**Watershed Watch – Protecting and Preserving our Environmental Heritage**

**BIOL 444**

Two-week Summer Course
Summer 2006

**OFFERED BY:** Drs. Barrett N. Rock, Natural Resources Department, Alan Baker, Department of Plant Biology, and Elise Sullivan, Department of Microbiology.

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Credits = 4: 12 hrs lecture, 36 hrs laboratory, per week.
Dates: 05/30/06 – 06/10/06;  Place: 131 Rudman Hall
Prerequisites: Course restricted to undeclared Freshmen and Sophomores.

**COURSE DESCRIPTION:**

**BIOL 444 is a freshman or sophomore year Inquiry course.** We are all downstream from someone. In fact, in our increasingly global society, we are all downstream of the entire world. Recent studies show that New Hampshire’s atmosphere receives inputs from the entire northern hemisphere. This inquiry course introduces students to hands-on methods for studying the Merrimack River Watershed over a two-week intensive Summer Research Institute (05/30-06/10, 2006). Designed for entry-level college students, this interdisciplinary course allows students to use a wide range scientific methods, including water quality testing and satellite imagery analysis to study both the aquatic and terrestrial parts of an entire watershed. By studying the watershed, students learn the exciting aspects of scientific fieldwork and data analysis, along with human and societal impacts on the watershed. Extensive hands-on experiences are offered (highlighted by a three-day field outing in the White Mountains of New Hampshire) to stimulate inquiry-based learning, where students are actively involved in answering real questions that lead to an improved understanding of 1) the role watersheds play in natural systems and 2) the societal impacts on and benefits derived from watersheds.

*Watershed Watch* has a Biology course prefix, because much of its subject matter and emphasis are on the aquatic and terrestrial biological aspects of a watershed. However, the course will be highly interdisciplinary, focusing on geologic, hydrologic, and atmospheric forces, along with the biologic processes responsible for the current status of the Merrimack drainage basin. *Watershed Watch* will also include a strong human impact perspective, documenting both the core values of watersheds to society, as well as human impacts on the Merrimack watershed over the past several centuries. The course fulfills a Category 3 General Education Requirement, as is appropriate for its problem-based focus on specific scientific and technological content.
FORMAT
The course format will integrate field work, laboratory analyses, discussion, individual research, extensive writing and oral presentation, as well as periodic lectures on key topics by the instructors to serve the students’ “knowledge needs”, and guest presentations. Each student will conduct an individualized inquiry (a research investigation) on a relevant topic, and will present the formalized results of their inquiry in written and oral form at the end of the two-week period.

READINGS


Grading: Course grades are based on components below. The grade scale is as follows: 100-90% (A, A-); 89.9-80% (B+ to B-); 79.9-70% (C+ to C-); 69.9-60% (D+ to D-).

<table>
<thead>
<tr>
<th>Component</th>
<th>Possible points</th>
<th>Date</th>
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<tbody>
<tr>
<td>Journal content</td>
<td>100</td>
<td>June 3, 10</td>
</tr>
<tr>
<td>Participation</td>
<td>100</td>
<td>Over two-week period</td>
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<tr>
<td>Research project</td>
<td></td>
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<tr>
<td>Proposal</td>
<td>100</td>
<td>June 3</td>
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<tr>
<td>Written Report</td>
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<td>June 10</td>
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<tr>
<td>Oral Presentation</td>
<td>100</td>
<td>June 10</td>
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<tr>
<td>Total</td>
<td>500</td>
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Journals: Each student will be expected to keep a daily journal during the course of the *Watershed Watch* Program. The journal will contain lecture notes; summaries of key discussions, Case Studies presented, and assigned readings; laboratory and field notes; drawings, data sets, data analyses, and a documentation of the development of the student’s research project. Students will be expected to spend a minimum of an hour each day working on their journal entries. Time will be allocated on a daily basis for making journal entries.

Grading of the journal will be based upon the following:

The completeness of the written material and drawings
Effort and thoughtfulness
Conciseness and clarity
Appropriate content
On-time submission

A maximum of 100 total points can be earned for student journaling during the two-week Watershed Watch Summer Research Institute. Journals will be evaluated on a weekly basis.

**Participation.** Students will be expected to participate fully in this hands-on, inquiry-based program. The two-week program will be intense and exciting, providing entry-level students the opportunity to experience authentic science in a community of active learners. Each student will participate as their interest level and willingness allow. All students are expected to contribute actively to discussions of assigned readings and formal course presentations, and to be prepared for this participation by having done the assigned readings. Students will have daily writing assignments, to be completed in their journals and summarized in the form of a research paper and a formal presentation to the rest of the class.

**Research projects:** Each student will be expected to participate in a series of scheduled research projects evaluating both the terrestrial components of watersheds (land cover types, changing land use, chemical input of cover types to soils and streams, etc.) and aquatic components (water chemistry, the impact of urban landscapes on water quality, effects of water impoundments, etc.). These scheduled research projects will serve as models for student-designed research projects. Remote sensing tools (satellite imagery and data sets, GPS, and GIS programs) will provide the spatial and temporal (change-over-time) contexts for both the course-based research projects and the student-generated research projects. Students will design their own research projects, working in small groups on both types of research projects. A formal written research proposal will be required which outlines each student-generated research project, along with a written final report on each student-generated research project. Oral presentations by the students (in the form of PowerPoint presentations) outlining their project and their findings will also be required.

**Daily schedule:** Attached is an outline of topics to be covered on a daily basis over the two-week Watershed Watch program. In addition to the daily activities, evening lectures and discussions will be held. A three-day period (June 2\textsuperscript{nd}, 3\textsuperscript{rd}, and 4\textsuperscript{th}) will be spent conducting fieldwork on Mount Moosilauke in the White Mountains.