

Stream Ecology BIOL 4440

Spring 2013

Stream Ecology has only been recognized as a major sub-discipline of ecology and limnology in the past few decades. Methods for teaching it and which core components to emphasize have therefore not been widely agreed upon among stream ecologists. In this course, our goals are relatively broad and we hope to provide an awareness of many areas and issues. Additionally, the course will provide tools that can be applied to evaluate the ecology flowing waters. Because of our location, we will be biased in using examples from prairie streams and rivers; however, we will discuss characteristics of streams from other ecoregions to familiarize you with scales, patterns, and processes in the absence of direct experience.

Goals: At the end of the semester each student is expected to be knowledgeable and competent in the following areas:

Be familiar with terminology in the field of stream ecology

Be familiar with equipment used in stream ecology

Understand ecological processes in streams and how they vary over distance and time

Understand basic stream hydrology and how to measure and calculate important metrics

Assess a stream's physical, chemical, and biological qualities, how they interact, and what those characteristics mean in terms of stream health and proper resource management.

Understand how and why major biological communities vary in a lotic system.

COURSE PHILOSOPHY

The course is structured to insure that students taking the course develop a set of skills that will enable them to function as effective aquatic field biologists. By the end of the course each student should be capable of

- 1) setting up a field study (which includes generating testable hypotheses and choosing appropriate equipment)
- 2) going into the field and collecting data,
- 3) analyzing, interpreting, and writing up the results of the field study in a professional manner acceptable to either an employer, a research supervisor, or a professional journal. To achieve this end the course includes a series of exercises, each of which builds upon the previous exercises

Course Outline and TENTATIVE Schedule, i.e. this schedule will vary

Date	Topic	Readings
January 15	Introduction and History Stream Ecology	
January 17	The physicochemical environment – Lecture ... practical applications to follow in the laboratory.	Allan & Castillo Chapters 1 & 2; Hauer & Lamberti Chapter 1. Hynes, HBN. 1975. A Stream and its Valley (reading)
January 22	Geomorphology II- river forms and processes	Allan & Castillo Chapter 3
January 24	Stream biota - who, what, where and challenges and solutions to life in moving fluids Lecture followed by laboratory	Allan & Castillo Chapter 4
January 29	Biotic interactions - community structure and species diversity	Allan & Castillo Chapter 10
January 31	GPS, GIS – Mapping and Watersheds Lecture - Lab combined ... guest instructor Dr. Bruce Hunter	Hauer and Lamberti Chap. 2 p. 23-49.
February 5	Energy Sources in Streams	
February 7	Lab Field Trip: Discharge Measurements and Stream Flow Analysis, Habitat Analysis, Physico-chemical measurements. Collection of macroinvertebrates from different habitats	
February 12	Energy Sources in Streams Autotrophs	Allan & Castillo chapters 6 & 12
February 14	Energy Sources in Streams Heterotrophic	Allan & Castillo Chapter 7
February 19	Biotic interactions – trophic relationships ... functional feeding groups and food webs	Allan & Castillo Chapter 8

February 21	Field trip- Leaf drift Material Storage and Transport Transport and Retention of CPOM Lecture – Lab combined	Hauer and Lamberti Chap. 27
February 26	Evolution of the Ecosystem Approach continued. Trophic Relationships Predation, herbivory & competition	Allan & Castillo Chapter 8
February 28	The River Continuum Craze/ Nutrient Spiraling	Allan & Castillo Chapter 1+ readings & Allan & Castillo Chapter 11
March 5	Expanded horizons II- floodplains	Allan & Castillo Chapter 14
March 7	Mid-Term Exam	
March 12 & 17	Spring Break	
March 19	Fish Communities	Hauer & Lamberti Chapter 22
March 21	Sampling Fish Communities Lecture and Lab combined	Handouts
March 26	Macroinvertebrate Drift	Hauer & Lamberti Chapter 21
March 28	Macrophytes and Bryophytes Lecture and Lab combined	Hauer and Lamberti Chapter 18 page 381
April 2	Organization of Field activities	
April 4	Overnight Field Trip	
April 9	Modification of Running waters by humankind	Allan & Castillo Chapter 13
April 11	Evaluating Stream Health	Hauer & Lamberti Chapter 35
April 16		
April 18	TBA	
April 23	Conservation of streams: a prospectus on the future	Biol. Rev. (2006), 81, pp. 163–182.
April 25		
April 30	Course Summary	

May 2	Group Presentations	
May 7	Bubba Biologist Celebration	
May 09	Final Examination 10:30 - 12:30	

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Office Hours: Monday & Wednesday 08:30 - 09:30 or by appointment. See note below.

Required Text: *Stream Ecology Structure and Function of Running Waters* (2nd edition) by J. David Allan & Castillo and Maria M. Castillo. This is the best available, summary of stream ecology I know of and will serve as a reference text. Information about the book can be found at <http://www.springer.com/life+sci/ecology/book/978-1-4020-5582-9>.

Selective reading materials may be assigned during the semester.

Attendance: Attendance is expected.

Grading: Short quizzes will be administered unannounced throughout the semester. They will be based on previous lectures and assigned readings. There are no make-ups for quizzes. The quizzes in part will be used to help me gauge the progress of the class and as part of the "participation score" (see below). Lecture examinations and quiz grades will account for 90% of your lecture grade. 10% of your grade will be based on attendance and class participation. The final grade is calculated by averaging your lecture and laboratory scores.

STUDENT RESPONSIBILITIES

Your responsibilities are to attend all the lectures and labs, ask questions, prepare ahead for class and laboratories, participate actively in the lab, complete assignments on time, and express yourself creatively and concisely in your work.

We will be using chemical reagents in the lab that may react adversely with your clothing should you spill on yourself. Therefore, wear "casual" clothes to the lab. Stream field work in January - March will be cold! You will need foot wear that can get wet, rain gear, and warm clothes. UNT has some chest waders in a variety of sizes (some with holes and fungal cultures with species unknown to science). Needless to say I strongly encourage each student to acquire his or her own pair of hip boots or chest waders.

Laboratory attendance is mandatory. There will be many times lecture and laboratory will be

combined or we might have lecture during part of the lab. You cannot master stream ecology from a book. If you anticipate not being able to participate in the laboratories I suggest that you drop the course. Late assignments will be downgraded 10 points for each day past the due date.

ADDITIONAL COURSE POLICIES

1. My office is open to students. If you cannot meet during my scheduled office hours contact me we will find a time to meet. If you have any problems with the course come see me right away. I will within reasonable limits work with you to help you through the course. However, I cannot help you raise a failing grade during the last weeks of the course. In fairness to the other members of the class I cannot assign you extra credit work to pull up required course work.
2. If you don't understand something in class--raise your hand and ask a question! More than likely other students are having the same problem. There is no such thing as a stupid question.
3. Cheating and Plagiarism are forms of academic dishonesty that will not be tolerated. If a student is caught cheating it will result in a 0% for that test or assignment. A second act of cheating will result in an "F" for the course.

Disability Accommodation:

"The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>. You may also contact them by phone at 940.565.4323."