

SUMMER SESSION 2023



FLATHEAD LAKE
BIO STATION
UNIVERSITY OF MONTANA



TO APPLY AND GET MORE INFORMATION VISIT flbs.umt.edu/education

2023 Course Schedule: [Join us in spectacular Northwest Montana for summer ecology courses!](#)

June 19-30	BIOE 440 Conservation Ecology (3 credits)	July 17-28	BIOE 416 Alpine Ecology (3)
	BIOE 400 Aquatic Microbial Ecology (3)		BIOE 439 Stream Ecology (3)
Jun 19-Jul 14	BIOE 342 Field Ecology (5)	Jul 17-Aug 11	BIOB 491 Evol. of Animal Behavior (5)
	BIOB 494 Seminars (1)	Jul 31-Aug 11	BIOE 458 Forest & Fire Ecology (3)
	BIOE 490 UGR Animal Behavior (2-4)		BIOE 453 Lake Ecology (3)
July 3-14	BIOE 451 Landscape Ecology (3)		BIOE 490 UGR Cryosphere Ecology (1-3)

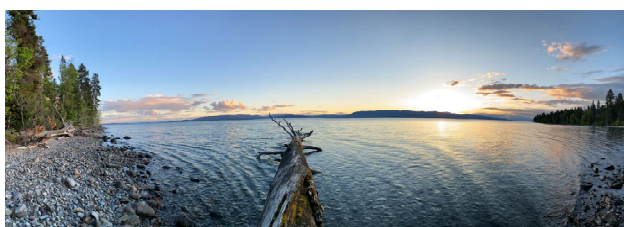
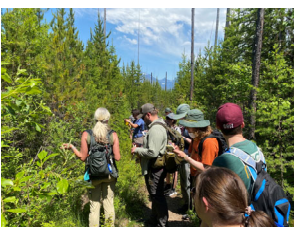
- ◇ Earn up to 13 credits in 8 weeks
- ◇ Credits easily transferable
- ◇ Undergrad 300/400 level courses
- ◇ Grad credit for 400 level courses
- ◇ Small class sizes
- ◇ Many scholarships available

On the Shores of Flathead Lake. The FLBS campus is located on 80 shoreline acres on the east shore of Flathead Lake ~85 miles north of Missoula, Montana, USA. The summer academic program emphasizes outdoor, experiential learning through direct observation of biota and ecological processes. Field trips go throughout the Flathead region and surrounding mountains. For this program, you will live and study with students from across the country to take our courses and interact with the amazing professors and researchers that are a part of the FLBS community.

Tuition and Fees. Tuition is charged per credit. More information on the back. Since you will stay on station during the courses, you will be charged lodging and food service.

Scholarships. There are many scholarships available to attend these courses. You must be a sophomore or above with a minimum GPA of 3.0. All eligible students are encouraged to apply as a high percentage of applicants receive an award. Scholarship application materials can be submitted through your online application. The list of required materials can be found at https://flbs.umt.edu/apps/education/ss_scholarships.aspx

Other Financial Aid. Eligible students can use AmeriCorps awards, VR&E (Chp 31) or federal financial aid to pay for this program.



APPLY NOW!

Summer 2023 Course Offerings—Four Week Courses

To participate in FLBS courses marked ●●●, you must be in good physical condition, able to hike up to 10+ miles a day in strenuous conditions at altitude, and properly equipped for a great deal of hiking.

●●● FIELD ECOLOGY, BIOE 342, 5 credits, June 19-July 14, Monday-Thursday full days, plus half day Fridays



Prerequisites: College-level biology, chemistry, and mathematics or equivalents; or consent of instructors. The course engages major concepts and approaches in modern ecology via immersive field experiences, hands-on sampling, and project-based learning in both aquatic and terrestrial habitats. Topics range from physiological and behavioral ecology to population and community ecology to ecosystem ecology and touches on themes of disturbance, invasive species, and climate change. The course will build students' natural history knowledge of the biota of the Rocky Mountain region while directly engaging them in active research projects of the instructors. Ecological phenomena will be examined in real time and real life. All-day and overnight trips will be conducted throughout the course, taking students into a range of aquatic and terrestrial environments near the Bio Station and the adjacent mountain areas including Glacier National Park. Students will conduct directed measurements connected to ongoing research projects of the faculty, developing technical skills as well as skills in scientific analysis and interpretation in written and oral form. Instructor—Dr. James Elser, FLBS-U of Montana, <https://flbs.umt.edu/newflbs/about-flbs/people/>

Seminars in Ecology & Resource Management BIOB 494, June 19-July 14, 1 Credit (CR/NCR)

This course may be taken with other courses in the first 4 weeks of summer session. Seminars include presentations and discussions focused on local environment issues and problems. Instructor—Dr. Gordon Luikart, FLBS, U of Montana, <https://flbs.umt.edu/newflbs/about-flbs/people/>

