ENVS 201: Environmental Systems & Field Ecology

Term: Fall 2026
Credits: 4.0
Lecture Times & Location: Monday, Wednesday, Friday 11:00–11:50 a.m., Meridian Science Center 120
Laboratory Time & Location: Monday 8:00–10:50 a.m., Meridian Science Center 132
Modality: In-Person Lecture and Laboratory

Instructor Information

- **Instructor:** Dr. Everett Moss (Associate Professor of Environmental Science)
- **Email:** emoss@university.alkimi.ai
- **Office:** Meridian Science Center 334
- **Office Hours:**
  - Wednesday & Thursday: 9:00–10:30 a.m. (In person, Meridian Science Center 334)
  - Monday: 3:00–4:00 p.m. (Virtual via Zoom; link posted in Canvas)
  - Also available by appointment.

Course Description

Population, community, and ecosystem ecology studied through field sampling design, species surveys, and habitat assessment, with a weekly three-hour field laboratory. ENVS 201 investigates fundamental principles of ecological systems from populations and communities to ecosystems and landscapes, emphasizing quantitative field methods and experimental design. Students examine life-history strategies, population demography, competitive and trophic interactions, biogeochemical cycling, and landscape fragmentation. Through weekly field laboratories across regional forest, wetland, and riparian habitats, you will master flora and fauna survey methods, vegetation sampling transects, mark-recapture techniques, and multivariate ecological data analysis.

Prerequisites

ENVS 101 and BIO 101.

Measurable Student Learning Outcomes

Upon successful completion of ENVS 201, students will be able to:

1. **Model Population Demography and Dynamics:** Construct life tables, estimate survival and fecundity rates, and model exponential, logistic, and stage-structured population growth.
2. **Design Field Ecological Sampling Protocols:** Implement randomized, stratified, and transect-based field sampling strategies to quantify plant and animal abundance, density, and distribution.
3. **Quantify Biological Diversity and Community Structure:** Calculate species richness, Shannon-Wiener diversity, evenness indices, and community similarity metrics from empirical field survey data.
4. **Analyze Trophic Dynamics and Nutrient Fluxes:** Quantify ecological energetics, trophic efficiency, primary productivity, and nutrient budgets across forest and aquatic ecosystems.

5. **Evaluate Landscape Ecology and Habitat Fragmentation:** Analyze patch size, edge effects, wildlife corridors, and metapopulation dynamics to assess conservation reserve designs.
6. **Communicate Scientific Field Research:** Synthesize empirical ecological field data into professional, peer-reviewed format research papers adhering to Ecological Society of America standards.

Required Course Materials & Approximate Costs

1. **Begon, Michael, and Colin R. Townsend. *Ecology: From Individuals to Ecosystems*. 5th ed., Wiley-Blackwell, 2021.** Approx. $65 for digital rental; approx. $140 for print purchase.
2. **Henderson, P. A. *Practical Methods in Ecology*. Wiley-Blackwell, 2003.** Approx. $40.
3. **Waterproof field notebook (Rite in the Rain), hand lens (10x), and outdoor field boots.** Approx. $35.
4. **Total estimated cost:** $75 to $215.

Generative AI Policy (AI Level 2: AI Permitted with Disclosure for Specified Tasks)

In accordance with Alkimi University Academic Policies (Student Handbook §5.8), ENVS 201 operates under **AI Level 2**.

- **What is permitted:** You may use AI tools to generate R code snippets for ecological diversity calculations, brainstorm experimental sampling protocols, and proofread draft sections of your scientific field reports.
- **What is prohibited:** You may not use AI to fabricate biodiversity data, synthesize field observations, generate complete written discussion sections, or access AI tools during exams.
- **Disclosure:** Submit an AI acknowledgment statement with each field report and the independent research project specifying any tools used and how analytical code was verified, or state that no AI was used.

