

### COURSE INFORMATION

- Lectures: Tuesday and Thursday 9:05 - 9:55  
A106 Corson Hall (Morison Room)
- Lab Sections: Tuesday or Wednesday 1:25-4:25  
Stimson 316
- Instructors: Cliff Kraft  
Natural Resources  
215 Bruckner Hall  
255-2775; cek7@cornell.edu  
<http://www.dnr.cornell.edu/cek7/kraft.htm>
- Alex Flecker  
Ecology & Evolutionary Biology  
E211 Corson Hall  
254-4263; asf3@cornell.edu  
<http://www.eeb.cornell.edu/flecker/flecker.html>
- Teaching Assistants: Sarah Collins; smc322@cornell.edu A406B Corson  
Claire Ingel; ces279@cornell.edu F-house (OH at Mann Lobby)
- Readings: Text: *Stream Ecology: Structure and Function of Running Waters*, 2<sup>nd</sup> edition,  
by J. David Allan and María M. Castillo (required; on reserve in Mann Library)
- Methods in Stream Ecology*, 2<sup>nd</sup> edition, edited by F.R. Hauer and G.A.  
Lamberti (on reserve in Mann Library). This is a valuable reference but is not  
required for the course.
- Additional readings will be posted on the course web site (via  
<http://blackboard.cornell.edu/>)
- Grading: Midterm Exam I (20% of grade)  
Midterm Exam II (20% of grade)  
Final Exam (20% of grade)  
Lab Reports (20% of grade)  
Field Project (15% of grade)  
Participation (5% of grade)
- Office Hours: Sarah Collins: Wednesday 11:30 am – 12:30 pm, or available by appointment  
Claire Ingel: Monday 2:30 – 3:30 pm, or available by appointment  
Alex Flecker: Monday 11 am -12 pm, or available by appointment  
Cliff Kraft: Thursday 10:15-11:15 am, or available by appointment

## OVERVIEW AND EXPECTATIONS

This course will introduce students to major conceptual themes and a toolbox of common methods used for studying the ecology of running waters. People have long had a fascination with streams and rivers, which are critical for human well-being as sources of water and food, recreation, power, navigational routes, conduits for effluents, and aesthetic enjoyment. Moreover, running waters represent ideal ecosystems for understanding many ecological phenomena, hence some classic ecological studies have been conducted in stream and river systems. Our goals for this course are to gain an understanding of: 1) major physical and biological features of streams and rivers, 2) the range of diversity of running waters around the world, 3) fundamental processes producing patterns of riverine structure and function, and 4) critical issues associated with the conservation and management of streams and their biota.

We aim to engage different learning styles with a combination of readings, lectures, field trips, lab exercises, and a field project. Lectures will highlight the major points about each topic, often taking a different approach than the text and providing additional examples. The laboratory is a vital part of the course and students are required to participate in each weekly lab. The laboratory will be organized around a set of exercises designed to acquaint students with essential techniques used by stream ecologists. We will conduct these exercises at two sites along a local stream, Six-Mile Creek, with the explicit objective of gathering a set of data that can be used to compare these study sites. These data will be incorporated into a field project report submitted at the end of the semester (due December 7).

Examinations: Examinations will be given during the class period and at a university-scheduled final exam time. We have tried to avoid religious holidays. Make-up exams will be arranged at the discretion of the instructors for documented illnesses. We will follow university policy for make-up final exams.

Final Exam: Scheduled for Wednesday, December 14, 2:00-4:30 pm (room to be announced). The final exam will be worth 20% of your final grade. Approximately half of the final will focus on the last third of the course, and the rest will be cumulative, drawing from material presented during the entire semester.

Laboratory Exercises: We have scheduled field lab dates (see lab schedule), though our ability to conduct meaningful field activities is weather dependent, so the lab schedule may be adjusted in response to weather conditions. We will try to provide advance notice about likely schedule changes based on weather forecasts. Each field lab activity will occur at one of two contrasting field sites along Six-Mile Creek. Each lab section (i.e. Tuesday or Wednesday labs) will alternate working at these sites, thereby develop a data set throughout the semester that will be used to evaluate contrasting ecological conditions within Six-Mile Creek. These data will be incorporated into the field project report due at the end of the semester (see "Field Project" below).

Lab write-ups will be due at the start of lab one week following completion of scheduled lab activities related to each topic. The following topics will be subject to lab write-ups:

1. Stream Habitat Analysis (due 9/20 & 9/21)
2. Fish Data Analysis (due 10/18 & 10/19)
3. Algae and Chlorophyll Data Analysis (due 11/1 & 11/2)
4. Stream Invertebrates Data Analysis (due 11/15 & 11/16)

**Late lab reports will not be accepted.** Exceptions will be made only for illness and other circumstances beyond your control. You must contact your lead TA regarding extenuating circumstances as soon as possible.

Field Project Report: Each student will be responsible for working on a group project that will require substantial work outside of regularly scheduled lab periods. Field work for these projects will be conducted by groups of 3-4 members, though each student will be responsible for preparing their own field project report. Reports will require collaboration and discussion among all students in a group. Project reports will also provide an opportunity for each student to take some initiative in using available data from Six-Mile Creek – collected throughout the semester – to evaluate contrasting stream conditions at our two primary study sites. We will provide details regarding the field project during class lab class sections scheduled for 9/20 & 9/21.

