

Course schedule

Due to the global pandemic, and because we depend on weather and the schedules of living things to determine when, and how to run our projects, the course schedule is subject to change. Welcome to the world of an ecologist!

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Ecology Lab Fall 2022 Schedule

Week #	Section 1 & 2	Notes†	Activity	Individual Assignments‡ Online quizzes are <i>always</i> due: Monday's at 7:00 pm	Group Assignments Due‡
1	Jan 30	Comp/ FW	Introduction to course; activity on generating ecological questions and hypotheses in Arboretum (field trip)	Online Quiz #1 Poison ivy (10 pts); Install R and RStudio on your laptop; Complete pre-lab R assignment (5 pts) due Wednesday, Feb 6	
2	Feb 6	Comp	Independent Invasive species research projects	Online Quiz #2 on reading Kricher Reading pp. 8-51, 58-62, 72-75, 77- 85 - 10 pts due Sunday, Feb 12.	
3	Feb 13	Comp/ FW	<u>Forest communities:</u> introduction; field trip to learn tree ID and practice sampling method, collect data as a class	In-lab, Feb 20 Tree Id Field Quiz #3 - 10 pts.	
4	Feb 20	FW	<u>Forest communities:</u> field trip to carry out group projects; In lab Tree Id Field Quiz #3	Online Quiz #4 on lab report format - due Sunday, Feb 26.	Forest Communities lab plan due Feb 27
5	Feb 27	Comp	Start statistics tutorial; start Data Analysis #1	In lab stats Quiz #5 March 6 (10 pts); Data Analysis #1 due week of March 6	
6	Mar 6	Comp	Forest communities: data analysis, plan report		Forest Communities lab report due Thursday, March 9 (25 pts); Forest presentations due in lab on

					Monday, March 20 (10 pts)
	Mar 13		No Lab Spring Break		
7	Mar 20	Comp	Present Forest Results; Complete Part II of stats tutorial; prep for soil CO ₂ project	Online Quiz #6 on Kricher pp. 414- 436 and soil CO ₂ lab handout due Sunday, March 26	
8	Mar 27	FW	Soil CO ₂ emission: field trip to locate sites for soil CO ₂ emission study, understory plant and invertebrate sampling	Online Quiz #7 Soil CO ₂ Emissions Set-up/Retrieval due Sunday, April 3	Soil CO ₂ Emissions lab report plan 5 pts: due Monday, April 10
9	April 3	FW	Soil CO ₂ emission: field trip to set up experiment and collect soil samples; back in lab, complete statistics tutorial	Online Stats Quiz #8 due of April 10	

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Week #	Section 1 & 2	Notes †	Activity	Individual Assignments‡ Online quizzes are always due: Monday's at 7:00 pm	Group Assignments Due‡
10	April 10	Comp	Soil CO ₂ emission: soil lab measurements; plan report and In-lab Stats Quiz #8		Soil CO ₂ emissions Analysis/results presentation - 10 pts; Soil CO ₂ emissions complete lab report preview due April 17
11	April 17	Comp	Present Soil CO ₂ results and review lab reports; progress review of Invasive species projects	Online Invasive species Quiz #9 due Sunday, April 23 - 10 pts	Soil CO ₂ emissions complete lab report - 25 pts due Monday, April 24
12	April 24	Comp	Invasive species projects		

13	May 1	Comp	Invasive Species: Data Analysis and plan report		Invasive species presentations due week of May 8 - 25 pts
14	May 8	Comp	Invasive species presentations		

† 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; assignments should be completed before lab period unless otherwise specified

**** *Reproduction of any course materials other than for your own personal use is prohibited without my consent.*****