Undergrad Research: Evolution of Animal Behavior, BIOE 490, 2-4 credits, June 19-Jul 14, Monday-Thursday full days, half day Fridays—An expansion of BIOB 491 Evolution of Animal Behavior. Principles and methods of animal behavioral ecology. Dr. Paul Watson, U of New Mexico, <https://www.drpjwatson.org/>

Evolution of Animal Behavior, BIOB 491, 5 credits, July 17-Aug 11, Monday-Thursday full days, plus half day Fridays



Prerequisites: One semester of college-level biology and an ecology course (can be met via BIOE342 Field Ecology at FLBS) or equivalents; or consent of instructor. Principles and methods of evolutionary behavioral ecology, strongly emphasizing the development and honing of professional field study skills. Interactive lectures and discussions will cover basic and advanced concepts relevant to modern Darwinian analyses of complex contingent behaviors, including sexual and social behaviors. We will engage in close observation of behaviors, followed by whole-class round-table formulation of (a) evolutionary adaptationist hypotheses about a given behavior's possible net benefits, (b) testable predictions of each hypothesis, and (c) effective and efficient methods to test those predictions in the field or lab; in the classroom or on-the-spot in

the field. Instructor—Dr. Paul Watson, U of New Mexico, <https://www.drpjwatson.org/>

Summer 2023 Course Offerings—Two Week Courses

CONSERVATION ECOLOGY, BIOE 440, 3 credits, Jun 19-30, Monday-Friday full days



Prerequisites: One semester of college-level biology and an ecology course or consent of instructor. This course emphasizes the application of basic biological research to problems in conservation and management with a focus on science, human dimensions, and policy interface. The three main disciplines in conservation biology we will study are Ecology, Evolution, and Human Dimension. These themes will be applied to case studies chosen to illustrate general principles and important issues in conservation and to facilitate discussion with professional field and conservation biologists. We will meet with professionals from government or nongovernment organizations providing a special opportunity to interactively learn by working side by side with conservation biologists, researchers, and natural resource managers from USGS, Montana FWP, US Forest Service, and the National Park Service. Instructor—Dr. Gordon Luikart, FLBS-U of Montana, <https://flbs.umt.edu/newflbs/about-flbs/people/>

AQUATIC MICROBIAL ECOLOGY, BIOE 400, 3 credits, Jun 19-30, Monday-Friday full days



Prerequisites: One year of college-level biology, chemistry, and mathematics or consent of instructor. The course provides a conceptual foundation and hands-on field and laboratory training in modern methods in aquatic microbial ecology. Lectures, laboratories, field trips, and in-class discussions will be used to explore topics such as physiology and metabolism of aquatic microbes in bio elemental cycles. Students will gain hands-on experience with both cultivation-based approaches and cultivation-independent methods for studying environmental micro-organisms. The heavy field-based emphasis is intended to provide an experiential learning environment. Instructor—Dr. Matt Church, FLBS-U of Montana, <https://flbs.umt.edu/newflbs/about-flbs/people/>

••• **LANDSCAPE ECOLOGY, BIOE 451, 3 credits, July 3-14, Monday-Friday full days**



Prerequisites: One year of college-level biology, chemistry, and mathematics, and an ecology course or consent of instructor. Introduction to the physical and ecological processes shaping landscapes, how these biological and physical processes interact, and how they are responding to global change. We examine how plants and animals are distributed across landscapes, how the physical template of the environment shapes species distributions and how biotic feedbacks can influence the physical environment. Processes of pattern formation in the environment such as disturbance from fire and how landscape pattern can affect both physical and biological processes will be examined. Field trips underscore concepts and allow data gathering and interpretation by students. Students are introduced to geospatial technologies such as Geographic Information Systems (GIS) and the use of “R”, a data analysis and visualization platform, which has become the standard in biological and earth sciences. Students analyze and interpret data through analyses and written presentations. Instructor—Dr. Tyler Hoecker, U of Montana

••• **ALPINE ECOLOGY, BIOE 416, 3 credits, July 17-28, Monday-Friday full days**

Prerequisites: One semester of college-level biology and ecology or consent of instructor. Exploration of distribution, abundance, and biotic interactions of plants and animals and their unique ecophysiological adaptations to life in the rigorous environments of high mountains above the timberline, with emphasis on the Crown of the Continent area. Students learn about distribution of plants and animals and study processes and interactions that are the foundation to ecology in alpine environments. Emphasis is placed on the processes that organize communities including drivers of global climate and complex interrelationships of biotic and abiotic interactions, including natural human components as modifiers of system dynamics, and how those processes affect alpine systems. Field trips and data intensive class projects underscore major concepts and allow training in data collection, analysis, writing a scientific paper, presentation and interpretation by students. Instructor—Macy Ricketts, FLBS

