

MPA in Environmental Science and Policy

ENV U6110: Ecology, Biodiversity & Land Use

Summer Semester 2009

Lectures: Fri 9:00am-12pm; Room 410 IAB

Labs: All GIS Labs: SIPA computer room 510A IAB, other labs 407 IAB

Session A: 1-3:30 PM

Session B: 3:30-6 PM

Instructor:

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Course Outline

Objective

This course enables understanding and learning about three distinct topics:

- 1) Importance of biodiversity and the threats to it
- 2) Basic ecological principles related to our biotic resources and how they interact with abiotic resources
- 3) How ecology can inform land use decisions and applied management strategies related to these resources

Towards that end, this course covers topics ranging from general ecology and conservation biology to sustainable development. It uses a cross disciplinary approach to understanding the nature of ecology and biological conservation, as well as the social, philosophical and economic dimensions of ecology and land use strategies. For the biodiversity portion of the class the biological principles relevant to the conservation of biodiversity at the genetic, population, community, and landscape levels will be examined. For the ecological portion of this course, we will focus on discovery of how abiotic and biotic resources interact and depend upon each other as well as basic and advanced ecology and evolutionary processes. The land use portion of this course will focus on applications and problem-solving in human land use

ranging from agriculture to urban development. The one technique to which we will give particular attention is geographic information systems (GIS). Students will gain a basic, practical understanding of GIS applications using ArcView GIS 9.3.

The specific objectives of the course are:

- To define an interdisciplinary approach to address environmental problems.
- To gain an understanding of the ways in which biology can contribute to the solution of the kinds of conservation and ecological problems now (or soon to be) facing human society.
- To develop skills needed to recognize and analyze the relationships among the scientific, technological, societal and economic issues that shape environmental research and decision-making.
- To prepare environmental management and policy professionals to use research in a data based decision-making process that is firmly grounded in current scientific knowledge and methodology.

Course Structure

Each section of the course includes the examination of key questions and concepts that will be illustrated by lectures, class discussion, required and supplemental readings, and associated websites.

Course lectures intend to present a broad overview of the issues in ecology, sustainable development, and land use affecting individuals, populations and the landscape. I encourage individuals in class to contribute to discussions in the lecture period. Students will be expected to do the assigned reading before class and be prepared to discuss the readings in class.

The class will meet for one lecture period (3 hrs) and one lab (2.5 hrs) per week. Attendance to lecture is highly recommended, but not mandatory. Attendance to lab is required. You will not be able to make up labs unless you request permission from both the professor and TAs beforehand.

Readings and Text:

Students will be expected to do a significant amount of reading for the course and to contribute to discussions on readings. The principal texts for this course are:

- "Ecosystems and Human Well Being" (Biodiversity Synthesis) by Millennium Ecosystem Assessment (2005, found as pdf on courseworks).
- "Applied Ecology & Environmental Management (Edward Newman, Blackwell Science 2nd Edition)
- Ecology & Ecosystem Conservation (O. Schmitz, 2007, Island Press)
- Selected chapters from the "Ecology" textbook (found as pdf on courseworks) by Begon et al. (2006)
- "Introduction to ArcGIS" by North Carolina State University GIS Research and Teaching Program and the National Park Service. Available for purchase from SIPA Express Printing office (4th Floor IAB). Also available on Courseworks as a pdf.

You can purchase textbooks online or in the Columbia bookstore. Scientific articles are available on the CourseWorks website, or the citation is listed and you may download them individually.

Grades:

Participation: 10%

GIS Lab Assignments: 20%

Restoration Ecology Paper: 50%

Ecology Lab Assignments: 20%

Participation (10%): Each week we will discuss the assigned readings in class. You should come to class every Friday having read the material to be discussed and be prepared to contribute to the discussion of it. Each week you should post one thoughtful comment or question about the reading on the Courseworks "Discussion" page before **8am Friday**. This grade is an easy 10 points toward your final score. If you read the papers and diligently participate in class and post questions to the discussion page, you'll get the full 10 points. If you only sometimes post discussion questions and only occasionally speak up in class, you'll get 5 points. If I never hear from you in class and you clearly aren't doing the reading, zero points (the difference between an A and a B). I also reserve the right to use exceptionally strong/weak participation as a means to make decisions on borderline final grades (i.e. decide between a B+ and A-).

