

SYLLABUS
Modeling Applications for Ecological Problems (1 credit)
FALL 2025

Instructor

Dr. Molly Simonis
Assistant Professor of Disease Ecology
College of Forestry, Wildlife, and Environment
College of Veterinary Medicine
Office: 2333 CFWE Building
Phone: 334-844-1071
Email: molly.simonis@auburn.edu

Class Hours

TBD

Office Hours

By appointment (virtual and in-person).

Course Description

This is a discussion-based course where we will examine varying modeling approaches used in ecological literature. Using examples from published literature, we will discuss 1) the broad ecological problem associated with the research question, 2) the research questions being addressed, and 3) the modeling application used and why. Thus, this course will reiterate the general research process, and students will develop an understanding for when and why to use varying modeling approaches in relation to their own research questions. Literature may focus more on current ecological problems in wildlife and/or disease, but conceptual application will be ecologically broad. This course is designed for graduate students, but exceptional undergraduate students performing independent research will be considered upon request (please email Dr. Simonis with requests; molly.simonis@auburn.edu).

Course Objectives

After completion of this course, students will be able to

1. Familiarize with current ecological topics in the literature
2. Identify current ecological problems (broad and specific)
3. Understand when, why, and what modeling approaches to use for research questions and/or hypotheses
4. Apply knowledge of modeling applications to their own research projects

Course Work

Published peer reviewed literature will be assigned each week, encompassing a current ecological problem and type of modeling approach. Students are required to participate in paper discussions each week and submit a brief summary of the manuscript being discussed (submit in CANVAS prior to the start of class). Students will also be required to lead discussions each

week throughout the semester (individual sign up requirements will be dependent on the number of students enrolled in the course).

Tentative lecture schedule

Week	Topic	Paper	Lead	Assignments Due
1	Course overview		Dr. Molly Simonis	
2	Frequentist modeling approaches	https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.4426	Grad student	Paper summary due before class
3		TBD	Grad student	Paper summary due before class
4	Ordination and variable reduction	https://www.d degruyter.com/document/doi/10.1515/ami-2019-0004/html	Grad student	Paper summary due before class
5	Meta-analyses	https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2656.13166	Grad student	Paper summary due before class
6	Network modeling approaches	https://onlinelibrary.wiley.com/doi/full/10.1111/ele.12304	Grad student	Paper summary due before class
7	Bayesian modeling approaches	https://www.pnas.org/doi/abs/10.1073/pnas.1914794117	Grad student	Paper summary due before class
8	Conceptual modeling approaches	https://conbio.onlinelibrary.wiley.com/doi/full/10.1046/j.1523-1739.2002.01232.x	Grad student	Paper summary due before class
9	Decision-making modeling approaches	https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/csp.2.220	Grad student	Paper summary due before class

10	Theoretical modeling approaches	https://onlinelibrary.wiley.com/doi/10.1111/ele.12904	Grad student	Paper summary due before class
11		https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2020.0559	Grad student	Paper summary due before class
12	Physiological modeling approaches	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0222311	Grad student	Paper summary due before class
13	Spatial modeling approaches	https://onlinelibrary.wiley.com/doi/full/10.1111/ele.13703	Grad student	Paper summary due before class
14		https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.3487	Grad student	Paper summary due before class
15	Predictive modeling approaches	https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(21)00245-7/fulltext?ref=dl-staging-website.gho.st.io	Grad student	Paper summary due before class

Grading

Your grade will be dependent on paper summaries, in-person discussion participation, and discussion leading. Your participation and discussion contributions are critical to this course.

Assignment or course contribution	Points per contribution	Quantity per course	Total
Paper summary	10	13	130
In-person participation	5	13	65
Discussion lead	15	TBD	TBD
Total possible points			TBD

Being that each graduate student has different research priorities, and/or unforeseen circumstances can occur (life happens), final grades will be calculated out of TBD points in lieu of a potential need for make-up work (see *Make-up Work* section in Classroom Policies below).

Point percentage and letter grades will follow university standards as follows:

Percent	Letter Grade
90-100	A
80-89	B
79-79	C
60-69	D
< 60	F

Classroom Policies

Computers and Internet Access

You will need access to a computer and the internet for this class. If you do not have access to a personal computer, you may be able to borrow a laptop from IT in the AU Library for up to two, three week periods in a semester, depending on availability

(<https://libguides.auburn.edu/ShortTermLaptopLoans>). If you do not have internet availability to request a temporary laptop, the circulation desk at the library can help get you computer and internet access to get a request submitted. Please note that requests may take days to fulfill.

General university computer access and availability throughout computer labs on campus can be found here:

https://auburn.service-now.com/it?id=sc_cat_item&sys_id=580c3518dbea76002fb0fba9bf9619be. In the event that you cannot access this link due to lack of computer or internet, please visit the circulation desk at the library for desktop computer availability there.