Grading Components and Weights

- **Midterm Exam 1:** 15% (In class, Friday, September 25)
- **Midterm Exam 2:** 15% (In class, Friday, October 30)
- **Field Laboratory Reports:** 25% (Weekly field reports due in Canvas Fridays at 11:59 p.m.)
- **Independent Field Research Project:** 15% (Due Friday, November 20 at 11:59 p.m.)
- **Ecological Problem Sets & Data Labs:** 10% (Canvas problem sets and R data exercises due Wednesdays at 11:59 p.m.; lowest dropped)
- **Final Comprehensive Examination:** 20% (Tuesday, December 15, 2026, 10:30 a.m.–12:30 p.m.)

Grading Scale (Alkimi University Standard)

- **A:** 93–100% | **A-:** 90–92%
- **B+:** 87–89% | **B:** 83–86% | **B-:** 80–82%
- **C+:** 77–79% | **C:** 73–76% | **C-:** 70–72%
- **D+:** 67–69% | **D:** 60–66% | **F:** Below 60%
- **Extra credit:** None is offered.

Course Schedule (Fall 2026)

Week	Dates	Topics & Readings	Laboratory	Assignments & Deadlines
Week 1	Aug 26, 28	**Introduction to Ecological Systems and Scales:** Ecological hierarchies, organismal responses to environmental gradients, physiological ecology, and experimental design in field studies. *Reading: Begon Ch. 1*	*No lab meetings this week.*	*First day of classes: Wed Aug 26.*

Week	Dates	Topics & Readings	Laboratory	Assignments & Deadlines
Week 2	Aug 31–Sep 4	**The Physical Environment and Terrestrial Biomes:** Global climate drivers, solar radiation, soil development, microclimatic variation, and biome characteristics. *Reading: Begon Ch. 2*	Lab 1: Forest Habitat Assessment and Microclimate Profiling.	*Wed Sep 2: Add/section change deadline.*
Week 3	Sep 9, 11	**Evolutionary Ecology and Life History Strategies:** Trade-offs in reproduction and survival, r-selection versus K-selection, senescence, and evolutionary stable strategies. *Reading: Begon Ch. 3*	*No lab meetings this week (holiday).*	*Mon Sep 7: Labor Day (no classes). Wed Sep 9: Census date (last day to drop without a W).*
Week 4	Sep 14–18	**Population Demography and Life Tables:** Age-structured populations, static and cohort life tables, net reproductive rate, generation time, and intrinsic rate of increase. *Reading: Begon Ch. 4*	Lab 2: Mark-Recapture Population Size Estimation: Terrestrial Isopods.	—
Week 5	Sep 21–25	**Interspecific Competition and Niches & Midterm Exam 1:** Lotka-Volterra competition equations, competitive exclusion principle, resource partitioning, and character displacement; Midterm Exam 1 in class. *Reading: Begon Ch. 5*	Lab 3: Plant Community Quadrat Sampling and Density Metrics.	**Midterm Exam 1 (in class).**
Week 6	Sep 28–Oct 2	**Predation, Herbivory, and Prey Dynamics:** Functional and numerical responses, predator-prey oscillations, optimal foraging theory, and plant defensive strategies. *Reading: Begon Ch. 6*	Lab 4: Herbivory Damage Assessment and Plant Chemical Defenses.	—
Week 7	Oct 5–9	**Mutualism, Parasitism, and Symbiosis:** Endosymbiosis, mycorrhizal networks, pollinator mutualisms, host-parasite coevolution, and vector-borne transmission. *Reading: Begon Ch. 7 & 8*	Lab 5: Riparian Forest Vegetation Transects and Basal Area Calculation.	—
Week 8	Oct 14, 16	**Community Structure and Species Diversity:** Species richness, Shannon-Wiener and Simpson diversity indices, rank-abundance curves, and latitudinal diversity gradients. *Reading: Begon Ch. 9*	*No lab meetings this week (holiday).*	*Oct 12–Oct 13: Fall break (no classes). Fri Oct 16: Midterm grades due.*
Week 9	Oct 19–23	**Food Webs, Trophic Cascades, and Keystones:** Connectance, food web stability, top-down versus bottom-up regulation, keystone species, and trophic cascade impacts. *Reading: Begon Ch. 10*	Lab 6: Aquatic Macroinvertebrate Sampling and Community Diversity Indices.	—
Week 10	Oct 26–30	**Ecological Succession and Disturbance & Midterm Exam 2:** Primary and secondary succession, facilitation, tolerance, inhibition models, intermediate disturbance hypothesis; Midterm Exam 2 in class. *Reading: Begon Ch. 11*	Lab 7: Old-Field Secondary Succession Chronosequence Survey.	**Midterm Exam 2 (in class).**
Week 11	Nov 2–6	**Ecosystem Metabolism and Primary Production:** Gross and net primary productivity, light and dark bottle methods, Eddy covariance flux towers, and ecological efficiencies. *Reading: Begon Ch. 12*	Lab 8: Leaf Litter Decomposition Rates and Macroinvertebrate Colonization.	*Fri Nov 6: Last day to withdraw (W) or elect Pass/No Pass.*
Week 12	Nov 9–13	**Biogeochemical Cycles and Nutrient Spiraling:** Nutrient pools and fluxes, carbon and nitrogen cycles, nutrient limitation, phosphorus immobilization, and stream nutrient spiraling. *Reading: Begon Ch. 13*	Lab 9: Stream Nutrient Spiraling and Forest Soil Carbon Stocks.	—
Week 13	Nov 16–20	**Landscape Ecology and Metapopulations:** Patch-corridor-matrix models, edge effects,	Lab 10: Spatial Analysis of Forest	**Independent Field Research Project due**

