

Center for Engaged Learning Abroad

Lake Ecology: An Introduction to Field Research

Course Number: ENVI 2935

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Credit: 3 hours

COURSE DESCRIPTION:

The course provides a comprehensive understanding of the physical, chemical, and biological processes that influence lake dynamics. This will be accomplished through lecture, field investigation, and laboratory analysis. We will explore two different lake ecosystems, Five Blue Lakes National Park and Chalillo Dam. Five Blue Lakes National Park is a series of naturally formed lakes; the lake behind Chalillo Dam was created in 2005 when the Macal River was dammed. We will compare and contrast the physical, chemical, and biological parameters between the two lakes and also assess differences among habitat types within each lake.

Students will learn basic and modern methods of field and laboratory investigation to compare and contrast data collected within and between the lake ecosystems. This will include how to monitor various water quality parameters, how to collect aquatic invertebrates within the limnetic and littoral zone, as well as how to taxonomically and genetically identify aquatic invertebrates. An emphasis throughout the course will be on the aquatic invertebrate life within both lakes.

COURSE OBJECTIVES:

By the end of the course, students will 1) be able to explain relationships among physical, chemical, and biological processes that influence lake dynamics, 2) be able to accurately measure basic water quality parameters in a lake setting and know why they are important, 3) understand and perform field sampling techniques to collect and qualitatively assess aquatic invertebrate life within a lake, 4) perform taxonomic identification of aquatic invertebrates using dissecting microscopes, 5) understand the role of genetic identification of organisms in ecology.

COURSE READINGS:

All course readings will be available in an electronic format on the CELA e-campus. Students will be responsible for **BRINGING** a hard or electronic copy of each paper with you and reading all materials **PRIOR** to class start so as to be prepared to effectively participate in discussions. Students will also be expected to read any additional handouts throughout the course.

Domingues, C. D., Sampaio da Silva, L. H., Rangel, L. M., de Magalhães, L., de Melo Rocha, A., Lobão, L. M., Paiva, R., Roland, F., Sarmiento, H. 2017. Microbial food-web drivers in tropical reservoirs. *Microbiology of Aquatic Systems* 73:505-520.

Lewis, W. M. 1996. Tropical lakes: how latitude makes a difference, p. 43–64. *In* F. Schiemer and K. T. Boland [eds.], *Perspectives in tropical limnology*. SPB Academic Publishing.

Minty, C. D. 2001. Preliminary Report on the Scientific and Biodiversity Value of the Macal and Rasapulo Catchment, Belize: A Wildlife Impact Assessment for the proposed Macal River Upper Storage Facility. London, England: The Natural History Museum. **READ Chapter 4-6, Annex B, and Annex C.**

Mullis, K. B. 1990. The unusual origin of the polymerase chain reaction. *Scientific American*. 262(4):56-65.

Zimmer, C. 2008. What is a species? *Scientific American*. 298(6):72-79.

REQUIRED EQUIPMENT:

Much of our class time will be spent in the field. Students should be prepared to be in and around water, rain or shine. Students should also be prepared for short hikes (1-4 miles) in any type of weather. At a minimum, students should have the following items:

- Tevas or tennis shoes that can get wet
- Hiking shoes
- Rain gear
- Snorkel gear (mask and snorkel) fins are optional
- Bug repellent
- Sunscreen
- Anti-itch cream
- Hat
- Long sleeve shirt and long pants
- Field notebook (waterproof Write-in-the-Rain notebooks recommended)
- Pencil (NO PENS)
- Camera
- Flash drive
- Water bottle

STUDENT ASSESSMENT:

As a student, you can take this course for credit or you can take it for personal development. For those wishing to receive academic credit for the course or for those wishing to receive a grade for the course and the ability to access a letter of completion from CELA showing that grade, the following assignments will make up the elements of the final grade. For those wishing to take the course for personal development, you will be expected to participate actively in all discussions, group assignments, labs and field work, maintain a field notebook, complete all field work sheets, but will not be asked to take the final exam and no grade will be recorded for you.

Students can earn a maximum of 100 points (= A) during the course. Grades will be computed as follows:

- **Class attendance and participation (20 points)**
Students are expected to be present at all times and effectively participate in activities and discussion. Participation will be assessed on a daily basis.
- **Assignments (30 points)**
Short individual and/or group assignments will be completed throughout the course.
- **Group presentation (20 points)**
Student groups will synthesize class information to create an ecological conceptual model that will be presented to the class.
- **Field notebook (10 points)**
Students will be expected to collect data and organized notes in a field notebook throughout the course.
- **Final exam (20 points)**
The final exam will cover material presented throughout the course.

SUMMARY:

The course consists of 75 hours of contact time over a two-week period. See the daily schedule for details. The course time is divided as follows:

- Classroom = 16
- Laboratory = 21
- Field = 38
- Total= 75

Daily schedule to be created and available Spring, 2018