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
Lab: ISC 107
e-mail: clinton@geneseo.edu
Virtual Office hours only:
M, T, R 8:30-9:30 am
https://geneseo.zoom.us/j/91369504542?pwd=dIFMZjTSVNZOE15OGkvMldReTNaQT09
Meeting ID: 913 6950 4542
Passcode: 547712

W 1:00-2:00 pm, other times by appointment
https://geneseo.zoom.us/j/94020878101?pwd=Ujl2RVL5NityQVBqcnhnUmtjVXo3Zz09
Meeting ID: 940 2087 8101
Passcode: 874630

**Required text:** *A Field Guide to Eastern Forests* by John Kricher (Houghton Mifflin, 1998)

**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 four, students will cooperate to set up and run experiments or make observations, collect data, and prepare a formal lab report for each of the four 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  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.

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  Goldenrods and insect galls (Population ecology) – In this project we will sample stems of goldenrod plants in the field to measure the incidence of galls caused by various gall-forming insects. In the lab, we will dissect galls and identify their inhabitants. Data collected may include the spatial distribution of galls within and between patches of plants, attributes of plants with and without galls, and predation and/or parasitism rates on gall ing insects.

Project 4  Auburn Squirrel Project (Behavior Ecology) – You will participate in a citizen science project on gray squirrels.

Expectations
You will be developing a report using the professional standards of scientific writing for each of the projects described above. Some of these reports will be written in stages, with some components prepared as an individual and some written as a group. 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.

Throughout this course we will be developing your skills in writing lab reports and employing the conventions of scientific writing. Your first two individually graded data analysis assignments will give you practice analyzing data, preparing figures, and describing the results in a results section. For the soil CO2 emission lab, everyone will write their own introduction section. For the forest communities project, everyone will write their own methods section. For the first two projects you will work as groups to analyze and interpret your data, and will present your results together in a Powerpoint presentation. You will practice all these skills to prepare an
individually graded complete report of the fourth project on the Auburn squirrel project. You will also present your findings to the class in an online format.

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 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**

- **Lab Report Development** 30% (writing Introduction, Methods and Results sections)
- **Group Lab Reports** 25% (Project 3 & 4; all members receive same grade)
- **Quizzes** 15% (In-lab and Online)
- **Data analysis** 15% (Group and Individual data analysis)
- **Participation/Presentations** 15% (includes preparedness, peer evaluation, in-class assignments, engagement in lab work, timeliness of assignments, organization & effectiveness of the PowerPoint presentations)

**Course Policies**

**Lab attendance.**
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. In-person meetings present the highest risk of contagion. If you are feeling unwell on a day that class meets in-person, do not attend. Remember that it is better to stay home if you are not feeling well, than to attend class and risk spreading illness to others. Throughout the semester, please be proactive in communicating about absences and contact the Dean of Students if you expect to be out for an extended period of time.

Un-excused absences will not affect your grade. You must however, contact me before lab to inform me of your absence and set up a time to discuss any missed materials. You should also, contact your group members regarding the lab to learn what you will be responsible for on any group assignments.

The college has developed an online COVID-19 screening report for students. Be sure to familiarize yourself with this process and complete the brief screening report before leaving for class. If you are experiencing common symptoms of COVID-19, stay home and contact Health and Counseling Services as soon as possible. I strongly encourage you to set a daily reminder to fill out the screening report.

**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.

Lab safety.
Face masks covering your mouth and nose are required at all times in the lab; this includes riding in vehicles or while in the field. 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. If you do not have a mask or are unwilling to wear one, you will be asked to leave the lab. We cannot safely hold class if students are not wearing face masks.

If you would feel more comfortable or if my teaching could be more accessible if we 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.

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. All office hours will be conducted virtually. I am happy to meet with you outside of my scheduled office hours. The best way of contacting me, would be to send an email with possible times that you are available. I can often answer questions by email as well. Please do not expect an immediate response – I will try to get back to you within 24 hours. If you are emailing me about a problem with R, be very specific about your problem. I usually cannot diagnose a problem unless you send me your complete R code – you can easily attach or copy this into your email (include the data file too if you are using one!). But if you do send your code and data, sometimes it only requires a second set of eyes to solve your problem!

Group dynamics. Success in this course depends to a great degree on effective collaboration with your group members. If your group is having any 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 make an effort to get started early.

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, or by the publisher of our textbook. It 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 from 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). 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](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. Additional information on the Office of Accessibility is available at [https://www.geneseo.edu/accessibility-office](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 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.

In the event I suspect you need additional support, I will express my concerns and the reasons for them, and remind you of resources (e.g., Counseling Services, Career Services, Dean of
Students, etc.) that might be helpful to you. It is not my intention to know the details of what might be bothering you, but simply to let you know I am concerned and that help, if needed, is available. Getting help is a smart and courageous thing to do – for yourself and for those who care about you.