Week	Dates	Topics & Readings	Laboratory	Assignments & Deadlines
		core area requirements, Levins metapopulation model, and source-sink dynamics. *Reading: Begon Ch. 14*	Habitat Patches and Edge Effects.	**Fri Nov 20 at 11:59 p.m.**
Week 14	Nov 23	**Island Biogeography and Reserve Design:** MacArthur-Wilson equilibrium theory, species-area relationships, SLOSS debate (single large or several small reserves), and corridors. *Reading: Begon Ch. 15*	Lab 11: Independent Project Field Data Collection and Sampling Validation.	*Nov 25–Nov 27: Thanksgiving break (no classes).*
Week 15	Nov 30–Dec 4	**Global Change Ecology and Invasive Species:** Anthropogenic nitrogen deposition, ocean warming, climate-driven phenological mismatch, and invasion ecology dynamics. *Reading: Begon Ch. 16*	Lab 12: Invasive Plant Survey and Abundance Modeling.	—
Week 16	Dec 7, 9	**Restoration Ecology and Research Symposium:** Ecological restoration targets, novel ecosystems, rewilding initiatives, and semester student research symposium. *Reading: Begon Ch. 17 & Review*	Lab 13: Independent Research Project Symposium Presentations.	*Wed Dec 9: Last day of classes. Thu Dec 10: Reading Day.*
Finals	Dec 15	**Final Comprehensive Examination:** Tuesday, December 15, 2026, 10:30 a.m.–12:30 p.m., Meridian Science Center 120.	—	Comprehensive examination covering population models, community ecology, ecosystem energetics, and landscape ecology.

Course Policies

Attendance Policy

Field ecology requires prompt and reliable attendance. Laboratory sessions begin at 8:00 a.m. sharp with vans departing from Meridian Science Center for regional field sites; tardiness means missing transportation and earning a zero. Notify Dr. Moss in advance of medical or emergency absences. More than two unexcused lab absences results in an automatic grade of F. Students who miss the first two class meetings without notifying the instructor may be dropped. Students may miss class for religious observance without penalty if they notify the instructor in writing within the first two weeks of the semester (by Wednesday, September 9, 2026). Absences for university-sponsored activities (athletics, performances, conferences) are excused with a letter from the sponsoring office at least one week in advance.

