

E528 Forest Ecology and Management



School of Public and Environmental Affairs

Indiana University

Bloomington

**Fall Semester
2007**

Lecture and Discussion

5:30-6:45 p.m. Monday
5:30-6:45 p.m. Wednesday

SPEA 273

Field/Laboratory

1:00 - 5:00 p.m. Friday

Meet at SPEA back door to depart for field trip
or in SPEA 375 for lab work

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<u>Date</u>	<u>Day</u>	<u>Topic or Activity</u>	<u>Reading</u>	<u>Field or Lab Topic</u>	<u>Location</u>
27 August	M	Introduction/Overview Scientific Writing	Ch. 1		
29 August	W	Forest Inventory: Taxonomy Forest Inventory: Temporal			
31 August	F			Getting Started Field Equipment Species Identification	Campus
3 September	M	Forest Inventory: Spatial	Ch. 2, 3		
5 September	W	Ecosystem Development Old Field (Quiz)*	Ch. 17		
7 September	F			Old Field	Kent Farm
10 September	M	Forest Inventory: Quantity			
12 September	W	Forest Inventory: What			
14 September	F			Old Field Laboratory	SPEA 375
17 September	M	Primary Productivity	Ch. 4,5,6		
19 September	W	Physical Environment <i>Old Field Data Out</i> Young Deciduous Forest (Quiz)	Ch. 7,8,9,10		
21 September	F			Young Deciduous Forest	IU Teaching and Research Preserve, Griffy Lake
24 September	M	Competition	Ch. 15		
26 September	W	<i>Young Forest Data Out</i> Forest Management-Pines Pine Plantation (Quiz)*			
28 September	F			Pine Plantation	Dutch Ridge, Hoosier National Forest
1 October	M	Disturbance	Ch. 12,14,16		
3 October	W	Old Field Report Due <i>Pine Plantation Data Out</i> Forest Management-Harvests Silvicultural Techniques (Quiz)*	Ch. 6,13		
5 October	F			Silvicultural Techniques	Morgan-Monroe State Forest
8 October	M	Forest Products			
10 October	W	Young Forests Report Due <i>Silviculture Data Out</i> Silviculture Timber Harvest			
12 October	F			Timber Harvest	Yellowwood State Forest
15 October	M	Guest Lecture: State Forests			

<u>Date</u>	<u>Day</u>	<u>Topic/Activity</u>	<u>Reading</u>	<u>Field/Lab</u>	<u>Location</u>
17 October	W	Pine Plantation Report Due Old Forests Old Forests (Quiz)*			
19 October	F			Old Deciduous Forest	Hoot Woods
22 October	M	Carbon Dynamics	Ch. 18		
24 October	W	Silvicultural Techniques Report Due <i>Hoot Woods Data Out</i> Decomposition			
26 October	F			Old Deciduous Forest	Pioneer Mothers Memorial Forest
29 October	M	Start Decomposition Experiment			SPEA 375
31 October	W	Nutrient Cycles Carbon Dynamics (Quiz)*	Ch. 19		
2 November	F			Carbon Dynamics	Morgan-Monroe State Forest
5 November	M	Nutrient Cycles			
7 November	W	Old Forest Report Due <i>Carbon Dynamics Data Out</i> Soils Laboratory (Quiz)			
9 November	F			Soils Laboratory	SPEA 375
12 November	M	Forest Soils <i>Soils Data Out</i>	Ch. 11		
14 November	W	Forest Soils Decomposition Experiment (Quiz)*			
16 November	F			Decomposition Experiment	SPEA 375
19 November	M	<i>Decomposition Data Out</i> Tropical Forests			
21 November	W	Thanksgiving Break			Cancun?
23 November	F	Thanksgiving Break			
26 November	M	Forests of the World Carbon Dynamics Report Due	Ch. 20, 21, 22		
28 November	W	Soils Report Due Future of Forests			
30 November	F	Open Date			
3 December	M	Decomposition Report Due Issues in Forest Management and Policy			
5 December	W	Issues in Forest Management and Policy			
7 December	F	Final Presentation/Debate Option			SPEA 273
10 December	M	Open Date			
12 December	W	Open Date			
14 December	F	Final Exam Option			

SCHEDULE

The schedule of field trips and laboratory exercises is given above. We will try to follow this schedule as closely as possible. However, the weather does not always conform to expectations and typically some changes in the schedule will be necessary. Accordingly, one week is scheduled "open" to allow for "rain days." Revised schedules will follow the original schedule as closely as possible and will be distributed as needed.

Even if some of the scheduled events require re-arrangement, the general pattern will remain the same.

- (1) Data from any field or lab exercise should be collected, compiled, and distributed to the class no later than the next Wednesday following the previous Friday's field or lab work.
- (2) All reports are due two weeks from the day the data are distributed.