**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 ecologists!
<table>
<thead>
<tr>
<th>Week #</th>
<th>Section 1</th>
<th>Section 2</th>
<th>Notes†</th>
<th>Activity</th>
<th>Individual Assignments Due‡</th>
<th>Group Assignments Due‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sept 1</td>
<td>Sept 3</td>
<td>comp</td>
<td>Introduction to course; sign up for Auburn squirrel project; collect data for the project</td>
<td>Take and poison ivy quiz (5 pts); install R and RStudio on your laptop; Online quiz on lab report format - 10 pts;</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sept 8</td>
<td>Sept 10</td>
<td>comp</td>
<td>Start statistics tutorial; prep for soil CO₂ project; start Data Analysis #1</td>
<td>Read pp. 415-436 and soil CO₂ lab handout; Online quiz on reading: Data Analysis #1-10 pts</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sept 15</td>
<td>Sept 17</td>
<td>FW</td>
<td>Soil CO₂ emission: field trip to locate sites for soil CO₂ emission study, understory plant and pitfall trap - invertebrate sampling</td>
<td></td>
<td>Field Site Descriptions</td>
</tr>
<tr>
<td>4</td>
<td>Sept 22</td>
<td>Sept 24</td>
<td>FW</td>
<td>Soil CO₂ emission: field trip to set up experiment and collect soil samples; back in lab, complete statistics tutorial</td>
<td></td>
<td>On your own: retrieve jars 24-48 hrs later; measure soil wet weights; Soil CO₂ lab plan</td>
</tr>
<tr>
<td>5</td>
<td>Sept 29</td>
<td>Oct 1</td>
<td>comp</td>
<td>Soil CO₂ emission: soil lab measurements; Complete the stats tutorial</td>
<td>Soil CO₂ Lab Introduction section due – 10 pts; Online stats quiz</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oct 6</td>
<td>Oct 8</td>
<td>FW</td>
<td>Forest communities: introduction; field trip to learn tree ID and practice sampling method, collect data as a class</td>
<td>Read pp. 8-51, 58-62, 72-75, 77-85; take online quiz #3 on reading - 10 pts,</td>
<td>Soil CO₂ Analysis – 10 pts</td>
</tr>
<tr>
<td>7</td>
<td>Oct 13</td>
<td>Oct 15</td>
<td>FW</td>
<td>Forest communities: field trip to carry out group projects</td>
<td>In lab Tree Id Field Quiz - 10 pts;</td>
<td>Present Soil CO₂ results online as a group</td>
</tr>
<tr>
<td>8</td>
<td>Oct 20</td>
<td>Oct 22</td>
<td>FW</td>
<td>Forest communities: data analysis, plan report</td>
<td></td>
<td>Forest Communities lab plan</td>
</tr>
<tr>
<td>9</td>
<td>Oct 27</td>
<td>Oct 29</td>
<td>FW</td>
<td>Goldenrod galls: introduction; field trip to take plant measurements and collect insect galls</td>
<td>Read &amp; watch video on the “Solidago Eurosta gall homepage” website take online quiz (10 pts); Forest Communities Methods section due - 10 pts</td>
<td>Forest Communities Data Analysis/results - 10 pts, Present Forest Communities results</td>
</tr>
<tr>
<td>10</td>
<td>Nov 3</td>
<td>Nov 5</td>
<td>comp</td>
<td>Goldenrod galls: dissect galls from goldenrods; plan data analysis</td>
<td></td>
<td>Goldenrod Lab plan</td>
</tr>
<tr>
<td>11</td>
<td>Nov 10</td>
<td>Nov 12</td>
<td>comp</td>
<td>Auburn Squirrel Project</td>
<td>Read pp. online quiz on reading (10 pts)</td>
<td>Goldenrod analysis due – 10 pts</td>
</tr>
<tr>
<td>12</td>
<td>Nov 17</td>
<td>Nov 19</td>
<td>comp</td>
<td>Auburn Squirrel Project</td>
<td>Auburn Squirrel Project Lab report plan</td>
<td>Squirrel Analysis – 10 pts;</td>
</tr>
<tr>
<td>Week #</td>
<td>Section 1</td>
<td>Section 2</td>
<td>Notes(^1)</td>
<td>Activity</td>
<td>Individual Assignments Due(^1)</td>
<td>Group Assignments Due(^2)</td>
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<tr>
<td>13</td>
<td>Nov 24</td>
<td>Nov 26</td>
<td>comp</td>
<td>Thanksgiving – no formal lab this week</td>
<td></td>
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<tr>
<td></td>
<td>Dec 1</td>
<td>Dec 3</td>
<td>comp</td>
<td>Auburn Squirrel Project</td>
<td>Squirrel lab report (25 pts)</td>
<td>due Monday, December 9</td>
</tr>
<tr>
<td>14</td>
<td>Dec 8</td>
<td>Dec 10</td>
<td>comp</td>
<td>Online Presentations</td>
<td>Peer evaluations due Monday, December 9</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) FW = field work: wear appropriate clothing & footwear for working outside – check weather; comp = bring your laptop computer to lab

\(^2\) Readings refer to *A Field Guide to Eastern Forests* by John Kricher; assignments should be completed before lab period unless otherwise specified