If your current laptop runs into any issues getting on the internet or Canvas, please contact the OIT service desk via email (itservicedesk@auburn.edu), phone (334-844-4944), or in person on the 3rd Floor of the library.

Communication

Canvas and email are the primary forms of communication for this course thus, students are responsible for checking both. You have control of the notification settings in your Canvas account. Be sure to set up notifications to alert you when an Announcement is posted, an Assignment is due, a grade is released, etc. For students new to Canvas, please review Canvas help topics and/or seek help through the [Biggio Center](#).

Academic Honesty

All portions of the Auburn University Student Academic Honesty code (Title XII) found in the [Student Policy eHandbook](#), will apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

AI Not Permitted in this Course

In this course, it is expected that all submitted work is produced by the students themselves, whether individually or collaboratively. Students must not seek the assistance of Generative AI Tools like ChatGPT or Copilot. Use of a Generative AI Tool to complete an assignment constitutes academic dishonesty.

Classroom Behavior

The Auburn University Classroom Behavior Policy is strictly followed in the course; please refer to the [Student Policy eHandbook](#) for details of this policy. As a general rule of thumb, you are expected to be respectful of the instructor and all of your peers throughout the course at all times.

Emergency Contingency

If normal class and/or lab activities are disrupted due to illness, emergency, or crisis situation, the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials.

Make-up Work

Students are responsible for their own learning. If unforeseen circumstances occur that prevent a student from attending class and/or submitting assignments, please contact Dr. Simonis (molly.simonis@auburn.edu). Make-up work is discouraged, but will be handled on a case-by-case basis if needed.

Americans with Disabilities Act

Students who need accommodations should submit their approved accommodations through the AIM Student Portal on AU Access and follow-up with the instructor about an appointment. It is important for the student to complete these steps as soon as possible; accommodations are not retroactive. Students who have not established accommodations through the [Office of Accessibility](#), but need accommodations, should contact the [Office of Accessibility](#) at: ACCESSIBILITY@auburn.edu or 334-844-2096. The [Office of Accessibility](#) is located in Haley Center 1228.

Resources

Mental Health

If you or someone you know needs support, you are encouraged to contact Auburn Cares at 334-844-1305 or auburn.edu/auburncares. Auburn Cares will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

[Student Counseling & Psychological Services](#) provides confidential, no-cost mental health counseling and psychiatric services to Auburn students. You can speak with a counselor 24/7/365 by calling 334-844-5123. Learn more about mental health information on campus at auburn.edu/scps.

Food and/or Financial Insecurity

Any student experiencing food insecurity or an unexpected financial crisis is encouraged to contact [Auburn Cares](#) at 334-844-1305 or auburn.edu/auburncares for resources and support. You may also visit the [AU Food Pantry](#) directly for more information regarding food insecurity resources on campus.

Sexual Misconduct

Auburn University faculty are committed to supporting our students and upholding gender equity laws as outlined by Title IX. Please be aware that if you choose to confide in a faculty member regarding an issue of sexual misconduct, dating violence, or stalking, we are obligated to inform the [Title IX Office](#), who can assist you with filing a formal complaint, No-Contact Directives, and obtaining supportive measures. Find more information at auburn.edu/titleix.

If you would like to speak with someone confidentially, [Safe Harbor](#) (334-844-7233) and [Student Counseling & Psychological Services](#) (334-844-5123) are both confidential resources. [Safe Harbor](#) provides support to students who have experienced sexual or relationship violence by connecting them with academic, medical, mental health, and safety resources. For additional information, visit auburn.edu/safeharbor.

AU EthicsPoint Anonymous Reporting

Auburn University (Auburn University, Auburn University at Montgomery, the Alabama Cooperative Extension System, and the Alabama Agricultural Experiment Station) uses the [EthicsPoint Anonymous Reporting System](#) to enhance communication and empower individuals to promote safety, security, and ethical behavior. This service does not replace existing reporting methods for reporting fraud, waste, abuse or other potentially illegal activities, but is a space to remain anonymous and report certain and uncertain situations that violate uni policy. If you are uncertain if a situation violates uni policy, is illegal, or constitutes harassment or discrimination, you may also use EthicsPoint to obtain clarification.

Ombuds Office

The [Auburn University Ombuds Office](#) serves all students, staff, and faculty seeking assistance with university related concerns. The Ombuds provide impartial, informal, independent, and confidential assistance to office visitors. The Ombuds are NOT mandatory reporters for sexual misconduct/Title IX. The office works with visitors to identify options and additional resources, including policies and processes to be aware of in pursuing a resolution. The Ombuds may offer alternative perspectives, help visitors prepare for difficult discussions, and mediate between parties if all parties agree. Contact the Ombuds at 334-844-7174 or aumbuds@auburn.edu.