Generally, Monday evenings will be used for lecture topics. Wednesday evenings will be used for some lecture topics, student reports, introduction to the next field or laboratory exercise, discussion and quizzes. Friday afternoons will be used for field trips and laboratory work.

COURSE OBJECTIVES

Learning how to ask and answer relevant ecological questions through a series of field and laboratory exercises is a primary objective of this course. Proper field and laboratory techniques, good experimental design, careful observation and data collection, and appropriate analysis will be emphasized. This course has been designed to emphasize field and laboratory experiences.

A second important objective is learning how to organize, analyze and present data, to arrive at sound conclusions supported by appropriate literature sources, and to communicate that information clearly and effectively.

A third important objective is learning some specific information about forests, forest ecology, and forest management. Because of limitations in time and space, the course will focus upon mixed deciduous forests in southern Indiana. However, there is much to learn about the ecology and management of these forests. And, the concepts and methods we will examine are readily transferable to other forest ecosystems.

Ecological questions often are large scale; thus, the time dimensions are days to several years and the spatial dimensions are local to regional or larger. Consequently, most ecological research requires from several months to several years. Obviously in one semester we cannot operate on these dimensions and must adjust our projects accordingly. Also, the study of some aspects of forest ecology, particularly involving animals, requires equipment, methodologies, or time periods that greatly restrict their inclusion in a structured class format.

All students in this course are expected to:

1. read the Field and Laboratory Manual carefully and always be prepared for each exercise,
2. do his or her share of the field and laboratory work,
3. be conscientious in collecting, reporting, and exchanging data in a careful and timely manner,
4. undertake appropriate and thorough data analysis,
5. read and use appropriate background literature, and
6. present results and conclusions in concise presentations and carefully written reports
7. take a comprehensive final examination, or participate in a final presentation/debate.

PREREQUISITES

Both a general ecology course and an introductory statistics course are recommended as prerequisites for this course. Neither are absolute requirements, provided that you are willing to do some extra background reading.

Being able to operate a personal computer is essential. In particular, you should be familiar with Excel, SPSS or SAS, Word, and PowerPoint.

FIELD TRIPS

1. Indiana University will provide all transportation. We will use 4WD trucks from the I.U. Motor Pool which are well-suited for our purposes. In general, the use of private vehicles will not be permitted.
2. For all field trips the trucks will depart from the back door of the SPEA building shortly after the beginning of the class period. If you are late in arriving for class, you probably will be left behind. We always will try to leave the field sites in time to be back on campus by the end of the class period. A signal will be given at the time you should stop your field work and promptly return to the trucks.
3. We will go to the field at the scheduled times unless there is heavy rain or a storm wherein field work would be difficult. If there is heavy rain at the beginning of the field period, and continued rain seems likely, the exercise will be postponed until the next week. If there is only light rain and clearing seems likely, the exercise will proceed.
4. Much of the course involves field work. Most of the time field work is quite enjoyable but it can be real torture if you are not properly equipped and prepared.
 - Good, sturdy shoes or boots are essential because some of the terrain is quite rugged. For the Kent Farm trip, wear long pants to protect your legs from brambles.
 - If light rain is occurring or seems possible, bring a poncho or raincoat, or be prepared to get wet.
 - Everyone should bring a clipboard or field notebook of some type.
 - A small day pack can be quite useful.
 - A water cooler and ice chest will be provided when the weather is warm. Bring along whatever drinks you would like.
 - If you are especially sensitive to insect stings, poison ivy, or have other medical concerns, please let the instructor know.
5. Both field and laboratory equipment will be issued to teams. Each team is responsible for checking equipment out, being sure they have the appropriate equipment, using it correctly, and returning equipment in good order.
6. Being prepared to undertake the field exercise is essential. Be sure to read through the instructions carefully **prior** to going to the field, but also be sure to bring your Laboratory and Field Manual and Tree Guide to the field.

REQUIRED AND RECOMMENDED MATERIALS

Field and Laboratory Manual -- Required

The Field and Laboratory Manual is produced locally by photocopying. The contents include:

1. general instructions about course operation and policies,
2. descriptions of field and laboratory techniques,
3. specific information about and instructions for each field or laboratory exercise,
4. suggestions about data analysis,
5. background information and useful references, and
6. blank data sheets.

Field Guide -- Required

One of the following books or a tree field guide of equivalent quality.

101 Trees of Indiana: A Field Guide. Indiana University Press. Bloomington.

The Audubon Society Field Guide to North American Trees - Eastern Region. Alfred Knopf. New York.

A Field Guide to Trees and Shrubs. The Peterson Field Guide Series. Houghton Mifflin. Boston.

