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’Leary 103

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

Instructors:
Dr. Carl Kirby, 226 O’Leary  Dr. Craig Kochel, 228 O’Leary  Dr. Matthew McTammany, 311 Biology
577-1385, kirby@bucknell.edu  577-3032; kochel@bucknell.edu  577-3975; mmctamma@bucknell.edu
www.facstaff.bucknell.edu/kirby  www.facstaff.bucknell.edu/kochel  www.facstaff.bucknell.edu/mmctamma

Hours: open door or by appt
see web site for times


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.
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
courage 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/ScheduleFs08.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 repellant.

We will provide additional field equipment.

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

<table>
<thead>
<tr>
<th>Day</th>
<th>Dates</th>
<th>Topic</th>
<th>Class Reading Assignment</th>
<th>Lab (field labs in bold)</th>
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</thead>
<tbody>
<tr>
<td>Th</td>
<td>Aug 28</td>
<td>INTRODUCTION Questions – Directions Watershed Origins Tectonics – Appalachians Basin Style – Geologic Control</td>
<td>PG CH1, CH2 (read - don't worry about details)</td>
<td>1) Field lab Overview - Williamsport to Montandon</td>
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<tr>
<td>TTh</td>
<td>Sept 2,4</td>
<td>EVOLUTION OF DRAINAGE Rainfall-Runoff, Infiltration, Overland Flow Soils, Colluvium Hillslope Hydrology and Linkages Basin Evolution and Experiments</td>
<td>PG pp. 134-147, 173-188 PG CH 4, CH 3 SE pp. 1-19</td>
<td>2) Field lab Union County Headwaters</td>
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<td>TTh</td>
<td>Sept 9,11</td>
<td>SURFACE WATER HYDROLOGY Basin Morphology and Networks Discharge, Rating Curves, Gages Flood Hydrograph Hydrograph Attenuation Water Balance – Flood, Drought</td>
<td>PG 5 (147-168) SE pp. 19-32</td>
<td>3) Field lab Roaring Creek – Equipment Installations</td>
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<td>TTh</td>
<td>Sep 16,18</td>
<td>FLUVIAL PROCESSES Flow in Alluvial Channels Channel Morphology/Pattern Sediment Entrainment/Transport</td>
<td>PG CH 6 SE pp. 33-56</td>
<td>4) Field lab Roaring Creek – Hydrographs, Gages</td>
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<td>TTh</td>
<td>Sep 23,25</td>
<td>FLUVIAL PROCESSES Isotopes/Legacy Sediments Sediment Storage – Sites, etc. Channel Adjustments</td>
<td>PG CH 7</td>
<td>5) Field lab White Deer Creek</td>
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<tr>
<td>TTh</td>
<td>Sep 30, Oct 2</td>
<td>WATER CHEMISTRY Mineral Solubility &amp; Dissolution Rates Isotopes</td>
<td>SE pp. 57-68, 279-284; Other TBA</td>
<td>6) Field lab Water Chemistry – Mine Drainage</td>
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<td>TTh</td>
<td>Oct 7,9</td>
<td>WATER CHEMISTRY Precipitation/Acid Precipitation Geology and Buffering Water-Rock-Colluvium Interactions Background/Toxicity</td>
<td>TBA</td>
<td>7) Field lab Water Chemistry – Headwater Streams</td>
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<td>S-T</td>
<td>Oct 11-14</td>
<td>Fall Break</td>
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<td>Th</td>
<td>Oct 16</td>
<td>AQUATIC HABITATS &amp; ECOLOGY Freshwater Biology Habitats and Dynamics – relation to fluvial processes &amp; chemistry</td>
<td>SE pp. 163-196, 68-103; Figs. 14.4, 14.6</td>
<td>8) Field lab Roaring Creek – Stream Ecology</td>
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<tr>
<td>TTh</td>
<td>Oct 28,30</td>
<td>FLOOD IMPACTS Frequency, Effects, Response, Controls, Recovery Physical, Chemical, &amp; Biological</td>
<td>PG pp. 168-173</td>
<td>10) Field lab Aquatic Habitats</td>
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**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.
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<thead>
<tr>
<th>TTh</th>
<th>Nov 4,6</th>
<th>RIVERINE WETLANDS &amp; ALLUVIAL AQUIFERS</th>
<th>11) Field lab Montandon Marsh</th>
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<tr>
<td>TTh</td>
<td>Nov 11,13</td>
<td>GROUNDWATER &amp; WATERSHEDS Flowpaths, chemical changes</td>
<td>12) Lab off for installation, etc assignment</td>
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<td>T</td>
<td>Nov 18,20</td>
<td>ANTHROPOGENIC IMPACTS Dams, Water Withdrawals, Channelization</td>
<td>SE pp. 317-357</td>
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<td>TTh</td>
<td>Nov 25</td>
<td>ANTHROPOGENIC IMPACTS Land-Use Impacts – Logging, Urban, Agriculture, Acid Precipitation</td>
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<td>Nov 26-30</td>
<td>Thanksgiving Break</td>
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<tr>
<td>W-Su</td>
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<td>No lab</td>
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<tr>
<td>TTh</td>
<td>Dec 2,4</td>
<td>ANTHROPOGENIC IMPACTS</td>
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<td>T</td>
<td>Dec 9</td>
<td>SUMMARY &amp; PROJECT PRESENTATIONS</td>
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<td></td>
<td>Dec 11-18</td>
<td>Final Exam Project TBA</td>
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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.