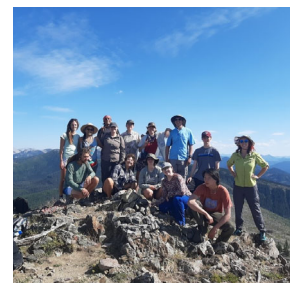


STREAM ECOLOGY, BIOE 439, 3 credits, Jul 17-28, Monday-Friday full days

Prerequisites: One year of college-level biology, chemistry, and mathematics, and an ecology course or consent of instructor. This course focuses on the fundamental concepts of stream/river ecology and the physical, chemical and biological processes that characterize running water ecosystems. Students will study the ecology of streams and obtain hands-on experience in the examination and characterization of stream systems. Daily participation, examinations, and written and oral reports of independent or group studies as directed by the professor are required. Instructors—Dr. Robert Hall, FLBS-U of Montana, <https://flbs.umt.edu/newflbs/about-flbs/people/>

••• **FOREST AND FIRE ECOLOGY, BIOE 458, 3 credits, July 31-Aug 11, Monday-Friday full days**

Prerequisites: Consent of instructor. Introduction to aspects of population, community, landscape and ecosystem ecology, including the interactive biophysical attributes and processes of forest ecosystems. Students observe and learn about plant distributions and plant community structure, including principles of plant ecology, ecophysiology, and ecological disturbances, especially wildfire. Energy and materials transfer and feedbacks are used to describe complex interrelationships driving the dynamic of these systems, including both natural and human components as modifiers of systems dynamics. Students learn how data is collected to maximize information used to answer scientific questions. 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. Instructor—Dr. Andrew Larson, U of Montana



LAKE ECOLOGY, BIOE 453, 3 credits, July 31-Aug 11, Monday-Friday full days

Prerequisites: One year of college-level biology, chemistry, mathematics, and ecology or consent from instructor. This course examines physical, chemical, and biological characteristics of lake ecosystems with an emphasis on nutrient cycling, food web interactions and water quality. This course focuses on functional relationships and productivity of plant and animal assemblages in lakes as regulated by physical, chemical, and biotic processes. Fundamental concepts of ecology as they relate to the aquatic environment are highlighted. Students will learn basic and contemporary study methods in field settings including Flathead Lake, glacial lakes of Glacier National Park and Swan Valley, inter-montane prairie kettle lakes and nutrient rich lakes. Emphasis is directed toward experiential learning and obtaining hands-on examination and characterization of lakes that will serve students well throughout their careers. Written and oral reports of independent studies as directed by the professor are required. Instructor—Dr. Shawn Devlin, FLBS, U of Montana, <https://flbs.umt.edu/newflbs/about-flbs/people/>

Undergrad Research: Cryosphere Ecology, BIOE 490, 3 credits, Jul 31-Aug 11, Mon-Fri full days

Prerequisites: One year of college-level biology, chemistry, and ecology or consent from instructor. In this course, we will examine the ecology of organisms in cryosphere environments including sea ice, permafrost, glaciers, and snow. We will consider the physiology and ecology of several key cryosphere organisms and discuss ecosystem-level processes in the cryosphere and how these may change with a changing climate. Instructor—Dr. Trinity Hamilton, University of Minnesota, <https://www.the-fringe-lab.com/>

Summer 2023 Course Offerings Independent Study 1-10 Credits

Advanced Undergraduate Research, BIOE 490, 1–10 Credits (CR/NCR) Independent research experience in field ecology associated generally with the various research projects at FLBS. Projects are mentored by permanent and visiting FLBS faculty. Send us a short outline of research work you would like to undertake.

Undergraduate Thesis, BIOB 499, 3–6 Credits (CR/NCR) Prerequisite: Senior standing and consent of instructor. Objective is to prepare a thesis/manuscript based on undergrad research in field ecology for presentation and/or publication. Student must give an oral presentation at the Biological Station. Student provides short outline of proposed research work.

Research In Ecology, BIOB 596, 1–8 Credits (CR/NCR) Open only to non-UM graduate students. The purpose of this independent research is to solve a specific ecological problem unrelated to thesis or dissertation as identified and examined by the student under mentorship of a Biological Station professor. Independent research includes design, analysis and reporting of ecological data. Student provides outline of proposed research work.

How to Apply

Apply online at flbs.umt.edu/apps/education. Early submission is important as classes fill early.

Use the website to:

- * Create an application account
- * Enter personal information, course selections, preferences, and demographic information
- * Complete required forms including the medical history form
- * Attach unofficial transcript(s) for undergraduate/graduate programs attended
- * Pay the application fee

Summer Session Acceptance. Submitted online applications are reviewed in the order received.

Applicants will be contacted within two weeks about acceptance status. Courses not meeting minimum enrollment may be canceled.