Textbook -- Required

Barnes, B.V., D.R. Zak, S.R. Denton, and S.H. Spurr. 1998. *Forest Ecology*, 4th Edition. John Wiley and Sons. New York.

Highly Recommended

Small day pack
Boots or sturdy shoes
Clipboard or field notebook

TEAMS

All exercises are designed to be carried out by small teams. Teams consist of two to four persons who will work together throughout the semester. A sign-up sheet will be circulated during an early class. All teams are responsible for their share of field and laboratory work, data collection, and data compilation.

Each team should select one topic from the list below.

For the selected topic the team will have responsibility for data compilation and distribution. Upon completion of the field/lab exercise, this team will obtain data sheets from all other teams, compile these data, and distribute back to all other class members. On the report due date, the team will make a presentation on their topic. Because the data for the Carbon Dynamics and Soil Analysis exercises are quite different, the instructor will compile and discuss those data.

PARTICIPATION AND COMMUNICATION

Participation

Everyone is expected to participate fully in all field and laboratory exercises. If you cannot participate in an exercise, please inform the instructor at the earliest opportunity. All class members are expected to participate in all class discussions.

Background Readings and Other Materials

Each exercise has a list of specific background readings in the appropriate section of the Field and Laboratory Manual. These readings are available both digitally and on paper from the Reserves Section of the Business/ SPEA Library. Topographic maps and aerial photographs of each field site are also available from Reserves. Reading assignments from Barnes et al. are noted for each topic. An excellent background document (*Silvics of North America*) is available on-line at http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm.

Presentations

On the date each report is due, the appropriate team will present their results and conclusions about the questions being addressed and lead a discussion of their analysis. Presentations should be about 30 minutes in length and should encourage discussion. Power Point presentations are encouraged but not required. A computer projector is available.

Reports

Data will be distributed no later than the Wednesday following the previous Friday's field or laboratory exercise. Reports will be due two weeks after the data for a given exercise have been distributed. The format of reports must follow the instructions for preparation of reports and use specific information from each exercise, as discussed in the Field and Laboratory Manual. Each student is expected to prepare her or his reports independently.

You may submit any three reports but you must select at least one from each group:

Group One

1. Old Field
2. Young Deciduous Forest

Group Two

3. Pine Plantation
4. Silvicultural Techniques

Group Three

5. Mature Deciduous Forests
6. Decomposition Experiment

EVALUATION

Because both individual and team participation are required, evaluation of performance will consider both using a point system.

Team Points

Team points will be given to each team member for careful data compilation and distribution, effective presentation, and stimulating discussion. All team members will receive the same score for the team's activities.

Reports

Individual points will be given for each of three reports submitted. Sound scientific content is essential. Also, attention should be given to organization, format, graphics, and writing style.

Reports submitted after their due date will be penalized 10 points per each 24 hours the report is late.

Quizzes

Being prepared to undertake the field and lab work is essential. Unannounced short quizzes may be given on Wednesday evenings to stimulate preparation for the exercise on the following Friday.

Final Exam/Presentation Options

Sometimes during past years, a final examination has been required. Some students expressed a strong preference for a presentation /debate. Other years, a presentation/debate has been used to evaluate overall performance. Some students expressed a strong preference for having a final exam. So, students may have their choice.

- For the final examination option, a comprehensive final exam will cover lectures, assigned readings, and presentations. The exam will use a short-answer format. An example of the exam will be distributed prior to the final exam date.
- For the presentation/debate option, there must be at least eight students who elect this option; otherwise, it will not be offered. Students may use the same teams as for previous work, or may re-organize. A presentation/debate team must have at least two persons and not more than four. All persons in the team will receive the same grade for the presentation/debate. Pairs of teams will work with the instructors to develop current, meaningful topics relevant to forest ecology and management. One team will be proponents of the topic, while the other team will take an opposing perspective. Assignment of the pro/con positions will be done using a binary decision tool (i.e., coin toss). Written evaluations will be done by the other members of the class.

Students may choose either option. However, the choice must be made no later than November 5th.

Questions

If you have questions about the grading of a report, quiz, or the final exam, please discuss them with an instructor within a few days of when the report, quiz, or exam is returned to you, not weeks later. Reports not picked up within 30 days of their return date will be discarded.

Course Grade

Your course grade will be calculated using the following point distribution.

<u>Type of Points</u>	<u>Maximum Score</u>	<u>Percentage</u>
Team	150	15
Report 1	200	20
Report 2	200	20
Report 3	200	20
Quizzes Option	(100)	(10)
Final Exam Option	(150)	(15)
Presentation/Debate Option	<u>(150)</u>	<u>(15)</u>
Total	1000	100%

Your percentage grade for the course will be calculated using your total score and a maximum possible points.