Saturday Field Trip (optional): We will offer an all-day Saturday field trip on **October 1<sup>st</sup>**. The main objective of the Saturday field trip will be to contrast and compare physical and biological features of streams along a river continuum in the Susquehanna drainage basin. The trip will provide in-the-field exposure to other local streams beyond our focal sites on Six-Mile Creek.

Academic Integrity: All students are expected to be familiar with and to adhere to the University's Code of Academic Integrity (<http://cuinfo.cornell.edu/Academic/AIC.html>), which states that any submission of work by a Cornell student for academic credit indicates that the work is the student's own. All outside assistance should be acknowledged and truthfully reported in all circumstances. Students in this class who violate the code will be given a grade of zero for the assignment and/or a failing grade for the course.

Sharing of Course Notes: We follow university policy which stipulates that students are not authorized to replicate, reproduce, copy or transmit lectures and course materials presented, or derivative materials including class notes, for sale or distribution to others without the written consent of the instructors who are the original source of the materials.

Disabilities: We will make appropriate accommodations for students with disabilities. Please make such requests during the first three weeks of the semester, except for unusual circumstances, so that arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

How to Access the Course Website (Blackboard): We will maintain a course web site that will provide access to lab handouts, readings not in the course textbook, assignments, additional course materials, and links to a host of resources in stream ecology. To access BLACKBOARD go to: <http://www.blackboard.cornell.edu>. Once at the Blackboard site, select the NTRES BIOEE 4560 course listing. **LOG IN** by entering your net ID and your net ID password.

**You must enroll for a course on Blackboard, as it is independent of the University registration system.**

1. Log in at <http://blackboard.cornell.edu>
2. Click "All Blackboard Courses" tab
3. Use the Course Catalog on the right side of the screen to locate your course, or click the Browse Course Catalog button at the bottom of the Course Catalog, then search by the course ID, name, or instructor [Profs Kraft, Flecker].
4. Click Enroll.
5. Once logged in, the **Blackboard Portal** appears and contains a module labeled **Support for Students**. We encourage you to click on and navigate through the **Getting Started with Blackboard Course**.

**Lecture Schedule**  
**A106 Corson Hall (Morison Room)**

**I. Stream templates**

25 August	Overview of the course and stream ecosystems (CK)
30 August	Watersheds, stream networks and hydrology (CK)
1 September	Channel formation and physical habitat (CK)
6 September	Chemical environment of streams (pH, O <sub>2</sub> , conductivity) (CK)
8 September	Physical environment of streams (flow, temperature, substrate) (CK)
13 September	Organic Matter I: primary producers (AF)
15 September	Organic Matter II: heterotrophs (AF)
20 September	Vertical linkages: Hyporheic exchange and groundwater (CK)
22 September	Lateral linkages: Floodplains and riparian zones (CK)
27 September	Exam 1

**II. Ecological Processes**

29 September	Trophic relationships (AF)
4 October	Species interactions (AF)
6 October	Top-down controls and trophic cascades (AF)
11 October	FALL BREAK
13 October	Disturbance (AF)
18 October	Bottom-up controls and subsidized food webs (AF)
20 October	Dispersal in running waters (AF)

25 October	Nutrient dynamics I: spiralling and budgets (SC)
27 October	Nutrient dynamics II: ecological stoichiometry (SC)
1 November	Organic matter dynamics (AF)
3 November	Synthetic models and concepts (AF)

### **III. Stream Conservation and Management**

8 November	Stream assessment (CK)
10 November	Exam 2
15 November	Non-indigenous species in fluvial ecosystems (CK)
17 November	Managing river fisheries (CK)
22 November	Ecology of flow-regulated rivers (CK)
24 November	THANKSGIVING
29 November	River restoration (CK)
1 December	Climate change and the future of running waters (CK)

**Lab Schedule  
(Stimson 316)**

Week 1	8/30 & 8/31	Stream Habitat Rating Lab (Field Lab)
Week 2	9/6 & 9/7	Quantifying Physical Habitat (Field Lab)
Week 3	9/13 & 9/14	Habitat Analysis Lab
Week 4	9/20 & 9/21	*Project: Leaf Breakdown (Field Lab)
Week 5	9/27 & 9/28	Quantifying Fish and Estimating Abundance in Streams (Field Lab)
Saturday	10/1	Saturday Field Trip (Optional)
Week 6	10/4 & 10/5	Fish Data Analysis
Week 7	10/11 & 10/12	Fall Break
Week 8	10/18 & 10/19	*Quantifying Autotrophs in Streams (Field Lab)
Week 9	10/25 & 10/26	Algae Identification/Chlorophyll Lab
Week 10	11/1 & 11/2	*Stream Invertebrate Collection Lab (Field Lab)
Week 11	11/8 & 11/9	Stream Invertebrate Identification Lab
Week 12	11/15 & 11/16	*Water chemistry Lab – Analyze water samples
Week 13	11/22 & 11/23	Thanksgiving Break
Week 14	11/29 & 11/30	**Class Project Workshop

\* Lab write up due in section

\*\*Field project report due Wednesday, December 7<sup>th</sup>