

**BIOL/ENST/GEOL/UNIV 299 – Watershed Systems Science
Tentative Syllabus and Schedule – Fall 2008**

9:30-10:52 TTh O'Leary 103

Lab Th 1-5 O'Leary103

COURSE WEBSITE

http://www.departments.bucknell.edu/environmental_center/WatershedCourse/FrontPageWatershed.html

Instructors:

Dr. Carl Kirby, 226 O'Leary 577-1385, kirby@bucknell.edu www.facstaff.bucknell.edu/kirby Hours: open door or by appt see web site for times	Dr. Craig Kochel, 228 O'Leary 577-3032; kochel@bucknell.edu www.facstaff.bucknell.edu/kochel Hours: open door or by appt Often at Env. Center; 577-1490	Dr. Matthew McTammany, 311 Biology 577-3975; mmctamma@bucknell.edu www.facstaff.bucknell.edu/mmctamma Hours: open door or by appt
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Required Materials: 1) Process Geomorphology, 4th Edition, Ritter, Kochel, & Miller, 2006;
2) Stream Ecology: Structure and Function of Running Waters, 2nd edition, 2007, Allan & Castillo

Grading policy:

3-4 short tests 20% Semester project 50% Lab 25% (includes 5% for equipment installation and/or calibration and/or sampling and/or lab analysis in smaller groups) Class Participation/Assignments 5%

Policies:

There is no way to make up outdoor labs.

The syllabus will almost certainly change, and it is not the final word on assignments. Changes will be announced in class, lab *or* by email. You will be responsible for being aware of such changes whether or not you attend class when they are announced. Students are responsible for acquiring all handouts distributed in class.

All work on tests must be solely your own. Some writing, discussion and laboratory assignments will be at least partially cooperative efforts; such assignments will be clearly designated during class.

Writing assignments will be described in class, and will be due at the end of class. Late assignments will not be accepted. Rare exceptions may be made for special circumstances, especially in case of emergency or serious illness. Please do not ask us to accept late papers "because I left it in my room" or for similar reasons.

All tests will be closed book. Material covered in the laboratory is fair game for the tests.

Only if you have a serious illness (sick enough to be in bed) or other emergency (serious enough to get an excuse from your dean) *and* if you arrange beforehand with an instructor will you be allowed to take a makeup exam.

Keys to success in this course:

If any of you need special accommodations for your successful completion of this class, feel free to discuss them with one of the instructors.

Field work, class discussion, small group work, and writing exercises will be an essential part of the learning process in this course. Active participation in group work and classroom exercises is expected: you will be teaching and learning from each other a great deal. Class discussion and small group work will be dependent upon the reading/writing being done thoroughly. We strongly encourage you to ask questions in class, in lab, in our offices or in the hallway. We strongly encourage the formation of informal study groups. You will likely understand the material more thoroughly due to participation in such a group. We will take attendance, and although it will not count toward your grades, grades do correlate very strongly with class attendance. Come to class unless you are really sick.

We expect you to work hard and participate. We expect you to read the assigned material before class and lab, take notes, and participate in class activities. You can expect that we will strive to evaluate you fairly. To succeed on tests, after reading and attending class, I suggest that you review your notes, use the book to help clear up material covered in class, go over the writing assignments and keys, ask questions of other students and us, and repeat these steps as necessary. Put concepts in your own words (on paper or aloud to others) for better understanding; attempt to tie concepts and terms together that relate. Practice using the terminology from the course material for greater familiarity.

Dr. Kirby's schedule is posted outside his office and at www.facstaff.bucknell.edu/kirby/ScheduleFa08.htm. In lieu of specific office hours, we have an open door policy. If we're in our offices, 99% of the time, we'll be happy and able to speak with you. It is best to ask in person, call, or email to set up a time to make sure we haven't stepped out of the office. We will try to leave a note by our doors if we've stepped out.

Stay engaged. Your grades will probably reflect your interest. Let's have fun learning about the Earth.

Field Trips

This course includes several required field trips that are an integral part of the course. Be prepared for inclement weather. **Field trips depart the 7th Street side of O'Leary promptly at 1:00pm,** and field trips will usually require almost four hours. **You will not be allowed on the bus with open-toed shoes.**

It is your responsibility to arrive at the O'Leary Building fully prepared for field trip departure. Bring any water/snacks/medicine/etc. that you might need. We will be unable to stop during field trips to make purchases or use bathroom facilities in most cases. Please inform one of the instructors of conditions that might require special accommodation during field trips.

Plan to wear/bring the following items for field trips:

- old clothes
- sturdy boots/shoes (no flip flops or Tevas)
- long pants (recommended)
- hat/sun screen
- rain jacket/sufficient warm clothes
- notebook
- clipboard
- pen
- pencil and eraser
- drinking water

Optional items - rain pants, camera, and bug repellent.