GIS Lab Assignments (20%): The majority of lab activities should be completed during lab time. Attendance to labs is considered mandatory except under extreme circumstances since complementary material in addition to the lab assignments will be presented and included in exams or assignments. Please bring a calculator to all labs.

Humans and the Environment Restoration Project (50%): 10-15 pgs (excluding figures) single spaced final term paper on restoration project. To be completed in groups of four students and due Aug 7th at 8am- put in dropbox on Courseworks (no exceptions)

Ecology (i.e. non computer) Labs/Assignments (20%): There are 3 ecology lab assignments. The first assignment is a Threat Assessment homework assignment which will be given in week 2 as homework (due June 19th in lab). The second assignment is a Threat Assessment that you will complete as a unique component of your restoration project (graded apart from your restoration project). This should be handed in groups on July 10th. The last assignment is the Palms & Parrots lab (to be completed by individuals) which will be handed in on July 2nd.

Classroom Policies:

Punctuality: Please be on time to lecture and for field trips. If you arrive late to class, please wait until the break to find a seat so as not to disturb the rest of the class during lecture time (you may quietly sit by the door). For field trips, please realize that we have quite a large group and therefore it may sometimes be difficult to hear the tour guides unless everyone is quiet.

For field trips, we will leave promptly at the departure time and due to traffic and other constraints of the time required to attend field trips, are not able to wait for you if you are tardy.

Attendance: Attendance of lectures is strongly encouraged since complementary material, in addition to required readings, will be presented in lectures and included in examinations/discussions. Discussion periods will also require in-class participation from all students and so failure to attend lectures may affect your final grade (see above).

Late Policy: Ten percent (10%) of the grade for any assignment will be deducted when assignments are handed in late. This policy is in effect no matter if it is one day late or 3 weeks late. The absolute LAST DAY to hand in ANY WORK for a grade will be August 7th. NO exceptions.

Plagiarism or Cheating: *I am extremely strict on plagiarism. DO NOT PLAGIARIZE. YOU RECEIVE AN AUTOMATIC "F" IN THE COURSE IF YOU ARE CAUGHT PLAGIARIZING IN ANY WAY.* Columbia has always believed that learning to write effectively and think critically are some of the most important goals a college student can achieve. Your assignments and papers play a major role in course performance, but more important, they play a major role in intellectual development. Every year there are instances in which students attempt to submit the work of other people as their own. Because intellectual integrity is the hallmark of educational institutions, academic **dishonesty is one of the most serious offenses that a student can commit at Columbia.** It is also punishable by suspension or dismissal from the University.

Logistical Issues:

Labs: We select students to be in Lab Session A and B completely at random. Your assignment to the A or B lab is considered final. However, at the mid-semester point (July 10th), we will switch (if you are in the earlier lab, you switch to the later lab). Due to the large number of students in the course (and the somewhat undesirable nature of Lab B on a Friday afternoon) we do not allow switching from Lab A to B, or vice versa, except under extreme circumstances, and only with prior approval from the professor AND TAs.

Although we do not take attendance during labs we do consider attendance mandatory. This is because we often change lab assignments or instructions as circumstances arise in lab (ex. a time constraint, a glitch in software, bonus questions). We also provide additional lecture material in labs that you will not be able to receive except by attending the labs. If you must miss a lab, you are responsible for all lab work and this must be submitted at the same time as other students or they will be considered late (see policy above). Labs begin at 1:30 (Lab A) and 3:30 (Lab B). Please do not show up to the computer room at 12pm expecting to begin your lab early as this is a time when the TAs may be preparing lab setups on the computers.

Courseworks: Assigned reading in the form of pdf documents are available under the "shared files" folder under "Class Files" in courseworks. If you choose to view the pdf version of the material on courseworks, please be aware that, at times, courseworks will give you an error indicating that the file you are trying to open either does not exist, or is corrupt. This often happens during heavy computer usage times and is a known bug in Courseworks. We

recommend logging out of Courseworks and trying again at another time. 99% of the time, the file is actually fine and will properly open if you attempt to open it at another time.

