UNIVERSITY OF VERMONT
RUBENSTEIN SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

ENSC 201 – The Recovery and Restoration of Altered Ecosystems

Course Syllabus, Spring 2011

Lead Instructor: Dr. Bill Keeton
Associate Professor of Forest Ecology and Forestry
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Office Hours (Hills 209): TTH 9:30 – 11:30 am
Other times by appointment.

Co-Instructor: Anthony McInnis
Ph.D. Candidate
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Office Hours (Johnson): F: 11:30-1:00
Other times by appointment.

Teaching Assistant: Mike Olson
M.Sc. Candidate
Meetings by appointment
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Meeting Time and Place:

Monday, 1:50 -4:55 pm, Jeffords Hall, Room 12
Wednesday 10:40 – 11:30 pm, Billings/MLK Lecture Hall
Friday 10:40 – 11:30 pm, Billings/MLK Lecture Hall

As the semester progresses and weather permits, Monday classes will increasingly be focused on hands-on activities in the field

Class web site: ENSC 201 on blackboard

Course Description:

This course will provide students with an understanding of the role of stresses and disturbances in aquatic and terrestrial ecosystems and natural processes of recovery. Students will be introduced to the practices used to modify, restore, and remediate ecosystems altered by human

activities and will develop a restoration program for a nearby, altered ecosystem that contains both land and water components.

Upon successful completion of this course, you should be able to:

1. Understand how various stresses and disturbances reconfigure aquatic and terrestrial ecosystems.

2. Understand the range of natural processes that are linked to ecosystem recovery.

3. Have a working knowledge of the variety of management practices used to modify, restore or remediate altered ecosystems.

4. Have developed a plan for a real-world restoration project.

5. Have implemented some restoration practices in the field.

Readings

Selections from various sources will be used as readings. Sources will include ecology texts, the journal literature *(Restoration Ecology, Environmental Management, Journal of Environmental Quality,* and others), restoration engineering handbooks, other publications, and the internet. Readings will be made available through links on the class web site or be placed on reserved in Bailey-Howe Library.

Course Requirements:

Regular attendance is expected. Please note the following University policy on religious holidays and let an instructor know if you need to be absent for this reason during the semester.

Students have the right to practice the religion of their choice. Each semester students should submit in writing to their instructors by the end of the second full week of classes their documented religious holiday schedule for the semester. Faculty must permit students who miss work for the purpose of religious observance to make up this work.

If you require special accommodations or anticipate absences (student athletes, ROTC, etc..), please let an instructor know at your earliest convenience.

Grading:	Mid-term exam	25%
	Final Exam	25%
	Classroom Activities and Participation, Weekly Freewrites, Homework Assignments	25%
	Restoration Project	25%

Restoration ecology is an applied discipline, best learned by hands-on activities and practice. Therefore, class attendance and participation are essential for mastering the material. It is not realistic to expect to do well in this class without participating in the classroom activities.

Dress appropriately for field trips/lab periods. Be aware that they weather can be unpredictable, and you must use your informed judgement on how to dress/prepare appropriately for field lectures or field work. If you are not properly prepared for field work and are unable to fully participate because you did not dress/prepare properly, you will lose participation grades.

Additional information about each homework assignment and its due date will be provided in class. Students will be expected to turn in a free write on the readings that are assigned each week. Assignments submitted after the due date will be penalized one letter grade per day except in extreme unusual circumstances (advanced arrangement required).

The restoration project is a service-learning activity and the capstone piece of the course. It will involve working on a restoration plan for a specific site with significant degradation and implementing appropriate pieces of that restoration in the field.

Beginning in mid March, most Monday laboratory sessions will focus on the project site and will extend for the entire 3-hour period. The restoration project will be conducted in small groups. The final products will include both a group written report and an oral presentation to the class at the end of the semester.

Attendance for the field lab on May 2nd is critical to implement the restoration plan. THERE WILL BE NO EXCUSED ABSENCES THIS DAY. PLEASE PLAN AHEAD.

Academic Integrity:

We expect all students to adhere to UVM's Code of Academic Integrity (http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf). Violations are serious offenses and can result in expulsion from the University. Although we encourage all students to discuss material and ideas freely among yourselves and with the instructors, all work submitted for grading must be strictly your own.

Course Outline and Schedule:

Topic	**Date**
Introduction: Restoration Ecology – the acid test of ecological understanding • Terms and context • The need for restoration • Restoration as experimentation • Ecosystem context for restoration	Jan 19-24
Ecosystem dynamics – applying ecological knowledge to restoration • Stability, resilience and change • Biological legacies, disturbance ecology, and succession • Natural variability	Jan 26-28

- Restoration and climate change

Mine reclamation and remediation • Mining primer • What to expect/Scale • Physical, Chemical & Biological/Ecological effects • Restoration Methods & Case Studies	Jan 31-Feb 2
Restoration in terrestrial ecosystems • Silvics and silviculture (Lab: Feb 7th) • Restoring soil quality • Fire Restoration • Restoration of old growth forests • Restoration of high biomass/high carbon forests • Tropical reforestation	Feb 4-23
Silvics/Silviculture Lab (Jericho/snowshoes)	Feb 7
Introduction to the class project	Feb 25
President's Day Holiday (no class)	**Feb 21**
Mid-term exam	**Feb 28**
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Settings Goals & Objectives	March 2
Spring Break (no class)	**Mar 7-11**
Restoration in aquatic ecosystems • Common problems and the need for restoration of lakes, wetlands, and estuaries • A systems context for defining restoration objectives and achievable outcomes • Controversies about restoring wetland functions • Managing colonization and regeneration processes • Restoring wetland and coastal wetlands – Hurricanes, Oil Spills	Mar 2-19
Control of invasive species	Mar 18
Invasive Species Lab/Field Trip	March 21
River/Riparian Restoration	March 23-25
Riparian Lab	March 28

Stream processes and riparian forests • River continuum concept and other conceptual models • Watershed dynamics, stream geomorphology, Lane's Balance • Restoring fish and other aquatic biota • Bank protection, hard and soft engineering • Riparian ecology; buffers and their functions		Mar 30-Apr 6
Plant propagation field trip		Apr 4
Project monitoring and adaptive management		Apr 8
1st site visit field trip/tour		Apr 11
Special topics to be determined		Apr 13-15
2nd site visit field trip, group project planning		Apr 18
Marine Restoration		Apr 20
Prairie Restoration		Apr 22
Final Group Project planning, site visit		Apr 25
Group presentations		**Apr 27 & 29**
Project work day		**May 2**
Final class – wrap up, course evaluations		May 4
Final Exam	**May 10th, 08:00 – 10:15 AM,**	**Billings/MLK**