We will provide additional field equipment.

Expect that some field trips will be conducted in inclement weather.

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Schedule – Fall 2008

The “Class Reading Assignment” column below refers to your textbooks (Process Geomorphology = PG; Stream Ecology = SE). These sections should be read before attending class.

Approximate schedule (subject to revision)

Day	Dates	Topic	Class Reading Assignment	Lab (field labs in bold)
Th	Aug 28	INTRODUCTION Questions – Directions Watershed Origins Tectonics – Appalachians Basin Style – Geologic Control	PG CH1, CH2 (read - don't worry about details)	1) Field lab Overview - Williamsport to Montandon
TTh	Sept 2,4	EVOLUTION OF DRAINAGE Rainfall-Runoff, Infiltration, Overland Flow Soils, Colluvium Hillslope Hydrology and Linkages Basin Evolution and Experiments	PG pp. 134-147, 173-188 PG CH 4, CH 3 SE pp. 1-19	2) Field lab Union County Headwaters
TTh	Sep 9,11	SURFACE WATER HYDROLOGY Basin Morphology and Networks Discharge, Rating Curves, Gages Flood Hydrograph Hydrograph Attenuation Water Balance – Flood, Drought	PG 5 (147-168) SE pp. 19-32	3) Field lab Roaring Creek – Equipment Installations
TTh	Sep 16,18	FLUVIAL PROCESSES Flow in Alluvial Channels Channel Morphology/Pattern Sediment Entrainment/Transport	PG CH 6 SE pp. 33-56	4) Field lab Roaring Creek – Hydrographs, Gages
TTh	Sep 23,25	FLUVIAL PROCESSES Isotopes/Legacy Sediments Sediment Storage – Sites, etc. Channel Adjustments	PG CH 7	5) Field lab White Deer Creek
TTh	Sep 30, Oct 2	WATER CHEMISTRY Mineral Solubility & Dissolution Rates Isotopes	SE pp. 57-68, 279-284; Other TBA	6) Field lab Water Chemistry – Mine Drainage
TTh	Oct 7,9	WATER CHEMISTRY Precipitation/Acid Precipitation Geology and Buffering Water-Rock-Colluvium Interactions Background/Toxicity	TBA	7) Field lab Water Chemistry – Headwater Streams
S-T	Oct 11-14	Fall Break		
Th	Oct 16	AQUATIC HABITATS & ECOLOGY Freshwater Biology Habitats and Dynamics – relation to fluvial processes & chemistry	SE pp. 163-196, 68-103; Figs. 14.4, 14.6	8) Field lab Roaring Creek – Stream Ecology
TTh	Oct 21,23	AQUATIC HABITATS & ECOLOGY Ecosystem Processes – Organic Matter & Nutrients Spatial and Temporal Variation, RCC	SE pp. 287-316, 255-279	9) Lab Analysis of Aquatic Macroinvertebrates
TTh	Oct 28,30	FLOOD IMPACTS Frequency, Effects, Response, Controls, Recovery Physical, Chemical, & Biological	PG pp. 168-173	10) Field lab Aquatic Habitats

Comment [MEM1]: I just stuck these figures in here to see if you or Craig thought they might be useful conceptually for the start of the course. I will probably use them in either aquatic ecology or the course summary (last day), if they're not used here.

Comment [MEM2]: These figures seem relevant to the material and should be considered for use in lecture, but it's hard to refer to them as assigned reading. Fig. 14.1 shows the area of different terrestrial habitats and varzea inundated in the seasonal flow regime of the Orinoco River floodplain. Fig. 14.5 shows the “flood-pulse” of inundation of riparian vegetation during floods and describes ecological responses.

TTh	Nov 4,6	RIVERINE WETLANDS & ALLUVIAL AQUIFERS Wetland Processes – Ecology & Climate Bank Storage – River Relationships		11) Field lab Montandon Marsh
TTh	Nov 11,13	GROUNDWATER & WATERSHEDS Flowpaths, chemical changes		12) Lab off for installation, etc assignment
TTh	Nov 18,20	ANTHROPOGENIC IMPACTS Dams, Water Withdrawals, Channelization	SE pp. 317-357	13) Field lab Lycoming Creek
T	Nov 25	ANTHROPOGENIC IMPACTS Land-Use Impacts – Logging, Urban, Agriculture, Acid Precipitation		No lab
W-Su	Nov 26-30	Thanksgiving Break		
TTh	Dec 2,4	ANTHROPOGENIC IMPACTS		14) Project Draft
T	Dec 9	SUMMARY & PROJECT PRESENTATIONS		No lab
	Dec 11-18	Final Exam Project TBA		

The final exam (semester project for this course) time and location to be announced by the Registrar. As per university policy, the final exam must be offered only at the time designated by the Registrar.