



Summer Session 2020

BIOB 439 Stream Ecology Syllabus

3 credits; Lectures, Labs, Field Work

Course dates: July 20–31, 2020

Location: FLBS, Ecology West Classroom

Instructor: Dr. Robert Hall

117 Elrod, Flathead Lake Bio Station, University of Montana

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

Course Description:

Stream Ecology (BIOE 439) is the study of the physical, chemical and biological processes in streams. F.-A. Forel coined limnology as the “oceanography of lakes”. Here we will do the same for streams and rivers by studying the ecology **of** streams rather than simply ecology **in** streams. This goal requires student integrating across scientific disciplines to learn principles, concepts and methods of stream ecology in a field, lecture, laboratory, and discussion settings. Daily participation, examinations, and written and oral reports of independent or group studies as directed by the professor are required.

Text: None, but lots of required readings on Dropbox.

Student Learning Outcomes:

Course Learning Objectives

- 1) Engage students in stream ecology concepts such as the interactions of physical, chemical, and biological processes through lectures, discussions, readings, and field investigations.
- 2) Students collect and analyze data and present written findings from field research, working both independently and as a team.

Expected Learning Outcomes

After completing this course, students will be able to:

- 1) Identify and explain ecological relationships pertaining to a variety of stream organisms and environments. Students accomplish this task using terms, concepts, and models familiar to professional stream ecologists.
- 2) Evaluate and communicate ideas from stream ecology literature.
- 3) Conduct a quantitative and repeatable study design that addresses a research question of relevance in stream ecology.

Evaluation and Grading:

Participation (daily)	24%	A ≥94% A- 90–93%
Short papers (4)	16%	B+ 87–89% B 84–86% B- 80–83%
Research paper (1)	30%	C+ 77–79% C 74–76% C- 70–73%
Final exam (1)	30%	D+ 67–69% D 64–66% D- 60–63%
		F <60%

Participation is based on discussions, attendance and short exercises that you will do, we will discuss, but won't become a full blown paper. Short papers are 1 pagers turned in on new papers in the field. Description for these is on Dropbox. Final paper is a group research report that you will write about the field data that we collect in the course.

Graduate Increment:

Students taking this class for graduate credit will take the lead in data analysis and modeling for jointly led class project. They will present to the class methods and models for leaf litter breakdown and ecosystem metabolism.

Course and Field Supplies/Equipment: (*Available for purchase at the FLBS Bookstore)

- Rite in the Rain field notebook*
- Pencils*
- Hot/cold mug*
- Water bottle*
- Lunch pack-up container (re-sealable)*
- Bear spray*
- Wading shoes or sandals
- Flashlight (headlamp) and batteries
- Laptop computer with MS Excel or RStudio
- Personal first aid kit
- Mess kit

- **Required Overnight Field Gear and Other Items to Bring Checklists:** <http://flbs.umn.edu/urls/lists>

Computers: We will do lots of data analysis and writing in this course. You are free to use the software of your choice. I use R (via RStudio) for data and graphing, LaTeX for difficult writing (papers), and MS Word for easy writing (this syllabus), and Excel for arranging data. You are welcome to use Excel, any other spreadsheet program, R, Matlab, MS Word, open office, R Markdown, etc. For those who don't like paying money, Rstudio and LaTeX are free and have cloud options (RStudio Cloud, Overleaf). You will use Overleaf for your paper because it allows for easy collaboration. I will set up the format so that all you have to do is type in the words. One of the exercises (stream metabolism) requires R, but we can use my computer. Please hand in all assignments as printed paper; I have a much easier time grading them that way.

Course Policies:

Students will adhere to University of Montana Student Conduct Code and Discrimination, Harassment, Sexual Misconduct, Stalking, and Retaliation Policy (UM policy website: <http://www.umn.edu/safety/policies/>). Students must also adhere to the FLBS Code of Conduct and FLBS Rules and Regulations, as well as abide by the Safety Orientation Checklist.

FLBS students are required to complete University of Montana Prevention Education Program courses: AlcoholEdu and Sexual Assault Prevention for Adult Learners after coursework begins and prior to completion of coursework.

Schedule: The schedule below has already changed. Spreadsheet on dropbox has the up to date one, and that will change too.

Note: Make sure you pack your brown bag lunch each day at breakfast!

Date	Lectures – Labs – Field Work
20-Jul-2020 (M)	08:00am Lecture: Intro to geomorphology & hydrology 10:00am Roy's Creek 12:00am Lunch 13:00pm Sampling Yellow Bay Creek 17:30pm Dinner
21-Jul-2020 (T)	08:00am Lecture: Carbon Cycling, metabolism, detritus, C budgets 10:00am Roy's Creek (set out litter bags, collect bugs/algae) 12:00pm Lunch 13:00pm Lecture: Bugs/Algae 14:00pm Look at collected bugs/algae 16:00pm Ulseth Discussion 17:30pm Dinner
22-Jul-2020 (W)	08:00am Lecture: Nutrient Cycling 10:00am TBA 12:00pm Lunch 13:00pm Trip Prep 15:00pm Depart for the Nyack 16:00pm South Fork Stop 19:00pm Dinner 20:00 Set out O2 sensors Camp overnight at Nyack
23-Jul-2020 (Th)	08:00am Start Diel O2, CO2 Nutrient addition experiment 13:00pm Fieldwork river sampling for project 17:30pm Dinner 20:30 NH4 analysis Camp overnight at Nyack
24-Jul-2020 (F)	08:00am Float Middle Fork From Cascadilla to West Glacier 16:00pm (or later) Return to FLBS
27-Jul-2020 (M)	08:00am Lecture: Food Webs / RCC 10:00am Return to Nyack 12:00pm Lunch 17:30pm Dinner

Date	Lectures – Labs – Field Work
28-Jul-2020 (T)	08:00am Sample analysis 11:00 Wallace discussion 12:00pm Lunch 13:00pm Data and sample analysis 17:30pm Dinner
29-Jul-2020 (W)	08:00am Giersch discussion 09:00am Samples and data 12:00pm Lunch 13:00pm Data and writing 17:30pm Dinner
30-Jul-2020 (Th)	08:00am Litterbag pickup, Roy's Creek 09:00am Sort and dry litter 11:00am Lecture: Bioassessment 12:00pm Lunch 13:00pm Data and writing 17:30pm Dinner
31-Jul-2020 (F)	08:00am Lecture: Dams 09:00am Kennedy Discussion 10:00am Weigh litter, analyze 12:00pm Lunch 13:00pm Chill 15:00pm Final

Students with disabilities may request reasonable modifications by contacting the instructor. The University of Montana assures equal access to instruction for students with disabilities in collaboration with instructors and Disability Services for Students (406.243.2243, <http://www.umt.edu/dss/default.php>). The University does not permit fundamental alterations of academic standards or retroactive modifications.