Late Work Policy

Field reports submitted past the Friday deadline lose 10% per day and will not be accepted more than three days late. Problem sets and data exercises submitted late lose 20% and cannot be submitted after answer keys are published. The lowest problem set score is dropped.

Fieldwork Gear and Inclement Weather Policy

Field laboratories take place rain or shine across muddy, wooded, and wetland terrains. Students must dress in durable outdoor clothing, long pants, waterproof hiking boots or rubber mud boots, and weather-appropriate rainwear. Field equipment, safety goggles, and high-visibility vests will be provided.

Final Exam Policy

The final examination (Tuesday, December 15, 2026, 10:30 a.m.–12:30 p.m.) is scheduled by the University Registrar and can't be moved without the Dean's written approval (Faculty Handbook §5.5). A student with three or more final exams on the same calendar day may reschedule one of them. Requests go to the instructor of the middle exam by the last day of classes. For this term, send the request by Wednesday, December 9, 2026 (Student Handbook §6.4).

Academic Integrity

Alkimi University is an academic community devoted to rigorous scholarship, open intellectual inquiry, and uncompromising ethical conduct. All students are subject to the regulations of the Alkimi University Academic Integrity Policy. Academic dishonesty—including plagiarism, cheating on examinations, unauthorized collaboration, fabrication of empirical data, and unauthorized submission of academic work generated by artificial intelligence—undermines the integrity of the university and carries severe disciplinary sanctions. Sanctions range from a failing grade on an assignment or exam to an administrative course failure recorded as an 'XF' on the official transcript, academic suspension, or expulsion. Suspected violations are formally investigated and resolved through the Office of Academic Integrity in accordance with Faculty Handbook §6. For detailed information, consult the Office of Academic Integrity, Lovell Hall 315, (555) 555-0163, integrity@university.alkimi.ai.

Accessibility Services

Alkimi University is committed to providing equitable educational access and reasonable accommodations for all students with documented disabilities, including physical, sensory, psychological, learning, and chronic health conditions. Students requesting academic accommodations must formally register with the Office of Accessibility Services, Harlan Hall 204, (555) 555-0155, access@university.alkimi.ai. Once approved, students will receive an official Faculty Accommodation Letter detailing approved accommodations. Students should present this letter to the instructor as early in the semester as possible, and at least one week prior to any exam or assignment requiring accommodation. Accommodations cannot be applied retroactively.

Student Wellness and Mental Health

Your physical health, psychological well-being, and mental health are essential to your academic success. If you experience heightened stress, anxiety, depressive symptoms, personal trauma, or academic burnout, free, confidential counseling and medical care are available through the Hollis Health & Counseling Center, located in the Hollis Center. Routine appointments are available Monday–Friday 8:00 a.m.–6:00 p.m. and Saturday 10:00 a.m.–2:00 p.m. during the semester by calling (555) 555-0190 or emailing health@university.alkimi.ai. Urgent, 24/7 crisis psychological counseling is accessible immediately at (555) 555-0199.

Campus Student Support Services

- **Academic Advising Center:** Lovell Hall 101 | (555) 555-0158 | advising@university.alkimi.ai
- **Writing Center:** Whitcombe Library 3rd Floor | Free consultations on papers, reports, and research projects at any stage.
- **Whitcombe Library:** Whitcombe Library, Main Floor | (555) 555-0170 | askalibrarian@university.alkimi.ai
- **Hollis Health & Counseling Center:** Hollis Center | (555) 555-0190 | 24/7 Counseling Line: (555) 555-0199 | health@university.alkimi.ai
- **Science Tutoring Center:** Drop-in peer tutoring and quantitative ecology assistance are available Monday through Thursday from 4:00 to 8:00 p.m.