Classroom Etiquette:

This program is meant to train you to become professionals in the field of public administration. As such, we present you with both academic and practical training. Much of the practical training focuses on effective communication, public speaking, writing memos, presentation, selling ideas, etc. In addition, we aim to give you guidance on professional etiquette that is expected of senior management officials. This means that we expect you to conduct yourself as a professional during class time. Just as you would not come to a professional meeting late, I expect that you will also come to class on time. Professionalism also extends to how you behave in front of your peers or boss. **It is for this reason that I ask that do not bring electronic devices, including laptops, cell phones, palm pilots, etc., to class, much as professionals in the real world refrain from routinely using them during professional meetings.** Checking email, surfing the web, or writing papers for other classes during lecture time is distracting to other students and is also discourteous. All lecture notes are posted online so there is not a pressing need for copious amounts of note taking in class.

SYLLABUS SUMMER 2009 Ecology & Biodiversity

Class	Date	Lecture	Lecturer	Lab	Readings
1a	May 29	Introduction to Course, Energy Flow through Ecosystems	KM	GIS 1	Pgs 7-47 Applied Ecology textbook
1b		Carbon Cycle & Climate Change			Thomas et al. 2004. Extinction Risk from Climate Change. Nature 427:145-149.
2a	June 5	Flow of Matter through Ecosystems (C/N/Ph)	KM	GIS 2	Ch 18 Ecology Textbook (pgs 525-549) pdf
2b		Threat Assessment (Threat assessment HW)			Pgs 92-125 Ecology & Ecosystem Conservation textbook
3a	June 12	Restoration Ecology	Matt Palmer	Randall's Island Field Trip	Pgs 52-78 Applied Ecology textbook
3b		Tropical Agroforestry	Generose Nziguheba		Agroforestry and Biodiversity Conservation in Tropical Landscapes: Intro Chapter Pg 1-11 (e-book)
4a	June 19	What is Biodiversity? Why is it important? Threats to biodiversity	KM	GIS 3	Pages 1-18 in Ecosystems and Human Well-Being-Biodiversity Synthesis (pdf)
4b		Ecosystem Services & Functions			Costanza et al. 1997. The value of the world's ecosystem services and natural capital. Nature 387:253-260 (pdf)
5a	June 26	Applied Population Dynamics	KM	Palms & Parrots Lab	Pgs 45-68 in Ecology & Ecosystem Conservation textbook
5b		Pest Control and Harvest management		<i>Lab due July 2nd</i>	Pgs 205-244 in Applied Ecology textbook
6	July 2	NO LECTURE (July 3 is a holiday)		Indian Point Field Trip	

7a	July 10	Tools in Species & Population Conservation	Martin Mendez	GIS 4	DeSalle, R., Amato, G. 2004. The expansion of conservation genetics. Nature Review Genetics 5:702-713 (pdf)
7b		Conservation Genetics		<i>Threat Assessment Lab Due</i>	TBA
8a	July 17	Land Use Geographic Distribution	Lerner-Lam	GIS 5	The global challenge: disaster risk, poverty and climate change CH 1 (pdf)
8b		and Natural Hazards			Global disaster risk: patterns, trends and drivers CH 2 (pdf)
9a	July 24	Habitat Fragmentation and Ecosystem Loss	KM	GIS Lab 6	pg 289-310 Applied Ecology text
9b		Biophysical Interactions			Salafsky et al. 1999. Threat Reduction Assessment: a Practical and Cost-Effective Approach to Evaluating Conservation and Development Project 13: 830-841 (pdf).
10a	July 31	Bioenergy	Miquel Pinedo	Recycling Plant Field Trip	5 papers (pdfs) listed on Courseworks under Bioenergy folder
10b		Bioenergy			
11a	Aug 7	Smart Growth	James Connolly	Practice Final Project Presentations	Wackernagel, M. et al. 2006. The Ecological Footprint of cities and regions: comparing resource availability with resource demand. Environment and Urbanization 18: 103-112.
11b		Urban Land Use		<i>Final papers due</i>	TBA
12	Aug 10	Restoration Project Presentations (9am-12pm, finish from 1-3pm)	KM		POTLUCK: If your last name begins with A-H: Drinks I-P: Entree R-Z Dessert