The Biological Station does not discriminate in admission, in the provision or application of services or programs, or in employment or housing policies on the basis of race, gender, age, national origin or ancestry, creed, religion, color, political ideas, sexual orientation, gender identity, gender expression, physical or mental disability, genetic information, veteran status, political ideas, marital or family status or pregnancy. FLBS is committed to providing an environment that is free from harassment and emphasizes the dignity and worth of every member of our community.

Financial Aid Options. Students meeting eligibility requirements for the following types of financial aid must contact the Biological Station by emailing summersession@flbs.umt.edu or calling 406-872-4515 as soon as they are accepted. Types of aid include AmeriCorps (Segal Award), Montana Vocational Rehabilitation, and Veterans Readiness and Employment (Chapter 31). For University of Montana students with federal financial aid, any remaining award from the preceding academic year may be available to students taking 6 or more credits of FLBS summer courses. For non-University of Montana students, contact your home institution's Financial Aid Office about processing a Consortium Agreement with University of Montana and your university to request summer financial aid.

How to Apply for a Scholarship

1. Complete a summer session application at flbs.umt.edu/apps/education
2. Submit/upload a statement about why you wish to attend FLBS. Indicate which courses or research at FLBS are relevant to your university curriculum or your plans for future work
3. Students may optionally strengthen their scholarship application by documenting financial need. Submit a pdf or print copy of the FAFSA SAR for 2021-2022 or 2022-2023
4. Applicants may upload application materials to their online application or send print copies to Scholarship Committee, Flathead Lake Biological Station, University of Montana, 32125 Bio Station Lane, Polson, MT 59860-6815 USA
5. Two letters of recommendation from faculty (or equivalent) must be submitted in support of your application. Letter writers must email letters directly to summersession@flbs.umt.edu or send letters to Scholarship Committee, Flathead Lake Biological Station, University of Montana, 32125 Bio Station Lane, Polson, MT 59860-6815 USA
6. Completed scholarship Applications must be received by 11:59 PM MST March 10, 2023. You must contact us to confirm that all application materials have been received. Incomplete applications will not be considered

Fees: Course fees are **\$620 per credit**. Students who pay their \$50 application fee before January 13, 2023 will receive a \$100 discount. Food service and lodging fees can be found in Table B.

Payment: Tuition, housing, and meal plan fees are due by Friday May 19, 2023. You should pay through your online application with a VISA, MasterCard, or Discover card. You can also pay by check to University of Montana Flathead Lake Biological Station, Attn: Summer Session and mail it to: Summer Session—FLBS, 32125 Bio Station Lane, Polson, MT, 59801-6815 USA.

Cancellations and Refunds: Cancel through your online application no later than Friday, May 5, 2023. Fees, excluding the nonrefundable application fee, paid before this deadline will be refunded. Cancellations made after this deadline will result in forfeiture of all fees paid to date.

Logistics: Information about packing list, transportation, lodging, food service, climate, bookstore, and more are easily accessible from our website flbs.umt.edu/apps/education, or email summersession@flbs.umt.edu

-Pets are not allowed on Station

-As part of the University of Montana, FLBS is a tobacco-free campus

Check-In: Information is provided in the acceptance letter. A check-in packet is also provided on the day of arrival. Arrive on the Sunday before your first course after 3PM. Orientations are held on each Sunday before new classes at 6PM. Check out by 11AM the day following your last course.

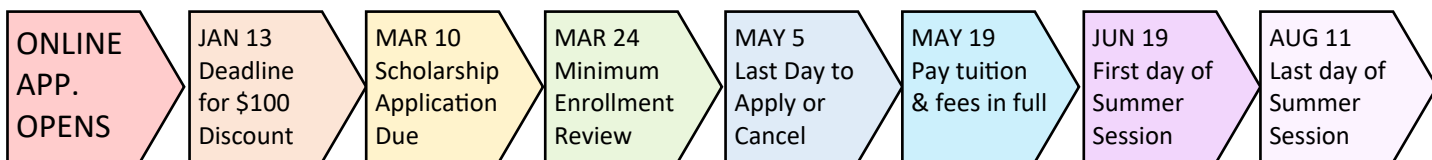


Table A. Course Fees

Credits	Tuition	Credits	Tuition
1	\$620	8	\$4,960
3	\$1,860	9	\$5,580
4	\$2,480	10	\$6,200
5	\$3,100	11	\$6,820
6	\$3,720	12	\$7,440
7	\$4,340	13	\$8,060

Table B. Housing & Meal Plan Fees

	Housing & Meal Plan Fees	
	Cabin Double	Cabin Single
2 Weeks	\$650	\$750
4 Weeks	\$1,300	\$1,500
6 Weeks	\$1,950	\$2,250
8 Weeks	\$2,600	\$3,000



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