



Summer Session 2017

BIOE 453 Large and Small Lake Ecology

3 credits; Lectures, Labs, Field Work

Course dates: August 7–18, 2017

Instructor: Dr. Shawn Devlin

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<http://flbs.umn.edu/people>

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:

The physical, chemical and biological characteristics of lake ecosystems with an emphasis on how the physical processes of lake circulation and stratification, nutrient loading and cycling, primary and secondary production and food web interactions, and the role of atmospheric and land use/watershed affect water quality. This course focuses on the 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 emphasized. Limnological principles are presented within the context of regional and landscape spatial scales. Students will learn basic and contemporary methods of study in field settings including Flathead Lake, glacial lakes of Glacier National Park, intermontane prairie kettle lakes and nutrient rich lakes. Because this is a field course offered through the Flathead Lake Biological Station, emphasis is directed toward experiential learning and obtaining hands-on examination and characterization of lakes that will serve the student well throughout their career. Written and oral reports of independent studies as directed by the professor are required.

Required Text: (available for purchase at the Biological Station Bookstore)

Dodds, Walter K. and Whiles, Matt R. 2010. *Freshwater Ecology: Concepts and Environmental Applications of Limnology*. 2nd Edition. Academic Press, 829 pages. ISBN-13: 978-0123747242

Reference Texts: Available for use at the Biological Station; if you own any of these, please bring.

Kalff, J. 2002. *Limnology* (1st edition). Prentice-Hall, Inc., Upper Saddle River, NJ 07458.

Wetzel, R. G. 2001. *Limnology: Lake and River Ecosystems*, 3rd edition. Academic Press, Inc., New York.

Horne, A. J. and C. R. Goldman. 1994. *Limnology*, 2nd edition. McGraw-Hill, Inc., New York, NY.

Holton, G. D. and H. E. Johnson. 1996. *A Field Guide to Montana Fishes*, 2nd edition. Montana Fish, Wildlife & Parks, Helena, Montana.

Prescott, G. W. 1962. *Algae of the Western Great Lakes Area*. William C. Brown, Dubuque, Iowa.

Prescott, G. W. 1969. *How to Know the Aquatic Plants*. Wm. C. Brown Company, Dubuque, Iowa.

Prescott, G. W. 1978. *How to Know the Freshwater Algae*, 3rd edition. Wm. C. Brown Company, Dubuque, Iowa.

Lesica, P. and P. Husby. 2001. *Field Guide to Montana's Wetland Vascular Plants*, Montana Wetlands Trust, Helena, Montana.

Pennak, R. W. 1989. *Fresh-Water Invertebrates of the United States: Protozoa to Mollusca*, 3rd edition. John Wiley & Sons, New York.

Thorp, J. H. and A. P. Covich, (eds.). 2001. *Ecology and Classification of North American Freshwater Invertebrates*, 2nd Edition. Academic Press, San Diego.

Cox, E. J. 1996. *Identification of Freshwater Diatoms from Live Material*. Chapman and Hall, London, UK. 158 pp.

Vinyard, W. C. 1979. *Diatoms of North America*. Mad River Press, Eureka, California.

Hauer, F. R. and G. A. Lamberti, (eds.). 2006. *Methods in Stream Ecology*. Elsevier-Academic Press, San Diego.
 Merritt, R. W. and K. W. Cummins, (eds.). 1996. *An Introduction to the Aquatic Insects of North America*, 3rd Edition. Kendall/Hunt Publishing Company, Dubuque, Iowa.
 Burch, J. B. 1989. *North American Freshwater Snails*. Malacological Publications, Hamburg, Michigan.

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 some cooking equipment are provided; students may have to provide some personal stoves and pots and pans for backpack trips.

- Waterproof field notebook (Rite in the Rain 8.5" by 11")*
 - Lab notebook*; binder or clipboard (optional)*
 - Pencils*
 - Magnification loop or lens (hand lens)*
 - Fine-tipped forceps-one straight and one soft touch*
 - Hot/cold mug*
 - Plastic, resealable containers for lunch pack-up
 - Laptop (highly recommended)
 - **Required Overnight Field Gear and Other Items to Bring Checklists:** [\(Click to view\)](#)
- Mess kit
 - Water bottle
 - Water purifier
 - Wading shoes and/or waders
 - Clothes that can get muddy
 - Flashlight and batteries
 - Mask, fins, snorkel, wetsuit (all optional, but if you already have these, bring them!)

Student Learning Outcomes:

Grading:

Course Policies:

Schedule: (Tentative will be revised late Spring 2017)

Date	Lectures/Lab/Field Work
7-Aug-17	
8-Aug-17	
9-Aug-17	
10-Aug-17	
11-Aug-17	
14-Aug-17	
15-Aug-17	
16-Aug-17	
17-Aug-17	
18-Aug-17	