

## **Lake and Stream Ecology**

**July 22 – August 8, 2024**

M-Th, 8am – 5pm

Mountain Research Station

University of Colorado, Boulder

*Lake and Stream Ecology covers the principles of biological, physical, and chemical processes of inland waters. Through lectures, field trips, lab exercises, and independent projects, students will address practical topics related to aquatic ecology, including sources and treatment of drinking water, differences in stream ecosystems from mountains to plains, and effects of natural and anthropogenic factors on lakes and streams. We will study aquatic ecosystems in the area, from lakes in the mountains to rivers on the plains.*

### **Instructor:**

Dev Niyogi

Department of Biological Sciences

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573-341-7191 (work) – good option if you leave message

314-341-5727 (cell) – may not have reception on field trips

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### **Goals:**

Freshwater ecology is an exciting, interdisciplinary science. The study of a lake or stream involves physics, chemistry, and of course biology. I hope that you will be able to integrate the diverse teachings of this class into a thorough understanding of freshwater ecosystems. Specifically, I hope and expect you to:

- Understand the physical, chemical, and biological characteristics of lakes and streams
- Understand and properly use limnological terminology
- Demonstrate an ability to interpret limnological data
- Be able to communicate limnological data (written and orally)
- Know where to find limnological data
- Know how to design limnological experiments
- Be familiar with the basic tools for conducting limnological research
- Work effectively in a group
- Contribute to discussions of freshwater science
- Demonstrate a professional attitude and have patience

**Textbook:**

None required, but some lecture material is based on *Freshwater Ecology*, by Dodds and Whiles, and *Limnology*, by Wetzel. These books and others will be available for students in the classroom.

**Grading breakdown:**

Exams = 30% (one in class [closed book], one take-on-your-own [open book])

Homework = 10%

Paper presentation = 10%

Project proposal and report = 25%

Project presentation = 10%

Notebook = 5%

Participation during fieldtrips and discussions = 10%

Your final percentage will determine your final grade per the usual scale (90-100 = A, 80-89 = B, etc). Assignments will be marked down 10% per calendar day for being late.

**Research project:**

Students will conduct a small research project using the techniques learned in class. Field and lab equipment are generally available for your use (given constraints of sharing and cost). You can work alone or in groups of 2, 3, or 4. Group projects should be larger in scope to ensure equal effort. Research reports should be about 5 pages (single-spaced, 12 point font) and should include figures of the main results. Reports should be written individually even if the project is done as a group. Further details on the research projects will be given in class.

**Presentations:**

Students will give a presentation about their research project on the last day of class (Thursday, August 10). Presentations should be about 12 minutes long for groups of 2 (somewhat longer for larger groups). All students in a group should speak at some point during the group presentations.

Students will also give an individual presentation on a recent paper in freshwater ecology. I will provide a variety of papers that you can use, or you can find one on your own and use it after getting my approval. These talks should be timed for 8 minutes of speaking. These talks are scheduled for the afternoons throughout the class.

**Attendance policy:**

Attendance is required, and students will be penalized for missed events if not cleared with me ahead of time. However, if you must deal with unusual circumstances (illness, family bereavement) during the class, please do not panic. See me as soon as convenient and we will work something out.

**Feedback:** I welcome all feedback about my teaching and the course.

**Tentative schedule of topics:**

<i>Week</i> <i>Day</i>	<i>Topics</i>	<i>Destination</i>
1 Mon	Introduction	Niwot Ridge
1 Tues	Stream physics and geomorphology	nearby streams
1 Wed	Lake origins Water, Light, temp	nearby lakes
1 Thurs	Stratification	Lake Estes
2 Mon	Dissolved oxygen Biota	Gamble Gulch
2 Tues	Anthropogenic impacts	nearby streams
2 Wed	Ecosystem processes	Rainbow Lakes
2 Thurs	<b>Exam</b> Project design and discussion	<b>Homework due at 8am</b> <b>In-class exam at 8am</b> Project discussion Proposal presentations
3 Mon	Boulder Reservoir Projects	Boulder Reservoir Boulder DWTP
3 Tues	Projects	Proposal due at 5pm
3 Wed	Projects	<b>Take-home exam due 9am</b>
3 Thurs	<b>Project presentations</b>	<b>Project papers can be emailed by 11:59pm on August 12</b>