



Summer Session 2017

BIOE 458 Forest and Grassland Ecology

3 credits; Lectures, Labs, Field Work

Course dates: August 7–18, 2017; Monday–Friday 8 am–5 pm

Instructor: Dr. Andrew Larson

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<http://www.cfc.umt.edu/personnel/details.php?ID=1710>

Prerequisites: One year of college-level biology, one semester of college-level chemistry, one semester of college-level mathematics, an ecology course (can be met via BIOE342 Field Ecology at FLBS) or equivalents; or consent of instructor.

Course Description

This course introduces students to aspects of population, community, landscape and ecosystem ecology, including the interactive biophysical attributes and processes of the forests and intermountain grasslands. Students observe and learn about plant distributions and plant community structure, including principles of plant ecology, ecophysiology, and ecological disturbances in these environments. Energy and materials transfer and feedbacks are used to describe complex interrelationships driving the dynamics of these systems, including both natural and human components as modifiers of systems dynamics. Students learn how data are collected to maximize information used to answer scientific questions, including the relationships between accuracy, precision, uncertainty, and cost. Field trips and field laboratory exercises are complemented with quantitative analysis of student-collected data, including tree demographic analysis, community composition and structural change, and analysis of net primary productivity and forest carbon stocks.

Required Text: Selected readings will be available.

Reference Texts: Available at the Biological Station.

Course and Field Supplies/Equipment: (*available for purchase at the FLBS Bookstore) Students must be prepared for spending time in the field. It is important that students adequately prepare for field trips by making certain they have the appropriate equipment and resources for the trip. Weather in the N. Rockies is highly variable and can change quickly so students should always carry layers for warmth and rain gear. Note: **Students will be camping overnight.** Food and cooking equipment are provided.

- Field notebook ("Rite-in-the-Rain" all-weather type)*
- Plenty of pencils, regular or mechanical; permanent ink pens*
- Hot/cold mug – useful at FLBS and for drives to field sites*
- Laptop computer
- Comfortable hiking boots that you're willing to get wet
- Pack suitable for day trips
- Packable water bottles (total cap \geq 2 qts)
- Lunch pack-up container (resealable plastic)
- **Required Overnight Field Gear and Other Items to Bring Checklists:** [\(Click to view\)](#)
- Mess kit, cooking gear and utensils
- Sunscreen, sun hat and sunglasses
- Compact personal hygiene kit for field use
- Binoculars (optional)
- Flashlight or headlamp and batteries
- 30 ft of rope for hanging food and pack out of bears' reach
- Cooking stove and fuel (optional)
- Drinking water purifier or filter (optional, but desirable)

Student Learning Outcomes

- Introduction to sampling techniques for plant community research and monitoring.
- Accurate use of traditional (compass, diameter tape) and modern (laser rangefinder, GPS) equipment.
- Introduction to fundamentals of experimental design.
- Understanding of physical environmental limitations to plant establishment, growth, and survival.
- Knowledge of plant disturbance adaptations and implications for community resilience.
- Identification of woody plant species of the Northern Rockies.
- Knowledge of forest-river interactions and feedbacks including large wood and floodplain succession.

Evaluation and Grading

Participation: 30%

Final oral exam: 35%

Data analysis and research paper: 35%

Schedule

Date	Location	Topic and activities
7-Aug-17	Napa Point	Map and compass use, intro field methods, whitebark pine ecosystems.
8-Aug-17	Glacier NP	Forest structural development, coarse woody debris, succession.
9-Aug-17	NF Flathead	Fire ecology and disturbance interactions. Overnight camping.
10-Aug-17	NF Flathead	Forest-stream interactions, LWD, floodplain succession. Overnight camping.
11-Aug-17	NF Flathead	Forest-stream interactions, LWD, floodplain succession.
14-Aug-17	Glacier NP	Subalpine forests and alpine treeline. Overnight at Coram or Nyack.
15-Aug-17	Coram EXF	Long-term experiment remeasurement: tree mortality, forest carbon storage, NPP.
16-Aug-17	FLBS	Data analysis: Tree demography, forest carbon stocks and net primary productivity.
17-Aug-17	Swan Valley	Frequent-fire forests and grasslands, culturally modified trees, old-growth.
18-Aug-17	FLBS	Final exam/paper.